



High Speed Rail (West Midlands - Crewe)

Environmental Statement

Volume 5: Technical appendices

CA2: Colwich to Yarlet

Land quality report (LQ-001-002)



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Department for Transport

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

Telephone: 08081 434 434

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.gov.uk/hs2

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1 Introduction

1.1.1 This document is an Appendix to the land quality assessment for the Colwich to Yarlet community area (CA2), it comprises:

- a summary of engagement undertaken (Section 2);
- detailed risk assessments (Section 3);
- geological sites of special scientific interest (SSSI) and local geological sites (Section 4); and
- mining and minerals data (Section 5).

1.1.2 Maps referred to throughout the land quality Appendix are contained in the Volume 5 Land Quality Map Book (map references LQ-01-105b-L1 to LQ-01-109a).

2 Engagement

2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the Environmental Statement for the Colwich to Yarlet area, the types of information that have been provided to the assessment team and any specific concerns of those engaged with.

Table 1: Engagement on land quality issues undertaken for the Colton to Yarlet area

Local authority or other organisation	Method/ dates of contact	Information provided and/or specific concerns
Staffordshire County Council (SCC)	Meeting (23 March 2016)	SCC provided access to their library of ground investigation and contamination surveys. Reports on sites in the vicinity of the Proposed Scheme were reviewed and information within them used in the land quality assessment. Provided information on the then emerging Minerals Local Plan and progress towards its adoption.
Stafford Borough Council (SBC)	Meeting (14 April 2016) Site visit (21 June 2016)	SBC provided a list of recorded burial and pyre sites relating to the 2001 foot and mouth disease (FMD) outbreak. SCC provided anecdotal information on historical brine pumping at Stafford and general ground conditions in the Stafford area. SCC arranged for a site visit to the former landfill site within the railway cutting at Hopton.
Environment Agency	Meeting (10 May 2016) Email (25 May 2016)	The Environment Agency provided additional information relating to recorded historical landfill sites within the study area and confirmed there were no SSSI (as defined in Part 2A of the Environmental Protection Act (1990) within the study area.
Food and Environmental Research Agency (FERA)	Meeting (16 May 2016)	FERA provided information on the nature and location of FMD burial and pyre sites relating to the 2001 outbreak within the study area.
British Geological Survey (BGS)	Meeting (23 February 2016)	The meeting with BGS provided an opportunity to discuss geological details for parts of the route including the limits of the Late Devensian ice sheet, the halite and gypsum deposits within the study area, aquifer information and mineral resources.
Animal and Plant Health Agency (APHA)	Email (28 July 2016) Telephone (02 August 2016)	APHA provided information on a recorded anthrax burial site from the 1970s in relation to farmland in Hopton, Staffordshire. However, the location provided for the burial is not within the study area. APHA confirmed that the discrepancy in their records is due to two farms being owned by the same person.
Staffordshire County Showground (SCS)	Email (07 April 2016)	SCS provided brief information on the age and nature of the historical landfill site which is located within the Showground. Confirmed that all records were lost in a fire in 1995.

3 Detailed risk assessment

- 3.1.1 This section presents assessments for the higher risk potentially contaminated sites within the study area. For each site the following data is presented:
- baseline risk assessment;
 - construction risk assessment;
 - post-construction risk assessment; and
 - assessment of temporary (construction) and permanent (post-construction) effects.
- 3.1.2 A two stage screening process, stage A and stage B, has been carried out in accordance with the methodology set out in the Scope and Methodology Report (SMR) and its Addendum which are set out in Volume 5: Appendix CT-001-001 and CT-001-002. The SMR Addendum contains the Land Quality Technical Note 5: Detailed methodology for contaminated land assessment.
- 3.1.3 At each of the above stages professional judgement has been used to check that the screening system is highlighting the most significant sites.
- 3.1.4 For those sites which pass through stage B, a further two stage (stages C and D) detailed risk assessment has been carried out in accordance with the methodology set out in the SMR.
- 3.1.5 The results of stage C are presented in three conceptual site models (CSM) as qualitative risk assessments (baseline, construction and post-construction). The construction and post construction risk assessments assume that appropriate mitigation has been undertaken and that the operation of the railway is in accordance with environmental legislation.
- 3.1.6 Where nearby sites present a similar contamination risk, they may be grouped and considered together. This may be the case in the more urban areas where, for example, a light industrial estate may be considered as one site, rather than a number of individual sites. Similarly, in rural areas, small historical backfilled ponds and pits might be grouped together.
- 3.1.7 Where sites have been grouped together, only one CSM is prepared for the grouped sites.
- 3.1.8 The sites assessed in this study area are set out in Table 2.

Table 2: Sites included in the detailed risk assessment within the Colwich to Yarlet area

Site reference	Name
2-107, 2-162, 2-176, 2-171, 2-168, 2-5, 2-23	Kents Barn Farm, SCC Holding No. 33, Yarlet Bank Farm, Hilltop Farm, Grove Farm, Moreton Grange Farm, Tithebarn Farm. Farms grouped for purposes of assessment
2-37	Sewage Filter Bed
2-39 and 2-245	Railway embankments (active)
2-41	Infilled ponds at Hoo Mill

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2-42 and 2-220	Mountford - Tixall landfill site and Mill House landfill site (JW Hunt)
2-71, 2-55, 2-83, 2-85, 2-76, 2-213	Brick House Farm, Upper Hanyards Farm, Mount Farm, Lowerbridge Farm, Lowerhouse Farm, Canal Side Farm. Farms grouped for purposes of assessment
2-56	Tank within farmyard at Upper Hanyards
2- 60	Madders - Lower Hanyards Farm landfill site, Hanyards Lane
2-65 and 2-66	Tanks within Staffordshire County Showground
2-69	Staffordshire County Showground landfill (Elmstar Plant)
2-70 and 2-77	Smithies, Hopton
2-89	Ministry of Defence (MoD) Stafford Depot off Within Lane, Hopton
2-94	Infilled pit at Hopton Farm
2-95	Filter bed/tank, Hopton
2-96	Vehicle servicing garage, Hopton
2-97	Stafford Borough Council – Hopton Railway Cutting landfill, Within Lane, Hopton
2-106	Kents Barn Farm No. 3 landfill, Hopton
2-108	Kents Barn Farm No. 2 landfill (H Nickolls and Son (Milford) Ltd), Sandon Road, Hopton
2-164	Yarlet Bank former garage/petrol station
2-179	Historical tank within farmland, Yarlet
2-189	Dismantled railway, Hopton
2-208	Potential anthrax infected cattle burial site, Hopton
2-219	Challinor – Within Lane landfill site, Hopton
2-221	British Pipeline Associate (BPA) Pipeline, Marston to Bishton
2-254, 2-255, 2-256, 2-249, 2-247, 2-248, 2-253	Tanks, factory, pumping station and depots on Pasturefields Enterprise Park

3.1.9 Contaminant types included within the risk assessments are based on the Department of the Environment, Farming and Rural Affairs (DEFRA) and Environment Agency (2002); Priority Contaminants Report CLR 8¹. Although this report has been withdrawn by the Environment Agency, there has been no subsequent authoritative replacement.

3.1.10 The remainder of this section presents the risk assessment for the sites going through to Stage C and D of the assessment. These sites are shown on Maps LQ-01-105b-L1 to LQ-01-109a (Volume 5 Land Quality Map Book).

3.1.11 The following abbreviations are used in these tables:

¹ Department for Environment, Food and Rural Affairs and Environment Agency (2002), *Potential Contaminants for the Assessment of Land*. R&D Publication CLR8

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- BOD – biochemical oxygen demand;
- COD – chemical oxygen demand;
- FMD – foot and mouth disease;
- MSA – mineral safeguarded area;
- PAH – polynuclear aromatic hydrocarbons;
- PCB – polychlorinated biphenyls;
- TPH – total petroleum hydrocarbons; and
- UXO – Unexploded ordnance.

3.1 Baseline risk assessment

Table 3: Farms grouped for purposes of assessment– site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination resulting from leaks and spills of liquids and solids, use of agricultural chemicals, burial of animal remains</p> <p>May include diesel fuel, lubricating oils, solvents, slurry and agricultural chemicals such as pesticides</p> <p>Potential for a range of organic contaminants including but not limited to asbestos, hydrocarbons (diesel range, lubricating oils, solvents), ammonia, elevated BOD, elevated COD, pesticides, anthrax</p>	On-site users Farm occupants, occasional farm workers and livestock	Direct contact, ingestion of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	Off-site users Residential and surrounding farmland	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
Direct contact with contaminated soils and waters		Unlikely	Minor	Very low	

Description

The main characteristics of these sites are:

- superficial deposits are absent in these areas and the underlying bedrock is classified as a Secondary B aquifer;
 - the sites are not located within a groundwater protection zone;
 - there are sensitive receptors within 10m of the sites, including residential. Some sites lie in close proximity to surface watercourses;
 - sites assessed without construction of the Proposed Scheme; and
 - assumes offsite receptors may be at risk during ploughing or other ground disturbance, or application of chemicals.
-

Table 4: 2-37 Sewage Filter Bed – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Potential for soil and groundwater contamination associated with a sewage treatment works (small scale)</p> <p>Contaminants may include, but may not be limited to heavy metals, cyanides, nitrates, nitrites, sulphate, asbestos, extremes of pH, oil/fuel hydrocarbons, sewage bacteria and pathogens, methane</p>	On-site users Maintenance workers at the treatment works	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	Off-site users Residential properties and farmland	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer in superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- superficial deposits are present in this area, which are classified as a Secondary A aquifer. The bedrock is classified as a Secondary B aquifer;
 - the site is not located in a groundwater protection zone;
 - there are sensitive receptors within 10m of the site, including residential properties. There is a surface watercourse approximately 100m to the south. The site is located within a MSA;
 - site assessed without construction of the Proposed Scheme; and
 - assume those involved in maintenance of the sewage treatment works (STW) would take appropriate precautions to protect their health and safety when working within the STW. Assume no public access to STW.
-

Table 5: 2-39 and 2-245 Railway embankments (active) – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Potential for soil and groundwater contamination associated with an active railway line</p> <p>Railway is on embankment, which may have been constructed using potentially contaminated fill materials including but not limited to heavy metals, sulphates, asbestos, PAH, chlorinated solvents and PCB</p>	<p>On-site users</p> <p>Railway workers, trespassers (assume rail passengers would not come into direct contact)</p>	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	<p>Off-site users</p> <p>Residential and Great Haywood Marina users, residential</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	<p>Controlled waters - groundwater</p> <p>Secondary A aquifer in the superficial deposits</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	<p>Controlled waters - surface water</p> <p>River Trent</p> <p>Trent and Mersey Canal</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Likely	Minor	Moderate/low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases or vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- superficial deposits are present beneath the embankment at Great Haywood, classified as a Secondary A aquifer. The bedrock is classified as a Secondary B aquifer. Superficial deposits are present beneath the Moreton embankment at Colwich, designated as a Secondary A aquifer;
 - the sites are not located in a groundwater protection zone; and
 - there are sensitive receptors within 50m of the site at Great Haywood, namely the River Trent and the Trent and Mersey Canal.
-

Table 6: 2-41 Infilled ponds at Hoo Mill – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate, ground gas and groundwater contamination from infilling of historical ponds with unknown fill materials</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH</p>	On-site users	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
	Agricultural fields with occasional farm workers and livestock	Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Low likelihood	Minor	Low
	Off-site users Agricultural and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary A aquifer in the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Minor	Moderate
	Controlled waters - surface water River Trent Trent and Mersey Canal	Lateral migration through groundwater Direct run-off from site	High likelihood	Minor	Moderate
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
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Description

The main characteristics of this site are:

- superficial deposits are present in this area, classified as a Secondary A aquifer. The bedrock is classified as a Secondary B aquifer;
 - The site is not located within a groundwater protection zone;
 - there are sensitive receptors within 10m of the site, including residential properties a surface water drain (tertiary watercourse) and the River Trent. The site is located on an MSA;
 - the site has been assessed without construction of the Proposed Scheme;
 - the nature of the materials used to infill the ponds are not known, but have included organic materials which would have the potential to generate landfill gases. The land has been returned to agricultural use following infilling and there are currently no enclosed structures over it. The area is unlikely to have been lined or have a formal capping system over the materials placed within the ponds, therefore any landfill gases are likely to be freely venting to atmosphere; and
 - the proximity of surface watercourses and the potentially granular nature of the superficial deposits (sand and gravel, the reason why the site is within the MSA) means that mobile contamination in groundwater and surface water run-off has a high probability to impact on the surface watercourses and groundwater locally.
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Table 7: 2-42 Mountford - Tixall landfill site and 2-220 Mill House landfill site (JW Hunt) – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate, ground gas and groundwater contamination from historical landfills</p> <p>Potential for a range of organic and inorganic contaminants including, but not limited, to heavy metals, asbestos, ammonia, ground gases (methane, carbon dioxide) and organics such as PAH</p>	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Commercial buildings (Chell Aircraft Spares and Anglo Welsh Ltd) within 40m of Mill House landfill	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary A aquifer in superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water Mill House landfill - Trent and Mersey Canal and River Trent Tixall landfill - drain and River Trent	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
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Description

The main characteristics of this site are:

- the sites are not within the area required for construction. Tixall landfill site is located on the boundary of the area required for construction;
 - there are superficial deposits present beneath the sites, which are classified as a Secondary A aquifer. The underlying bedrock at Mill House landfill is classified as a Secondary B aquifer and at Tixall as a Principal aquifer;
 - there are sensitive receptors within 10m of the Mill House landfill site, which lies close to the Trent and Mersey canal and the River Trent and is within 40m of properties off Mill Lane to the south and east. Tixall landfill is not located close to any properties, the nearest property is Hoomill Cottages approximately 370m north-east of the landfill. However, there is a surface water drain on the boundary of Tixall landfill which appears to connect to the River Trent approximately 320m to the east of the site;
 - sites assessed without construction of the Proposed Scheme;
 - Tixall landfill site last waste input was either 1995 or 1997 and records held by SCC state that it received "inert subsoils and soils". Mill Lane landfill last received waste in 1990 and was reported to have received "demolition and construction waste". As both sites received largely inert, non-biodegradable waste, they are not expected to be capable of producing significant quantities of landfill gas. Surrender information provided for Tixall landfill recorded low concentrations of landfill gas on completion. Both sites were returned to use as agricultural land on completion of landfilling;
 - both sites have been closed for a minimum of 20 years and with no formal capping, lining or leachate collection systems in place, any mobile contamination within the waste will have become dissolved into the shallow groundwater and the source term would be expected to be declining; and
 - the landfills are located within agricultural land. It is assumed that any landfill gas generated can freely vent to atmosphere from the surface. There are no buildings located directly over the landfilled areas in which gas could accumulate to hazardous levels.
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Table 8: Brick House Farm, Upper Hanyards Farm, Mount Farm, Lowerbridge Farm, Lowerhouse Farm, Canal Side Farm-- site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination resulting from leaks and spills of liquids and solids, use of agricultural chemicals, burial of animal remains</p> <p>May include diesel fuel, lubricating oils, solvents, slurry and agricultural chemicals such as pesticides and herbicides, pathogens</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to hydrocarbons (diesel range, lubricating oils, solvents), ammonia, elevated BOD, elevated COD, pesticides, herbicides, FMD, anthrax</p>	On-site users Farm residents, occasional farm workers and livestock	Direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Likely	Minor	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential and surrounding farmland	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Bromsgrove Sandstone Formation Principal aquifer Kidderminster Formation Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Severe	High
	Controlled waters - surface water River Trent Trent and Mersey Canal Series of Tertiary Rivers	Lateral migration through groundwater	Likely	Medium	Moderate
		Direct run-off from site			
	Exposure to gases and vapours	Unlikely	Severe	Moderate/low	

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property receptors - buildings, foundations and services (off-site)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

The main characteristics of these sites are:

- all sites are located over a Principal aquifer within the sandstone bedrock;
- groundwater is abstracted at 2-55 Upper Hanyards Farm for potable supply. This farm is in a source protection zone (SPZ) associated with the abstraction;
- there are sensitive receptors within 10m of the sites, including residential properties, MSA and surface watercourses; and
- the assessment assumes offsite receptors may be at risk during ploughing or other ground disturbance, or application of chemicals.

Table 9: 2-56 Tank within farmyard at Upper Hanyards – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tank within farmyard. There is a private groundwater abstraction at farm used by Upper and Lower Hanyards Farms</p> <p>Tank contents unknown, but may have contained diesel fuel, slurry or agricultural chemicals such as sheep dip, tank now removed</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), ammonia, elevated BOD, elevated COD, pesticides</p>	On-site users Farm residents and occasional farm workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Likely	Medium	Moderate
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential (Lower Hanyards Farm)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Likely	Medium	Moderate
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer, SPZ associated with private borehole	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Severe	High
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Minor	Low
		Direct contact with contaminated soils and waters	Likely	Minor	Moderate/low

Description

The main characteristics of this site are:

- superficial deposits are absent in this area, and the underlying bedrock is classified as a Principal aquifer;
 - the site is located within a groundwater protection zone, associated with the borehole which is located at Upper Hanyards Farm and is used to supply potable water to Upper and Lower Hanyards Farms;
 - there are sensitive receptors within 10m of the site, including residential properties. There are no surface watercourses within 250m of the site;
 - the site has been assessed without construction of the Proposed Scheme; and
 - the tank was removed in recent times, therefore source term is assumed to be finite and declining.
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Table 10: 2-60 Madders - Lower Hanyards Farm Landfill Site – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate, ground gas and groundwater contamination from historical landfills</p> <p>Potential for a range of organic and inorganic contaminants including, but not limited, to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH</p>	On-site users Agricultural, occasional workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential (Lower Hanyards Farm and Upper Hanyards Farm)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- the landfill site accepted waste between 1992 and 1996. Waste received was described as dry inert rubble, hardcore, bricks, soil and subsoil. As the waste received is believed to be largely inert, and filling was completed over 20 years ago, the landfill is not expected to be generating significant quantities of landfill gas;
 - superficial deposits are absent in this area, and the underlying bedrock is classified as a Principal aquifer;
 - the site is not located in a groundwater protection zone, but groundwater is abstracted at Upper Hanyards Farm for potable use by both Upper and Lower Hanyards Farms;
 - there are sensitive receptors within 10m of the site (a surface water drain to the immediate east of the site) and residential properties at Upper and Lower Hanyards Farms within 250m of the site;
 - site has been assessed without construction of the Proposed Scheme;
 - historical landfill site assumed to be unlined with no formal capping system or leachate control measures installed. The site was returned to agricultural use following completion of landfilling. The landfill is located within an agricultural field, with no confined spaces (buildings) present over it; and
 - there is known to be a potable groundwater abstraction borehole at Upper Hanyards Farm to the north-east. The water from the borehole is used to supply water to both Upper and Lower Hanyards Farms. The exact location of the borehole is not known, and therefore it is not known whether the landfill is located within the 250m SPZ for the borehole. It is considered possible that the groundwater quality within the borehole may be influenced by contamination from the landfill.
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Table 11: 2-65 and 2-66 Tanks within Staffordshire County Showground – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tanks within Staffordshire County Showground site. Tanks were not observed to be present during recent site visit</p> <p>Tank contents unknown, but may have contained diesel fuel or agricultural chemicals</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), pesticides, herbicides, fertilisers</p>	On-site users Showground staff and members of the public	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Severe	Moderate
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

The main characteristics of this site are:

- the site is not located within the area required for construction;
 - superficial deposits are absent in this area, and the underlying bedrock is classified as a Principal aquifer;
 - the sites are potentially located in a groundwater protection zone, associated with the borehole or boreholes which are used to abstract groundwater for on-site use;
 - there are sensitive receptors within 50m of the sites;
 - the sites have been assessed without construction of the Proposed Scheme; and
 - assumed tanks were above ground (AST) as were shown on OS maps until recent times, but are no longer present. Assume source term is finite and declining.
-

Table 12: 2-6g Staffordshire County Showground landfill (Elmstar Plant) – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfill Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and hydrocarbons	On-site users	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
	Plant staff, recreational users and domestic animals	Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users - structures within Staffordshire County Showground within 50m	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Severe	High
	Controlled waters - surface water Unnamed stream 370m to south-east	Lateral migration through groundwater Direct run-off from site	Likely	Negligible	Low
	Property receptors - buildings, foundations and services (on-site and off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

The main characteristics of this site are:

- the landfill site is located in the south-western corner of the SCS site. Current use of landfilled area is for car park, woodland walks and display area/dog showing ring. There are no enclosed structures within the landfilled area;
 - superficial deposits are absent within this area and the underlying bedrock is classified as a Principal aquifer;
 - the Showground has a licensed groundwater abstraction, which is used for agricultural purposes. The exact location of the abstraction within the showground is not known. The abstracted groundwater is licensed for agricultural purposes, potentially it may be used for animal drinking water, but not believed to be used as potable water for humans. As the location is not known, the site may lie within a SPZ associated with these abstractions;
 - there are sensitive receptors within 50m of the landfill, comprising structures within the showground site. There are residential properties approximately 350m from the landfill to the south-east and north-west, but given the distance these are not classed as sensitive receptors. There is a surface watercourse (unnamed) approximately 370m to the south-east of the landfill, but the distance to this receptor means it is not classed as a sensitive receptor;
 - site has been assessed at baseline, without construction of the Proposed Scheme;
 - the landfill was licensed in 1986 and the last input of waste was in 1989. The Environment Agency records the waste as construction, excavation and demolition materials. The Showground has stated that the purpose of the landfilling was to raise and level the land and that this was done using 'inert materials'. Unfortunately any further records relating to the landfilling were lost in a fire on the showground site in 1995. It is understood that the landfill is unlined and does not have a formal capping system or any leachate control. The landfill license was surrendered in 1992; and
 - given the inert nature of the wastes placed within the landfill and the time which has elapsed since completion, it is not expected to be generating significant quantities of landfill gas. The landfill is not capped and therefore surface water is free to pass through the waste, which is likely to have resulted in mobile contaminants entering the groundwater locally.
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Table 13: Baseline CSM and qualitative risk assessment 2-70 and 2-77 Smithies, Hopton

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination resulting from historical use of the sites as a blacksmith's workshop, or Smithy. Potentially contaminative materials may have included coal ash from the forges, asbestos from fireproof materials, oils and greases</p> <p>Potential for contaminants including, but not limited to heavy metals, PAH, asbestos, hydrocarbons including lubricating oils</p>	On-site users Residential	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential and agricultural	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Negligible	Low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Negligible	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Likely	Negligible	Low

Description

The main characteristics of these sites are:

- superficial deposits are absent in these areas and the underlying bedrock is classified as a Principal aquifer;
 - the site is not located in a groundwater protection zone;
 - there are sensitive receptors within 10m of both sites, including residential. Both sites are located within a MSA. The former smithy at The Croft in Hopton is located approximately 120m to the north of a stream. The former smithy at Brick House Farm is located approximately 270m to the north of a drain;
 - sites assessed without construction of the Proposed Scheme; and
 - neither building indicated on historical maps to have been the smithy is shown on current mapping, suggesting that both sites have been redeveloped. It is not known when the sites were redeveloped, therefore it is assumed that the sites were not remediated prior to construction of the new developments and contamination associated with the smithies may remain.
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Table 14: 2-8g MoD Stafford Depot off Within Lane, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination from MoD operations at the site off Within Lane</p> <p>Potential for a range of contaminants associated with equipment maintenance, repair and storage, including but not limited to fuels, solvents, lubricating oils, asbestos, PCBs, chlorinated hydrocarbons, heavy metals, extremes of pH, UXO</p>	On-site users MoD staff and visitors	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low Likelihood	Minor	Low
	Off-site users Residential and agricultural	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Minor	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

The main characteristics of these sites are:

- superficial deposits are absent in this area, and the underlying bedrock is classified as a Principal aquifer;
 - the site is not located in a groundwater protection zone;
 - there are sensitive receptors within 10m of the site, including residential and MSA. No sensitive surface water receptors have been identified within 250m of the site;
 - the site is bounded to the west by a historical landfill site (Hopton North cutting), which may be generating landfill gas. The landfill site is not within the MoD site boundary and has been assessed separately;
 - the site has been assessed without construction of the Proposed Scheme; and
 - it is assumed that the MoD may be aware of any contamination issues within the site and are managing them to prevent exposure to staff and visitors, under their Health and Safety obligations.
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Table 15: 2-94 Infilled marl pit at Hopton Farm – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate, ground gas and groundwater contamination from infilling of historical pit with unknown fill materials. Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users - Agricultural workers and livestock	Direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low Likelihood	Minor	Low
		Inhalation of ground gases	Low Likelihood	Minor	Low
	Off-site users Agricultural and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters - surface water Kingston Brook	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- superficial deposits are absent in this area and the underlying bedrock is classified as a Secondary B aquifer;
 - the site is not within a groundwater protection zone;
 - there are sensitive receptors within 10m of the site (residential development, not shown on OS mapping but shown on aerial images as having been constructed), the site is located over an MSA and there is a surface watercourse (Kingston Brook) located approximately 130m to the south-east of the site;
 - the site has been assessed without construction of the Proposed Scheme;
 - the nature of the waste placed within the infilled pit and the dates of infilling are not known. It is assumed that the material may have included organic materials which would have the potential to generate gases such as methane and carbon dioxide. The area is assumed not to have been lined or capped on completion of filling and therefore gas is likely to be freely venting to atmosphere. Given the proximity of new residential development to the pit, the probability of exposure is likely as the pathway is very short (10m); and
 - site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.
-

Table 16: 2-95 Filter bed/tank, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Potential for soil and groundwater contamination associated with filter beds/tank</p> <p>Contaminants include but not limited to heavy metals, cyanides, nitrates, nitrites, sulphate, asbestos, extremes of pH, oil/fuel hydrocarbons, sewage bacteria and pathogens, methane</p>	On-site users Maintenance workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Agricultural	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer in the bedrock geology	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very Low

Description

The main characteristics of this site are:

- superficial deposits are absent in this area, and the underlying bedrock is classified as a Principal aquifer;
 - the site is not located in a groundwater protection zone;
 - there are no sensitive receptors within 50m of the site;
 - site assessed without construction of the Proposed Scheme; and
 - assume those involved in maintenance of the filter bed/tank would take appropriate precautions to protect their health and safety e.g. use of appropriate PPE during maintenance works. Assumed no public access to filter bed/tank.
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Table 17: 2-g6 Vehicle servicing garage, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate, ground gas and groundwater contamination from former garage Potential for a range of organic and inorganic contaminants associated with garage including but not limited to heavy metals, inorganics, organics such as PAH, ground gases (methane, carbon dioxide)	On-site users - Garage staff and general public	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential and agricultural	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer of the Mercia Mudstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters - Surface water Kingston Brook	Lateral migration through groundwater Direct run-off from site	Unlikely	Minor	Very low
	Property receptors - potential buildings, foundations and services (on-site and off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- superficial deposits are absent in this area, and the underlying bedrock is classified as a Secondary B aquifer;
 - the site is not located in a groundwater protection zone;
 - there are sensitive receptors within 50m of the site, including residential and an MSA;
 - the site has been assessed without construction of the Proposed Scheme; and
 - site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.
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Table 18: 2-97 Stafford Borough Council – Hopton Railway Cutting landfill, Within Lane, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate, ground gas and groundwater contamination from historical landfill which received mixed wastes including household refuse</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and hydrocarbons</p>	<p>On-site users</p> <p>Maintenance workers</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Off-site users</p> <p>Residential (High Bridge Farm and unnamed farm)</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Medium	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	<p>Controlled waters - groundwater</p> <p>Principal aquifer</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	<p>Controlled waters - surface water</p> <p>Overland flow to south</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Unlikely	Negligible	Very low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- the landfill site was operational before 1974 and continued to receive waste until the 1980s. The wastes received included household refuse. The waste was placed directly into a former railway cutting, which was cut into the sandstone bedrock. The landfill is understood to have no lining and no engineered cap. No leachate control systems are in place. Gas monitoring is carried out by the Environment Agency in standpipes installed around the perimeter of the site. There is a line of gas venting wells along the centreline of the landfill, although on inspection they were blocked with earth and assumed to not be functioning;
 - based on observations made during a site walkover and anecdotal evidence from SBC, landfilling is believed to have stopped at the former bridge over the cutting which leads to a small farm on the eastern site of the cutting;
 - superficial deposits are absent in this area and the underlying bedrock is classified as a Principal aquifer;
 - the site is not located in a groundwater protection zone;
 - there are no surface watercourses within 250m of the landfilled area;
 - there are sensitive receptors within 10m of the landfill, including farm buildings and MoD property. The landfill site is secured from access by members of the public and is heavily overgrown. The site is accessed infrequently by the Environment Agency for monitoring of the gas standpipes and by SBC staff to cut back the vegetation to allow the Environment Agency access. There are no enclosed structures on the site;
 - it is assumed that the Environment Agency/SBC staff accessing the site do so having carried out a risk assessment and will be provided with appropriate PPE to manage the risks;
 - sites assessed at baseline, without construction of the Proposed Scheme; and
 - evidence of groundwater issue/runoff from southern extent of landfill.
-

Table 19: 2-106 Kents Barn Farm No. 3 landfill, Hopton - site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfills Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Residential and agriculture	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
Direct contact with contaminated soils and waters		Unlikely	Minor	Very low	

Description

The main characteristics of this site are:

- superficial deposits are absent in this area and the bedrock is classified as a Secondary B aquifer;
 - the site is not located in a groundwater protection zone;
 - there are sensitive receptors within 10m of the site, but not residential properties or other structures. The site is located over an MSA. There are no surface watercourses within 250m of the site;
 - the site has been assessed without construction of the Proposed Scheme; and
 - the landfill started receiving waste in 1984, and was complete by 1987. The waste was described as "rubble, hardcore and excavated materials". It is considered possible that the waste may have included organic materials such as topsoil, which would have the potential to generate landfill gas. The landfill was returned to agriculture on completion and there are no enclosed structures over it. The landfill is not believed to have been lined or have a formal capping system or leachate management system. Gas is likely to be freely venting to atmosphere. Given that over 30 years has passed since the landfilling was completed, it is anticipated that any landfill gas generation will now be low.
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Table 20: 2-108 Kents Barn Farm No. 2 landfill (H Nickolls and Son (Milford) Ltd), Sandon Road, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil contamination, leachate, ground gas and groundwater contamination from historical landfill Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Residential, agriculture and kennels	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Moderate/low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
Direct contact with contaminated soils and waters		Low likelihood	Minor	Low	

Description

The main characteristics of this site are:

- superficial deposits are absent in this area and the underlying bedrock is classified as a Secondary B aquifer;
 - the site is not located in a groundwater protection zone;
 - there are potential receptors within 10m of the site, including a dog boarding kennels on the western boundary and a residential property at The Oaklands 50m to the east. There are no surface watercourses within 250m of the site;
 - site assessed without construction of the Proposed Scheme;
 - the landfill started receiving waste in 1983 and was complete by 1985. The waste was described as construction and farm waste. It is considered possible that the waste may have included organic materials within the "farm waste", which would have the potential to generate landfill gas. The landfill was returned to agriculture on completion and there are no enclosed structures over it. The landfill is not believed to have been lined or have a formal capping system or leachate management system. Gas is likely to be freely venting to atmosphere. Given that over 30 years has passed since the landfilling was completed, it is anticipated that any landfill gas generation will now be low; and
 - gas risk has been classified as 'low likelihood' even though potential future residential receptors associated with Policy Stafford 2 are present within 10m, building receptors (dog boarding kennels) are within 10m, as waste is older and likely to be low gassing potential now. Also waste is within Mercia Mudstone which has lower permeability, so would not be expected to allow gas to easily migrate to nearby properties. Any gas is free to vent to atmosphere as landfill not built over, thereby reducing the likelihood that gas would migrate laterally if it can escape vertically to atmosphere.
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Table 21: 2-164 Yarlet Bank former garage/petrol station – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil and groundwater contamination from former petrol station/garage Potential for a range of organic contaminants (fuels, oils)	On-site users Retail and public house staff and visitors	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Minor	Very low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Negligible	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Negligible	Very low

Description

The main characteristics of this site are:

- superficial deposits are absent from the area and the underlying bedrock is classified as a Secondary B aquifer;
 - the site is not located within a groundwater protection zone;
 - there are sensitive receptors within 10m of the site, including residential;
 - sites assessed without construction of the Proposed Scheme; and
 - the site is no longer in use as a garage, therefore the source term is assumed to be finite and declining.
-

Table 22: 2-179 Historical tank within farmland, Yarlet – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tank within farmland</p> <p>Tank contents unknown, but may have contained diesel fuel, slurry or agricultural chemicals such as sheep dip, tank now removed</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), ammonia, elevated BOD, elevated COD, pesticides</p>	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary B Aquifer within the Mercia Mudstone Group	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water Unnamed tertiary river	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Negligible	Very low
Direct contact with contaminated soils and waters		Unlikely	Minor	Very low	

Description

The main characteristics of this site are:

- superficial deposits are not located within the site and the underlying bedrock is classified as a Secondary B aquifer;
 - the site is not located within a groundwater protection zone;
 - there are sensitive receptors within 10m of the site (an un-named Tertiary river to the south of the site);
 - tank has been removed in recent times; and
 - site assessed without construction of the Proposed Scheme.
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Table 23: 2-189 Dismantled railway, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Potential for soil and groundwater contamination associated with a former railway line including but not limited to heavy metals, sulphates, asbestos, PAH, chlorinated solvents, PCB	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential and agricultural workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer in the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases or vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

The main characteristics of this site are:

- superficial deposits are present in this area, and are classified as Secondary A aquifer. The bedrock is classified as a Secondary B aquifer;
 - the site is not located within a groundwater protection zone;
 - there are sensitive receptors within 50m of the site, including residential and MSA;
 - sites assessed without construction of the Proposed Scheme;
 - pathways may be created through farming activities such as ploughing where the ground may be disturbed, releasing dust into the air. Site is currently unsurfaced so potential for leaching is high; and
 - site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.
-

Table 24: 2-208 Potential anthrax infected cattle burial site, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil contamination with spores of <i>Bacillus anthracis</i> resulting from historical burial of anthrax-infected cattle dating from the early 1900s</p> <p>Information on the potential burial site was provided by local residents in Hopton, no official record held by APHA</p> <p>Information received suggests cattle were buried, rather than burned, at the site</p>	On-site users Agricultural workers and livestock	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Severe	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Severe	Moderate/low
		Inhalation of ground gases	Unlikely	Negligible	Very low
	Off-site users Residential and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Severe	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Severe	Moderate/low
		Inhalation of ground gases	Unlikely	Negligible	Very low
	Controlled waters - groundwater Principal aquifer	Physical mobilisation and migration from contaminated soils and waters	Unlikely	Severe	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Severe	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	N/A	N/A	N/A
		Direct contact with contaminated soils and waters	N/A	N/A	N/A

Description

The main characteristics of this site are:

- superficial deposits are absent from this area, and the underlying bedrock is classified as a Principal aquifer;
 - the site is not located in a groundwater protection zone;
 - there are sensitive receptors within 10m of the site, including residential properties. There are no surface watercourses within 250m of the site;
 - sites assessed without construction of the Proposed Scheme; and
 - pathways may be created through farming activities such as ploughing where the ground may be disturbed, releasing spores into the air or bringing them into the surface layers of the soil. Spores may also potentially be physically mobilised in surface or groundwater.
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Table 25: 2-219 Challinor – Within Lane landfill site, Hopton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil contamination, leachate, ground gas and groundwater contamination from historical landfills</p> <p>Potential for a range of organic and inorganic contaminants including, but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH, TPH, pesticides</p>	<p>On-site users</p> <p>- site is in an open area (containing Brown Equestrian) next to a depot</p>	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Off-site users - Residential, agricultural and commercial</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	<p>Controlled waters – groundwater</p> <p>Principal aquifer</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium	Moderate
	<p>Controlled waters - surface water</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Likely	Minor	Moderate/low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Medium	Moderate/low

Description

The main characteristics of this site are:

- the site only partially lies within the study area;
 - superficial deposits are absent in the area, and the underlying bedrock is classified as a Principal aquifer;
 - the site is not located in a groundwater protection zone;
 - there are sensitive receptors within 10m of the site (MSA) and within 50m, including residential at Pool Farm. Hopton Pools are located within 50m of the site;
 - sites assessed without construction of the Proposed Scheme; and
 - the Environment Agency does not hold records of when the landfill first started to receive waste, but reported that the licence was issued in August 1985. The landfill is listed as taking 'other wastes', which may include hazardous, non-hazardous and inert wastes. Anecdotal reports suggest the exact nature of the wastes received is not known for certain and there is a long history of disputes with the Environment Agency and the local authority including a High Court injunction under planning legislation. Information from the Environment Agency confirmed that the site appeared to have been capped during a closure inspection. Not known if landfill was lined.
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Table 26: 2-221 BPA Pipeline, Marston to Bishton – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil and groundwater contamination resulting from leaks and spills from BPA pipeline BPA pipeline contents unknown, but may contain gas or hydrocarbon products	On-site users Future residential, agricultural workers and recreational users of agricultural land and Ingestre Park Golf Club	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential, agricultural, recreational users of agricultural land, recreational users/workers of Great Haywood Marina, Staffordshire County Showground, and depot	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer of Kidderminster Formation Principal aquifer of Bromsgrove Sandstone Formation Secondary B aquifer of Mercia Mudstone Group	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Severe	Moderate
	Controlled waters - surface water River Trent Trent and Mersey Canal Unnamed secondary river and a series of tertiary rivers	Lateral migration through groundwater Direct run-off from site	Low likelihood	Severe	Moderate

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- the site comprises a linear feature (a pipeline), parts of which are located within the area required for construction;
 - superficial deposits are present along parts of the pipeline, around the Trent valley and Staffordshire County Showground;
 - the underlying bedrock is classified as either Secondary B or Principal aquifer; and
 - the pipeline passes through outer (250m) source protection zones relating to the borehole abstractions at Staffordshire County Showground and Upper Hanyards Farm
- There are sensitive receptors within 10m of the pipeline in some locations. The pipeline crosses MSA. The pipeline crosses the River Trent and the Trent and Mersey Canal. Leaks are unlikely to go unnoticed due to the likelihood that the pipeline will have a leak detection system.

Table 27: 2-254 Depot, 2-255 Depot, 2-256 Depot, 2-249 Depot, 2-247 Factory, 2-248 Tanks, 2-253 Industrial Estate and Pumping Station all on Pasturefields Enterprise Park – site baseline CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from commercial activities within industrial estate, including above-ground storage tank</p> <p>Tank contents unknown, but may have contained fuel or chemicals</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to hydrocarbons (fuel, solvents), heavy metals, elevated BOD, elevated COD</p>	On-site users Workers and visitors to Pasturefields Enterprise Park	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users - Residential (Rushy Pits Farm, Mumble Farm and properties on A51 Lichfield Road)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Moderate/low
	Controlled waters - surface water Unnamed tertiary river	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Negligible	Very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

The main characteristics of this site are:

- superficial deposits are present beneath all sites, which are classified as a Secondary A aquifer. The underlying bedrock is classified as a Secondary A aquifer;
 - The site is not located within a groundwater protection zone;
 - there are sensitive receptors within 10m of the sites, including the River Trent and two un-named watercourses. The Trent and Mersey Canal is within 250m of the sites. The sites are located within an MSA. The sites are within an allocated area (SBC Policy E3 Pasturefields Industrial Estate) which allows for future expansion of the industrial estate;
 - tank is not present on current OS map, suggesting it is no longer present. However, industrial uses of the Estate may mean other tanks are present within the site;
 - all sites are within the Pasturefields Enterprise Park. It is assumed that the Enterprise Park will be majority hard paving at ground surface, meaning unlikely contact between site users and any contaminated soil. However, any surface spillages could enter the river or streams via the site drainage system, affecting groundwater and surface water quality locally; and
 - site assessed without construction of the Proposed Scheme.
-

3.2 Construction risk assessment

Table 28: Farms grouped for purposes of assessment - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination resulting from leaks and spills of liquids and solids, use of agricultural chemicals, burial of animal remains</p> <p>May include diesel fuel, lubricating oils, solvents, slurry and agricultural chemicals such as pesticides</p> <p>Potential for a range of organic contaminants including but not limited to asbestos, hydrocarbons (diesel range, lubricating oils, solvents), ammonia, elevated BOD, elevated COD, pesticides, anthrax</p>	On-site users Residential, agricultural workers and livestock	Direct contact, ingestion of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	Off-site users Residential, agricultural land	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Minor	Moderate
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	High likelihood	Minor	Moderate
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- five of the sites lie within the area required for construction. Tithebarn Farm (CA2-23) is located on the proposed alignment, assumed to not be occupied during construction, therefore construction and post-construction risks not assessed for this site;
 - during construction standard mitigation procedures are assumed to be implemented in accordance with the draft Code of Construction Practice² (CoCP). Construction workers have been excluded from assessment due to the use of personal protective equipment (PPE)/risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
 - whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
 - assumes construction phase includes remediation that may be required where sites are within the area required for construction; and
 - the Proposed Scheme as it passes all farms is located within a cutting. Potential temporary worsening of groundwater quality as a result of dewatering activities during construction of cuttings, which may draw contaminated groundwater away from the sources.
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² Draft Code of Construction Practice, Volume 5: Appendix CT-003-000

Table 29: 2-37 Sewage Filter Bed - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Potential for soil and groundwater contamination associated with a sewage treatment works (small scale)</p> <p>Contaminants may include, but may not be limited to heavy metals, cyanides, nitrates, nitrites, sulphate, asbestos, extremes of pH, oil/fuel hydrocarbons, sewage bacteria and pathogens, methane</p>	On-site users Maintenance workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	Off-site users - Residential and agricultural land	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- the site is located within the area required for construction of the Proposed Scheme;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumes construction phase would not include remediation of the site itself, as assume it would need to remain in operation during construction;
- proposed route is on embankment past site, assume no dewatering required so no temporary effect on groundwater quality; and
- assume status of site does not change as a result of construction, given controls set out in draft CoCP.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 30: 2-39 and 2-245 Railway embankments (active) - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Potential for soil and groundwater contamination associated with an active railway line</p> <p>Railway is on embankment, which may have been constructed using potentially contaminated fill materials including but not limited to heavy metals, sulphates, asbestos, PAH, chlorinated solvents, PCB</p>	<p>On-site users</p> <p>Railway workers and trespassers (assume rail passengers would not come into direct contact)</p>	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	<p>Off-site users</p> <p>Residential and users of Great Haywood Marina</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	<p>Controlled waters - groundwater</p> <p>Secondary A aquifer within the superficial deposits</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	<p>Controlled waters - surface water River Trent</p> <p>Trent and Mersery canal</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Likely	Minor	Moderate/low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- both sites are located within the area required for construction of the Proposed Scheme;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumes construction phase includes remediation that may be required;
- assume railway lines will continue operating during construction, as are on WCML; and
- proposed route to be constructed on viaduct over the existing railway. Assume status of site does not change as a result of construction, given controls set out in draft CoCP.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 31: 2-41 Infilled ponds at Hoo Mill - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate, ground gas and groundwater contamination from infilling of historical ponds with unknown fill materials</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH</p>	On-site users	Direct contact, ingestion of dusts and vapours from contaminated soils	N/A	N/A	N/A
	Assume site not accessible for agriculture during construction	Direct contact, ingestion, inhalation of vapours from contaminated waters	N/A	N/A	N/A
		Inhalation of gases	N/A	N/A	N/A
	Off-site users Agricultural and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Medium	High
	Controlled waters - surface water River Trent Trent and Mersey canal	Lateral migration through groundwater Direct run-off from site	High likelihood	Medium	High
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- parts of the site are within the area required for construction of the Proposed Scheme. It is assumed that some disturbance of the ground will occur during construction. It is assumed that the site is not accessed by the landowner/members of the public during construction or used for farming due to the presence of the construction activities within parts of the site;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- historical infill exists without any lining, impermeable capping or leachate control systems in place; and
- assumed dewatering during construction, for example during construction of the viaduct supports at Great Haywood, could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline. Dewatering would draw any contamination away from the closest residential and property receptors, so risks to property via water may decrease during construction.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 32: 2-42 Mountford - Tixall landfill site and Mill House landfill site (JW Hunt) - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfills Potential for a range of organic and inorganic contaminants including, but not limited to heavy metals, asbestos, ammonia, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential (Mill House landfill)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Minor	Moderate
	Controlled waters - surface water River Trent (Mill House and Tixall landfills) Trent and Mersey Canal (Mill House landfill)	Lateral migration through groundwater Direct run-off from site	High likelihood	Minor	Moderate
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Likely	Minor	Moderate/low

Description

Notes/assumptions

- assumes remediation is not required as part of Proposed Scheme;
- assumes that landfill material will not be disturbed during HS2 Phase 2a construction works, as neither site is located within the area required for construction. There was a proposal for a new surface water drain to cross Tixall landfill, but this raised as a potential risk at the initial preliminary design stage and drain has been diverted along the north-eastern side of the landfill instead;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- historical infill exists without any lining, impermeable capping or leachate control systems in place; and
- the proposed route is on the Great Haywood viaduct and Trent North embankment as it passes these two landfill sites. Dewatering may be required during the construction of pier foundations for the Great Haywood viaduct. It is assumed that any dewatering carried out during construction could draw contamination into the groundwater, or cause it to travel further away from the source, causing a temporary worsening in groundwater and surface water quality compared to baseline. Worsening groundwater quality may also have a temporary effect on property receptors via direct contact of foundations with shallow groundwater contamination.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 33: Brick House Farm, Upper Hanyards Farm, Mount Farm, Lowerbridge Farm, Lowerhouse Farm, Canal Side Farm. Farms grouped for purposes of assessment - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination resulting from leaks and spills of liquids and solids, use of agricultural chemicals, burial of animal remains</p> <p>May include diesel fuel, lubricating oils, solvents, slurry and agricultural chemicals such as pesticides and herbicides, pathogens</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to hydrocarbons (diesel range, lubricating oils, solvents), ammonia, elevated BOD, elevated COD, pesticides, herbicides, FMD, anthrax</p>	On-site users Residential, agricultural workers and livestock	Direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Likely	Minor	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential and agricultural land	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Principal aquifer within the Bromsgrove Sandstone Formation Principal aquifer within Kidderminster Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium	Moderate
			Exposure to gases and vapours	Unlikely	Severe

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	Property receptors - buildings, foundations and services (off-site)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- Upper Hanyards Farm CA2-55 and Lowerbridge Farm CA2-85 lie on the route and will be demolished during construction. All other farms lie within Zone 1 of the study area (Zone 1 is the area required for construction plus a 10m margin either side);
- assume the groundwater abstraction at Upper Hanyards will cease to be used during construction, therefore removing the SPZ;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline; and
- the route passes five of the farms which are located within a cutting (2-55 is within the Brancote South cutting;, 2-71 and 2-76 are within the Hopton South cutting; and 2-83 and 2-85 are within Hopton North cutting). Potential temporary worsening of groundwater quality as a result of dewatering activities during construction of cuttings, which may draw contaminated groundwater away from the sources

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 34: 2-56 Tank within farmyard at Upper Hanyards - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tank within farmyard. NB there is a private groundwater abstraction at farm used by Upper and Lower Hanyards Farms</p> <p>Tank contents unknown, but may have contained diesel fuel, slurry or agricultural chemicals such as sheep dip, tank now removed</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), ammonia, elevated BOD, elevated COD, pesticides</p>	On-site users Residential and agricultural workers - farm occupants, occasional farm workers	Direct contact, ingestion of dusts and vapours from contaminated soils	N/A	N/A	N/A
		Direct contact, ingestion of contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users Residential (Lower Hanyards Farm)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of Personal Protective Equipment (PPE)/risk management;
- whilst the CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline;
- assumes construction phase includes remediation that may be required; and
- assumes Upper Hanyards Farm will not be occupied during construction, as lies directly on the route. It is also assumed that the borehole which currently supplies water to both Upper and Lower Hanyards Farms will not be operational, as it is located at Upper Hanyards farm. This will remove or significantly reduce any impacts to human health via the consumption of, and contact with, groundwater as a drinking water source.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 35: 2-60 Madders - Lower Hanyards Farm landfill site, Hanyards Lane - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfills Potential for a range of organic and inorganic contaminants including, but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential(Lower Hanyards Farm)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Minor	Moderate
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to explosive gases	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters. Unlikely to worsen as receptors close to route may be demolished during construction.	Low likelihood	Medium	Moderate/low

Description

Notes/assumptions

- the site is not located within the area required for construction. Landfilled material is assumed to not be disturbed during construction;
- assume that land will continue to be used for agriculture during construction, therefore risks of exposure to on-site users remain as baseline;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- risk to off-site human receptors from contaminated groundwater are assumed to improve temporarily, as the route is two cuttings (Brancote North and Brancote South cuttings) at this location and dewatering would draw any contaminated groundwater away from the closest receptors (note that Upper Hanyards Farm is located directly on the line of the Proposed Scheme, so will be demolished as a result of construction). In addition, the groundwater abstraction borehole at Upper Hanyards Farm is assumed to be destroyed during construction as a result of the demolition of Upper Hanyards Farm. Therefore, the potential pollution linkage between groundwater contamination and off-site human health via the consumption of groundwater at both Upper and Lower Hanyards Farm is removed;
- assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline; and
- as site is not within area required for construction, and waste is not to be disturbed, surface water risks are assumed to remain as at baseline.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 36: 2-65 and 2-66 Tanks within Staffordshire County Showground - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tanks within Staffordshire County Showground site. Tanks were not observed to be present during recent site visit</p> <p>Tank contents unknown, but may have contained diesel fuel or agricultural chemicals</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), pesticides, herbicides, fertilisers</p>	On-site users Staffordshire County Showground staff and members of the public	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Severe	High
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline;
- potential temporary worsening of groundwater effects due to dewatering in Hopton South cutting immediately adjacent to Staffordshire County Showground; and
- assumes construction phase includes remediation that may be required.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 37: 2-69 Staffordshire County Showground landfill (Elmstar Plant) - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfill Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and hydrocarbons	Current users Workers, recreational visitors and domestic animals	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	N/A	N/A	N/A
		Direct contact, ingestion, inhalation of vapours from contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users Staffordshire County Showground	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Severe	Very high
	Controlled waters - surface water Unnamed stream	Lateral migration through groundwater Direct run-off from site	High likelihood	Negligible	Moderate/low
	Property receptors - buildings, foundations and services (on-site and off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- the landfill lies within the area required for construction and the Proposed Scheme is in cutting through the landfilled area, which will require the removal of part or all of the refuse to create the cutting and for geotechnical reasons. The assessment assumes that any remediation required in addition to the removal of waste will be carried out during construction, but the full benefits of any remediation will not be realised until completion of the works within the landfilled area;
- it has been assumed that the landfill site will not be used for Staffordshire County Showground purposes during construction, and the area will be fenced off to protect members of the public, therefore all risks have been reduced to 'Not Applicable' for the site in the construction phase. It is likely that the remainder of the Showground site will continue to operate as normal during construction and therefore sensitive receptors will be present off-site;
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline; and
- the route of the Proposed Scheme is in Hopton South cutting as it passes through the landfill, therefore it is assumed that there may be a temporary worsening of groundwater quality as a result of dewatering, which could draw mobile contaminants from the landfill. However, the cutting is located to the south of the Showground site, therefore any contamination would be expected to be drawn away from the Showground and off-site users. Surface water risk may also increase as site is on a slope and runoff may occur from the exposed waste, although the closest surface water receptor is some distance away (370m).

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 38: 2-70 and 2-77 Smithies, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination resulting from historical use of the sites as a blacksmith's workshop, or Smithy. Potentially contaminative materials may have included coal ash from the forges, asbestos from fireproof materials, oils and grease</p> <p>Potential for contaminants including, but not limited to heavy metals, PAH, asbestos, hydrocarbons including lubricating oils</p>	On-site users - Residential	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential and agricultural land	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Likely	Minor	Moderate/low

Description

Notes/assumptions

- neither site is located within the area required for construction of the Proposed Scheme. It is assumed that the ground within these sites will not be disturbed as a result of construction of the Proposed Scheme;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline; and
- assumes residential properties are occupied during construction.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 39: 2-8g MoD Stafford Depot off Within Lane, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination from MoD operations at the site off Within Lane</p> <p>Potential for a range of contaminants associated with equipment maintenance, repair and storage, including but not limited to: fuels, solvents, lubricating oils, asbestos, PCBs, chlorinated hydrocarbons, heavy metals, extremes of pH, UXO</p>	<p>On-site users</p> <p>MoD staff and visitors</p>	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low Likelihood	Minor	Low
	<p>Off-site users</p> <p>Residential and agricultural land</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	<p>Controlled waters - groundwater</p> <p>Principal aquifer</p>	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Minor	Moderate
	<p>Controlled waters - surface water</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Low likelihood	Minor	Low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- the site is not located within the area required for construction of the Proposed Scheme. The site only partially lies within the study area;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002); and
- assumed that dewatering in the Hopton North cutting may cause temporary worsening in groundwater quality as a result of drawing contamination into groundwater.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 40: 2-94, Infilled pit at Hopton Farm - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate, ground gas and groundwater contamination from infilling of historical pit with unknown fill materials</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH</p>	On-site users - agricultural workers and livestock	Direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low Likelihood	Minor	Low
		Inhalation of ground gases	Low Likelihood	Minor	Low
	Off-site users Agricultural and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water Kingston Brook	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Likely	Minor	Moderate/low

Description

Notes/assumptions

- the site does not lie within the area required for construction and it is therefore assumed that none of the infilled material will be disturbed during construction of the Proposed Scheme;
- site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a likely to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- historical infill exists without any lining, impermeable capping or leachate control systems in place; and
- assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 41: 2-95 Filter bed/tank, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Potential for soil and groundwater contamination associated with filter beds/tank.</p> <p>Contaminants include but not limited to heavy metals, cyanides, nitrates, nitrites, sulphate, asbestos, extremes of pH, oil/fuel hydrocarbons, sewage bacteria and pathogens, methane</p>	<p>On-site users Maintenance workers</p>	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Off-site users Agricultural land</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Controlled waters - groundwater Principal aquifer within the bedrock geology</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	<p>Controlled waters - surface water</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Low likelihood	Minor	Low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very Low

Description

Notes/assumptions

- the site is not located within the area required for construction;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- proposed route is in a cutting at this site. Potential temporary worsening of groundwater quality as a result of dewatering activities during construction of cuttings, which may draw contaminated groundwater away from the sources; and
- assume status of site does not change as a result of construction, given controls set out in draft CoCP.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 42: 2-96 Vehicle servicing garage, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate, ground gas and groundwater contamination from former garage Potential for a range of organic and inorganic contaminants associated with garage including but not limited to heavy metals, inorganics, organics such as PAH, ground gases (methane, carbon dioxide)	On-site users Garage workers and members of the public	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential and agriculture	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifers of the bedrock Mercia Mudstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water Kingston Brook	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - potential buildings, foundations and services (on-site and off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- the site is not located within the area required for construction of the Proposed Scheme;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- assumed that dewatering in the Hopton North cutting may cause temporary worsening in groundwater quality as a result of drawing contamination into groundwater; and
- site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 43: 2-97 Stafford Borough Council – Hopton Railway Cutting landfill, Within Lane, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate, ground gas and groundwater contamination from historical landfill which received mixed wastes including household refuse</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and hydrocarbons</p>	<p>On-site users Maintenance workers</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Off-site users Residential (High Bridge Farm and unnamed farm to south-east) and MoD Stafford site</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Medium	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	<p>Controlled waters - groundwater Principal aquifer</p>	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Minor	Moderate
	<p>Controlled waters - surface water Overland flow to south</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Unlikely	Negligible	Very low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Likely	Minor	Moderate/low

Description

Notes/assumptions

- landfill is not within the area required for construction. It is assumed that residual landfill material will not be disturbed during HS2 Phase 2a construction works;
- assumes no change to landfill access arrangements during construction i.e. that the site continues to be fenced off and unavailable for public access, only being accessed infrequently for monitoring;
- assumes site remediation is not required as part of Proposed Scheme;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- historical infill exists without any lining, impermeable capping or leachate control systems put in place; and
- the route is in the Hopton North cutting as it passes to the south of the landfill. Assessment assumes that dewatering during construction could draw contamination into the groundwater, potentially further away from the source, causing a temporary worsening in groundwater quality compared to baseline.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 44: 2-106 Kents Barn Farm No. 3 landfill, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfills Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Agriculture and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Medium	High
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- the site is not located within the area required for construction. It is assumed that none of the landfilled material will be disturbed during construction of the Proposed Scheme;
- historical landfills assumed unlikely to have lining, impermeable capping or leachate control systems in place;
- assumed dewatering during construction could draw contamination into the groundwater, as route past the landfill is in cutting, causing a temporary worsening in groundwater quality compared to baseline; and
- impact on surface waters remains as at baseline, as there are no sensitive surface waters identified close to the site.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 45: 2-108 Kents Barn Farm No. 2 landfill (H Nickolls and Son (Milford) Ltd), Sandon Road, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil contamination, leachate, ground gas and groundwater contamination from historical landfill</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH</p>	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Residential, agriculture and	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Likely	Severe	High
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium	Moderate
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Likely	Severe	High
		Direct contact with contaminated soils and waters	Likely	Minor	Moderate/low

Description

Notes/assumptions

- the southern edge of the landfill site lies within the area required for construction. It is assumed that the landfilled materials may be disturbed during construction and the remainder of the site remains in use by the landowners during construction. Assumes farming use of remainder of landfilled area continues during construction, apart from the area within the area required for construction. Therefore there is a risk of on-site users remaining at risk of exposure and possibly increased exposure due to ground disturbance in part of the site caused by construction for the Proposed Scheme. This is more likely to relate to soil and dust exposure than contaminated waters, considering the typical farming use of the site;
 - off-site exposure is assessed to worsen during construction as a result of disturbance of the landfilled material and future presence of housing associated with allocation Policy Stafford 2 which may have been constructed by the time the Proposed Scheme is constructed;
 - during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
 - whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
 - historical landfills assumed unlikely to have lining, impermeable capping or leachate control systems in place;
 - assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline; and
 - assumes construction phase includes any remediation that may be required.
-

Table 46: 2-164 Yarlet Bank former Garage/Petrol Station - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil and groundwater contamination from former petrol station/garage Potential for a range of organic contaminants (fuels, oils)	On-site users Retail and public house workers and visitors	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Negligible	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Negligible	Very low

Description

Notes/assumptions

- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- assumed that dewatering in cutting may cause temporary worsening in groundwater quality as a result of drawing contamination into groundwater;
- site is no longer in use as a garage, therefore source term is assumed to be finite and declining; and
- assumes construction phase includes remediation that may be required.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 47: 2-179 Historical Tank within farmland, Yarlet - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tank within farmland</p> <p>Tank contents unknown, but may have contained diesel fuel, slurry or agricultural chemicals such as sheep dip, tank now removed</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), ammonia, elevated BOD, elevated COD, pesticides</p>	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary B aquifer within the Mercia Mudstone Group	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water Unnamed tertiary river	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Negligible	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- site is not located within the area required for construction. Assumed it will not be disturbed as a result of construction;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a likely to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline; and
- assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline. However, site is some distance from the proposed route therefore effect will be minor.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 48: 2-18g Dismantled railway, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Potential for soil and groundwater contamination associated with a former railway line</p> <p>Heavy metals, sulphates, asbestos, PAH, chlorinated solvents, PCB</p>	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential and agricultural workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Medium	High
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases or vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- the site is located within the area required for construction of the Proposed Scheme;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumes construction phase includes remediation that may be required;
- site is located on alignment/within land required for construction of the Proposed Scheme, therefore assumed members of public will not have access during construction;
- assumed that risks to offsite users will be controlled in line with draft CoCP during construction;
- temporary worsening in groundwater quality during construction if groundwater affected by dewatering, as route is in cutting at this location; and
- site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 49: 2-208 Potential anthrax infected cattle burial site, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil contamination with spores of <i>Bacillus anthracis</i> resulting from historical burial of anthrax-infected cattle dating from the early 1900s</p> <p>Information on the potential burial site was provided by local residents in Hopton, no official record held by APHA</p> <p>Information received suggests cattle were buried, rather than burned, at the site</p>	On-site users Agricultural workers and livestock	Direct contact, ingestion of dusts and vapours from contaminated soils	N/A	N/A	N/A
		Direct contact, ingestion, inhalation of vapours from contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users Residential and agricultural workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Severe	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Severe	Moderate
		Inhalation of ground gases	Unlikely	Negligible	Very low
	Controlled waters - groundwater Principal aquifer	Physical mobilisation and migration from contaminated soils and waters	Low likelihood	Severe	Moderate
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Severe	Moderate
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	N/A	N/A	N/A
		Direct contact with contaminated soils and waters	N/A	N/A	N/A

Description

Notes/assumptions

- the site is located within the area required for construction of the Proposed Scheme. Site is located on alignment and within a cutting, therefore assumed members of public will not have access during construction;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumes construction phase includes remediation that may be required; and
- assumed that risks to offsite users will be controlled in line with draft CoCP during construction, but low probability remains

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 50: 2-219 Challinor – Within Lane landfill site, Hopton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil contamination, leachate, ground gas and groundwater contamination from historical landfills</p> <p>Potential for a range of organic and inorganic contaminants including, but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH, TPH, pesticides</p>	<p>On-site users</p> <p>- site is in an open area (containing Brown Equestrian) next to a depot</p>	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Off-site users - Residential, agricultural and commercial</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	<p>Controlled waters - groundwater</p> <p>Principal aquifer</p>	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Medium	High
	<p>Controlled waters - surface water</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	High likelihood	Minor	Moderate
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Medium	Moderate/low

Description

Notes/assumptions

- site is not located within the area required for construction of the Proposed Scheme. It is assumed that the site and landfilled material will not be disturbed during construction;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002); and
- risk to offsite users during construction from contaminated groundwater are likely as line is in cutting at this location and dewatering may draw any contaminated groundwater towards the receptors at Pool Farm. Assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 51: 2-221 BPA Pipeline, Marston to Bishton - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil and groundwater contamination resulting from leaks and spills from BPA pipeline BPA pipeline contents unknown, but may contain gas or hydrocarbon products	On-site users Future residential, agricultural workers, recreational users of agricultural land and Ingestre Park Golf Club	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users - Residential receptors, agricultural workers, recreational users of agricultural land, recreational users and workers at Great Haywood Marina, Staffordshire County Showground, and a depot	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer of Kidderminster Formation Principal aquifer of Bromsgrove Sandstone Formation Secondary B Aquifer of Mercia Mudstone Group	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Severe	High
	Controlled waters - surface water River Trent Trent and Mersey Canal Unnamed secondary river and series of	Lateral migration through groundwater Direct run-off from site	Likely	Severe	High

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	tertiary rivers)				
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a low likelihood probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline;
- assumed dewatering during construction could draw contamination into the groundwater, causing a temporary worsening in groundwater quality compared to baseline; and
- the Pipeline to be re-routed in small section of the route and additional pollution prevention measures will be required whilst this is done, however this does not affect the type of on and off-site receptors.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

Table 52: 2-254 Depot, 2-255 Depot, 2-256 Depot, 2-249 Depot, 2-247 Factory, 2-248 Tanks, 2-253 Industrial Estate and Pumping Station all on Pasturefields Enterprise Park - construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from commercial activities within industrial estate, including above-ground storage tank</p> <p>Tank contents unknown, but may have contained fuel or chemicals</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to hydrocarbons (fuel, solvents), heavy metals, elevated BOD, elevated COD</p>	On-site users Workers and visitors to Pasturefields Enterprise Park	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential (Rushy Pits Farm, Mumble Farm and properties on A51 Lichfield Road)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Moderate/low
	Controlled waters - surface water Unnamed tertiary river	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Negligible	Very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- none of the sites are located within the area required for construction. The land required for construction of the Proposed Scheme as it passes through the industrial estate relates to an active railway line which bisects the site. It is assumed that they will not be disturbed during construction;
- during construction standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management and in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002);
- whilst the draft CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface runoff and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the draft CoCP generally results in a likely to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline; and
- assuming that at the area required for construction relates to an active railway line, that no dewatering or major ground disturbance is proposed.

Note: Construction workers have not been included in this assessment and are scoped out in accordance with the Land quality Technical Note in the SMR Addendum (Volume 5: Appendix CT-001-002).

3.3 Post–construction risk assessment

Table 53: Farms grouped for purposes of assessment - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil and groundwater contamination resulting from leaks and spills of liquids and solids, use of agricultural chemicals, burial of animal remains</p> <p>May include diesel fuel, lubricating oils, solvents, slurry and agricultural chemicals such as pesticides</p> <p>Potential for a range of organic contaminants including but not limited to asbestos, hydrocarbons (diesel range, lubricating oils, solvents), ammonia, elevated BOD, elevated COD, pesticides, anthrax</p>	On-site users Residential, agricultural workers and livestock	Direct contact, ingestion of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	Off-site users Residential and agricultural	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes construction works are complete and remediation has been carried out where necessary;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - Tithebarn Farm (CA2-23) on the route, assumed to not be in use post-construction due to demolition during construction.
-

Table 54: 2-37 Sewage Filter Bed -Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Potential for soil and groundwater contamination associated with a sewage treatment works (small scale)</p> <p>Contaminants may include, but may not be limited to heavy metals, cyanides, nitrates, nitrites, sulphate, asbestos, extremes of pH, oil/fuel hydrocarbons, sewage bacteria and pathogens, methane</p>	On-site users	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
	Maintenance workers	Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases	Unlikely	Minor	Very low
	Off-site users Residential and agricultural	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assume condition of site is same as that pre-construction, will not be remediated as part of the works; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 55: 2-39 and 2-245 Railway embankments (active) - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Potential for soil and groundwater contamination associated with an active railway line</p> <p>Railway is on an existing embankment,, which may have been constructed using potentially contaminated fill materials including but not limited to heavy metals, sulphates, asbestos, PAH, chlorinated solvents, PCB</p>	On-site users Railway workers and trespassers (assume rail passengers would not come into direct contact)	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of gases and vapours	Unlikely	Minor	Very low
	Off-site users Residential areas and users of Great Haywood Marina	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases and vapours	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water River Trent Trent and Mersey Canal	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to ground gases or vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 56: 2-41 Infilled ponds at Hoo Mill - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil, leachate, ground gas and groundwater contamination from infilling of historical ponds with unknown fill materials Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Low likelihood	Minor	Low
	Off-site users Agricultural and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood	Minor	Moderate
	Controlled waters - surface water River Trent Trent and Mersey canal	Lateral migration through groundwater Direct run-off from site	High likelihood	Minor	Moderate
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete. Assumes any remediation would have been limited to those parts of the site which lay within the area required for construction of the Proposed Scheme and contamination may remain outside those areas; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 57: 2-42 Mountford - Tixall landfill site and Mill House landfill site (JW Hunt) - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil, leachate, ground gas and groundwater contamination from historical landfills</p> <p>Potential for a range of organic and inorganic contaminants including, but not limited to heavy metals, asbestos, ammonia, ground gases (methane, carbon dioxide) and organics such as PAH</p>	<p>On-site users</p> <p>Agricultural workers</p>	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Off-site users</p> <p>Residential (Mill House landfill)</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	<p>Controlled waters - groundwater</p> <p>Secondary A aquifer within the superficial deposits</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	<p>Controlled waters - surface water</p> <p>River Trent (Mill House and Tixall landfills)</p> <p>Trent and Mersey Canal (Mill House landfill)</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Likely	Minor	Moderate/low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes site remediation is not required as part of Proposed Scheme;
 - also assumes that residual landfill material will not be disturbed during HS2 construction works and sites will continue in their baseline uses following construction of the Proposed Scheme;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 58: Farms grouped for purposes of assessment, all located over a Principal aquifer - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil and groundwater contamination resulting from leaks and spills of liquids and solids, use of agricultural chemicals, burial of animal remains</p> <p>May include diesel fuel, lubricating oils, solvents, slurry and agricultural chemicals such as pesticides and herbicides, pathogens</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to hydrocarbons (diesel range, lubricating oils, solvents), ammonia, elevated BOD, elevated COD, pesticides, herbicides, FMD, anthrax</p>	On-site users	Direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Likely	Medium	Moderate
	Residential, agricultural workers and livestock	Direct contact, ingestion, inhalation of vapours from contaminated waters	Likely	Minor	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential and agricultural land	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Principal aquifer within the Bromsgrove Sandstone Formation Principal aquifer within Kidderminster Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters - surface water River Trent Trent and Mersey Canal Series of tertiary rivers	Lateral migration through groundwater Direct run-off from site	Low likelihood	Medium	Moderate/low
		Exposure to gases and vapours	Unlikely	Severe	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
	Property receptors - buildings, foundations and services (off-site)	Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes any remediation required has been undertaken and construction works are complete;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - Upper Hanyards Farm CA2-55 and Lowerbridge Farm CA2-85 lie on the route of the Proposed Scheme and will be demolished post-construction.
-

Table 59: 2-56 Tank within farmyard at Upper Hanyards - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tank within farmyard. NB there is a private groundwater abstraction at farm used by Upper and Lower Hanyards Farms</p> <p>Tank contents unknown, but may have contained diesel fuel, slurry or agricultural chemicals such as sheep dip, tank now removed</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), ammonia, elevated BOD, elevated COD, pesticides</p>	On-site users	Direct contact, ingestion of dusts and vapours from contaminated soils	N/A	N/A	N/A
	Residential and agricultural workers	Direct contact, ingestion of contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
	Residential (Lower Hanyards Farm)	Direct contact, ingestion of contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Minor	Very low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Minor	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - assumes Upper Hanyards Farm will not be occupied post-construction, as lies directly on the route. It is also assumed that the borehole which currently supplies water to both Upper and Lower Hanyards Farms will not be operational, as it is located at Upper Hanyards farm.
-

Table 6o: 2-6o Madders - Lower Hanyards Farm landfill site, Hanyards Lane - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfills Potential for a range of organic and inorganic contaminants including, but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential (Lower Hanyards Farm)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes construction is complete;
 - assumes that residual landfill material was not disturbed during HS2 construction works;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - Upper Hanyards Farm lies on the route of the Proposed Scheme, assumed not to be a receptor post-construction. The groundwater abstraction borehole at Upper Hanyards is assumed to have been destroyed during construction and Lower Hanyards farm no longer uses this abstraction for drinking water supply.
-

Table 61: 2-65 and 2-66 Tanks within Staffordshire County Showground - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tanks within Showground site. Tanks were not observed to be present during recent site visit</p> <p>Tank contents unknown, but may have contained diesel fuel or agricultural chemicals</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), pesticides, herbicides, fertilisers</p>	On-site users Staffordshire County Showground staff and members of the public	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Severe	Moderate
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 62: 2-6g Staffordshire County Showground landfill (Elmstar Plant) - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil, leachate, ground gas and groundwater contamination from historical landfill</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and hydrocarbons</p>	On-site users Workers, recreational visitors and domestic animals	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Workers and visitors to Staffordshire County Showground	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Severe	Moderate/low
	Controlled waters - surface water Unnamed stream	Lateral migration through groundwater Direct run-off from site	Low likelihood	Negligible	Very low
	Property receptors - buildings, foundations and services (on-site and off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes that a large quantity of the landfilled waste has been removed as a result of construction of the Hopton South cutting and any further remediation required has been undertaken to render the area suitable for the intended end use, which may include an engineered cap over any remaining waste;
 - assumes construction works are complete; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 63: 2-70 and 2-77 Smithies, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil and groundwater contamination resulting from historical use of the sites as a blacksmith's workshop, or Smithy. Potentially contaminative materials may have included coal ash from the forges, asbestos from fireproof materials, oils and greases</p> <p>Potential for contaminants including but not limited to heavy metals, PAH, asbestos, hydrocarbons including lubricating oils</p>	On-site users Residential	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential and agricultural land	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Negligible	Low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Negligible	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Likely	Negligible	Low

Description

Notes/assumptions

- assumes construction works are complete; and
 - assumes condition returns to baseline on completion of construction, as no remediation would have been carried out to properties as a result of HS2 construction.
-

Table 64: 2-8g MoD Stafford Depots off Within Lane, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil and groundwater contamination from MoD operations at the site off Within Lane Potential for a range of contaminants associated with equipment maintenance, repair and storage, including but not limited to: fuels, solvents, lubricating oils, asbestos, PCBs, chlorinated hydrocarbons, heavy metals, extremes of pH, UXO	On-site users MoD staff and visitors	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Agricultural land and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Minor	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes construction works are complete; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 65: 2-94 Infilled pit at Hopton Farm - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil, leachate, ground gas and groundwater contamination from infilling of historical pit with unknown fill materials</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH</p>	<p>On-site users</p> <p>Agricultural workers and livestock</p>	Direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low Likelihood	Minor	Low
		Inhalation of ground gases	Low Likelihood	Minor	Low
	<p>Off-site users</p> <p>Agricultural and residential</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	<p>Controlled waters - groundwater</p> <p>Secondary B aquifer</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	<p>Controlled waters - surface water</p> <p>Kingston Brook</p>	<p>Lateral migration through groundwater</p> <p>Direct run-off from site</p>	Low likelihood	Minor	Low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete;
 - assumes that residual landfill material will not be disturbed during HS2 construction works;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.
-

Table 66: 2-95 Filter bed/tank, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Potential for soil and groundwater contamination associated with filter beds/tank</p> <p>Contaminants include but not limited to heavy metals, cyanides, nitrates, nitrites, sulphate, asbestos, extremes of pH, oil/fuel hydrocarbons, sewage bacteria and pathogens, methane</p>	On-site users	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
	Maintenance workers	Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Agricultural land	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer within the bedrock geology	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very Low

Description

Notes/assumptions

- 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - assume condition of site is same as that pre-construction, will not be remediated as part of the works.
-

Table 67: 2-96 Vehicle servicing garage, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil, leachate, ground gas and groundwater contamination from former garage Potential for a range of organic and inorganic contaminants associated with garage including but not limited to heavy metals, inorganics, organics such as PAH, ground gases (methane, carbon dioxide)	On-site users	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
	Garage workers and members of the public	Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential and agriculture	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer of the bedrock Mercia Mudstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Low
	Controlled waters - surface water Kingston Brook	Lateral migration through groundwater Direct runoff from site	Unlikely	Minor	Very low
	Property receptors - potential buildings, foundations and services (on-site and off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes construction works are complete;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.
-

Table 68: 2-97 Stafford Borough Council – Hopton Railway Cutting landfill, Within Lane, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil, leachate, ground gas and groundwater contamination from historical landfill which received mixed wastes including household refuse</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and hydrocarbons</p>	<p>On-site users Maintenance workers</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	<p>Off-site users Residential(High Bridge Farm and unnamed farm to south-east of landfill)and MoD Stafford site</p>	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Medium	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	<p>Controlled waters - groundwater Principal aquifer</p>	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	<p>Controlled waters - surface water Overland flow to south</p>	<p>Lateral migration through groundwater Direct run-off from site</p>	Unlikely	Negligible	Very low
	<p>Property receptors - buildings, foundations and services (off-site)</p>	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes site remains inaccessible to public after construction of the Proposed Scheme;
 - also assumes that residual landfill material will not be disturbed during HS2 construction works, as site lies outside the area required for construction; and
 - 'On-site users' excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers. Also excludes monitoring and maintenance staff employed by the Environment Agency/SBC involved in routine works at the site.
-

Table 69: 2-106 Kents Barn Farm No. 3 landfill, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil, leachate, ground gas and groundwater contamination from historical landfills Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Agriculture and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes no remediation was required, as site does not lie within the area required for construction of the Proposed Scheme, therefore no disturbance of the site should be necessary during construction. Site reverts to baseline post-construction, assuming no remediation carried out and temporary effects caused by dewatering during construction cease once Phase 2a is operational; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 70: 2-108 Kents Barn Farm No. 2 landfill (H Nickolls and Son (Milford) Ltd), Sandon Road, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil contamination, leachate, ground gas and groundwater contamination from historical landfill</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH</p>	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Minor	Low
	Off-site users Residential, agriculture and kennels	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Moderate/low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Low likelihood	Minor	Low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - assumed that remediation did not extend to entire landfilled area and was concentrated on the small area of the site which was within the area required for construction only. Therefore, exposure within the landfilled area is still possible via the same pathways as previously. Risk reverts to baseline.
-

Table 71: 2-164 Yarlet Bank former garage/petrol station - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil and groundwater contamination from former petrol station/garage Potential for a range of organic contaminants (fuels, oils)	On-site users Retail and public house workers and visitors	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Off-site users Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Controlled waters - groundwater Secondary B aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Minor	Very low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Negligible	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Severe	Moderate/low
		Direct contact with contaminated soils and waters	Unlikely	Negligible	Very low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction; and
 - site is no longer in use as a garage, therefore source term is assumed to be finite and declining.
-

Table 72: 2-179 Historical Tank within farmland, Yarlet - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from historical tank within farmland</p> <p>Tank contents unknown, but may have contained diesel fuel, slurry or agricultural chemicals such as sheep dip, tank now removed</p> <p>Potential for a range of organic contaminants including but not limited to hydrocarbons (diesel range), ammonia, elevated BOD, elevated COD, pesticides</p>	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Minor	Low
	Off-site users Residential	Inhalation of ground gases	Unlikely	Minor	Very low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary B aquifer within the Mercia Mudstone Group	Inhalation of ground gases	Unlikely	Minor	Very low
		Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Minor	Moderate/low
	Controlled waters - surface water Unnamed tertiary river	Lateral migration through groundwater	Likely	Minor	Moderate/low
		Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Negligible	Very low
Direct contact with contaminated soils and waters		Unlikely	Minor	Very low	

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 73: 2-189 Dismantled railway, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Potential for soil and groundwater contamination associated with a former railway line including but not limited to heavy metals, sulphates, asbestos, PAH, chlorinated solvents, PCB	On-site users Agricultural workers	Direct contact, ingestion of dusts and vapours from contaminated soils	Likely	Medium	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential and agriculture	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Unlikely	Minor	Very low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Minor	Very low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases or vapours	Unlikely	Minor	Very low
		Direct contact with contaminated soils and waters	Unlikely	Minor	Very low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete;
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction;
 - a length of dismantled railway remains in the fields beyond the area required for construction which will revert back to the baseline risk profile; and
 - site lies within an area allocated for future housing (Policy Stafford 2). Assume that any contamination associated with the site has been cleaned up prior to development, in accordance with national planning policy.
-

Table 74: 2-208 Potential anthrax infected cattle burial site, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil contamination with spores of Bacillus anthracis resulting from historical burial of anthrax-infected cattle dating from the early 1900s</p> <p>Information on the potential burial site was provided by local residents in Hopton, no official record held by APHA</p> <p>Information received suggests cattle were buried, rather than burned, at the site</p>	On-site users Agricultural workers and livestock	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Severe	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Severe	Moderate/low
		Inhalation of ground gases	Unlikely	Negligible	Very low
	Off-site users Residential and agricultural workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Severe	Moderate
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Severe	Moderate/low
		Inhalation of ground gases	Unlikely	Negligible	Very low
	Controlled waters - groundwater Principal aquifer	Physical mobilisation and migration from contaminated soils and waters	Unlikely	Severe	Moderate/low
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Unlikely	Severe	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	N/A	N/A	N/A
		Direct contact with contaminated soils and waters	N/A	N/A	N/A

Description

Notes/assumptions

- assumes burial site may not be encountered during construction and therefore may not be removed during construction, or not removed in its entirety. The location of the burial is not known, only that it may be present within the field indicated; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 75: 2-219 Challinor – Within Lane landfill site, Hopton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil contamination, leachate, ground gas and groundwater contamination from historical landfills Potential for a range of organic and inorganic contaminants including, but not limited to heavy metals, ammonia, asbestos, ground gases (methane, carbon dioxide) and organics such as PAH, TPH, pesticides	On-site users - Recreational users (site is in an open area next to a depot)	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential, agriculture and, commercial	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Low likelihood	Severe	Moderate
	Controlled waters - groundwater Principal aquifer	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium	Moderate
	Controlled waters - surface water	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Medium	Moderate/low

Description

Notes/assumptions

- assumes construction works are complete; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

Table 76: 2-221 BPA Pipeline, Marston to Bishton - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Soil and groundwater contamination resulting from leaks and spills from BPA pipeline BPA pipeline contents unknown, but may contain gas or hydrocarbon products	On-site users - potential future residential receptors, farm workers and recreational users of agricultural land, recreational visitors to Ingestre Park Golf Club	Direct contact, ingestion of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential, agricultural workers and recreational users of agricultural land, recreational users and workers at Great Haywood Marina, Staffordshire County Showground, and a depot	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Low likelihood	Medium	Moderate/low
		Direct contact, ingestion of contaminated waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Principal aquifer of Kidderminster Formation Principal Aquifer of Bromsgrove Sandstone Formation Secondary B aquifer of Mercia Mudstone Group	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Severe	Moderate
	Controlled waters - surface water River Trent Trent and Mersey Canal	Lateral migration through groundwater Direct run-off from site	Low likelihood	Severe	Moderate

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
	Unnamed secondary river and a series of tertiary rivers)				
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Low likelihood	Severe	Moderate
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes remediation required has been undertaken and construction works are complete; and
- 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.

Table 77: 2-254 Depot, 2-255 Depot, 2-256 Depot, 2-249 Depot, 2-247 Factory, 2-248 Tanks, 2-253 Industrial Estate and Pumping Station all on Pasturefields Enterprise Park - Post-construction CSM and qualitative risk assessment

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Soil and groundwater contamination resulting from leaks and spills from commercial activities within industrial estate, including above-ground storage tank</p> <p>Tank contents unknown, but may have contained fuel or chemicals</p> <p>Potential for a range of organic and inorganic contaminants including but not limited to hydrocarbons (fuel, solvents), heavy metals, elevated BOD, elevated COD</p>	On-site users Workers and visitors to Pasturefield Enterprise Park	Direct contact, ingestion of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Unlikely	Minor	Very low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Off-site users Residential (Rushy Pits Farm, Mumble Farm and properties on A51 Lichfield Road)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low
		Direct contact, ingestion of contaminated waters	Low likelihood	Minor	Low
		Inhalation of ground gases	Unlikely	Minor	Very low
	Controlled waters - groundwater Secondary A aquifer within the superficial deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Minor	Moderate/low
	Controlled waters - surface water Unnamed tertiary river	Lateral migration through groundwater Direct run-off from site	Likely	Minor	Moderate/low
	Property receptors - buildings, foundations and services (off-site)	Exposure to gases and vapours	Unlikely	Negligible	Very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Description

Notes/assumptions

- assumes construction works are complete; and
 - 'On-site users' excludes rail passengers (as whilst within trains, they will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.
-

3.4 Assessment of temporary (construction) and permanent (post-construction) effects

Table 78: Farms grouped for purposes of assessment - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Secondary B aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of property to gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Low	Very low	Minor adverse effect	Neutral effect
Main risk	Moderate	Moderate	Moderate		
Overall significance				Neutral to minor adverse effect	Neutral effect

Table 79: 2-37 Sewage Filter Bed - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Secondary A aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral effect	Neutral effect
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Neutral effect	Neutral effect

Table 8o: 2-39 and 2-24,5 Railway embankments (active) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Secondary A aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral effect	Neutral effect
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Neutral effect	Neutral effect

Table 81: 2-41 Infilled ponds at Hoo Mill - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	N/A	Moderate/low	Moderate beneficial effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	N/A	Low	Minor beneficial effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Low	N/A	Low	Minor beneficial effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of Secondary A aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Exposure of property to gases and vapours	Moderate	Moderate/low	Moderate	Minor beneficial effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Very low	Low	Minor beneficial effect	Neutral effect
Main risk	Moderate	High	Moderate		
Overall significance				Minor adverse to moderate beneficial effect	Neutral effect

Table 82: 2-42and 2-220 Mountford - Tixall landfill site and Mill House landfill site (JW Hunt) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of Secondary A aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of property to gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Main risk	Moderate	Moderate	Moderate		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 83: Farms located over a Principal aquifer - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	Low	Low	Minor beneficial effect	Minor beneficial effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of Principal aquifers to leaching, vertical and lateral migration from contaminated soils and waters	High	Moderate	Moderate/low	Minor beneficial effect	Moderate beneficial effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate	Moderate	Moderate/low	Neutral effect	Minor beneficial effect
Exposure of property to gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Main risk	High	Moderate	Moderate		
Overall significance				Neutral to minor beneficial effect	Neutral to moderate beneficial effect

Table 84: 2-56 Tank within farmyard at Upper Hanyards Farm - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	N/A	N/A	Moderate beneficial effect	Moderate beneficial effect
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Moderate	N/A	N/A	Moderate beneficial effect	Moderate beneficial effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	N/A	N/A	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Exposure of off-site human receptors by direct contact and ingestion of contaminated waters	Moderate	N/A	N/A	Moderate beneficial effect	Moderate beneficial effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	High	Moderate/low	Very low	Moderate beneficial effect	Major beneficial effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate/low	Very low	Neutral effect	Moderate beneficial effect
Exposure of property to gases and vapours	Low	Very low	Very low	Minor beneficial effect	Minor beneficial effect
Direct contact of property with contaminated soils and waters	Moderate/low	Very low	Very low	Moderate beneficial effect	Moderate beneficial effect
Main risk	High	Moderate/low	Low		
Overall significance				Minor adverse to moderate beneficial effect	Neutral to major beneficial effect

Table 85: 2-6o Madders - Lower Hanyards Farm landfill site, Hanyards Lane - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	Low	Low	Minor beneficial effect	Minor beneficial effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	Moderate/low	Moderate/low	Minor beneficial effect	Minor beneficial effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Main risk	Moderate	Moderate	Moderate/low		
Overall significance				Minor adverse to minor beneficial effect	Neutral to minor beneficial effect

Table 86: 2-65 and 2-66 Tanks within Staffordshire County Showground - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Exposure of property to gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Main risk	Moderate	High	Moderate		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 87: 2-69 Staffordshire County Showground landfill (Elmstar Plant) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	N/A	Low	Moderate beneficial effect	Minor beneficial effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	N/A	Low	Moderate beneficial effect	Minor beneficial effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	N/A	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	Moderate/low	Low	Neutral effect	Minor beneficial effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	Moderate	Moderate/low	Neutral effect	Minor beneficial effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	High	Very high	Moderate/low	Minor adverse effect	Moderate beneficial effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Low	Moderate/low	Very low	Minor adverse effect	Minor beneficial effect
Exposure of property to gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Low	Very low	Minor adverse effect	Neutral effect
Main risk	High	Very high	Moderate/low		
Overall significance				Moderate adverse to moderate beneficial effect	Neutral to moderate beneficial effect

Table 88: 2-70 and 2-77 Smithies, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact and ingestion of contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Very low	Low	Very low	Minor adverse effect	Neutral effect
Exposure of property to gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Neutral to minor adverse effect	Neutral effect

Table 89: 2-8g MoD Stafford Depot off Within Lane, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of vapours and landfill gases	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of vapours	Low	Low	Low	Neutral effect	Neutral effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Very low	Low	Very low	Minor adverse effect	Neutral effect
Exposure of property to vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Main risk	Moderate/low	Moderate	Moderate/low		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 90: 2-94 Infilled marl pit at Hopton Farm - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of Secondary B aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Main risk	Moderate	Moderate	Moderate		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 91: 2-95 Filter bed/tank, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property to gases	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very Low	Very Low	Very Low	Neutral effect	Neutral effect
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table g2: 2-96 Vehicle Servicing Garage, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of Secondary B aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Very low	Low	Very low	Minor adverse effect	Neutral effect
Exposure of property to vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral effect	Neutral effect
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 93: 2-97 Stafford Borough Council – Hopton Railway Cutting landfill, Within Lane, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Main risk	Moderate	Moderate	Moderate		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 94: 2-106 Kents Barn Farm No. 3 landfill, Hopton landfill - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of Secondary B aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	High	Moderate/low	Moderate adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Low	Very low	Minor adverse effect	Neutral effect
Main risk	Moderate/low	High	Moderate/low		
Overall significance				Moderate adverse to neutral effect	Neutral effect

Table 95: 2-108 Kents Barn Farm No. 2 landfill (H Nickolls and Son (Milford) Ltd), Sandon Road, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	Low	Moderate/low	Minor beneficial effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Exposure of Secondary B aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Low	Low	Low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Moderate/low	Low	Minor adverse effect	Neutral effect
Main risk	Moderate	High	Moderate		
Overall significance				Minor adverse to minor beneficial effect	Neutral effect

Table 96: 2-164 Yarlet Bank former garage/petrol station - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of Secondary B aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Very low	Low	Very low	Neutral effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of property to vapours	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Neutral effect	Neutral effect

Table 97: 2-179 Historical Tank within farmland, Yarlet - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Secondary B aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate\low	Moderate\low	Moderate\low	Neutral effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Main risk	Moderate\low	Moderate\low	Moderate\low		
Overall significance				Neutral effect	Neutral effect

Table 98: 2-189 Dismantled railway, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate	Low	Moderate	Minor beneficial effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Low	Low	Minor beneficial effect	Minor beneficial effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Secondary A aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate/low	High	Very low	Moderate adverse effect	Moderate beneficial effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate/low	Very low	Neutral effect	Moderate beneficial effect
Exposure of property to gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Main risk	Moderate	High	Moderate		
Overall significance				Moderate adverse to minor beneficial effect	Neutral to moderate beneficial effect

Table 99: 2-208 Potential anthrax infected cattle burial site, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts from contaminated soils	Moderate	N/A	Moderate	Moderate beneficial effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	N/A	Moderate/low	Moderate beneficial effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases	Very low	N/A	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts from contaminated soils	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact and ingestion of contaminated waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Principal aquifer to physical mobilisation and migration from contaminated soils and waters	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of property to gases	N/A	N/A	N/A	N/A	N/A
Direct contact of property with contaminated soils and waters	N/A	N/A	N/A	N/A	N/A
Main risk	Moderate	Moderate	Moderate		
Overall significance				Minor adverse to moderate beneficial effect	Neutral effect

Table 100: 2-219 Challinor – Within Lane landfill site, Hopton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Exposure of Principal aquifer to leaching, vertical and lateral migration from contaminated soils and waters	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate	Moderate/low	Minor adverse effect	Neutral effect
Exposure of property to gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Main risk	Moderate	High	Moderate		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 101: 2-221 BPA Pipeline, Marston to Bishton - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact and ingestion of contaminated waters	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Principal and Secondary B aquifers to leaching, vertical and lateral migration from contaminated soils and waters	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate	High	Moderate	Minor adverse effect	Neutral effect
Exposure of property to gases and vapours	Moderate	Moderate	Moderate	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral effect	Neutral effect
Main risk	Moderate	High	Moderate		
Overall significance				Minor adverse to neutral effect	Neutral effect

Table 102: 2-254 Depot, 2-255 Depot, 2-256 Depot, 2-249 Depot, 2-247 Factory, 2-248 Tanks, 2-253 Industrial Estate and Pumping Station all on Pasturefields Enterprise Park - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of on-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of on-site human receptors by direct contact, ingestion and inhalation of vapours from contaminated waters	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of on-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of off-site human receptors to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors by direct contact and ingestion of contaminated waters	Low	Low	Low	Neutral effect	Neutral effect
Exposure of off-site human receptors to inhalation of gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Exposure of Principal and Secondary B aquifers to leaching, vertical and lateral migration from contaminated soils and waters	Moderate\low	Moderate\low	Moderate\low	Neutral effect	Neutral effect
Discharge of contaminants to surface water by lateral migration through groundwater and direct run-off from site	Moderate/low	Moderate/low	Moderate/low	Neutral effect	Neutral effect
Exposure of property to gases and vapours	Very low	Very low	Very low	Neutral effect	Neutral effect
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral effect	Neutral effect
Main risk	Moderate/low	Moderate/low	Moderate/low		
Overall significance				Neutral effect	Neutral effect

4 Geological sites of special scientific interest and local geological sites

4.1.1 No geological SSSI or local geological sites are present in the Colwich to Yarlet area.

5 Mining and minerals data

- 5.1.1 This section presents the following data relating to mining and minerals information:
- details of planning data for minerals sites; and
 - number of marl pits in each study area.
- 5.1.2 The Staffordshire County Council Minerals Local Plan for Staffordshire 2015 to 2030 (adopted in 2017)³ shows that the route passes through two MSA; one for sand and gravel extraction and one for bedrock sand extraction, which is shown in Maps LQ-01-105b-L1 to LQ-01-109a.
- 5.1.3 There are over one hundred historical marl pits, mostly very small, and no active marl pits in the study area. There is no evidence of current working of these pits. Many pits have filled with water and become ponds, and others have been backfilled with unspecified materials. Where the latter is the case, they have been assessed as potential contaminated sites as part of the overall baseline for the land quality study.

³ Staffordshire County Council (2017), *The Minerals Local Plan for Staffordshire 2015 to 2030*, adopted 16 February 2017

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

08081 434 434
HS2Enquiries@hs2.org.uk