

High Speed Rail (Crewe – Manchester)

Background information and data

Land quality

BID LQ-002-0MA02

MA02: Wimboldsley to Lostock Gralam

Land quality baseline data

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Department for Transport

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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 Wimboldsley to Lostock Gralam 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-001-0MA02)¹.
- 1.1.3 Sites (for example MA02-46) referred to throughout this report are contained in the Volume 5 Map Book (see Environment Statement, Volume 5 Land quality Map Book, Maps LQ-01-304b to LQ-01-309a²).
- 1.1.4 The Environmental Impact Assessment Scope and Methodology Report (SMR) (see Environmental Statement, Volume 5, Appendix CT-001-00001³) should be referred to for details of the land quality assessment methodology.

¹ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Land quality report*, Volume 5, Appendix LQ-001-0MA02. Available online at:

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

² 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>.

³ 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>.

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 Wimboldsley to Lostock Gralam area (see Environmental Statement, Volume 5, Appendix LQ-001-0MA02¹).

2.1.2 For each site or group of sites, further information on each site receptor can be found in Table 1 to Table 16.

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;
 - farms;
 - authorised disposal/deep storage facilities;
 - historical dredging silt lagoon;
 - historical localised shallow mineral extraction;
 - cemetery;
 - former chemical works;
 - electrical sub-station – large; and
 - former RAF airfield.
- off-site:
 - historical landfill;
 - farms;
 - historical infilled land;
 - former ammonia soda and bleach works;
 - industrial estate;
 - former railway land; and
 - power station.

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
London and North-western railway (MA02-46)	Railway staff (existing site users) Residents, workers in	Secondary Undifferentiated Aquifer – glacial till Secondary B Aquifer – Sidmouth	Tributary of River Weaver (Water Framework Directive (WFD) status poor)	Wimboldsley Wood Site of Special Scientific Interest (SSSI) adjacent	Railway lines, roads and associated infrastructure (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
	commercial/ industrial areas, farm workers, walkers (adjacent*)	Mudstone Formation	Shropshire Union Canal and the Dingle (adjacent) (WFD status poor)	Local Wildlife Sites (LWS) - Woodland near Lea Hall at Wimboldsley, and Shropshire Union Canal (Middlewich Branch)	Farm buildings and residential property (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 – farm sites grouped for assessment (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
Yew Tree Farm (MA02-82)	Residents and farm workers (existing site users) Farm workers, walkers (adjacent site users)	Secondary A Aquifer – glaciofluvial deposits Secondary Undifferentiated Aquifer – glacial till	Shropshire Union Canal (adjacent) (WFD status poor) Multiple springs, located between 200m and 250m to the north-east, east and south-east	LWS - Shropshire Union Canal (Middlewich Branch) (adjacent)	Farm (and associated infrastructure) and residential buildings (existing)	None
Higgins Lane Farm (MA02-141)	Residents and farm workers (existing site users) Farm workers, walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till	Trent and Mersey Canal (adjacent) (WFD status moderate)	LWS - Billinge Green Farm Pond, and Whatcroft Lane Wetlands, and Pear Tree Farm	Farm (and associated infrastructure) and residential buildings (existing) Canal (adjacent)	Billinge Flashes (Regionally Important Geological Sites (RIGS) Geodiversity site)

* 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.

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Table 3: Receptors – authorised disposal/deep storage facilities sites grouped for assessment (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
Winsford Rock Salt Mine Waste Disposal Facility, Middlewich (MA02-124)	Workers in deep storage facility (existing site users)	None	None	None	None	None
Holford Brinefield Landfill Site (MA02-181)	Workers in deep storage facility (existing site users)	Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	None	None

* deep storage facilities not thought to pose risk to human, environmental or property receptors at the surface, therefore have not been considered as part of this assessment.

* 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 dredging silt lagoon (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
Dredging silt lagoon (MA02-232)	Farm workers (existing site users) Farm workers, residents, walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till	Trent and Mersey Canal (adjacent) (WFD status moderate)	LWS - Billinge Green Farm Pond, and Ash trees along Trent and Mersey Canal at Billinge Green, and Whatcroft Lane Wetlands	Farm buildings, tanks, and residential property (adjacent)	Billinge Flashes (RIGS Geodiversity Site)

* 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 – historical localised shallow mineral extraction (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
Localised shallow mineral	Farm workers (existing and	Secondary Undifferentiated Aquifer – glacial till	None	LWS - River Dane at Bostock, and	None	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
excavation (MA02-119)	adjacent site users)	Secondary A Aquifer – Glaciofluvial deposits		Bull's Wood and Meadow		

* 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 6: Receptors – cemetery (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
Burial ground (MA02-186)	Visitors/ walkers (existing site users) Residents and commercial industrial site workers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till Secondary B Aquifer – Sidmouth Mudstone Formation	None	None	Residential properties and farm buildings (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 7: Receptors – former chemical 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
Chemical works (MA02-200)	Walkers (existing site users) Walkers and farm workers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till Secondary B Aquifer – Sidmouth Mudstone Formation	Tributary of Peover Eye (WFD status poor)	Plumley Lime Beds Nature Reserve (SSSI) LWS - Hame Farm Pond (adjacent)	Mast, likely telecoms (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.

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Table 8: Receptors – electrical sub-station - large (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
Electrical sub-station (MA02-193)	Sub-station workers (existing site users) Farm workers and walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till Secondary A Aquifer – glaciofluvial deposits and alluvium Secondary B Aquifer – Sidmouth Mudstone Formation	Wade Brook (adjacent) (WFD status poor)	LWS - Wade Brook	Sub-station buildings and associated infrastructure (existing) None (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 9: Receptors – former RAF airfield (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
Former RAF Cranage (MA02-342)	Residents, walkers, farm workers, visitors to and workers at industrial premises (existing site users) Residents, school users, walkers, farm workers and golf course users (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till Secondary A Aquifer – glaciofluvial deposits and alluvium Secondary B Aquifer – Sidmouth Mudstone Formation	Puddinglake Brook (WFD poor) and ponds	None	Sub-station buildings and associated infrastructure , farm buildings, industrial premises, (existing) Farm, residential properties, school, light industrial/commercial premises (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.

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Table 10: Receptors – historical landfill site (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
Lostock lime beds and works tip (MA02-183)	Workers at waste lime beds (existing site users) Farm workers, residents, walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till Secondary B Aquifer – Sidmouth Mudstone Formation	Wade Brook (WFD status poor) and Trent and Mersey Canal (WFD status moderate) (adjacent)	LWS - Wade Brook (adjacent)	Waste lime beds and associated infrastructure (existing) Residential properties and works (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 11: Receptors – farm sites 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
Bridge Farm (MA02-134)	Residents and farm workers (existing site users) Residents, farm workers and walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till Secondary A Aquifer – Glaciofluvial deposits	Puddinglake Brook (WFD status poor) and Trent and Mersey Canal (WFD status moderate) (adjacent)	LWS - Puddinglake Brook Wood, and Whatcroft Hedge	Farm and residential property (existing). Also within footprint of Winsford Rock Salt Mine Residential properties (adjacent)	None
Mill Farm (MA02-241)	Residents and farm workers (existing site users) Residents, farm workers and walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till	River Wheelock (WFD status poor) (adjacent) Spring at Mill Farm (adjacent)	None	Tank, silo, farm buildings and residential property (existing). Residential properties (adjacent)	None

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** 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 12: Receptors – historical infilled 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
Mound associated with ammonia works (MA02-215)	Walkers (existing site users)	Secondary Undifferentiated Aquifer – glacial till	Tributary of Peover Eye (WFD status poor) (adjacent)	Plumley Lime Beds Nature Reserve (SSSI) LWS - Mill Wood and Mill Bottoms, and Long Wood, Lostock	None	None
	Farm workers and walkers (adjacent site users*)	Secondary A Aquifer – alluvium				

** 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 13: Receptors – former ammonia soda and bleach works sites 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
Ammonia soda works (MA02-211)	Walkers (existing site users)	Secondary Undifferentiated Aquifer – glacial till	Tributary of Peover Eye (WFD status poor)	Plumley Lime Beds Nature Reserve (SSSI) LWS - Long Wood at Lostock, and Hame Farm Pond	None	None
	Walkers and farm workers (adjacent site users*)					
Lostock works/ bleach works (MA02-262)	Workers at Lostock/ bleach works (existing site users)	Secondary Undifferentiated Aquifer – glacial till	Wade Brook (WFD status poor) and Trent and Mersey Canal (WFD status moderate)	LWS - Wade Brook, and Griffith's Park (both adjacent), and Wincham Brook Valley 2	Buildings and infrastructure associated with the works, such as processing, storage, waste and cooling facilities, and canal (existing)	None
	Railway staff and walkers (adjacent site users*)	Secondary A Aquifer – alluvium and glaciofluvial deposits				
		Secondary B Aquifer - Sidmouth Mudstone Formation				

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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
					yards/depots (adjacent)	

* 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 14: Receptors – industrial estate (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
Winsford Industrial Estate (MA02-102)	Workers and visitors to industrial estate (existing site users) Railway staff, farm workers and walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till Secondary A Aquifer - alluvium and glaciofluvial deposits	None	LWS - The Willowbeds (adjacent)	Warehouses, depots, office space (existing) Factory, 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.

Table 15: Receptors – former 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
Railway sidings (MA02-210)	Walkers (existing site users) Railway staff, farm workers and walkers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till	Tributary of Peover Eye (WFD status poor)	Plumley Lime Beds Nature Reserve (SSSI) LWS - Holford Moss Wood, and Hame Farm Pond, Long Wood at Lostock, and Mill Wood and Mill Bottoms	Pond and unknown building (existing) Railway line (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 16: Receptors – current power station (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
Gas distribution station (MA02-298)	Workers at gas distribution station (existing site users) Farm workers (adjacent site users*)	Secondary Undifferentiated Aquifer – glacial till	Tributary of Gad Brook (WFD status poor) (adjacent)	None	Buildings associated with works e.g. processing, cooling and storage facilities etc., and canal (existing) Railway line, and storage yards and depots (adjacent)	None

** adjacent site receptors located within the land required for the construction of the Proposed Scheme (on-site) and are therefore removed from the construction stage assessment. This applies to human and property receptors only.*

3 Minerals data

- 3.1.1 All relevant information associated with minerals, when considered as a resource, is presented in Environmental Statement, Volume 2, Land Quality, Community Area report: Wimboldsley to Lostock Gralam (MA02), Section 10⁴.
- 3.1.2 Summaries have been produced which present findings of a review of information from available planning documents and freely available public information relating to minerals sites within the Wimboldsley to Lostock Gralam area, comprising:
- Winsford Rock Salt Mine; and
 - Holford Brinefield.

3.2 Geological setting

- 3.2.1 Salt extraction in Cheshire is from the Triassic age Mercia Mudstone Group between approximately 130m and 750m below ground level. 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 Winsford Rock Salt Mine

Introduction

- 3.3.1 Winsford Rock Salt Mine is located beneath the route of the Proposed Scheme between Bostock and Mere Heath and Whatcroft which is situated to the north-west of Winsford Industrial Estate.
- 3.3.2 The site is owned and operated by Compass Minerals. It supplies salt to the UK rock salt market, primarily for the use of de-icing UK highways. It is capable of an output of 30,000 tonnes of salt per week⁵. The mine covers an area of approximately 800ha.

⁴ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Volume 2, Community Area report: Wimboldsley to Lostock Gralam (MA02), Section 10 Land quality*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

⁵ Axis (2009a), *Proposed Extension of Life of Mining operations at Winsford Rock salt Mine, Bradford Road, Winsford, Cheshire, Environmental Statement Volume 2, Non-Technical Summary (Cheshire West and Chester, Planning Permission 09/00589/FZ5)*.

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- 3.3.3 The location and approximate extent of the mine is shown on map LQ-01-306 (in the Volume 5, Land quality Map Book).
- 3.3.4 Salt is extracted from Winsford Rock Salt mine through deep salt mining, via ‘room and pillar’⁶ at depths of between 130m and 220m below ground level. Mining is currently operational within the Winsford Salt Mine at two gallery levels, each of typically 8m height. Crushed salt is then brought to the surface for storage. Mine workings are advanced and roadways driven at right angles, which creates massive pillars at regular intervals to support the strata above. Connected ‘rooms’ of void space provide tunnels for access, with more than 137 miles of tunnels across the site⁷.

Details on development and associated planning permissions

- 3.3.5 The mine began operation in 1844 but production stopped when the mine was closed in 1892. The mine re-opened by the newly formed Salt Union in 1928 following the collapse of the Adelaide Mine in Northwich⁸. The mine expanded rapidly in the 1950s to provide salt to de-ice the country’s expanding road network. The mine now extends approximately 5km from east to west and 3km from north to south.
- 3.3.6 In 2009, planning permission (09/00589/FZ5) was granted by Chester West and Chester Council (CWCC) to Salt Union Ltd for the proposed extension of life of mining operations at Winsford Rock Salt Mine from the original consent ending in 2011 until 2021, based on a mineral extraction rate of 900,000 tonnes of rock salt per year.
- 3.3.7 The properties of rock salt and natural ventilation within the facility provide a year-round stable environment for storage of paper documents. Planning permission (10/00473/COU) was granted by CWCC in 2010 to expand the storage facility further.
- 3.3.8 A further planning permission (11/01980/S73) was granted by CWCC in 2011 to extend the life of the mine until 2048. According to the Axis Environmental Statement produced in 2009, there were still large reserves within the consented area.

⁶ Mining method in which the mined material is excavated leaving pillars of unexcavated material to provide support the mine roof.

⁷ Axis (2009b), *Proposed Extension of Life of Mining operations at Winsford Rock salt Mine, Bradford Road, Winsford, Cheshire, Planning Application Document (Cheshire West and Chester, Planning Permission 09/00589/FZ5)*.

⁸ Compass Minerals (2020), *Salty Tales: a brief history of Winsford*. Available online at: <http://winsfordrocksaltmine.co.uk/history/>.

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Waste management licences and environmental permits

- 3.3.9 Winsford Rock Salt Mine Waste Disposal Facility (EPR/AP3238GH) is an Environment Agency registered active authorised 'landfill'. However, it is not a landfill in the traditionally understood sense whereby wastes are placed in an excavation extending from ground level to a relatively shallow depth (or in some cases mounded above ground). Instead it is permitted as an underground storage facility for hazardous waste.
- 3.3.10 The waste disposal area is contained at a depth of 130m to 200m below existing ground level.
- 3.3.11 Planning permission for the facility was originally granted by CWCC in 2003 (4/34566) for Minosus Ltd (Compass Minerals Ltd & Veolia) for use of salt caverns for waste disposal. The site, operated by Veolia, began receiving waste under an Environmental Permit in 2005, including solid and granular hazardous wastes in containers.
- 3.3.12 Planning permission was subsequently granted by CWCC in 2012 (12/03271/MIN) for Veolia to make extensions and alterations to buildings and warehouses (and other associated infrastructure) at the surface to increase capacity for the reception and bagging of hazardous waste at the site.
- 3.3.13 The current Environmental Permit for the facility states that it is for the underground storage of hazardous waste, specifically, the permanent storage (e.g. emplacement in container in a mine) of hazardous wastes under the Landfill Directive. The annual waste input limit is listed as 99,000 tonnes per year.
- 3.3.14 There are a number permitted waste streams listed, including but not limited to the following:
- wastes from the manufacture, formulation, supply and use of salts and their solutions and metallic oxides;
 - waste from power stations;
 - wastes from the iron and steel industry and various thermal metal processes;
 - wastes from shaping and physical and mechanical surface treatment of metals and plastics;
 - wastes from the incineration or pyrolysis of waste and other types of waste treatment;
 - wastes from oil regeneration; and
 - wastes from, construction and demolition.

3.4 Holford Brinefield

Introduction

- 3.4.1 Holford Brinefield is located near Northwich, Cheshire and measures approximately 3.7km (east to west) and 3km (north to south). It is located partially under the land required for the operation of the Proposed Scheme.
- 3.4.2 The location of Holford Brinefield and its components is provided in LQ-01-308 (in the Volume 5, Land quality Map Book). The site is owned and operated by INOVYN, part of the INEOS Group and comprises a field of some 200 caverns within the Northwich Halite member. Caverns typically range from 100m to 150m in diameter, 100m to 200m high with cavern crown (top) depths of some 200m to 350m below ground level around Lostock Gralam, depending on the depth of the Northwich Halite Member⁹.
- 3.4.3 Cavities can be used to store gas due to their minimal permeability to liquids and gases. The underlying mudstones – including those at Holford Brinefield – can then prevent the downward migration into more sensitive aquifers such as the Sherwood Sandstone.
- 3.4.4 The brine is extracted and processed at the site providing feedstock for customers such as INEOS Salt, Tata – Soda Ash Works, and INEOS ChlorVinyls (producer of chlorine for UK water treatment).
- 3.4.5 On completion of salt extraction, the caverns located within the study area are licensed for the storage of waste salt processing products. Caverns may also be utilised for gas storage.

Proposed extensions and associated planning permissions

- 3.4.6 The following sections outline the main planning applications associated with proposed extensions of the existing Holford Brinefield within the land quality study area.
- 3.4.7 Controlled solution mining has taken place at the Holford Brinefield since the 1920s¹⁰. Holford Brinefield has planning permission (Application 4/32984, dated 21 May 1998) for solution mining and disposal of waste from the former Cheshire County Council. The permission is given under both the Town and Country Planning Act 1990 and the Environment Act 1995.
- 3.4.8 The Environment Act 1995 (Section 96) placed a duty on all Mineral Planning Authorities (MPAs) to review and update planning permissions for mineral sites which were granted planning permission under the Town and Country Planning Acts between 1948 and 1983;

⁹ HS2 Ltd / Inovyn (2013), Stakeholder meeting.

¹⁰ Ineos (2014), *The Keuper Gas Storage Project, Proposal Summary Document*.

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and to then undertake a periodic review every 15 years thereafter. This process is known as the Review of Old Mineral Permissions (ROMPs).

- 3.4.9 This permission covers the area of Holford Brinefield which includes the caverns discussed previously.

Springbank Farm

- 3.4.10 Springbank Farm is located immediately to the west of the existing Holford Brinefield. It is located partially within land required for the construction and operation of the Proposed Scheme. The location of the proposed facility is shown on map LQ-01-308 (in the Volume 5, Land quality Map Book).
- 3.4.11 A planning applications decision notice from Cheshire County Council to ICI in 1998 (Application 4/32984 and 5/98/0192P) describes the proposed extension of the brinefield comprising controlled brine pumping activities and subsequent storage of waste from brine processing within five planned caverns, permitted until 2042.
- 3.4.12 The original planning application did not include for gas storage and was subsequently amended. A further planning application in 2002 included the proposal for additional activities to be carried out from 2004. These activities were proposed to comprise the controlled solution mining of salt, and construction of associated infrastructure, from eight new caverns and subsequent use for storage of natural gas (Application 4/APP/2002/0234). A total of twelve caverns have been subject to planning applications within the Springbank Farm site.
- 3.4.13 Four of the proposed caverns are located beneath the route of the Proposed Scheme.
- 3.4.14 To date no development of the Springbank Farm extension has been carried out.

King Street Energy

- 3.4.15 The proposed King Street Energy development is located largely to the east of the route of the Proposed Scheme, immediately to the south of the existing Holford Brinefield. The location of the development site is shown on map LQ-01-307 (in the Volume 5, Land quality Map Book).
- 3.4.16 An initial planning application was submitted in 2008 for a Hazardous Substances Consent (08-2782-FZ5) in relation to the storage of natural gas at the site but was rejected on the grounds that the wider development had not yet been finalised.
- 3.4.17 Applications (4/07/2846/FZ5) were subsequently submitted in 2012 for the proposed controlled brine extraction, and associated infrastructure, from ten new cavities specifically designed for natural gas storage within the site covering approximately 97 hectares. It was proposed to store approximately 263 million cubic metres or 10,000 tonnes of natural gas, with approximately 160 million cubic metres available for trading.

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- 3.4.18 The proposed caverns are located in the western part of the overall King Street Energy development site and situated outside of the land required for the operation of the Proposed Scheme.
- 3.4.19 To date no development of the King Street Energy extension has been carried out.

Waste management licences and environmental permits

- 3.4.20 Holford Brinefield site is registered by the Environment Agency as an authorised 'landfill' (permit reference EPR/XP3934SL) although this is actually a permit for deep underground storage of waste in salt caverns. The authorised operator is INOVYN Enterprises Limited.
- 3.4.21 The environmental permit EPR/XP3934SL for the facility states that it is for the disposal of waste in a landfill. The specified activity under the permit is the landfill for non-hazardous waste and landfill restoration. The annual waste input limit is listed as 220,000 tonnes per year.
- 3.4.22 The only permitted waste stream in the permit are wastes from the manufacture, formulation, supply and use of salts and their solutions and metallic oxides.

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 (LGS) are present in the Wimboldsley to Lostock Gralam area.
- 4.1.2 Engagement with Cheshire RIGS was undertaken in 2018 and data provided by the group has identified one Regionally Important Geodiversity site within the Wimboldsley to Lostock Gralam area, as described below.
- 4.1.3 Billinge Flashes is located in the centre of the study area, roughly 500m east of Shipbrookhill and in proximity to several farms. It comprises a number of lakes and is thought to have formed from the subsidence of a buried glacial valley resulting from rock solution beneath porous sands, gravels and clays, and former historical uncontrolled brine pumping in the area.
- 4.1.4 Billinge Flashes is crossed by the route of the Proposed Scheme and is therefore, within land required for the construction of the Proposed Scheme. Refer to Map Book CT-05-313¹¹ for the site location.

¹¹ High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Volume 2 Map Book, map CT-05-313*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

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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;
- planning applications;
- historical ground investigation reports submitted as part of planning applications;
- landfill site data; and
- foot and mouth burial sites.

5.2 Local authorities contaminated site data

5.2.1 There are no sites within the study area potentially considered as contaminated land by Cheshire East Council (CEC). No information was provided by CWCC in relation to contaminated sites.

5.3 Planning applications

5.3.1 Available historical ground investigation reports submitted as part of the planning application process are outlined in Table 17.

Table 17: Summary of ground investigation reports from local authority planning applications

Planning reference and location / grid reference	Relevant site ID	Description	Comment
02/0548P Plumley Lime Beds, Plumley, adjacent to land required for the construction of the Proposed Scheme (370810 375052)	Boundary of investigation from planning portal not given. MA02-210, MA02-211 and MA02-215 within footprint of Plumley Lime Beds	Interpretive report concluded no plausible link between polluted shallow groundwater and more sensitive abstracted groundwater in area. Shallow groundwater was thought to be flowing into the river, which is good quality.	Identified as a potential contamination site and included in detailed assessment.
10/01794/OUT Land at Stubbs Lane, Lostock Gralam, adjacent to land required for the construction of the Proposed Scheme (369535 374873)	None	Phase 1 investigation identified no sources of contamination at the site and the following ground investigation found no concentrations of contaminants in exceedance of respective screening values.	Not identified as a potential contamination site.

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5.4 Landfill site data

5.4.1 Table 18 presents information provided by CEC regarding landfill sites within the study area, identified within the Wimboldsley to Lostock Gramam area. No data was provided by CWCC.

Table 18: Summary of landfill sites

Landfill permit number and location	Relevant site ID	Description	Comment
EAHLD17139 Croxtan Lane, Middlewich, Cheshire (370810, 375052)	MA02-107	Construction and demolition wastes, house and shop refuse plus builder's rubble and soil. Partially within the study area.	Not identified as a potential contamination site.

5.5 Foot and mouth burial sites

5.5.1 Table 19 presents information provided by local authorities in relation to possible foot and mouth animal burial sites within the study area. Available records do not provide an exact location for the burial or pyre sites but give the grid reference of the farm concerned.

Table 19: Foot and mouth burial pits (1967 outbreak)

Site name	Details	Comment
Wimboldsley Hall	Middlewich (grid reference 368300 362400). Cattle: 154, sheep: 2, pigs: 50	Not considered in the detailed assessment.
Lea Hall and Rookery Farm	Wimboldsley, Middlewich (grid reference 368100 363900) Cattle: 259	Not considered in the detailed assessment.
Dairy House Farm	Wimboldsley, Middlewich (grid reference 368200 364600) Cattle: 211	Not considered in the detailed assessment.
Norcroft Farm	Wimboldsley, Middlewich (grid reference 369200 364800) Cattle: 144	Not considered in the detailed assessment.
Clive Green Farm	Clive Green, Winsford (grid reference 367600 364900) Cattle: 10	Not considered in the detailed assessment.
Park Farm	Stanthorne, Middlewich (grid reference 368400 365300) Cattle: 105, pigs: 19	Not considered in the detailed assessment.
Yew Tree Farm	Stanthorne, Middlewich (grid reference 368600 365700) Cattle: 97	Not considered in the detailed assessment.
Clive Hall	Winsford	Not considered in the detailed assessment.

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Site name	Details	Comment
	(grid reference 367300 365800) Cattle: 40, pigs: 39	
Stanthorne Hall	Middlewich (grid reference 368100 366600) Cattle: 129	Not considered in the detailed assessment.
Brook House Farm	Middlewich (grid reference 371400 366500) Cattle: 103	Not considered in the detailed assessment.
Dairy House Farm	Croxton, Middlewich (grid reference 369400 367900) Cattle: 146	Not considered in the detailed assessment.
Langford Farm	Lostock Gralam (grid reference 370400 374000). Cattle: 83	Not considered in the detailed assessment.

5.6 Other regulatory data

5.6.1 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 20 below.

Table 20: Summary of other regulatory data

Data	Description
Control of Major Accident Hazards (COMAH) sites	COMAH site reference: Holford H165 Gas Storage Cavity, National Grid Gas Plc, Moss Lane, Holford, Cheshire, CW9 7TG. This COMAH address is located within the study area approximately 1.1km to the east of the route of the Proposed Scheme. This relates to gas storage within the existing Holford Brinefield (MA02-181).
Pollution incidents to controlled waters	There were 71 minor, 5 significant and one major pollution incidents to controlled waters reported within the study area between 1991 and 2016. Major 1993 - major pollution incident occurred to an unknown water course (nearest water course is the Shropshire Union Canal) west of Manor Park. It involved the release of agricultural pollutants with a 'strong organic load' (cause unknown). Significant 1994 - unknown water course (nearest water course is the Shropshire Union Canal) west of Wimboldsley Grange. It involved the release of agricultural pollutants (slurry/animal waste) from yard washings, due to poor/inadequate maintenance. 1994 - unknown water course (nearest water course is River Wheelock) east of Stanthorne. It involved the release of inert suspended solids, due to in-river works. 1995 - tributary of the River Weaver south-east of Clive Green. It involved the release of organic waste (cattle slurry) due to a leaking underground pipe. 1997 - unnamed freshwater stream at Winsford Industrial estate. It involved the accidental spillage of chemicals (paint and dyes).

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Data	Description
	1997 - the River Croco to the west of Midpoint 18 Motorway Industrial Estate in Middlewich. It involved the accidental spillage of diesel oil.
Discharge consents	Environment Agency data indicate that there are 45 discharge consents to surface water within the study area. The majority of these relate to sewage or trade discharges.
Environmental permits	There are six petrol stations, as well as numerous local authority pollution prevention and control permits in the study area. There are 15 recorded sites with integrated pollution prevention and control permits in the study area.
Ecological SSSI	Wimboldsley Wood SSSI is a nationally significant ecological designation and is located approximately 20m from land required for the construction of the Proposed Scheme. Plumley Lime Beds SSSI is a nationally significant ecological designation and is located adjacent to land required for the construction of the Proposed Scheme to the east of Lostock Gralam.
Local Wildlife Sites (LWS)	There are 30 LWS located within the study area, including 16 located within, or partially within, the land required for the construction of the Proposed Scheme.

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6 Site visit records

6.1.1 Records of site visits are included in the following section. The number of site visits was limited by land access restrictions. Site specific visits were completed at:

- MA02-183 Lostock Lime Beds and Works Tip;
- MA02-200 Chemical Works; and
- MA02-141 Higgins Lane Farm.

Table 21: Geo-environmental site inspection pro forma for MA02-183 Lostock Limebeds and Works Tip

PROJECT	Site Walkover MA02-183 Lostock Limebeds and Works Tip		
Land Access Number(s):	L17917, L17877, L17911		
Site Name:	MA02-183 Lostock Lime Beds		
Surveyor name:	JS and SG	NGR (centre of land parcel):	368600, 373400
Weather:	Sunny and cold	Date:	13/12/18
OVERVIEW SITE DESCRIPTION			
<p>Waste lime beds with associated infrastructure e.g. pipes, pump house, roadways around edge Process water from TATA works to west of site, pumped to site in pipes then discharged into lime beds. Different cells of lime beds in operation at different times – some grassed/not in use currently Access: via locked gate off Cookes Lane to south-west then track up to beds</p>			
TOPOGRAPHY			
<p>Raised embankments around beds (~2m high) Embankments (~5m high) around edge of site</p>			
SOIL QUALITY			
No soil visible			
MINING EVIDENCE			
No mining is known to have occurred in the area and no evidence of mining was identified during the visit.			
WATER QUALITY			
<p>Observations from a distance when standing on access track around beds: Water from adjacent TATA plant being discharged into lime beds at outfall = cloudy white (high sediment load) and steaming. Much of sediment has dropped out of suspension prior to first corner in lime bed channel Water in drains along eastern edge leading to surface water discharge point at Wade Brook = minimal sediment suspended</p>			
SITE DRAINAGE			
Water only noted in channels in lime beds and drains flowing to Wade Brook. Some standing water in unused lime beds understood to be from recent rainfall.			
VEGETATION COVER			
Grass only, present to the side of the lime beds and on embankments around the site. The grass close to the lime bed channel was discoloured from sediment deposition following channel overtopping.			
ECOLOGICAL ISSUES (OUTLINE)			
None			

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PROJECT	Site Walkover MA02-183 Lostock Limebeds and Works Tip
BUILDINGS AND LARGE INFRASTRUCTURE (if applicable)	
None	
ANCILLARY INFRASTRUCTURE (if applicable)	
Pump house in centre of the site and above ground pipes entering the site from the north and following the north western edge of the lime beds before changing to run south-east between two beds to the pump house.	
SITE OPERATION (PAST AND PRESENT)	
Understood to have been used as lime beds for many years	
VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION	
White residue in beds, understood to be calcium chloride through discussion with site operatives	
SURROUNDING LAND USE	
NORTH	Fields and lime processing facility
EAST	Residential/fields
WEST	Residential
SOUTH	Residential
GENERAL	
MISCELLANEOUS COMMENTS/NOTES	

Table 22: Geo-environmental site inspection pro forma for MA02-200 Chemical works

PROJECT	Site Walkover MA02-200 Chemical works		
Land Access Number(s):			L5910
Site Name:	MA02-200 Chemical works		
Surveyor name:	SG and MH	NGR (centre of land parcel):	370400, 374640
Weather:	Sunny and breezy	Date:	26/09/18
OVERVIEW SITE DESCRIPTION			
Surrounded by 2m high wire fence with barbed wire, although gaps present through which access to the site was gained. Large padlocked gates to north at area of hardstanding. Site overgrown with weeds and trees. Lots of rubbish and piles of made ground (brick, concrete, wire fencing etc.), with evidence of recent bonfires and litter, such as bottles and cans. Railway tracks evident in concrete at northern entrance.			
TOPOGRAPHY			
Flat other than mounds of material/possible building remains			
SOIL QUALITY			
No visual contamination observed other than litter			
MINING EVIDENCE			
No mining is known to have occurred in the area and no evidence of mining was identified during the visit.			
WATER QUALITY			
No water was observed during the site visit.			

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PROJECT		Site Walkover MA02-200 Chemical works	
SITE DRAINAGE			
Three underground tanks/drains in the south, one large pit in the north – all observed as surface covers missing Some waterlogged soils near south of site No other surface water			
VEGETATION COVER			
Mature trees, grass, moss – appear healthy Less growth on areas of railtrack/hardstanding			
ECOLOGICAL ISSUES (OUTLINE)			
None noted			
BUILDINGS AND LARGE INFRASTRUCTURE (if applicable)			
Large areas of concrete hardstanding now covered by a thin layer of soil Foundation slabs of some structures still in place			
ANCILLARY INFRASTRUCTURE (if applicable)			
Pump house and pipes			
SITE OPERATION (PAST AND PRESENT)			
Old chemical works with rail access Now derelict			
VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION			
Litter			
SURROUNDING LAND USE			
NORTH	Active railway line		
EAST	Moss Lane with Holford Brinefield offices		
WEST	Open fields		
SOUTH	Open fields		
GENERAL	Walkers using roads around site		
MISCELLANEOUS COMMENTS/NOTES			
Small pipe (possibly water monitoring well) from ground in bushes south of derelict building Site has evidence of bonfires and rubbish, suggesting accessed by people			

Table 23: Geo-environmental site inspection pro forma for MA02-141 Higgins Lane Farm

PROJECT		Site Walkover MA02-141 Higgins Lane Farm	
Land Access Number(s):		L5391	
Site Name:	MA02-141 Higgins Lane Farm		
Project Reference:	HS2	Date:	12/12/18
Surveyor name:	JS and SG	NGR (centre of land parcel):	368450, 371200
Weather:	Fair but cold		
OVERVIEW SITE DESCRIPTION			
Derelict looking farmhouse with barns/stables (filled with disused items) Mounds of surplus materials in the south, including; soils, tyres, old tank, possible asbestos sheeting etc. Horses and cows present in barns/outbuildings on the site Possible asbestos cement sheeting on stables			

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PROJECT	
Site Walkover MA02-141 Higgins Lane Farm	
TOPOGRAPHY	
Flat	
SOIL QUALITY	
Topsoil appears in good condition A few mounds (~1.5m high, up to 10m wide) of material, comprising soil and made ground on-site to rear of buildings, made ground of gravelly loam with brick, concrete, metal and plastics. No other visual or olfactory evidence of contamination.	
MINING EVIDENCE	
No mining is known to have occurred in the area and no evidence of mining was identified during the visit.	
WATER QUALITY	
No water was seen on-site other than in puddles on hardstanding and in a slurry pit leading off a barn containing cattle. Puddles and slurry pit contained some straw/soil/dung with a strong organic odour.	
SITE DRAINAGE	
No drains noted other than the slurry pit leading from the cattle barn Standing water/puddles on tracks around farm	
VEGETATION COVER	
Little vegetation present around farm buildings as almost entirely hardstanding	
ECOLOGICAL ISSUES (OUTLINE)	
None noted	
BUILDINGS AND LARGE INFRASTRUCTURE (if applicable)	
Derelict farmhouse Cattle shed with cows inside Stables with horses Large silo filled with ash (possibly fibrous material) at base	
ANCILLARY INFRASTRUCTURE (if applicable)	
Slurry pit and large tank/silo behind cattleshed (corroded at side)	
SITE OPERATION (PAST AND PRESENT)	
Farm	
VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION	
Presence of mounds of material of unknown composition or origin. Noted presence of asbestos sheeting (likely for roofing), mostly intact	
SURROUNDING LAND USE	
NORTH	Fields
EAST	Fields
WEST	Marina and Trent and Mersey Canal
SOUTH	Fields
GENERAL	
MISCELLANEOUS COMMENTS/NOTES	
None	

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7 References

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