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HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix LQ-001-0MA04

Land quality

MA04: Broomedge to Glazebrook

Land quality report

M217

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Department for Transport

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

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1 Introduction

1.1.1 This report is an appendix to the land quality assessment for the Broomedge to Glazebrook area, it comprises:

- a summary of engagement undertaken;
- details on committed developments relevant to land quality that form part of the future baseline; and
- detailed risk assessments associated with land contamination.

1.1.2 This appendix should be read in conjunction with:

- Volume 2, Community area reports;
- Volume 3, Route-wide effects;
- Volume 4, Off-route effects; and
- Background Information and Data (BID) (BID LQ-002)[1].

1.1.3 Maps referred to throughout this report are contained in the Volume 5: Land quality Map Book (Maps Series LQ-01-312b to LQ-01-314a). Sites carried through to assessment are given a reference number. In this report they are referred to as MA04-43 and on the maps they are referred to as 04-43.

1.1.4 Further information regarding receptors in relation to each site or group of sites is set out in the BID.

1.1.5 Information about Local Geological Sites and geological Sites of Special Scientific Interest (SSSI) and site visit records are set out in the BID document.

1.1.6 The Environmental Impact Assessment Scope and Methodology Report (SMR), (see Volume 5, Appendix CT-001-00001) should be referred to for details of the Land quality assessment.

[1] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background and Information Data, Land quality baseline data*. BID LQ-002-0MA04. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

2 Engagement

2.1.1 Table 1 sets out the organisations that have been engaged with during the preparation of the land quality section of the Environmental Statement (ES) for the Broomedge to Glazebrook area, the types of information that have been provided to the assessment team and any specific concerns raised.

Table 1: Engagement on land quality issues undertaken for the Broomedge to Glazebrook area

Organisation	Method/dates of contact	Information provided and/or specific concerns
Warrington Borough Council (WBC)	Meeting (15 May 2018)	Initial presentation on land quality assessment.
	Phone call (12 July 2018)	No current priority areas of potentially contaminated land within the selected search area.
	Meeting (5 June 2019)	Presentation and workshop with update of progress, discussion of Working Draft Environmental Statement (WDES) consultation responses, review of the land quality assessment process and review of example key sites. No specific concerns raised.
	Email (16 October 2020)	WBC was provided with updated GIS shapefile for the scheme.
	Meeting (22 October 2020)	Presentation with update on Stage 2 design refinement, review of the land quality assessment process and presentation on significant impacts identified to date.
	Email (11 November 2020)	Email resent to WBC to clarify the data request.
Trafford Metropolitan Borough (TMBC)	Meeting (15 May 2018)	Initial Presentation on land quality assessment.
	Phone call (18 July 2018)	Telephone call with TMBC Contaminated Land Officer to discuss the scope of requirements for land quality engagement.
	Email (9 August 2018)	Email to TMBC to confirm scope of request.
	Email (13 August 2018)	Email exchange to confirm timescales on receiving engagement information.
	Email (12 September 2018)	TMBC Contaminated Land Officer sent through an example of proposed environmental data via email.
	Email (17 September 2018)	Email with TMBC to confirm environmental data transmittal requirements and reconfirm the need for site investigation reports.
	Email (26 September 2018)	TMBC sent requested environmental data as shapefiles via email.
	Meeting (5 June 2019)	Presentation and workshop with update of progress, discussion of Working Draft Environmental Statement (WDES) consultation

Organisation	Method/dates of contact	Information provided and/or specific concerns
		responses, review of the land quality assessment process and review of example key sites. No specific concerns raised.
	Email (16 October 2020)	TMBC were provided with updated GIS shapefile for the scheme.
	Meeting (22 October 2020)	Presentation with update on Stage 2 design refinement, review of the land quality assessment process and presentation on significant impacts identified to date.
Environment Agency	Meeting (15 May 2018)	Presentation and workshop on land quality approach. No specific concerns raised but introductions made to Environment Agency HS2 team.
	Meeting (14 September 2018)	Meeting to discuss acquiring Environment Agency landfill data. Agreed procedure for acquiring detailed, site specific data and contacts with local area officers. Priority landfills along the route discussed and general information provided. Detailed information to be provided by local area officers at subsequent meeting. Specific concerns raised by Environment Agency around: prohibition on reuse of arisings within permitted area under the existing permit and illegal deposition or tipping of waste.
	Meeting (04 February 2021)	Meeting to discuss Hollins Green historical landfill and also adjacent Lanstar historical landfill (also known as land adjacent to Distillers. Environment Agency highlighted concerns relating to the suspected hazardous nature of substances and materials disposed into the Lanstar historical landfill.
Animal and Plant Health Agency (APHA)	Email (16 May 2019)	APHA detailed that there is no register of animal burial sites.

3 Risk assessment

3.1.1 A four-stage process, comprising stages A to D, has been carried out in accordance with the methodology set out in the SMR. At each stage, professional judgement has been used to check that the screening and assessment process is highlighting significant sites.

3.1.2 Stage A highlights potentially contaminative sites based on their potential impact. Sites with a moderate to high potential impact move through to stage B where they are assessed based on receptor proximity.

3.1.3 Sites with a high potential impact pass through stage B to detailed assessment irrespective of receptor proximity. Sites with a moderate potential impact and moderate to high receptor proximity also go through to detailed assessment.

3.1.4 For those sites which pass through stage B, a further detailed risk assessment (stages C and D) has been carried out.

3.1.5 The results of stage C are presented in three conceptual site models (CSM) as qualitative risk assessments covering baseline, construction and post-construction scenarios. Stage D then compares the risk of impact at construction and post-construction stages with the baseline to determine the change in risk and hence the potential for a significant effect.

3.1.6 Section 3.2 to 3.5 present assessments for potentially contaminated sites which have passed through the two-stage screening process within the study area. For each site the following data are presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment;
- assessment of temporary (construction) effects; and
- assessment of permanent (post-construction) effects.

3.1.7 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.

3.1.8 Where nearby sites present a similar contamination risk, they have been grouped and considered together. For example, in rural areas, small historical backfilled ponds and pits have been grouped together for assessment purposes.

3.1.9 Where sites have been grouped together, only one CSM has been prepared for those sites. The sites in the Broomedge to Glazebrook area have been listed as follows in Table 2.

3.1.10 For clarity, ‘on-site’ in this document means ‘within the land required for the construction of the Proposed Scheme’ and ‘off-site’ refers to ‘land beyond this boundary, but within the study area’.

Table 2: Sites included in the risk assessment within the Broomedge to Glazebrook area

Site group	Site title (site ID) and land use class[2]
On-site	
Historical landfills	Former refuse pit (MA04-43), Class 3 Historical Hollins Green landfill (MA04-45), Class 3 Historical Warburton Farm landfill (MA04-66), Class 3
Former Ministry of Defence (MoD) land	Former rifle range (MA04-51), Class 3 Former barracks (MA04-55), Class 3 Former MoD land and rifle range (MA04-71), Class 3
Former and current railway land	Disused railway (MA04-17), Class 2 Former mineral railway (MA04-42), Class 2 Current Liverpool to Manchester Line (via Warrington Central) (MA04-57), Class 2 Former LNER (MA04-61), Class 2
Off-site	
Farms	Current Moss Brow Farm (MA04-21), Class 1 Current Villa Farm (MA04-24), Class 1 Current Paddocklane Farm (MA04-30), Class 1 Current Leebrook (Lea brook) Farm (MA04-52), Class 1
Sewage works	Current sewage works (MA04-37), Class 2 Current sewage works (MA04-40), Class 2
Cemetery	Current cemetery (MA04-47), Class 2
Current and former smithies	Current smithy (MA04-46), Class 3 Former smithy (MA04-44), Class 3
Historical landfills	Historical Lanstar landfill (also known as land adjacent to tar distillers (MA04-48), Class 3 Historical Lock Lane Landfill (MA04-67), Class 3 Historical Lock Lane Landfill (MA04-68), Class 3
Former tank	Former tank (MA04-39), Class 3
Former MoD land	Former Barracks East (MA04-54), Class 3
Former railway land	Disused railway lines (MA04-64), Class 2 Disused railway lines (MA04-65), Class 2

3.1.11 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 8[3]. Although this report has been withdrawn by the Environment Agency, it remains technically valid and there has been no subsequent authoritative replacement.

3.1.12 The remainder of this section presents the risk assessment for the sites going through to stages C and D of the assessment. These sites are shown on Maps LQ-01-312b to LQ-01-314a, (Volume 5: Land Quality Map Book).

[2] As defined by the SMR.

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

3.1.13 The following abbreviations are used in these tables:

- CoCP – Code of Construction Practice;
- PAH – polycyclic aromatic hydrocarbons;
- PCB – polychlorinated biphenyls;
- PPE – personal protective equipment;
- VOC – volatile organic compounds;
- SVOC – semi-volatile organic compounds; and
- SPZ – source protection zone.

3.2 Baseline risk assessment

Table 3: Baseline CSM and qualitative risk assessment for historical landfills (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination in infilled ground, landfill waste, contaminated groundwater/leachate plume: metals, asbestos, hydrocarbons; ground gas and landfill gas-methane, carbon dioxide, VOC and hydrogen sulphide	Existing site users: site visitors, maintenance workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Adjacent site users: Residential and commercial	Inhalation of ground gases	Unlikely	Severe	Moderate/low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters - surface water: Manchester Ship Canal, Glaze Brook	Lateral migration through groundwater Direct runoff from site	Likely	Medium	Moderate
	Controlled waters – groundwater Secondary A Aquifer - Glaciofluvial sheet and alluvium deposits. Secondary B Aquifer- Tarporley Siltstone Formation and Bollin Mudstone Member	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium to minor	Moderate to moderate/low
	Property receptors - buildings, foundations and services (adjacent) Commercial/Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Severe	Moderate/low

Notes/assumptions

• sites assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 1 for details of receptors relevant to groups of sites;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• MA04-45 accepted industrial waste between 1989 and 1990. There are no other available details of the landfill construction, contents or licensing arrangements for all sites.

Table 4: Baseline CSM and qualitative risk assessment for former MoD land (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current site activities: contaminants primarily including asbestos, explosive ordnance, VOC, metals, hydrocarbons. Potential for ground gases/vapours	Existing site users: Commercial staff and visitors, residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users, such as those within nearby residential properties	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: Glaze Brook, ponds, interconnected drains	Lateral migration through groundwater Direct runoff from site	Unlikely	Negligible	Very low
	Controlled waters – groundwater Principle Aquifer – Wilmslow Sandstone Formation Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer-Tarporley Siltstone Formation SPZ 3	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium to minor	Moderate/low to very low
	Property receptors - buildings, foundations and services (existing and adjacent) Commercial/Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 2 for details of receptors relevant to the sites;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed; and

• the northern section of MA04-55 is in a SPZ 3.

Table 5: Baseline CSM and qualitative risk assessment for former and current railway land (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	Existing site users: site visitors, maintenance workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users, residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water Manchester Ship Canal, River Bollin, drains	Lateral migration through groundwater Direct runoff from site	Low likelihood to unlikely	Medium to negligible	Moderate/low to very low
	Controlled waters – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Tarporley Siltstone Formation SPZ 3	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium to minor	Moderate/low to very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
	Property receptors - buildings, foundations and services (adjacent) Residential	Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 3 for details of receptors relevant to the site;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed; and

• the following sites are located within a SPZ 3: MA04-57. MA04-61.

Table 6: Baseline CSM and qualitative risk assessment for farms (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users: site visitors, workers and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users: Residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: ponds, drains	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits, Shirdley Hill Sand Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium to minor	Moderate/low to very low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
	Principal Aquifer- Helsby Sandstone Formation Secondary B Aquifer- Bollin Mudstone Member, Tarporley Siltstone Formation				
	Property receptors - buildings, foundations and services (existing and adjacent) Residential/Farm buildings	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 4 for details of receptors relevant to the site;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed; and

• MA04-52 is the only site over a Principal Aquifer.

Table 7: Baseline CSM and qualitative risk assessment for sewage works (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from use as sewage filter bed: contaminants primarily comprising metals and metalloids, inorganic ions, organic contaminants, acids/alkalis, microorganisms, fuel oils,	Existing site users: Commercial and industrial staff and visitors	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users: Commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Minor	Very low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
acids, low levels of ground gas generation	Controlled waters – surface water: Manchester Ship Canal, Red Brook	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low
	Controlled water – groundwater: Secondary A Aquifer Glaciofluvial sheet deposits Secondary B Aquifer - Tarporley Siltstone Formation Secondary B Aquifer- Bollin Mudstone Member	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (existing and adjacent) Commercial/Industrial	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low
	Ecological designations –Coroners Wood	Vertical and lateral migration, direct contact	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 5 for details of receptors relevant to the site;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors; and

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed.

Table 8: Baseline CSM and qualitative risk assessment for cemetery (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities contaminants primarily comprising	Existing site users site visitors, workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
metals, semi-metals, pathogens, potentially low levels of ground gas (methane and carbon dioxide)	Adjacent site users: Residential	Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Controlled waters - surface water: ponds	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer- Bollin Mudstone Member, Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 1 for details of receptors relevant to the site; and

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed.

Table 9: Baseline CSM and qualitative risk assessment for current and former smithies (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities: PCB, metals, asbestos, PAH and chlorinated	Existing site users Residential, industrial staff and visitors	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users	Inhalation of ground gases	Unlikely	Medium	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: ponds	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary (undifferentiated) Aquifer – glacial till Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor to negligible	Low to very low
	Property receptors - buildings, foundations and services (existing and adjacent) Industrial and residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 7 for details of receptors relevant to the site;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors; and

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed.

Table 10: Baseline CSM and qualitative risk assessment for historical landfills (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination in infilled ground, industrial landfill waste, contaminated	Existing site users: site visitors, workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
groundwater/leachate plume: metals, asbestos, hydrocarbons; ground gas and landfill gas (methane, carbon dioxide, VOC and hydrogen sulphide)	Adjacent site users Residential	Inhalation of ground gases	Unlikely	Severe	Moderate/low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: Manchester Ship Canal, Glaze Brook	Lateral migration through groundwater Direct runoff from site	Likely	Medium	Moderate
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits, Alluvium Principal Aquifer- Helsby Sandstone Formation Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium	Moderate
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Severe	Moderate/low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 8 for details of receptors relevant to the site;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors; and

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed.

Table 11: Baseline CSM and qualitative risk assessment for former tank (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current activities: contaminants primarily comprising petroleum and diesel range hydrocarbons	Existing site users: site visitors, and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users Commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: Red Brook, Manchester Ship Canal	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Commercial	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 1 for details of receptors relevant to the site; and

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed.

Table 12: Baseline CSM and qualitative risk assessment for former MoD land (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former and current site activities: contaminants primarily including asbestos, explosive ordnance, VOC, metals, hydrocarbons. Potential for low levels of ground gases/vapours	Existing site users: site visitors and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users Residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: Glaze Brook	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Principal Aquifer - Helsby Sandstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium	Moderate/low to low
	Property receptors - buildings, foundations and services (existing and adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 1 for details of receptors relevant to the site; and

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed.

Table 13: Baseline CSM and qualitative risk assessment for former railway land (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline phase
Potential contamination from former activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	Existing site users: site visitors and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users Residential and commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: ponds, River Bollin	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer- Bollin Mudstone Member	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site assessed without construction of the Proposed Scheme;

• see BID document Section 2 Table 11 for details of receptors relevant to the site;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors; and

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed.

3.3 Construction risk assessment

Table 14: Construction CSM and qualitative risk assessment for historical landfills (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination in infilled ground, landfill waste, contaminated groundwater/leachate plume: metals, asbestos, hydrocarbons; ground gas and landfill gas- methane, carbon dioxide, VOC and hydrogen sulphide	Existing site users: site visitors, maintenance workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Adjacent site users: Residential and commercial	Inhalation of ground gases	Unlikely	Severe	Moderate/low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters - surface water: Manchester Ship Canal, Glaze Brook	Lateral migration through groundwater Direct runoff from site	Likely	Medium	Moderate
	Controlled waters – groundwater Secondary A Aquifer - Glaciofluvial sheet and alluvium deposits. Secondary B Aquifer- Tarporley Siltstone Formation and Bollin Mudstone Member	Leaching, vertical and lateral migration from contaminated soils and waters	High likelihood to Likely	Medium	High to moderate
	Property receptors - buildings, foundations and services (adjacent) Commercial/Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Severe	Moderate/low

Notes/assumptions:

• site investigation will be required prior to construction of the Proposed Scheme;

• sites which lie within the land required for construction of the Proposed Scheme may require remediation;

• sites located on the land required for the construction of the Proposed Scheme are assumed to be unoccupied during construction, therefore on-site construction risks to human health receptors are labelled as not applicable (N/A);

• it is assumed that existing on-site properties will be demolished during the construction stage and so risks to them have not been assessed;

• remediation will be restricted to mitigation of land quality effects arising from the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the potentially contaminated area;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

• during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP (Volume 5, Appendix CT-002-00000). Construction workers have been excluded from the assessment due to the use of PPE/risk management protocols and in accordance with the SMR;

• while 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 Proposed Scheme at MA04-43 and -45 is located on a piled viaduct potentially temporarily increasing the probability of impact on the underlying superficial and bedrock aquifers during construction.

Table 15: Construction CSM and qualitative risk assessment for former MoD land (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current site activities: contaminants primarily including asbestos, explosive ordnance, VOC, metals, hydrocarbons. Potential for low levels of ground gases/vapours	Existing site users: site visitors, construction workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Adjacent site users, such as those within nearby residential properties	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: Glaze Brook, ponds, interconnected drains	Lateral migration through groundwater Direct runoff from site	Unlikely	Negligible	Very low
	Controlled waters – groundwater Principle Aquifer – Wilmslow Sandstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood	Medium to minor	Moderate/low to very Low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
	Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer-Tarporley Siltstone Formation				
	Property receptors - buildings, foundations and services (adjacent) Commercial/Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site investigation will be required prior to construction of the Proposed Scheme;

• sites which lie within the land required for construction of the Proposed Scheme may require remediation;

• sites located on the land required for the construction of the Proposed Scheme are assumed to be unoccupied during construction, therefore on-site construction risks to human health receptors are labelled as not applicable (N/A);

• it is assumed that existing on-site properties will be demolished during the construction stage and so risks to them have not been assessed;

• remediation will be restricted to mitigation of land quality effects arising from the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the potentially contaminated area;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors; and

• during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from the assessment due to the use of PPE/risk management protocols and in accordance with the SMR.

Table 16: Construction CSM and qualitative risk assessment for former and current railway land (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons);	Existing site users: site visitors, maintenance workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Adjacent site users,	Inhalation of ground gases	Unlikely	Medium	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water Manchester Ship Canal, River Bollin, drains	Lateral migration through groundwater Direct runoff from site	Low likelihood to unlikely	Medium to negligible	Moderate/low to very low
	Controlled waters – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Likely to unlikely	Medium to minor	Moderate to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site investigation will be required prior to construction of the Proposed Scheme;

• sites which lie within the land required for construction of the Proposed Scheme may require remediation;

• sites located on the land required for the construction of the Proposed Scheme are assumed to be unoccupied during construction, therefore on-site construction risks to human health receptors are labelled as not applicable (N/A);

• it is assumed that existing on-site properties will be demolished during the construction stage and so risks to them have not been assessed;

• remediation will be restricted to mitigation of land quality effects arising from the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the potentially contaminated area;

•for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

•during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from the assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and

• while 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.

Table 17: Construction CSM and qualitative risk assessment for farms (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users: site visitors, workers and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users: Residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: ponds, drains	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits, Shirdley Hill Sand Formation Principal Aquifer - Helsby Sandstone Formation Secondary B Aquifer - Bollin Mudstone Member, Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium to minor	Moderate/low to very low
	Property receptors - buildings, foundations and services (existing and adjacent) Residential/Farm buildings	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

- *site investigation may be required prior to construction of the Proposed Scheme;*
- *existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;*

• 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 protocols and in accordance with the SMR;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

•during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from the assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and

• while 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.

Table 18: Construction CSM and qualitative risk assessment for sewage works (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from use as sewage filter bed: contaminants primarily comprising metals and metalloids, inorganic ions, organic contaminants, acids/alkalis, microorganisms, fuel oils, acids, low levels of ground gas generation	Existing site users: Commercial and industrial staff and visitors	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users: Commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Minor	Very low
	Controlled waters – surface water: Manchester Ship Canal, Red Brook	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits	Leaching, vertical and lateral migration from	Low likelihood to unlikely	Minor	Low to very low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
	Secondary B Aquifer - Tarporley Siltstone Formation Secondary B Aquifer- Bollin Mudstone Member	contaminated soils and waters			
	Property receptors - buildings, foundations and services (existing and adjacent) Commercial/Industrial	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low
	Ecological designations –Coroners Wood	Vertical and lateral migration, direct contact	Unlikely	Minor	Very low

Notes/assumptions:

• site investigation may be required prior to construction of the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• 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 protocols and in accordance with the SMR;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors; and

• while 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.

Table 19: Construction CSM and qualitative risk assessment for cemetery (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities contaminants primarily comprising metals, semi-metals, pathogens,	Existing site users site visitors, workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
potentially low levels of ground gas (methane and carbon dioxide)		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within nearby residential properties	Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Controlled waters - surface water: ponds	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Bollin Mudstone Member, Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site investigation may be required prior to construction of the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• 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 protocols and in accordance with the SMR;

• while 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

• while 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.

Table 20: Construction CSM and qualitative risk assessment for former and current smithies (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	Existing site users Residential, industrial staff and visitors	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: ponds	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary (undifferentiated) Aquifer – glacial till Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor to negligible	Low to very low
	Property receptors - buildings, foundations and services (existing and adjacent) Industrial and residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

- *site investigation may be required prior to construction of the Proposed Scheme;*
- *existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;*

• 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 protocols and in accordance with the SMR;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

• during construction, standard mitigation procedures are assumed to be implemented in accordance with the draft CoCP. Construction workers have been excluded from the assessment due to the use of PPE/risk management protocols and in accordance with the SMR; and

• while 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.

Table 21: Construction CSM and qualitative risk assessment for historical landfills (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination in infilled ground, industrial landfill waste, contaminated groundwater/leachate plume: metals, asbestos, hydrocarbons; ground gas and landfill gas (methane, carbon dioxide, VOC and hydrogen sulphide)	Existing site users: site visitors, workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Adjacent site users Residential	Inhalation of ground gases	Unlikely	Severe	Moderate/low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: Manchester Ship Canal, Glaze Brook	Lateral migration through groundwater Direct runoff from site	Likely	Medium	Moderate
	Controlled water – groundwater: Secondary A Aquifer - glaciofluvial sheet deposits, alluvium Principal Aquifer - Helsby Sandstone Formation Secondary	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium	Moderate

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
	B Aquifer - Tarporley Siltstone Formation				
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Severe	Moderate/low

Notes/assumptions:

• site investigation may be required prior to construction of the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors;

• 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 protocols and in accordance with the SMR;

• while 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.

Table 22: Construction CSM and qualitative risk assessment for a former tank (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current activities: contaminants primarily comprising petroleum and diesel range hydrocarbons	Existing site users: site visitors, and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users Commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
	Controlled waters – surface water: Red Brook, Manchester Ship Canal	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Commercial	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• site investigation may be required prior to construction of the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• 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 protocols and in accordance with the SMR;

• while 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.

Table 23: Construction CSM and qualitative risk assessment for former MoD land (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former and current site activities: contaminants primarily including asbestos,	Existing site users: site visitors and Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters Inhalation of ground gases	Low likelihood	Medium	Moderate/low
			Unlikely	Medium	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
explosive ordnance, VOC, metals, hydrocarbons. Potential for low levels of ground gases/vapours	Adjacent site users Residential	Inhalation of ground gases Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
			Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: Glaze Brook	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Principal Aquifer - Helsby Sandstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium	Moderate/low to low
	Property receptors - buildings, foundations and services (existing and adjacent) Residential	Direct contact with contaminated soils and waters Exposure to explosive gases	Low likelihood	Minor	Low
			Unlikely	Minor	Very low

Notes/assumptions:

• site investigation may be required prior to construction of the Proposed Scheme;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• 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 protocols and in accordance with the SMR; and

• while 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.

Table 24: Construction CSM and qualitative risk assessment for former railway land (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at construction phase
Potential contamination from former activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	Existing site users: site visitors and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users Residential and commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: ponds, River Bollin	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer- Bollin Mudstone Member	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

- *site investigation may be required prior to construction of the Proposed Scheme;*
- *existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;*
- *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 protocols and in accordance with the SMR;*

• for groups of sites where different sensitivities of receptors have been identified, a risk range has been provided based on the least and most sensitive receptors; and

• while 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.

3.4 Post-construction risk assessment

Table 25: Post-construction CSM and qualitative risk assessment for historical landfills (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination in infilled ground, landfill waste, contaminated groundwater/leachate plume: metals, asbestos, hydrocarbons; ground gas and landfill gas-methane, carbon dioxide, VOC and hydrogen sulphide	Existing site users: site visitors, maintenance workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Adjacent site users: Residential and commercial Controlled waters - surface water: Manchester Ship Canal, Glaze Brook	Inhalation of ground gases	Unlikely	Severe	Moderate/low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters - surface water: Manchester Ship Canal, Glaze Brook	Lateral migration through groundwater Direct runoff from site	Likely	Medium	Moderate
	Controlled waters – groundwater Secondary A Aquifer - Glaciofluvial sheet and alluvium deposits.	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium to minor	Moderate to moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Secondary B Aquifer- Tarporley Siltstone Formation and Bollin Mudstone Member				
	Property receptors - buildings, foundations and services (adjacent) Commercial/Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Severe	Moderate/low

Notes/assumptions:

• assumes construction works are complete and remediation has been carried out where necessary. No pathways are left open;

• as human health receptors are no longer present at the post-construction stage the risk are labelled as not applicable (N/A);

• it is assumed that existing properties are no longer present on-site at the post-construction stage and so risks to them have not been assessed;

• a risk range may be given as the need for remediation strategies will vary to focus on specific contaminative risks at each site;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed; and

• excludes rail passengers (as whilst within trains, 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 26: Post-construction CSM and qualitative risk assessment for former MoD land (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current site activities: contaminants primarily including asbestos, explosive ordnance, VOC, metals, hydrocarbons. Potential for ground gases/vapours	Existing site users: site visitors, maintenance workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users, such as those within nearby residential properties	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours	Low likelihood	Medium	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
		from contaminated soils and waters			
	Controlled waters – surface water: Glaze Brook, ponds, interconnected drains	Lateral migration through groundwater Direct runoff from site	Unlikely	Negligible	Very low
	Controlled waters – groundwater Principle Aquifer – Wilmslow Sandstone Formation Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer-Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium to minor	Moderate/low to very low
	Property receptors - buildings, foundations and services (existing and adjacent) Commercial/Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• assumes construction works are complete and remediation has been carried out where necessary. No pathways are left open;

• it is assumed that existing properties are no longer present on-site at the post-construction stage and so risks to them have not been assessed;

• a risk range may be given as the need for remediation strategies will vary to focus on specific contaminative risks at each site;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• excludes rail passengers (as whilst within trains, 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

• MA04-51 is proposed to be developed for woodland creation including a diverted new public right of way and it is therefore assumed that it will become an area of public open space and that the draft CoCP has been applied and remediation undertaken. It is assumed that for MA04-55 human health and on-site property receptors are no longer present at the post-construction stage.

Table 27: Post-construction CSM and qualitative risk assessment for former and current railway land (on-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	Existing site users: site visitors, maintenance workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users, residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water Manchester Ship Canal, River Bollin, drains	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low
	Controlled waters – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium to minor	Moderate/low to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• assumes construction works are complete and remediation has been carried out where necessary. No pathways are left open;

• it is assumed that existing properties are no longer present on-site at the post-construction stage and so risks to them have not been assessed;

• a risk range may be given as the need for remediation strategies will vary to focus on specific contaminative risks at each site;

• existing site users and adjacent site users in the receptor column refer to users at or near to the areas assessed;

• excludes rail passengers (as whilst within trains, 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

• MA04-17 will still be part of the Trans-Pennine route and site receptors will be restored post-construction.

Table 28: Post-construction CSM and qualitative risk assessment for farms (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities including potential tanks: contaminants primarily compromising petroleum and diesel range hydrocarbons, pesticides, asbestos, pathogens, aggressive ground conditions for concrete (sulphate/pH). Potential for low concentrations/flow rates of ground gases/vapours	Existing site users: site visitors, workers and residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users: Residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: ponds, drains	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits, Shirdley Hill Sand Formation Principal Aquifer - Helsby Sandstone Formation Secondary B Aquifer - Bollin Mudstone Member, Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium to minor	Moderate/low to very low
		Direct contact with contaminated soils and waters	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Property receptors - buildings, foundations and services (existing and adjacent) Residential/Farm buildings	Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;

• assumes baseline conditions will not change at post-construction; and

• existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.

Table 29: Post-construction CSM and qualitative risk assessment for sewage works (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from use as sewage filter bed: contaminants primarily comprising metals and metalloids, inorganic ions, organic contaminants, acids/alkalis, microorganisms, fuel oils, acids, low levels of ground gas generation	Existing site users: Commercial and industrial staff and visitors	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users: Commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Minor	Very low
	Controlled waters – surface water: Manchester Ship Canal, Red Brook	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low
	Controlled water – groundwater: Secondary A Aquifer Glaciofluvial sheet deposits	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Secondary B Aquifer - Tarporley Siltstone Formation Secondary B Aquifer - Bollin Mudstone Member				
	Property receptors - buildings, foundations and services (existing and adjacent) Commercial/Industrial	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low
	Ecological designations – Coroners Wood	Vertical and lateral migration, direct contact	Unlikely	Minor	Very low

Notes/assumptions:

• assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;

• assumes baseline conditions will not change at post-construction; and

• existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.

Table 30: Post-construction CSM and qualitative risk assessment for cemetery (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities contaminants primarily comprising metals, semi-metals, pathogens, potentially low levels of ground gas (methane and carbon dioxide)	Existing site users site visitors, workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
		Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Adjacent site users, such as those within nearby residential properties	Inhalation of ground gases	Low likelihood	Medium	Moderate/low
	Controlled waters - surface water: ponds	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Controlled water – groundwater Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Bollin Mudstone Member, Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

- *assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;*
- *assumes baseline conditions will not change at post-construction; and*
- *existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.*

Table 31: Post-construction CSM and qualitative risk assessment for former and current smithies (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons); potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	Existing site users Residential, industrial staff and visitors	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
	Controlled waters – surface water: ponds	Lateral migration through groundwater Direct runoff from site	Low likelihood	Negligible	Very low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary (undifferentiated) Aquifer – glacial till Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor to negligible	Low to very low
	Property receptors - buildings, foundations and services (existing and adjacent) Industrial and residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;

• assumes baseline conditions will not change at post-construction; and

• existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.

Table 32: Post-construction CSM and qualitative risk assessment for historical landfills (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination in infilled ground, industrial landfill waste, contaminated groundwater/leachate plume: metals, asbestos,	Existing site users: site visitors, workers and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Severe	Moderate/low
	Adjacent site users	Inhalation of ground gases	Unlikely	Severe	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
hydrocarbons; ground gas and landfill gas (methane, carbon dioxide, VOC and hydrogen sulphide)	Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: Manchester Ship Canal, Glaze Brook	Lateral migration through groundwater Direct runoff from site	Likely	Medium	Moderate
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits, Alluvium Principal Aquifer - Helsby Sandstone Formation Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Likely	Medium	Moderate
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Severe	Moderate/low

Notes/assumptions:
- *assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;*
- *assumes baseline conditions will not change at post-construction; and*
- *existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.*

Table 33: Post-construction CSM and qualitative risk assessment for a former tank (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current activities: contaminants	Existing site users: site visitors, and farm workers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
primarily comprising petroleum and diesel range hydrocarbons		Inhalation of ground gases	Unlikely	Medium	Low
	Adjacent site users Commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: Red Brook, Manchester Ship Canal	Lateral migration through groundwater Direct runoff from site	Low likelihood	Medium	Moderate/low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Tarporley Siltstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Commercial	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

- *assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;*
- *assumes baseline conditions will not change at post-construction; and*
- *existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.*

Table 34: Post-construction CSM and qualitative risk assessment for former MoD land (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former and current site activities: contaminants primarily	Existing site users: site visitors and Residential	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
including asbestos, explosive ordnance, VOC, metals, hydrocarbons. Potential for low levels of ground gases/vapours	Adjacent site users Residential	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
	Controlled waters – surface water: Glaze Brook	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Principal Aquifer -Helsby Sandstone Formation	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Medium	Moderate/low to low
	Property receptors - buildings, foundations and services (existing and adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

• assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;

• assumes baseline conditions will not change at post-construction; and

• existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.

Table 35: Post-construction CSM and qualitative risk assessment for former railway land (off-site)

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
Potential contamination from former activities: PCB, metals, asbestos, PAH and chlorinated hydrocarbons);	Existing site users: site visitors and walkers	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Low likelihood	Medium	Moderate/low
		Inhalation of ground gases	Unlikely	Medium	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at post-construction phase
potentially low levels of ground gas (methane and carbon dioxide); petroleum and diesel range hydrocarbons	Adjacent site users Residential and commercial	Inhalation of ground gases	Unlikely	Medium	Low
		Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils and waters	Unlikely	Medium	Low
	Controlled waters – surface water: ponds, River Bollin	Lateral migration through groundwater Direct runoff from site	Unlikely	Medium	Low
	Controlled water – groundwater: Secondary A Aquifer - Glaciofluvial sheet deposits Secondary B Aquifer - Bollin Mudstone Member	Leaching, vertical and lateral migration from contaminated soils and waters	Low likelihood to unlikely	Minor	Low to very low
	Property receptors - buildings, foundations and services (adjacent) Residential	Direct contact with contaminated soils and waters	Low likelihood	Minor	Low
		Exposure to explosive gases	Unlikely	Minor	Very low

Notes/assumptions:

- *assumes construction works are complete and remediation has been carried out where necessary. No pathways are open;*
- *a risk range may be given as the need for remediation will vary at each site;*
- *assumes baseline conditions will not change at post-construction; and*
- *existing site users and adjacent site users in the receptor column refer to users within/near to the areas assessed.*

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

3.5.1 The significance of the effects of land contamination is assessed by comparing the difference in risk of each contaminant linkage at baseline to those at construction and at post-construction stages. This provides a way of assessing both the adverse and beneficial effects during construction and the post-construction period.

Table 36: Historical landfills (on-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	N/A	N/A	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Moderate/low	N/A	N/A	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Moderate	Moderate	Moderate	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of	Moderate to moderate/low	High to moderate	Moderate to moderate/low	Minor adverse	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
contaminated groundwater/leachate					
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Overall significance				Neutral to minor adverse	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 37: Former MoD land (on-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	N/A	Low	Neutral	Minor beneficial
Exposure of existing site users to inhalation of gases and vapours	Low	N/A	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
and vapours from contaminated soils and waters					
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Very low	Very low	Very low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Moderate/low to very low	Moderate/low to low	Moderate/low to very low	Minor adverse	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral to minor adverse	Neutral to minor beneficial

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area;

• as property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A);

• as human health receptors are no longer present during the construction stage the risks are labelled as not applicable (N/A); and

• woodland planting and footpath creation on MA04-51 will mean there are site users post-construction.

Table 38: Former and current railway land (on-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts	Moderate/low	N/A	Low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
and vapours from contaminated soils and waters					
Exposure of existing site users to inhalation of gases and vapours	Low	N/A	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Moderate/low to very low	Moderate/low to very low	Low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Moderate/low to very low	Moderate to very low	Moderate/low to very low	Minor adverse	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral to minor adverse	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area;

• as human health and property receptors are no longer present during the construction stage the risks are labelled as not applicable (N/A); and

• The Trans-Pennine way will be open to the public once construction is complete meaning on-site users in post-construction.

Table 39: Farms (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Very low	Very low	Very low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Moderate/low to very low	Moderate/low to very low	Moderate/low to very low	Neutral	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 40: Sewage works (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Very low	Very low	Very low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Low to very low	Low to very low	Low to very low	Neutral	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Ecological designations vertical and lateral migration, direct contact – Coroners Wood	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 41: Cemetery (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Very low	Very low	Very low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of	Low to very low	Low to very low	Low to very low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
contaminated groundwater/leachate					
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 42: Former and current smithies (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Low	Low	Low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Very low	Very low	Very low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Low to very low	Low to very low	Low to very low	Neutral	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 43: Historical landfill (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of adjacent site users to inhalation of gases and vapours	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Moderate	Moderate	Moderate	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Moderate	Moderate	Moderate	Neutral	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 44: Former tank (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Low to very low	Low to very low	Low to very low	Neutral	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 45: Former MoD land (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Low	Low	Low	Neutral	Neutral
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Moderate/low to low	Moderate/low to low	Moderate/low to low	Neutral	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

Table 46: Former railway land (off-site) - significance of effect assessment

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of existing site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Moderate/low	Moderate/low	Moderate/low	Neutral	Neutral
Exposure of existing site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to inhalation of gases and vapours	Low	Low	Low	Neutral	Neutral
Exposure of adjacent site users to contamination by direct contact, ingestion and inhalation of dusts and vapours from contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Discharge of contaminants to surface water by lateral migration through groundwater and direct runoff from site	Low	Low	Low	Neutral	Neutral

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction significance	Post-construction significance
Exposure of groundwater to vertical and lateral migration of contaminated groundwater/leachate	Low to very low	Low to very low	Low to very low	Neutral	Neutral
Direct contact of property with contaminated soils and waters	Low	Low	Low	Neutral	Neutral
Exposure of property to explosive gases	Very low	Very low	Very low	Neutral	Neutral
Overall significance				Neutral	Neutral

Notes/assumptions:

• the significance column may report a range of outcomes for a site. The draft CoCP is designed to mitigate effects, and it is considered that only temporary minor adverse effects during the construction period will occur from ground disturbance. Mitigation measures over and above the draft CoCP are detailed in the Volume 2 report for this study area; and

• as human health and property receptors are no longer present during the construction and post-construction stages the risks are labelled as not applicable (N/A).

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