

# **High Speed Rail (Crewe – Manchester)**

## **Background information and data**

### **Land quality**

BID LQ-002-0MA01

MA01: Hough to Walley's Green

Land quality baseline data

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Department  
for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

High Speed Two (HS2) Limited,  
Two Snowhill  
Snow Hill Queensway  
Birmingham B4 6GA

Telephone: 08081 434 434

General email enquiries: [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk)

Website: [www.hs2.org.uk](http://www.hs2.org.uk)

A report prepared for High Speed Two (HS2) Limited:

**ARUP+** ERM | FOSTER + PARTNERS | JACOBS  
RAMBOLL | TYPSPA | COSTAIN

**MWJV**

Mott MacDonald | WSP

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# 1 Introduction

- 1.1.1 This report presents land quality baseline data highlighting areas of contamination originating from historical and current land use, and mineral and geoconservation resources in the study area.
- 1.1.2 Baseline data have been collected for the Proposed Scheme in relation to the Hough to Walley's Green area. The baseline data in this report has been used to inform the land quality assessment which is set out in the Environmental Statement (see Volume 5, Land quality report, Appendix: LQ-001-0MA01)<sup>1</sup>.
- 1.1.3 Sites (for example MA01-205) referred to throughout this report are contained in the Volume 5 Map Book (see Environment Statement, Volume 5 Land quality Map Book, Maps LQ-01-300 to LQ-01-304a<sup>2</sup>).
- 1.1.4 The Environmental Impact Assessment Scope and Methodology Report (SMR) (see Environment Statement, Volume 5, Appendix CT-001-00001<sup>3</sup>) should be referred to for details of the land quality assessment methodology.

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<sup>1</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Land quality report*, Volume 5, Appendix LQ-001-0MA01. Available online at:

<https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>2</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Volume 5 Land quality Map Book*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>3</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Environmental Impact Assessment Scope and Methodology Report*, Volume 5, Appendix CT-001-00001. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

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## 2 Receptor information

- 2.1.1 This section provides further receptor information for sites that have been evaluated in stages C and D of the land quality assessment and assessed for the Hough to Walley's Green area (see Environmental Statement, Volume 5, Appendix LQ-001-0MA01<sup>1</sup>).
- 2.1.2 For each site or group of sites, further information on each site receptor can be found in Table 1 to Table 8.
- 2.1.3 For clarity, 'on-site' in this report means 'within the land required for the construction of the Proposed Scheme' and 'off-site' refers to land beyond this boundary, but within the study area. The sites and groups of sites for assessment in this area include:
- on-site:
    - railway land;
    - works;
    - farm; and
    - historical infilled land.
  - off-site:
    - tanks (likely for fuel storage), petrol filling stations and power stations;
    - former and current works, garages, coal wharf, depot and scrapyards;
    - cemetery; and
    - railway land.

**Table 1: Receptors – railway land (on-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Current London and North Western Railway/ other junctions (MA01-205)	Railway staff (existing site users) Residents and workers in commercial/ industrial areas (adjacent site users*)	Secondary Undifferentiated – glacial till Secondary B Aquifer – Sidmouth Mudstone Formation	None	Local Wildlife Sites (LWS) – Spring Plantation Grassland and Mossbridge Marsh (adjacent)	Railway infrastructure (existing) Variety of buildings and structures due to extent of site including residential, commercial and industrial buildings through central Crewe, and farms and associated buildings to	None

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Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
					the north of Crewe (adjacent)	

*\* adjacent site receptors located outside the land required for the construction of the Proposed Scheme (off-site) remain and are therefore included in the construction stage assessment. This applies to human and property receptors only.*

**Table 2: Receptors – works (on-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Current works (MA01-35)	Commercial /industrial workers and visitors (existing site users)  Railway staff and commercial/ industrial workers and visitors (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Large parking lot (truck stop), fuelling station and depot buildings (existing)  Industrial/co mmercial buildings e.g. depots and warehouses as well as railway line and infrastructure (adjacent)	None

*\* adjacent site receptors located outside the land required for the construction of the Proposed Scheme (off-site) remain and are therefore included in the construction stage assessment. This applies to human and property receptors only.*

**Table 3: Receptors – farm (on-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Current Bridge Farm (MA01-190)	Residents, farm workers and visitors (existing site users)  Residents, walkers, nearby farm workers	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Farm (kennels) and associated buildings (existing)  Farm and associated buildings, and	None



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Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
	(adjacent site users*)				railway line (adjacent)	

\* adjacent site receptors located outside the land required for the construction of the Proposed Scheme (off-site) remain and are therefore included in the construction stage assessment. This applies to human and property receptors only.

**Table 4: Receptors – historical infilled land (on-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Historical mound of unknown material (MA01-184)	Walkers (existing site users)  Residents, walkers and farm workers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Railway line and newly built residential properties (adjacent)	None

\* adjacent site receptors located outside the land required for the construction of the Proposed Scheme (off-site) remain and are therefore included in the construction stage assessment. This applies to human and property receptors only.

**Table 5: Receptors – tanks (likely for fuel storage), petrol filling stations and power stations grouped for assessment (off-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Current industrial estate/ Electrical sub-station/ tank (MA01-37)	Commercial /industrial site workers and visitors (existing site users)  Commercial /industrial site workers and visitors (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Variety of commercial and industrial buildings including car showrooms, works, concrete plant, depots, yards etc (existing and adjacent)	None
Current petrol filling station (MA01-137)	Commercial /industrial site workers and visitors, visitors to filling	Secondary Undifferentiated Aquifer – glacial till	None	None	Garage buildings with pumps (existing)	None

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Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
	station (existing site users)  Commercial /industrial site workers and visitors and residents (adjacent site users*)	Secondary B Aquifer – Sidmouth Mudstone Formation			Residential properties and storage yard (adjacent)	
Current petrol filling station (MA01-180)	Commercial /industrial site workers and visitors, visitors to filling station (existing site users)  Residents (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Buildings associated with filling station including pump and shop (existing)  Residential properties and electrical sub-station (adjacent)	None

\* adjacent site receptors located within the land required for the construction of the Proposed Scheme (on-site) are assumed to have been removed at the construction stage and are therefore not considered in the construction stage assessment. This applies to human and property receptors only.

**Table 6: Receptors – former and current works, garages, coal wharf, depot and scrapyards grouped for assessment (off-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Former sidings and historical sand pit (MA01-09)	Walkers and commercial/ industrial site workers and visitors (existing site users)  Walkers and railway staff (adjacent site users*)	Secondary A Aquifer – glaciofluvial deposits  Secondary B Aquifer – Sidmouth Mudstone Formation	Gresty Brook and Basford Brook (both Water Framework Directive (WFD) status Low), (adjacent)	None	Railway line, road bridge and farm buildings (adjacent)	None

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Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Current works (MA01-28)	Commercial /industrial site workers and visitors (existing site users)  Commercial /industrial site workers and visitors and railway staff (adjacent site users*) Residents and school users (adjacent site users at future baseline)	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	Gresty Brook (WFD status Low)	LWS – Mere Gutter with Basford Brook (adjacent)	Commercial/ industrial buildings including depots, factories, and warehouses (existing)  Variety of commercial/ industrial buildings including car servicing/ dealerships, warehouses, depots and railway infrastructure (adjacent)	None
Former Cumberland coal wharf with warehouse (MA01-136)	Walkers and park users (existing site users)  Walkers and park users, residents, railway staff and commercial/ industrial site workers and visitors (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Depot, railway line and tank (adjacent)	None
Current MOT test centre (MA01-139)	Commercial /industrial site workers and visitors, visitors to MOT test centre (existing site-users)	Secondary A Aquifer - alluvium  Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	MOT test centre buildings (existing)  Depot, open green space and residential properties (adjacent)	None

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Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
	Commercial /industrial site workers and visitors, railway staff and residents (adjacent site users*)					
Current depot (MA01-141)	Commercial /industrial site workers and visitors (existing site users)  Walkers and park users, residents. railway staff and commercial/ industrial site workers and visitors (adjacent site users*)	Secondary A Aquifer - alluvium  Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Depot buildings (existing)  MOT test centre, open green space and residential properties (adjacent)	
Current garage mechanics (MA01-146)	Commercial /industrial site workers and visitors (existing site users)  Commercial /industrial site workers and visitors, railway staff and residents (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Garage building (existing)  Railway line and residential properties (adjacent)	None

*\* adjacent site receptors located within the land required for the construction of the Proposed Scheme (on-site) are assumed to have been removed at the construction stage and are therefore not considered in the construction stage assessment. This applies to human and property receptors only.*

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**Table 7: Receptors – cemetery (off-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Current Crewe cemetery (MA01-149)	Visitors to cemetery/ workers (existing site users)  Residents and commercial/ industrial site workers and visitors (adjacent site users*)	Secondary A Aquifer - alluvium and glaciofluvial deposits  Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Few small buildings associated with cemetery (existing)  Residential properties, depot and railway infrastructure (adjacent)	None

\* adjacent site receptors located within the land required for the construction of the Proposed Scheme (on-site) are assumed to have been removed at the construction stage and are therefore not considered in the construction stage assessment. This applies to human and property receptors only.

**Table 8: Receptors – railway land (off-site)**

Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
Current railway land with infrastructure (MA01-21)	Railway staff (existing site users)  Walkers, commercial/ industrial site workers and visitors and railway staff (adjacent site users*)	Secondary A Aquifer - alluvium  Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth Mudstone Formation	Gresty Brook (WFD status Low)	LWS – Mere Gutter with Basford Brook (existing)	Railway lines and associated infrastructure (existing)  Commercial/ industrial buildings e.g. depots and warehouses (adjacent)	None
Current railway land (MA01-230)	Railway staff (existing site users)  Residents, walkers, cemetery visitors and workers,	Secondary A Aquifer - alluvium  Secondary Undifferentiated Aquifer – glacial till  Secondary B Aquifer – Sidmouth	None	None	Railway lines and associated infrastructure (existing)  Residential properties, cemetery/pub	None

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Site title (site ID)	Sensitive land use (human receptor)	Aquifer designation	Surface watercourse	Geological, and ecological designations	Property e.g. buildings and structures	Geoconservation sites
	(adjacent site-users*)	Mudstone Formation			lic open space (adjacent)	
Current railway land (MA01-234)	Railway staff (existing site users)  Residents, walkers, farm workers and commercial/ industrial site workers and visitors (adjacent site users)	Secondary A Aquifer – glaciofluvial deposits  Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Railway lines and associated infrastructure (existing)  Residential property, Casey Bridge and industrial/co mmercial buildings (adjacent)	None
Current railway land (MA01-235)	Railway staff (existing site users)  Residents and users of recreational areas (adjacent site users)	Secondary (Undifferentiated) Aquifer – glacial till  Secondary B Aquifer - Sidmouth Mudstone Formation	None	None	Railway lines and associated infrastructure (existing)  Residential properties (adjacent)	None

*\* adjacent site receptors located within the land required for the construction of the Proposed Scheme (on-site) are assumed to have been removed at the construction stage and are therefore not considered in the construction stage assessment. This applies to human and property receptors only.*

## 3 Minerals data

- 3.1.1 Background data summaries have been produced which present findings of a review of information from available planning documents relating to Warmingham Brinefield which is the active salt extraction site in the Hough to Walley's Green area.
- 3.1.2 Other relevant information relating to minerals and planning in the Hough to Walley's Green area is provided in Environmental Statement, Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 10<sup>4</sup>.

### 3.2 Geological setting

- 3.2.1 Salt extraction in Cheshire is from the Triassic age Mercia Mudstone Group between approximately 130m and 350m below ground level (mbgl). The salt is concentrated into two major rock salt members: the upper member comprising the Wilkesley Halite Member is approximately 300m in thickness and is separated from the lower Northwich Halite Member by 400m of mudstone (the Wych and Byley Mudstone Formations). The Northwich Halite Member is approximately 200m to 285m in thickness. Each halite member is made up of thick, massive beds of reddish to pink to white rock salt interbedded with red mudstone, siltstone, and sandstone.

### 3.3 Warmingham Brinefield

#### Brine washing

- 3.3.1 Prior to the 1930s, brine caverns were produced through drilling into the salt body and washing immediately beneath the salt rockhead. This method was found to be unsafe, with high risk of subsidence and collapse of caverns. Controlled brining was subsequently introduced (including at Warmingham Brinefield) after the understanding of subsidence risks improved. This new controlled brining method comprised the use of multiple drilling strings, and controlled pressurised water circulation, combined with the introduction of blanket gas which enabled the shape of the brine cavern to be designed and particularly the roof shape to be monitored and controlled. The system maintained a salt roof above the cavern and the caverns were positioned within the deeper salt of the 'dry rockhead'<sup>5</sup> in order to maintain stability. Caverns are typically washed over a 20-year programme<sup>6</sup>.

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<sup>4</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 10 Land quality*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>5</sup> 'Dry rockhead' is a term used in salt mining areas where rock salt is below a protective layer of mudstone, stopping water from reaching the salt.

<sup>6</sup> Bell, F.G. (1992), *Salt mining and associated subsidence in Mid Cheshire, England and its influence on planning*.

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- 3.3.2 Cavities can be used to store gas due to their minimal permeability to liquids and gases. The underlying mudstones – including those at Warmingham Brinefield – can then prevent the downward migration into more sensitive aquifers such as the Sherwood Sandstone.

## Details on development and associated planning permissions

- 3.3.3 Warmingham Brinefield is located near Warmingham, Cheshire and covers an area of approximately 100ha. The site is owned and has been operated by British Salt (part of TATA Chemicals Europe) since 1975. It is also utilised for underground gas storage which is leased and operated by Énergie de France (EDF).
- 3.3.4 The existing brinefield is made up of two components called Hill Top Farm and Hole House Farm, the locations of which are shown on Maps LQ-01-303 and LQ-01-304a (in the Volume 5, Land quality Map Book). An extension to the existing Brinefield, referred to as the Parkfield Farm extension, is also proposed.

### Hill Top Farm

- 3.3.5 Hill Top Farm is the larger of the two components that make up Warmingham Brinefield. With the exception of some proposed highways works it is located outside the land required for the construction of the Proposed Scheme. The controlled solution mining of the Northwich Halite salt field was first proposed at Hill Top Farm in 1973 (Cheshire County Council (CCC) Planning references: 3/1/1510, 3/5/12233, 4/5/9294, and 5/4/7834).
- 3.3.6 There are 16 caverns located at Hill Top Farm: ten are either currently or in the process of being converted for the purposes of natural gas storage by EDF (CCC planning reference 09/3380W), two are used for the storage of waste associated with the salt manufacturing process at the site, and four are currently being used for the extraction of brine.
- 3.3.7 Caverns at Hill Top Farm are situated within the Northwich Halite at depths of between 240m-275mbgl. These are understood to be between 60m-80m in height and 120m-130m in diameter, within an area of dry rockhead above the Northwich Halite Formation.

### Hole House Farm

- 3.3.8 Hole House Farm is the smaller component of Warmingham Brinefield and is located to the west of Hill Top Farm. With the exception of a narrow strip of land associated with some proposed highways and a small area in the south associated with some utilities works, it is located outside the land required for the construction of the Proposed Scheme.
- 3.3.9 Hole House Farm comprises four 120m diameter caverns located between 330m-375mbgl.
- 3.3.10 EDF were granted planning permission by CCC (CCC planning reference 7/P95/350) to convert four former brine cavities at Hole House Farm in 1995 for the purposes of natural gas, these were to be completed by no later than 2010. An additional two cavities were



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permitted in 1999 (CCC planning reference P99/0159). Planning permission was granted to the mining operator (British Salt) in 2008 to create 11 new cavities for brine extraction and associated gas processing plant (CCC planning reference 7/2007/CCC/13).

- 3.3.11 This consent has been modified multiple times in following years to grant permission for construction and extension of associated infrastructure for the purpose of gas processing. A time extension (unspecified) on this application was applied for from Cheshire East Council (CEC) in 2010 (CEC planning reference 10/3685W). However, this was withdrawn in 2011. Ten of the 11 caverns were proposed to be used for gas storage by EDF (CCC planning reference 7/08/CCC/0015).

## Proposed Parkfield Farm extension

- 3.3.12 The proposed Parkfield Farm extension is located close to the existing Network Rail West Coast Mainline, immediately to the west of Hole House Farm and its associated four brine caverns. It is located partially within the land required for the construction and operation of the Proposed Scheme.
- 3.3.13 The Parkfield Farm extension was originally consented in 1980 (CCC planning reference 7/6129) although it was never implemented during the 10 year period for which the planning consent was valid. An extension to this application (CCC planning reference 7-18355) was granted in 1990. No development was implemented during the 10 year period for which this planning consent was valid.
- 3.3.14 A further planning permission (CCC planning reference 7/2007/CCC/13) was granted to British Salt in 2008 to wash an additional seven caverns for brine extraction. This is located at Parkfield Farm adjacent to the route of the Proposed Scheme with all proposed well-heads within 300m of the route of Proposed Scheme.
- 3.3.15 Correspondence with CEC on the status of this permission has identified that the planning authority regard the permission (which covers the entirety of Warmingham Brinefield) as having been implemented. Development of the caverns within the Parkfield Farm area has not taken place at the time of writing.

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## **4 Geological Sites of Special Scientific Interest and local geological sites**

- 4.1.1 No geological Sites of Special Scientific Interest (SSSI) or Local Geological Sites are present in the Hough to Walley's Green area.

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# 5 Other sources of data and information

5.1.1 Other sources of baseline data and information that are deemed necessary include:

- data gained from local authorities regarding contaminated land;
- historical ground investigation reports submitted as part of planning applications;
- anecdotal information;
- foot and mouth burial pits; and
- landfill sites.

## 5.2 Local authorities contaminated site data

5.2.1 Sites potentially considered as contaminated land by CEC have been listed in Table 9.

**Table 9: Summary of contaminated site data from local authorities**

Site location/ grid reference	Relevant site ID*	Description	Comment
371539 351192	MA01-330	Garage	Not considered in the detailed assessment.
371455 351151	-	Nursery	Not identified as a potential contamination site.
371444 351244	MA01-334	Smithy	Not considered in the detailed assessment.
372226 351720	MA01-09	Rail sidings and sand pit, creamery	Within a larger site identified, and included in the detailed assessment.
372350 352897	MA01-341	Flour/corn mill	Not considered in the detailed assessment.
372559 353730	MA01-344	Sewage works and filter beds	Not considered in the detailed assessment.
370987 353728	MA01-336	Air shaft, coal wharf, tank, cattle market, depot, railway lines and station, garage, sidings, railway land, warehouses, builders yard, mill, works	Not considered in the detailed assessment.
370904 353727	MA01-19	Wagon works	Not considered in the detailed assessment.
370862 353789	MA01-20	Gasometer	Not considered in the detailed assessment.
370749 353770	-	Disturbed ground	Not identified as a potential contamination site.
370776 354383	-	Cattle market	Not identified as a potential contamination site.

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Site location/ grid reference	Relevant site ID*	Description	Comment
370822 354527	-	Embankment	Not identified as a potential contamination site.
370815 354654	MA01-41	Builder's yard	Not considered in the detailed assessment.
370747 354632	-	Warehouse	Not identified as a potential contamination site.
370775 354699	MA01-375	Smithy	Not considered in the detailed assessment.
370830 354724	MA01-45	Garage	Not considered in the detailed assessment.
370709 354778	-	Warehouse	Not identified as a potential contamination site.
370661 354753	MA01-374	Textile works	Not considered in the detailed assessment.
370786 354938	MA01-52	Builder's yard	Not considered in the detailed assessment.
371995 352112	MA01-319	Sand pit	Not considered in the detailed assessment.
371508 354175	MA01-28	Steel works	Within a larger site identified, and included in the detailed assessment.
370579 356070	MA01-128	Saw mill, garage, warehouse	Not considered in the detailed assessment.
370647 356071	MA01-130	Foundry, coal wharf, rail sidings, warehouses, builders yard, depot, fire station, sawmill, factory, works	Not considered in the detailed assessment.
370662 356109	MA01-136	Coal wharf, rail sidings, warehouses, builders yard, depot, fire station, sawmill, factory, works, dairy	Identified as a potential contamination site and included in detailed assessment.
370447 356155	MA01-134	Scrap yard	Not considered in the detailed assessment.
370533 356188	MA01-137	Garage (identified as a petrol filling station from mapping)	Identified as a potential contamination site and included in detailed assessment.
370410 356203	-	Ambulance station	Not identified as a potential contamination site.
370898 356206	MA01-133	Coal wharf, rail sidings, warehouses, builders yard, depot, fire station, sawmill, factory, works	Not considered in the detailed assessment.

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Land quality

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MA01: Hough to Walley's Green

Land quality baseline data

Site location/ grid reference	Relevant site ID*	Description	Comment
370523 356233	MA01-142	Smithy, depot, works	Not considered in the detailed assessment.
370898 356242	MA01-143	Fustian cutting mill	Not considered in the detailed assessment.
370756 356293	MA01-145	Builder's yard	Not considered in the detailed assessment.
370756 356397	MA01-148	Brick field	Not considered in the detailed assessment.
370321 356438	MA01-149	Cemetery	Identified as a potential contamination site and included in detailed assessment.
370763 356671	MA01-154	Pond within a clay pit	Not considered in the detailed assessment.
370864 356677	MA01-156	Hospital	Not considered in the detailed assessment.
370539 357298	MA01-177	Smithy	Not considered in the detailed assessment.
370486 357367	MA01-178	Works, builder's yard	Not considered in the detailed assessment.
370417 357391	MA01-178	Coach works, works, builder's yard	Not considered in the detailed assessment.
370153 357718	MA01-184	Disturbed ground (potentially landfill)	Identified as a potential contamination site and included in detailed assessment.
370523 358008	-	Pond inside clay pit	Not identified as a potential contamination site.
369739 358024	MA01-188	Works	Not considered in the detailed assessment.
367541 355334	MA01-353	Garage	Not considered in the detailed assessment.
367309 355444	MA01-367	Landfill	Not considered in the detailed assessment.
367652 356357	MA01-354	Works	Not considered in the detailed assessment.
368398 356414	MA01-357	Clothing and refrigeration factory, motor works	Not considered in the detailed assessment.
367916 356803	MA01-359	Waste disposal site	Not considered in the detailed assessment.
367967 356945	MA01-368	Landfill	Not considered in the detailed assessment.
368090 356728	MA01-360	Works	Not considered in the detailed assessment.

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Site location/ grid reference	Relevant site ID*	Description	Comment
368312 356750	MA01-360	Clay Pit, depot, works	Not considered in the detailed assessment.
368431 356935	MA01-370	Refuse tip, disturbed ground, depot, works	Not considered in the detailed assessment.
368812 356890	MA01-373	Landfill, disturbed ground, fuel filling station, sewage pumping station and filter beds	Not considered in the detailed assessment.
368957 356544	-	Air shaft	Not identified as a potential contamination site.
369526 356822	MA01-376	Transport depot, industrial park	Not considered in the detailed assessment.
369562 356498	-	Brick field	Not identified as a potential contamination site.
370217 357126	MA01-168	Refuse tip, brickfield	Not considered in the detailed assessment.
371317 357480	MA01-379	Works and pond	Not considered in the detailed assessment.
371132 357709	MA01-377	Brick and pipe works	Not considered in the detailed assessment.
370190 361199	MA01-221	Works, pond, embankment, landfill	Not considered in the detailed assessment.
370969 361004	MA01-371	Brick field	Not considered in the detailed assessment.
370906 361084	-	Graveyard	Not identified as a potential contamination site.
370865 361153	MA01-381	Smithy	Not considered in the detailed assessment.
370995 361223	MA01-380	Corn mill	Not considered in the detailed assessment.

- refers to sites not identified as potential contaminative sites and therefore a unique identifier ID has not been assigned.

## 5.3 Planning applications

5.3.1 Available historical ground investigation reports submitted as part of the planning application process are outlined in Table 10.

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**Table 10: Summary of ground investigation reports from local authority planning applications**

Planning reference and location	Relevant site ID	Description	Comment
15/4224N and 16/4535D Basford Old Creamery, Newcastle Road, Chorlton	MA01-08	Ground investigation including some testing of on-site soils with comparison of results against human health assessment criteria.	Not considered in the detailed assessment.
10/3262N and 13/3954D Land adjacent to 97 Broughton Road, Crewe	-	Ground investigation including some testing of on-site soils with comparison of results against human health and groundwater assessment criteria.	Not identified as a potential contamination site.
16/4479D Land west of Broughton Road, Crewe	-	Ground investigation and remediation report including some testing of on-site soils with comparison of results against human health assessment criteria.  Remediation was required due to presence of asbestos and phytotoxic contaminants. The validation report stated all made ground was excavated and disposed of off-site.	Not identified as a potential contamination site.
19/2306D Macon Court, Herald Drive, Crewe	Within MA01-67	Ground investigation report including some testing of on-site soils with comparison of results against human health assessment criteria.	Not considered in the detailed assessment.
18/5040N Land at Mill Street and Lockitt Street, Crewe	Adjacent to MA01-69 and MA01-71	Ground investigation including some testing of on-site soils and groundwater with comparison of results against human health and groundwater assessment criteria.	Not identified as a potential contamination site.
16/4270D Land Off Railway Exchange, Weston Road, Crewe	-	Ground investigation including some testing of on-site soils and groundwater with comparison of results against human health and groundwater assessment criteria.	Not identified as a potential contamination site.

- refers to sites not identified as potential contaminative sites and therefore a unique identifier ID has not been assigned.

## 5.4 Anecdotal information

5.4.1 The following table summarises anecdotal information regarding potentially contaminated sites within the study area.

**Table 11: Summary of anecdotal information**

Site name	Address / grid reference	Comment
Former petrol filling station (PFS) and Kwik Fit	Earle Street, Crewe (371038 355776)	Two CEC staff members remember this as a PFS. Not considered in the detailed assessment.
Land at Chapel View Farm	Chapel View Farm, Chorlton Lane, Chorlton (372468 351070)	CEC records anecdotally indicate buried material on-site (including ash). However, no source for the information was provided. Not identified as a potential contamination site.

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## 5.5 Landfill site data

5.5.1 Table 12 presents information provided by CEC regarding landfill sites within the study area, identified within the Hough to Walley's Green area.

**Table 12: Summary of landfill sites**

Landfill permit number and location	Relevant site ID	Description	Comment
British Railways Tip, Tommy's Lane, Crewe, Cheshire	MA01-67	Historical landfill with no Environment Agency data on licensing status or waste accepted. Anecdotal thought to have accepted construction, demolition and building wastes. It has since been partially redeveloped for warehousing and office space. Boreholes in the area indicate that the wastes typically extended to less than 4m below ground level (bgl) although up to 8.8m bgl was recorded in some areas of the site.	Not considered in the detailed assessment.
Broad Street, Copenhall	Within MA01-168	Present from 1958-1968 according to historical maps, within larger site comprising infilled brick works/marl pit, quarries and clay pits.	Not considered in the detailed assessment.
Warmingham (Hilltop Farm) Brinefield, Off Warmingham Road, Warmingham, EAHLD18038	MA01-221	Recorded as an active waste disposal facility taking 'other' wastes (construction, demolition, dredgings) and operated by British Salt Limited. Waste is deposited in worked salt caverns at depth. Caverns are typically 100m to 150m in diameter at depths of between 200m to 350m below ground level). The Environment Agency landfill reference is EAHLD18038.	Not considered in the detailed assessment.
Maw Green landfill site, Maw Green Road, Crewe, EAHLD18025	MA01-366	Environment Agency records indicate that waste has been deposited since 1985 and the site is still active. Wastes deposited include inert, industrial, commercial, household and special wastes as well as liquid sludge. It is reported by the Environment Agency to have gas and leachate controls.	Not considered in the detailed assessment.
Marshfield Bank Farm, Middlewich Road, Crewe, EAHLD17198	MA01-367	Environment Agency records indicate that waste was deposited between 1983 and 1993 and comprised inert and special wastes.	Not considered in the detailed assessment.



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Landfill permit number and location	Relevant site ID	Description	Comment
Pyms Lane Phase 2, Crewe, EAHL17191	MA01-368	Environment Agency records indicate that waste was placed between 1957 and 1986, and comprised inert, industrial, commercial, household and special wastes. It is reported by the Environment Agency to have gas controls.	Not considered in the detailed assessment.
Rolls Royce Tip, Pym's Lane, Crewe, EAHL17194	MA01-368	Environment Agency records indicate that waste was placed between 1945 and 1983, and comprised inert waste only.	Not considered in the detailed assessment.
Crewe Borough Council, Refuse Disposal Works, Pym's Lane Tip, Crewe, EAHL17189	MA01-370	Environment Agency records indicate that waste was placed between 1928 and 1982, and comprised inert, industrial, commercial, and household wastes as well as liquid sludge.	Not considered in the detailed assessment.

## 5.6 Foot and mouth burial sites

5.6.1 Information provided by CEC regarding foot and mouth burial sites located within the study area is presented in Table 13. The site name applies to the farm on which the burial took place as precise burial locations are not recorded.

**Table 13: Summary of foot and mouth burial sites**

Site name	Details	Comment
Moss Farm	Over 670m from route of the Proposed Scheme. Cattle: 34	Not considered in the detailed assessment.
Park House Farm	Over 260m from route of the Proposed Scheme. Cattle: 58, pigs: 41	Not considered in the detailed assessment.
Newfield Hall Farm	Over 350m from route of the Proposed Scheme. Cattle: 42	Not considered in the detailed assessment.
Park Hill (Hall) Farm	150m from route of the Proposed Scheme. Cattle: 109, pigs: 101	Not considered in the detailed assessment.
Lane End Farm	Over 1km from route of the Proposed Scheme. Number of animals buried not provided.	Not considered in the detailed assessment.
Spring Farm	Over 300m from the route of the Proposed Scheme. Number of animals buried not provided.	Not considered in the detailed assessment.
Church Farm	Over 1.7km from route of the Proposed Scheme.	Not considered in the detailed assessment.

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Site name	Details	Comment
	Number of animals buried not provided.	
Whitehall Farm	Over 1.8km from route of the Proposed Scheme. Number of animals buried not provided.	Not considered in the detailed assessment.

## 5.7 Other regulatory data

5.7.1 Regulatory data reviewed include pollution incidents (major, significant and minor categories), radioactive and hazardous substances consents, environmental permits (integrated pollution control and integrated pollution prevention and control licences), and ecological receptors. Details are provided in Table 14 below.

**Table 14: Summary of other regulatory data**

Data	Description
Control of Major Accident Hazards (COMAH) sites	Warmingham Brinefield in relation to gas storage in the mining void. The site is used for gas storage and the footprint of the site, which largely comprises 'gas storage wellhead <sup>7</sup> compounds', is located partially within the study area.
Pollution incidents to controlled waters	There were 42 minor and 6 significant pollution incidents to controlled waters reported within the study area between 1991 and 2016. <b>Significant</b> 1995 - gas oil to Valley Brook off the A532 in Crewe Gates Farm Industrial Estate 1995 - diesel oil to Gresty Brook at Basford Hall Sorting Sidings 1994 - diesel oil to Gresty Brook at Basford Hall Sorting Sidings 1993 - oils (unknown) to Gresty Brook at Basford Hall Sorting Sidings 1993 - diesel oil to Gresty Brook at Basford Hall Sorting Sidings 1992 - farm drainage to a tributary of the River Weaver at Moat House Farm near Minshull Vernon in April There was also one incident on the substantiated pollution incident register, in Basford Hall Sorting Sidings in Crewe, resulting in a significant impact on water.
Discharge consents	Environment Agency data indicate that there are two active discharge consents to groundwater within the study area. The first of these is associated with multiple domestic properties, including farm houses at Minshull Hall Court, entering groundwater via soakaway as sewage (final treated effluent). The second is located at Gresty Road rail depot, entering groundwater via soakaway as sewage. Environment Agency data indicate that there are 14 active discharge consents to surface water within the study area.
Environmental permits	There are nine petrol station licenced sites as well as numerous local authority pollution prevention and control permits in the study area. There are no integrated pollution prevention and control permits ('Environmental Permits') in the study area.
Local Wildlife Sites (LWS)	There are six LWS located within the study area, including four located within, or partially within, the land required for the construction of the Proposed Scheme.

<sup>7</sup> Wellheads are a term given to the surface feature of an oil, gas or water well, usually used to control pressures and link to a wider pipe network.

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# 6 Site visit records

6.1.1 Records of site visits are included in the following section. Site specific visits were completed at:

- MA01-184 mound of unknown material;
- MA01-193 Moss Bridge Farm;
- MA01 Middlewich Street shaft site; and
- MA01-35 Works.

**Table 15: Geo-environmental site inspection pro forma for MA01-184 mound of unknown material**

PROJECT		Site Walkover: MA01-184 mound of unknown material	
Land Access Number(s):		L15830	
Site Name:	MA01-184 mound of unknown material		
Surveyor name:	SG and MH	NGR (centre of land parcel):	357718, 370147
Weather:	Sunny and breezy	Date:	25/09/18
<b>OVERVIEW SITE DESCRIPTION</b>			
Mound of unknown material overgrown with mature hawthorn, blackthorn, brambles and other weeds. In fenced area with secured gate, although access was gained for the site visit.			
<b>TOPOGRAPHY</b>			
Mound approximately 4m high, gradient approximately 20° on the northernmost slope, and 10° on the south-eastern slope. Surrounding area consisting of flat fields.			
<b>SOIL QUALITY</b>			
Unknown quality on the mound as little exposed material through dense vegetation.			
<b>MINING EVIDENCE</b>			
No mining is known to have occurred in the area and no evidence of mining was identified during the visit.			
<b>WATER QUALITY</b>			
No water noted on site during the visit. A dry ditch was seen to the east without any notable contaminative residues or discolouration on the soil.			
<b>SITE DRAINAGE</b>			
No evidence of water but a dry ditch was seen to the east and bog/marsh plants adjacent to mound, indicating that this area of the field is subject to poor drainage.			
<b>VEGETATION COVER</b>			
The mound has near full coverage by mature hawthorn, blackthorn, brambles and other weeds. Some grass noted to the south-east as the gradient decreases to near flat. No signs of distress by the vegetation was noted.			
<b>ECOLOGICAL ISSUES (OUTLINE)</b>			
None evident.			
<b>BUILDINGS AND LARGE INFRASTRUCTURE (if applicable)</b>			
None on site.			
<b>ANCILLARY INFRASTRUCTURE (if applicable)</b>			
A wooden gate/fence surrounds the plot to the north, east and south, whilst a wire fence exists to the west to stop access to the railway line from the site.			

## Background Information and Data

Land quality  
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PROJECT		Site Walkover: MA01-184 mound of unknown material
<b>SITE OPERATION (PAST AND PRESENT)</b>		
Currently a fenced off mound surrounded by fields. No on-site evidence as to former land use.		
<b>VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION</b>		
None noted during the site visit.		
<b>SURROUNDING LAND USE</b>		
<b>NORTH</b>	Field with grazing cows at the time of the walkover	
<b>EAST</b>	Construction site for residential estate.	
<b>WEST</b>	Railway line	
<b>SOUTH</b>	Field with 3m high mound, appear to contain rubble, possibly associated with construction site to east. Grassed/weed cover	
<b>GENERAL</b>	None	
<b>MISCELLANEOUS COMMENTS/NOTES</b>		
None		

**Table 16: Geo-environmental site inspection pro forma for MA01-193 Moss Bridge Farm**

PROJECT		Site Walkover: MA01-193 Moss Bridge Farm	
<b>Land Access Number(s):</b>		NL093	
<b>Site name:</b>	MA01-193 Moss Bridge Farm		
<b>Surveyor name:</b>	SG and MH	<b>NGR (centre of land parcel):</b>	358155, 370034
<b>Weather:</b>	Sunny and breezy	<b>Date:</b>	25/09/18
<b>OVERVIEW SITE DESCRIPTION</b>			
Equine centre with riding area covered with rubber pellets Barns/outbuildings used for tractor storage, stables and food storage Chickens and sheep in pens			
<b>TOPOGRAPHY</b>			
Flat			
<b>SOIL QUALITY</b>			
The site is mostly hardcovered with no exposed soil, including in the riding area where rubber pellets formed the surfacing. Animal pens have some exposed soil with no visual or olfactory evidence of contamination.			
<b>MINING EVIDENCE</b>			
No mining is known to have occurred in the area and no evidence of mining was identified during the visit.			
<b>WATER QUALITY</b>			
None noted other than in the slurry pit which was surrounded within concrete sides. The base of the pit was not visible to estimate depth or the basal material. A strong organic odour was present coming from the slurry.			
<b>SITE DRAINAGE</b>			
Drains within the hardstanding across most of the site, which look to be in good condition. The outfalls of the drains could not be determined.			

## Background Information and Data

Land quality

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MA01: Hough to Walley's Green

Land quality baseline data

PROJECT	Site Walkover: MA01-193 Moss Bridge Farm
<b>VEGETATION COVER</b>	
None on site, however a small garden is present to the south of the site with a variety of small plants and shrubs. Grass covers an area of the garden, as well as in an area of scrap car storage to the north of the paddock. No signs of vegetation distress observed during the site visit.	
<b>ECOLOGICAL ISSUES (OUTLINE)</b>	
None noted.	
<b>BUILDINGS AND LARGE INFRASTRUCTURE (if applicable)</b>	
Riding paddock covered with rubber pellets in east of site. Large metal storage container beside paddock.  Barns/outbuildings across site – tractor leaking oil/engine fluid onto gravel floor, large fuel trailers with hydraulic fluids on floor and horse stables, barn and tunnel with likely asbestos sheeting roof.  Residential house in south of site.	
<b>ANCILLARY INFRASTRUCTURE (if applicable)</b>	
Used hay pile/slurry pit – possibly unlined Old oil barrel used for burning on hardstanding next to slurry pit Diesel tank suspended on bricks to south of site entrance (approximately 2x3x1m) and another behind house (approximately 0.5x0.5x2m) Scrap car storage behind paddock.	
<b>SITE OPERATION (PAST AND PRESENT)</b>	
Currently a farm and equine centre. No evidence of other former site uses.	
<b>VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION</b>	
Notable issues seen during site visit include: Slurry pit Leaking machinery e.g. tractor engine oil/fluids Oil barrel used for burning plastics Asbestos sheeting used for roofing on some outbuildings Scrap cars	
<b>SURROUNDING LAND USE</b>	
<b>NORTH</b>	Fields with grazing horses at time of visit
<b>EAST</b>	Fields with grazing sheep at time of visit
<b>WEST</b>	Fields with horse jumping equipment, railway line, and a residential area beyond
<b>SOUTH</b>	Road and residential house then fields
<b>GENERAL</b>	None
<b>MISCELLANEOUS COMMENTS/NOTES</b>	
None	

## Background Information and Data

Land quality  
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 MA01: Hough to Walley's Green  
 Land quality baseline data

**Table 17: Geo-environmental site inspection pro forma for MA01-shaft**

PROJECT		Site Walkover MA01-Middlewich Street shaft site	
Land Access Number(s):		L47619	
Site name:	MA01-Middlewich Street shaft site		
Surveyor name:	JS and SG	NGR (centre of land parcel):	356412, 370607
Weather:	Fair, windy	Date:	12/12/18
<b>OVERVIEW SITE DESCRIPTION</b>			
Triangular shaped plot of land next to rail tracks, mostly grass with some unkept foliage. Likely to be used as a recreational area of open space for the houses nearby. A gravel track/footpath bounds the site to the east.			
<b>TOPOGRAPHY</b>			
Slight slope from north to south, approximately 3m over length of site.			
<b>SOIL QUALITY</b>			
None visible other than in landscaped areas, no visual or olfactory evidence of contamination present.			
<b>MINING EVIDENCE</b>			
No mining is known to have occurred in the area and no evidence of mining was identified during the visit.			
<b>WATER QUALITY</b>			
No water noted on site during the visit.			
<b>SITE DRAINAGE</b>			
None observed during the site visit.			
<b>VEGETATION COVER</b>			
Mostly grass, some shrub cover, one tree on-site. No signs of vegetation distress observed during the site visit.			
<b>ECOLOGICAL ISSUES (OUTLINE)</b>			
None evident.			
<b>BUILDINGS AND LARGE INFRASTRUCTURE (if applicable)</b>			
None, track running along eastern boundary.			
<b>ANCILLARY INFRASTRUCTURE (if applicable)</b>			
None			
<b>SITE OPERATION (PAST AND PRESENT)</b>			
Unknown			
<b>VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION</b>			
None noted.			
<b>SURROUNDING LAND USE</b>			
<b>NORTH</b>	Residential estate and children's play park		
<b>EAST</b>	Residential estate, including small scrap yard/mechanic/garage adjacent to east of site		
<b>WEST</b>	Railway line runs north-north-west along western boundary, fenced off whole way along		
<b>SOUTH</b>	Railway line and further residential properties		
<b>GENERAL</b>	Mostly shrub cover around site		
<b>MISCELLANEOUS COMMENTS/NOTES</b>			
None			

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Land quality  
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**Table 18: Geo-environmental site inspection pro forma for MA01-35 Works**

PROJECT		Site Walkover MA01-35 Works	
<b>Land Access Number(s):</b>		L16432	
<b>Site name:</b>	MA01-35		
<b>Surveyor name:</b>	JS and SG	<b>NGR (centre of land parcel):</b>	354305, 37141
<b>Weather:</b>	Fair, windy	<b>Date:</b>	12/12/18
<b>OVERVIEW SITE DESCRIPTION</b>			
Industrial/commercial units along The Sidinges (road), footpath, and soft landscaping with planting. Industrial units include an Appliances Online (AO) depot, ARC car wash, car hire centre. Gist Crewe maintenance depot entrance leads off The Sidinges to south-west.			
<b>TOPOGRAPHY</b>			
Flat			
<b>SOIL QUALITY</b>			
None visible other than in landscaped areas. Soil looks to be brown loam, no visual or olfactory evidence of contamination noted, although the majority was covered by leaf litter/grass at the time of the walkover.			
<b>MINING EVIDENCE</b>			
No mining is known to have occurred in the area and no evidence of mining was identified during the visit.			
<b>WATER QUALITY</b>			
No water was seen on site. Runoff from roads and paths noted to enter drains.			
<b>SITE DRAINAGE</b>			
Drains noted along roads, likely entering foul sewer.			
<b>VEGETATION COVER</b>			
Some bushes in landscaped area along footpath leading to AO depot entrance and alongside The Sidinges. Unknown species but no leaves as winter, no signs of distress. Grass verge with bench outside car hire centre.			
<b>ECOLOGICAL ISSUES (OUTLINE)</b>			
None evident.			
<b>BUILDINGS AND LARGE INFRASTRUCTURE (if applicable)</b>			
Depots/industrial units, highway and pavement.			
<b>ANCILLARY INFRASTRUCTURE (if applicable)</b>			
Petrol pump and generators near entrance of Gist Maintenance Depot – in metal bunds, no staining visible. Street lighting along The Sidinges as well as large fences surrounding units.			
<b>SITE OPERATION (PAST AND PRESENT)</b>			
Presently commercial/industrial units with road. No on-site evidence of former uses.			
<b>VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION</b>			
None noted.			

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Land quality

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Land quality baseline data

<b>PROJECT</b>	<b>Site Walkover MA01-35 Works</b>
<b>SURROUNDING LAND USE</b>	
<b>NORTH</b>	Large industrial/commercial area with car sales and Wrights food group
<b>EAST</b>	Car wash and car sales
<b>WEST</b>	Railway line
<b>SOUTH</b>	Warehouse/depots to the south-east
<b>GENERAL</b>	Industrial/commercial area with roads.
<b>MISCELLANEOUS COMMENTS/NOTES</b>	
Gated entrance to Gist site used for access to commercial/industrial premises by vehicles. No pedestrians seen outside of the unit boundaries during the walkover.	



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Land quality

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MA01: Hough to Walley's Green

Land quality baseline data

# 7 References

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**High Speed Two (HS2) Limited**

Two Snowhill

Snow Hill Queensway

Birmingham B4 6GA

Freephone: 08081 434 434

Minicom: 08081 456 472

Email: [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk)

