

**The Network Rail (Leeds to Micklefield
Enhancements) Order**



TRANSPORT AND WORKS ACT 1992

**Transport and Works (Applications and Objections
Procedure) (England and Wales) Rules 2006**

**THE NETWORK RAIL (LEEDS to MICKLEFIELD
ENHANCEMENTS) ORDER**

**DOCUMENT NR16: ENVIRONMENTAL REPORT
VOLUME 1: MAIN TEXT**

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1. INTRODUCTION

1.1 Transpennine Route Upgrade

1.1.1 The Transpennine Route Upgrade (TRU) is a major, multi-billion pound programme of improvements to bring more frequent, faster and greener trains between York, Leeds and Manchester on a better, cleaner, more reliable railway.

1.1.2 TRU is a phased programme of works to address the existing overcrowding and congestion on the route attributable to the limited capacity and dated infrastructure. The project supports economic growth, and “levelling up” opportunities across the north of England. The existing route carries a mix of fast express trains, local stopping services and freight trains but has not seen significant investment for many years.

1.1.3 The TRU programme involves a variety of works including the electrification of the railway (installation of overhead line equipment (OLE) and associated infrastructure), removal, re-modelling and replacement of bridges and structures to accommodate OLE, track and signalling upgrades, and structural strengthening works. Where level crossings are affected by the improved services proposed, TRU also involves level crossing closures and, where necessary, their replacement by safer alternatives.

1.2 The proposed Network Rail (Leeds to Micklefield Enhancements) Transport and Works Act Order

1.2.1 The proposed Network Rail (Leeds to Micklefield Enhancements) Transport and Works Act Order (TWAo) (the Leeds to Micklefield Enhancements Order) relates to works that fall within the boundaries of TRU East Project E2 to E4, which is the section of TRU between Leeds and Church Fenton. Within this section, a number of works require the acquisition and use of land outside the ownership of Network Rail. These works involve the demolition and construction of overbridges; the closure of level crossings and implementation of safer alternatives; and the land acquisition and temporary access required for construction.

1.2.2 These works and associated land uses are proposed to be authorised by the Leeds to Micklefield Enhancements Order. Collectively these works and land uses are referred to as the Leeds to Micklefield Enhancements Order Scheme (‘the Scheme’). Other works required as part of the TRU East Project E2 to E4 will be carried out under permitted development rights and planning permissions obtained from the local planning authority. The proposed Leeds to Micklefield Enhancements Order includes provisions (such as temporary possession of land) to facilitate these additional works.

1.2.3 Listed Building Consent applications are also to be submitted for works to listed bridges. The applications do not form part of the Order but will be submitted and determined concurrently.

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1.3 Scope of Environmental Report

- 1.3.1 This Environmental Report (the Report) has been prepared on behalf of Network Rail Infrastructure Limited (Network Rail). It presents the findings of specific technical environmental studies that have been undertaken to identify the likely environmental impacts of the components of the Scheme for which deemed planning permission is being sought as part of the TWAO application and the associated temporary construction compounds and accesses required to deliver those components (referred to as the ‘relevant works components of the Scheme’).
- 1.3.2 The relevant works components proposed of the Scheme are summarised below and described in more detail in Table 1.1 and Chapter 3:
- Installation of small-scale electrification and signalling infrastructure mounted on metal staging structures between Kirkgate Viaduct (HUL4/47) and Marsh Lane Viaduct (HUL4/44) at Penny Pocket Park in Leeds City Centre.
 - Works to bridges at Austhorpe Lane, Crawshaw Woods and Ridge Road.
 - Works to divert gas mains at Austhorpe Lane and Ridge Road.
 - Closure of Barrowby Lane Level Crossings and provision a new footbridge and bridleway bridge.
 - Installation of a Track Sectioning Cabin (TSC) at Micklefield.
 - Closure of Peckfield Level Crossing and provision of an alternative route for the public right of way.
- 1.3.3 Mitigation and enhancement measures are proposed that aim to reduce impacts and adverse environmental effects.
- 1.3.4 The Report does not consider the effects of certain additional elements which are either being carried out as permitted development or through planning permission obtained separately from the local planning authority. The proposed Leeds to Micklefield Enhancements Order includes provisions to facilitate these elements but does not authorise the works. These elements which are not included within the scope of this Report [NR16] are described in Table 1.2.
- 1.3.5 Figures 1.1.1 to 1.1.3 in Volume 2 – Figures of the Environmental Report [NR16] shows the extent of the relevant works components of the Scheme, from Kirkgate to Marsh Lane Land in the west to the Peckfield Level Crossing Closure in the east.
- 1.3.6 Further information regarding the purpose and content of the Report is provided in Sections 1.5 and 1.7 below.

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Relevant Works Component of the Scheme	Description of matters authorised by the Order	Status of works
Kirkgate to Marsh Lane Land	The installation of small-scale electrification and signalling infrastructure mounted on metal staging structures between Kirkgate Viaduct (HUL4/47) and Marsh Lane Viaduct (HUL4/44) at Penny Pocket Park in Leeds City Centre	Works subject to request for deemed planning permission
Austhorpe Lane Gas Main Diversion	Removal of existing Northern Gas Networks high-pressure gas main pipe bridge (HUL4/20B) located adjacent to Austhorpe Lane Overbridge (HUL4/21) and diversion of the gas main via a new micro-tunnel constructed under the railway.	Works subject to request for deemed planning permission
Replacement Austhorpe Lane Bridge	Demolition of the Grade II listed public highway Austhorpe Lane Overbridge (HUL4/21) and Austhorpe Lane Footbridge (HUL4/21A) and the construction of a new dual-purpose overbridge (the 'Replacement Austhorpe Lane Bridge') incorporating a two-lane carriageway highway (5.5 m) and 2 m footway on the western side.	Works subject to request for deemed planning permission
Austhorpe Lane Northwest and Southeast Compounds	Temporary construction compounds north-west and south-east of Austhorpe Lane Overbridge	Permitted development
Works to Raise Crawshaw Woods Bridge	Works to partially dismantle and reinstate the Grade II Listed Crawshaw Woods Overbridge (HUL4/20) in an elevated position to allow sufficient headroom for the installation of OLE, including the permanent acquisition of land required for embankment works.	Works subject to request for deemed planning permission
Crawshaw Woods Bridge Compound North and	Temporary use of land for construction compounds north and south of the railway	Permitted development

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Relevant Works Component of the Scheme	Description of matters authorised by the Order	Status of works
Crawshaw Woods Bridge Compound South		
New Barrowby Lane Bridge and New Access Tracks to New Barrowby Lane Bridge	Works for the closure of the Barrowby Lane and Barrowby Foot Level Crossings and construction of a ramped bridleway bridge at Barrowby Lane, including the permanent acquisition of land required for the new bridge, Public Right of Way diversion (Austhorpe 9)	Works subject to request for deemed planning permission
Barrowby Lane Bridge Compound	The temporary use of land for construction of the ramped bridge	Permitted development
Ridge Road Gas Main Diversion	Removal of existing Northern Gas Networks high-pressure Gas Main Pipe Bridge (HUL 4/15) adjacent to Ridge Road Overbridge (HUL4/14) and diversion of the gas main via a new micro-tunnel constructed under the railway.	Works subject to request for deemed planning permission
Replacement Ridge Road Bridge	Demolition and reconstruction of Grade II Listed Ridge Road Overbridge (HUL4/14), incorporating re-alignment of existing highway.	Works subject to request for deemed planning permission
Ridge Road Northeast Compound and Ridge Road South Compound	Temporary use of land for a construction compound	Permitted development
Micklefield TSC	Permanent acquisition of land off Phoenix Avenue, Micklefield and the construction of a TSC	Works subject to request for deemed planning permission
Peckfield Level Crossing Closure; The Lower Peckfield Lane Highway Works	Works and land use for the closure of Peckfield Level Crossing and construction of Public Right of Way diversion (footpath or bridleway link to PRow Micklefield 8) with associated highways improvement and parking works ('The Lower Peckfield Lane Highway Works')	Works subject to request for deemed planning permission

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Order Scheme Component	Description
Kirkgate Compound and Kirkgate Construction Land ¹	Temporary compound and construction works in connection with the reconstruction of the existing HUL4/47 Kirkgate Underbridge (HUL 4/47) requiring the temporary use of land in Leeds City centre adjacent to the Underbridge
Marsh Lane Compound and Marsh Lane Construction Land ¹	The temporary use of land as a compound for construction adjacent to Marsh Lane Viaduct (HUL4/44) to the south-east of Leeds City Centre
Manston Lane Compound ¹	The temporary use of land as a construction compound to the south of Manston Lane, Cross Gates, including a new access from Manston Lane to facilitate the TRU track renewal programme.
Brady Farm Overbridge (HUL4/15) ¹	Temporary use of land adjacent to Grade II listed Brady Farm Overbridge (HUL4/15) in connection with demolition of the overbridge (the 'Brady Farm Bridge Compound')
Phoenix Avenue Compound ¹	Temporary use of land for a compound off Phoenix Avenue to facilitate the TRU programme
Garforth Moor Level Crossing Closure ¹	Closure of Garforth Moor Level Crossing and stopping up of associated Public Right of Way Garforth 7
Highroyds Wood Level Crossing Closure ¹	Closure of Highroyds Wood Level Crossing and diversion of associated Public Right of Way Micklefield 7
Osmondthorpe Lane Compound ¹	Temporary use of land required for use as a construction compound in connection with the construction of a replacement of Osmondthorpe Lane underbridge
The Neville Hill Access Land ²	Permanent use of land off Newmarket Approach to provide access to the Neville Hill railway sidings.
Wykebeck Avenue Compound ¹	Temporary use of land required for a compound off Wykebeck Avenue to facilitate the TRU programme

Notes

1 – Secured under permitted development rights

2 – Subject to a separate planning application to Leeds City Council.

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1.4 Environmental Impact Assessment Screening

- 1.4.1 Subject to certain exceptions, the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 (the Application Rules) require the applicant for a TWAO to submit an Environmental Statement (ES) in relation to any proposed works that constitute a project of the type outlined in Annex I or Annex II of the Environmental Impact Assessment (EIA) Directive 2011/92/EU, as amended by Directive 2014/52/EU (the EIA Directive). An ES is not required for projects listed in Annex II if the Secretary of State notifies the applicant that an ES is not required because the project is unlikely to have a significant effect on the environment (i.e. a negative EIA screening decision is provided).
- 1.4.2 Under Rules 7(4) and 7(13) of the Application Rules, an EIA screening decision was sought from the Secretary of State in April 2023. The Screening Decision letter [NR10] received from the Secretary of State on 17 May 2023 confirmed that EIA is not required. The Screening Decision letter dated 17 May 2023 makes reference to consultation responses received from Natural England, the Environment Agency, Historic England and Leeds City Council.
- 1.4.3 The following requirement is included (note 8) in the Screening Decision letter from the Secretary of State [NR10]. A description of how this has been addressed is provided in Section 1.5 and Chapter 4.
- *“As acknowledged in your supporting documents an appropriate level of detail on the scheme’s: Cumulative and combined effects; Ecology, nature conservation and biodiversity; Water - hydrology and surface water; Land - transport and access; Land - landscape and visual; Land - cultural heritage; Soil - geology and ground conditions; Residues and emissions – materials and waste; Noise & Vibration; and Air pollution should be submitted with any subsequent application for an order under the 1992 Act.”*

1.5 Purpose of this Environmental Report

- 1.5.1 This Report includes the findings of an environmental appraisal, with technical note appendices provided in Volume 3 of the Environmental Report [NR16] that serve to address feedback from statutory bodies, in addition to other legal requirements regarding the environment. This Report presents consideration of the following 11 topics, with each topic being addressed for each relevant works component of the Scheme as applicable:
- Cultural heritage;
 - Archaeology;
 - Ecology;
 - Landscape and visual;
 - Arboriculture;

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- Noise and vibration;
 - Transport;
 - Geo-environment;
 - Water environment – flood risk and drainage;
 - Agriculture; and
 - Sustainability Statement – sustainability and climate change.
- 1.5.2 This report provides detail on the cumulative and combined effects of the relevant works components of the Scheme; ecology, nature conservation and biodiversity; water - hydrology and surface water; land - transport and access; land - landscape and visual; land - cultural heritage; soil - geology and ground conditions; and residues and emissions – Noise & Vibration. No technical studies have been undertaken for materials and waste or air pollution as potentially significant effects on materials and waste and air quality will be avoided through construction works being carried out in compliance with Network Rail's Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015) (Document Reference: NR/L2/ENV/015, current version v9, 2021) and a Code of Construction Practice (CoCP), detailed in Section 1.5.5. Further detail on how materials and waste and air pollution will be managed during construction is provided in Section 4.1.7 and 4.1.8 respectively.
- 1.5.3 For each environmental topic, consideration has been given to applicable legislation, policy and guidance, and an appraisal of impacts and effects undertaken for each relevant works component. Consideration of environmental topics in this way has helped to enable impact avoidance and mitigation measures to be incorporated into the relevant works components of the Scheme design to minimise associated effects.
- 1.5.4 With respect to construction-related impacts and effects on the environment, a CoCP will be prepared and the measures set out within this will be implemented to address this phase of the Scheme, ensuring that works are appropriately managed and impacts and effects reduced where feasible.
- 1.5.5 The CoCP will be divided into two parts. Part A of the CoCP **[NR17]** has already been prepared and is submitted with the TWAO application to establish general construction practice and principles and the general environmental management system for the Scheme. Part A of the CoCP **[NR17]** will subsequently be supplemented by a suite of specialist plans, including any such documents that are required through the implementation of planning conditions as included in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' **[NR12]** that will form Part B of the CoCP. Part B of the CoCP will be subject to the approval of the local authority for the relevant works components of the Scheme that require planning permission (refer to Table 1.1). The suite of plans (as described in Section 3.2.58) forming Part B of the CoCP, such as the Noise and Vibration Management Plan, will include mitigation measures outlined in chapters of this Report, and where appropriate, will be cross-referenced to the Report itself. Further information regarding the CoCP is provided in Section 3.2 below.

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Mitigation measures set out within the Report and CoCP will jointly address feedback from engagement with the statutory bodies (as summarised in Section 4.2).

- 1.5.6 For the other relevant works components of the Scheme for which planning permission is not sought (refer to Table 1.1), environmental effects and mitigation are addressed through both the CoCP Part A [NR17] and Network Rail's Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015), which comprise a rigorous, effective and well-established set of environmental standards and procedures that are routinely implemented by Network Rail on its projects nationwide.

1.6 Legislation, Planning Policy, and Guidance

- 1.6.1 Network Rail has considered legislation, planning policy and guidance (such as technical assessment specifications as issued by the relevant professional body) to the extent they are relevant to the Scheme. These are summarised within each technical note appendix in Volume 3 of the Environmental Report [NR16] as relevant to that topic.
- 1.6.2 Legislation and the planning process relevant to the TWAO itself is summarised in Section 1.2 above.

1.7 Structure and Content of the Report

- 1.7.1 The Report [NR16] is presented in three volumes as follows.
- Volume 1: Environmental Report – Main text
 - Volume 2: Environmental Report – Figures
 - Volume 3: Environmental Report – Appendices – Environmental Technical Notes
- 1.7.2 Volume 1, the main text of the Report, is structured as follows.
- Chapter 1 – Introduction (this chapter)
 - Chapter 2 – Description of the existing environment (providing an overview of the site and the surrounding area within the vicinity of the relevant works components of the Scheme)
 - Chapter 3 – The Scheme (providing a description of the relevant works components of the Scheme and outlining key components);
 - Chapter 4 – The approach to the Environmental Report;
 - Chapters 5 to 15 – Summary of the content of the technical note appendices (providing a description of the outcomes of studies and appraisals undertaken, and identifying mitigation or enhancement measures as applicable).
 - Chapter 16 - Summary (providing a summary of the mitigation measures).
 - Chapter 17 – References

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- Chapter 18 – Abbreviations
- 1.7.3 Volumes 2 and 3, the Figures and Appendices volumes, present plans, drawings, technical material and other supporting information referenced within Volume 1 - Main Text.

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2. DESCRIPTION OF THE EXISTING ENVIRONMENT¹

2.1 Location of the Scheme

- 2.1.1 As shown on Figures 1.1.1 to 1.1.3 in Volume 2 – Figures of the Environmental Report [NR16], the relevant works components of the Scheme comprise discrete components between Kirkgate to Marsh Lane Land in Leeds city centre, to Peckfield Level Crossing in Micklefield. Only the relevant works components of the Scheme, as described in Table 1.1 are considered within this Report. The footprint of the relevant works components of the Scheme, comprising approximately 16.38 ha, is referred to as the ‘Total Scheme Area’. The perimeter of each of the relevant works components of the Scheme are bounded by a ‘Scheme Boundary’, for example see Figure 3.1.1 to 3.1.6 in Volume 2 – Figures of the Environmental Report [NR16] for Scheme Boundary – Kirkgate to Marsh Lane Land.
- 2.1.2 A high-level summary, for each environmental topic, of the existing baseline conditions within and near to the relevant works components of the Scheme is provided in the following paragraphs.

Location and Land Use

- 2.1.3 The works at Kirkgate to Marsh Lane Land are located within Leeds city centre on a raised railway embankment immediately surrounded by a local park (Penny Pocket Park) and graveyard. Austhorpe Lane Bridge is located 615 m east of Cross Gates railway station and is adjacent to residential areas to the north-east and south-west and woodland to the south-east. Crawshaw Woods Bridge is located approximately 2.5 km east of Cross Gates railway station, surrounded by agricultural land. Barrowby Lane and Barrowby Foot level crossings are located to the west of Garforth, adjacent to Garforth Stables surrounded by agricultural land. Ridge Road bridge is located approximately 1.6 km east of East Garforth railway station, surrounded by agricultural land, with the Phoenix Avenue industrial estate to the south-east. Micklefield TSC is located approximately 500 m to the west of Micklefield Station, adjacent to Pit Lane within an area of scrub and trees. Residential properties are located to the north-east. Peckfield Level Crossing is located approximately 340 m west of Micklefield railway station to the west of the settlement of Micklefield.

¹ Presentation of Information - Unless otherwise specified, all distances within the Report relate to the shortest distance between two described points. For example, the distance between the relevant works components of the Scheme (or Scheme Area) and a designated area is presented as the linear (‘as-the-crow-flies’) distance between the two closest points on their respective boundaries. Système Internationale (SI) units are generally used, with the exception of measures where other units are the accepted standard in common use or in relation to railway works (such as miles when considering vehicular speed limits or miles and chainage when considering track references, respectively). Ordnance Survey (OS) National Grid References (NGR) coordinates are used to describe locations. All botanical nomenclature follows that described in Stace’s New Flora of the British Isles (Stace, 2019). In general, and for all species, Latin species names are provided at the first reference of that species within the Report, together with its ‘common’ name. Thereafter, the species is referred to using only its common name.

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Traffic and Transport - Highways and Public Rights of Way

- 2.1.4 Highways works will be required to support the construction of the relevant works components of the Scheme. Engagement is ongoing with the local highway authority, Leeds City Council, to understand how to best manage the Scheme's interfaces with the highway network, minimising inconvenience to the local community and businesses.
- 2.1.5 Two primary highway locations considered in this Report will be impacted by works to support the relevant works components of the Scheme. It is likely that these works and modifications throughout the route will have some temporary effects on traffic flow in the surrounding area.
- 2.1.6 The two highway locations and potential interventions comprise the following:
- Replacement Ridge Road Bridge – demolition of the existing bridge and construction of a new bridge, requiring road closures of the A656. Closures would be kept to a minimum and it is expected that traffic will be diverted via the A63 and A642.
 - Replacement Austhorpe Lane Bridge – demolition of the existing footbridge and road bridges and construction of a new bridge, requiring a road closure of Austhorpe Lane. The closure is expected to last between two and four months, with a diversion via Station Road. The Austhorpe Lane Gas Main Diversion is also expected to require a temporary road closure of Austhorpe Lane.
- 2.1.7 A number of PRoW are located within, and in proximity to, the Scheme area and will be impacted by the Scheme. The PRoW are a mixture of public footpaths and bridleways. Works to these rights of way may include diversions (temporary and permanent) and also the closure of some routes. PRoW (Bridleway Refs: Austhorpe 9 and Barwick 10) will be temporarily closed during Works to Raise Crawshaw Woods Bridge. Works associated with the New Barrowby Lane Bridge will require the closure of public footpath Garforth 6 and public bridleway Austhorpe 9. The Peckfield Level Crossing Closure works will require the extinguishment of the PRoW (bridleway) over the crossing.

Ecology

- 2.1.8 There are no international statutory designated sites for nature conservation within 2 km of the Scheme. There is one national statutory designated site for nature conservation within 2 km of the Scheme. This is Roach Lime Hills Site of Special Scientific Interest (SSSI), designated for its species-rich open grassland that is managed using traditional grazing. The SSSI is 1.2 km at its closest point to the Scheme.
- 2.1.9 Two local statutory sites for nature conservation lie within 2 km of the Scheme, these being Primrose Valley Local Nature Reserve (LNR) (important for the wildlife-rich river corridor and species-rich grassland with ponds) and Ledston Luck LNR (important for the species-rich grassland, including five species of orchid on a former

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colliery ‘stack’). These sites are 1.4 km and 1.0 km respectively at their closest points to the Scheme.

- 2.1.10 There are also eleven non-statutory sites designated for nature conservation within 2 km of the Scheme, eight are designated as Local Wildlife Sites (LWS) and three are designated as a Site of Importance for Nature Conservation (SINC); the sites and their distance, at their closest point, to the Scheme are summarised below (listed from east to west).

• Leeds Liverpool Canal LWS	980 m
• Great Swarcliffe Plantation LWS	1,400 m
• Barnbow Common LWS	450 m
• Parlington Hollins LWS	1,700 m
• Hawks Nest Wood LWS	1,200 m
• The Hills, Sandgate Lane LWS –	1,400 m
• Hartley Wood & Castle Hills LWS	370 m
• Newthorpe Quarry SINC	1,100 m
• Newthorpe Farm Grassland and Verge SINC	1,100 m
• Coburnhill Wood LWS	1,200 m
• Huddleston Old Wood SINC	1,500 m

- 2.1.11 The Replacement Ridge Road Bridge and Ridge Road Gas Main Diversion, the Micklefield TSC and Peckfield Level Crossing Closure are within the SSSI impact risk zone for Roach Lime Hills SSSI, which highlights potential risks from ‘any transport proposal including road, rail and by water’.

- 2.1.12 All relevant works components of the Scheme are within or partially within the Leeds Habitat Network.

- 2.1.13 An Extended Phase 1 habitat survey has been completed for the relevant works components of the Scheme. Bat surveys have been undertaken for Austhorpe Lane Bridge (HUL4/21), Austhorpe Lane Footbridge (HUL4/21A), Crawshaw Woods Bridge (HUL4/20) and Ridge Road Bridge (HUL4/14). A bat roost has been recorded at Ridge Road bridge and a historic record of a bat roost has been recorded at Crawshaw Woods bridge. A number of trees have also been identified as having moderate and high bat roost suitability. The presence of great crested newt (*Triturus cristatus*) is confirmed in ponds adjacent to the Austhorpe Lane Southeast compound component of the Scheme and potential presence is identified at ponds adjacent to the Crawshaw Woods Bridge and Barrowby Lane components of the Scheme.

- 2.1.14 Other ecological features that have been considered as part of the ecological appraisal include nesting birds, badger (*Meles meles*), brown hare (*Lepus europaeus*), common toad (*Bufo bufo*), and western European hedgehog (*Erinaceus europaeus*).

Geo-Environment

- 2.1.15 The Micklefield Quarry SSSI is located to the east of Micklefield TSC.

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- 2.1.16 A desk-based study has been carried out to identify known potential contamination sources and locations of former coal mining works. A site walkover has also been undertaken.
- 2.1.17 A short geo-environmental Phase 1 site investigation report has been prepared using data from a desk-based study (including the relevant Envirocheck, Groundsure and unexploded ordnance reports) and findings from the site walkovers to identify potential contamination sources.

Water Resources/ Flood Risk

- 2.1.18 The relevant works components of the Scheme do not lie within any Environment Agency Flood Zones 2 or 3 and as such the risk of flooding from main rivers is considered to be low. All sites covered in this Report are located within Flood Zone 1, defined as having less than 1 in 1,000 annual probability of river or sea flooding.
- 2.1.19 There are no reservoirs, canal systems, tidal areas or flood defence systems located within proximity to the Scheme.
- 2.1.20 In addition to a review of available baseline information, a site walkover has been undertaken, to identify potential impacts relating to flood risk and drainage.

Cultural Heritage

- 2.1.21 The Kirkgate to Marsh Lane Land lies within the Central Area – Leeds City Centre Conservation Area. There are no World Heritage Sites, registered parks and gardens, registered battlefields or protected wreck sites within 500 m of the relevant works components of the Scheme. The Former World War I National Filling Factory, Barnbow Scheduled Monument is located within 500 m of Crawshaw Woods Bridge. Workers would have used Crawshaw Woods bridge as the main access to the factory and, while this functional relationship has been lost, the proximity of the assets allows for this former connection to be interpreted.
- 2.1.22 Forming part of the railway are a number of designated structures that highlight the importance of the historic railway itself. These have group value, are designed with the same design aesthetic and materials, and have historic interest as part of the Leeds and Selby Railway. Within the relevant works components of the Scheme, works are required to the following Grade II listed bridges:
- HUL4/21 Austhorpe Lane bridge
 - HUL4/20 Crawshaw Woods bridge
 - HUL4/14 Ridge Road bridge
- 2.1.23 There is one further Grade II listed building adjacent to the Scheme Boundary of the Replacement Ridge Road Bridge, a Milepost at SE431331, located to the east of Ridge Road.
- 2.1.24 Where works are proposed beyond the boundary of the existing rail corridor (namely third-party land required for construction compounds) and land has previously not

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been disturbed, it is possible that as yet unknown archaeological remains may be impacted.

Landscape

- 2.1.25 There are no national statutory or non-statutory designations relating to landscape value within the study area.
- 2.1.26 At a national scale the study area is split between National Character Area (NCA) Profile 38: Nottinghamshire, Derbyshire and Yorkshire Coalfield (NE402) in the west of Garforth and NCA Profile: 30 Southern Magnesian Limestone (NE367).
- 2.1.27 Vegetation comprises deciduous trees and shrubs along the M1 corridor, roadside planting along A roads and small woodland blocks along the eastern edge of Garforth. Larger woodland blocks are present immediately to the east of the A1(M). The majority of the rail corridor is lined with deciduous vegetation restricting views towards the rail corridor.
- 2.1.28 A number of PRoW are located within the study area. There are several bridleways and footpaths in proximity to the Scheme.

Noise and vibration

- 2.1.29 Those potentially affected by noise will principally be residential properties. The dominant noise sources identified from baseline sound monitoring are trains and road traffic and further details are provided in Section 10.2 below.
- 2.1.30 There are five Noise Important Areas (NIA) in proximity to the relevant works components of the Scheme, with one between the Kirkgate to Marsh Lane Land and Marsh Lane viaduct, one adjacent to Austhorpe Lane bridge, one east of Barrowby, one at Pit Lane close to the Micklefield TSC and one at Peckfield. One NIA to the east of the Kirkgate to Marsh Lane Land is attributed to road noise and the remainder are attributed to railway noise. These NIA are acknowledged as part of the baseline environment, but since NIA are identified to help achieve reductions in operational noise from the attributed source (rail or road), the NIA are not directly relevant to the Scheme works described in Table 1.1 (reflecting the fact that the impacts and any adverse effects associated with the Scheme works will be temporary and only experienced during the construction period).

Arboriculture

- 2.1.31 Trees subject to Tree Preservation Orders (TPO) are located to the east of Ridge Road and at the entrance to Micklefield Recreation Park, adjacent to a path proposed to be upgraded, associated with the Peckfield Level Crossing Closure. Priority deciduous woodland is located to the south-east of Austhorpe Lane bridge. Two veteran trees have been identified in proximity to works at Barrowby, one is located to the west of Works to Raise Crawshaw Woods Bridge and one is located along the line of the proposed footpath at Peckfield Level Crossing Closure.

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Agriculture and soils

- 2.1.32 Provisional Agricultural Land Classification (ALC) mapping shows the Scheme is located in either an urban setting or in Grade 3 agricultural land, with Grade 2 in some areas, so may include Best and Most Versatile (BMV) Agricultural Land.

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3. THE SCHEME

3.1 Overview

- 3.1.1 As summarised in Section 1.3 the Scheme consists of a number of discrete components. This Report covers only the relevant works components for which planning permission is sought and the associated temporary construction compounds and accesses required to deliver those components that require planning permission (the relevant works components of the Scheme) as detailed in Table 1.1.

3.2 The Relevant Works Components of the Leeds to Micklefield Order

- 3.2.1 The following sections provide a summary of each relevant works component of the Scheme.

The Kirkgate to Marsh Lane Land

- 3.2.2 The site of the Kirkgate to Marsh Lane Works is located 0.85 km east of Leeds railway station; Grid Reference: SE 30728 33409; between Ch. 32450 and 32000 within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.3 The proposed works include the installation of small-scale electrification and signalling infrastructure mounted on metal staging structures between Kirkgate Viaduct (HUL4/47) and Marsh Lane Viaduct (HUL4/44) at Penny Pocket Park in Leeds city centre (the ‘Kirkgate to Marsh Lane Land’).
- 3.2.4 Pending detailed design, the proposed Order will include powers of acquisition over four small plots of land (two on each side of the railway) totalling approximately 190 square metres.
- 3.2.5 It is also assumed that the metal staging structures will require piled foundations within and potentially outside the railway land boundary. Construction will be undertaken from the railway, requiring no access via non-railway land.
- 3.2.6 The construction programme for the proposed works at Kirkgate to Marsh Lane Land is not yet known.
- 3.2.7 An overview and guide to land acquisition for the Kirkgate to Marsh Lane Land is shown in Figure 3.1.1 in Volume 2 of the Environmental Report [NR16].

The Austhorpe Lane Gas Main Diversion

- 3.2.8 The proposed works include removal of the existing Northern Gas Networks high-pressure gas main pipe bridge (HUL4/20B), located adjacent to Austhorpe Lane Overbridge (HUL4/21) and diversion of the gas main via a new micro-tunnel to be constructed under the railway. Permanent works also include the installation of gas main inspection points either side of the railway and works in the highway to reconnect the diversion into the gas main network.

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- 3.2.9 The site is located 615 m east of Cross Gates Railway station; Grid Reference: SE 36818 34505 and Ch.25500 within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.10 Temporary construction compounds are proposed to the north-west ('The Austhorpe Lane Northwest Compound') and south-east of Austhorpe Lane Overbridge ('The Austhorpe Lane Southeast Compound').
- 3.2.11 The Austhorpe Lane Northwest and Southeast Compounds are currently expected to be required from Autumn 2023 to Autumn 2026 and the works to divert the gas main are expected to take place between Autumn 2023 to Autumn 2024.
- 3.2.12 An overview and guide to land acquisition for the Austhorpe Lane Gas Main Diversion is shown in Figure 3.1.2 in Volume 2 of the Environmental Report [NR16].

The Replacement Austhorpe Lane Bridge

- 3.2.13 The proposed works include the demolition and reconstruction of the Grade II listed public highway Austhorpe Lane Overbridge (HUL4/21) and Austhorpe Lane Footbridge (HUL4/21A) and the construction of a new dual-purpose overbridge (the 'Replacement Austhorpe Lane Bridge') incorporating a two-lane carriageway highway (5.5 m) and 2 m footway on the western side.
- 3.2.14 The site is located 615 m east of Cross Gates Railway Station; Grid Reference: SE 36818 34505 and Ch.25500 within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.15 There is a requirement for permanent land acquisition to accommodate highway realignment and temporary land acquisition for construction compounds to the north-west ('The Austhorpe Lane Northwest Compound') and south-east of Austhorpe Lane Overbridge ('The Austhorpe Lane Southeast Compound').
- 3.2.16 The Replacement Austhorpe Lane Bridge will incorporate diverted utility services currently located within the existing masonry arch bridge.
- 3.2.17 The Austhorpe Lane Northwest and Southeast Compounds will accommodate staff welfare, parking, plant and material storage space and be required provisionally from Winter 2024 to Autumn 2026, and the Replacement Austhorpe Lane Bridge works are expected to take place between Spring 2025 to Spring 2026.
- 3.2.18 An application for Listed Building Consent for the required works to the listed overbridge will be submitted separately to the application for the Order.
- 3.2.19 An overview and guide to land acquisition for the Replacement Austhorpe Lane Bridge, The Austhorpe Lane Northwest Compound and The Austhorpe Lane Southeast Compound is shown in Figure 3.1.2 in Volume 2 of the Environmental Report [NR16].

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Works to Raise Crawshaw Woods Bridge

- 3.2.20 The proposed works include the partial dismantling and reinstatement of the Grade II Listed Crawshaw Woods Overbridge (HUL4/20) in an elevated position to allow sufficient headroom for the installation of OLE) (the ‘Works to Raise Crawshaw Woods Bridge’). The works require the temporary use of land for construction north and south of the railway (the ‘Crawshaw Woods Bridge Compound North’ and the ‘Crawshaw Woods Bridge Compound South’).
- 3.2.21 Crawshaw Woods Bridge has an existing private vehicular access right and a public right of way and is located 2.5 km east of Cross Gates Railway Station; Grid Reference: SE 38743 34200; Ch.23500 within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.22 The Works to Raise Crawshaw Woods Bridge involve:
- dismantling of the existing cast iron structure;
 - reinstatement of bridge to incorporate raised soffit height incorporating refurbished/ reconstructed cast iron structure;
 - temporary closure of existing Public Right of Way (Bridleway Refs: Austhorpe 9 and Barwick 10);
 - creation of a temporary highways access for construction from Manston Lane and William Parkin Way; and
 - permanent acquisition of land required for embankment works.
- 3.2.23 The Crawshaw Woods Bridge Compound North will accommodate a crane and include a new access to the Public Highway at Manston Lane. The Crawshaw Woods Bridge Compound South will accommodate bridge construction works and include a new temporary access to the Public Highway at William Parkin Way. The Crawshaw Woods Overbridge works are expected to take place between Summer 2025 and Spring 2026.
- 3.2.24 An application for Listed Building Consent for the required works to the listed bridge will be submitted separately to the application for the Order.
- 3.2.25 An overview and guide to land acquisition for the Works to Raise Crawshaw Woods Bridge and The Crawshaw Woods Bridge Compounds is shown in Figure 3.1.3 in Volume 2 of the Environmental Report [NR16].

The New Barrowby Lane Bridge

- 3.2.26 The proposed works include the closure of the Barrowby Lane and Barrowby Foot Level Crossings and construction of a ramped bridleway bridge at Barrowby Lane (the ‘New Barrowby Lane Bridge’). The works involve a Public Right of Way diversion (‘New Access Tracks to New Barrowby Lane Bridge’) and temporary use

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of land for construction of the ramped bridge (the 'Barrowby Lane Bridge Compound').

- 3.2.27 Barrowby Lane Level Crossing is a bridleway crossing that connects Barrowby Lane to the south of the railway, leading to Nanny Goat Lane to the north of the railway. The crossing is located 1.2 m west of Garforth Railway Station; Grid Reference: SE 39603 33883 and Ch22550, within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.28 Barrowby Foot Level Crossing is a public right of way across a level crossing, accessed by steps on the railway embankment, located 430 m to the east of Barrowby Lane Level Crossing; Grid Reference: SE 40037 33791; Ch.22150, within the metropolitan borough of City of Leeds, West Yorkshire. It connects Barrowby Lane to the south of the railway to Nanny Goat Lane to the north of the railway.
- 3.2.29 The New Barrowby Lane Bridge is proposed to be located 100 m to the west of the existing bridleway crossing, Grid Reference: SE 39511 33905 and Ch22700.
- 3.2.30 The scope of the Scheme at this location comprises the following items:
- Construction of the New Barrowby Lane Bridge, ramped bridleway bridge to replace existing level crossings, located 100 m to the west of the existing bridleway crossing.
 - Creation of new PRow (bridleway) over ramped bridge.
 - Creation of new PRow (footpath) over stepped bridge.
 - Permanent acquisition of land to install the New Barrowby Lane Bridge.
 - Set up of The Barrowby Lane Bridge Compound and construction access for bridge installation, located to the southwest of the New Barrowby Lane Bridge.
 - Creation of new PRow (bridleway) on Barrowby Lane between the access points to the Barrowby Lane level crossing and the Barrowby Foot level crossing, and the new bridge (New Access Tracks to New Barrowby Lane Bridge)
 - Replacement of two field gates on Barrowby Lane.
 - Closure of Barrowby Foot Level Crossing and extinguishment of Public Right of Way (public footpath Garforth 6).
 - Closure of Barrowby Lane Level Crossing and extinguishment of Public Right of Way (public bridleway Austhorpe 9).
 - Temporary access requirements from Barwick Road to the New Barrowby Lane Bridge.
 - Land for landscape and ecological mitigation planting.
- 3.2.31 The Barrowby Lane Bridge Compound will accommodate staff welfare, parking, plant and material storage space and is expected to be required from Winter 2024 to Summer 2025.

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- 3.2.32 The duration of construction activity for the New Barrowby Lane Bridge is anticipated to be from Autumn 2024 to Spring 2025.
- 3.2.33 An overview and guide to land acquisition for the New Barrowby Lane Bridge and The Barrowby Lane Bridge Compound is shown in Figure 3.1.4 in Volume 2 of the Environmental Report [NR16].

The Ridge Road Gas Main Diversion

- 3.2.34 The proposed works include the removal of the existing Northern Gas Networks high-pressure Gas Main Pipe Bridge (HUL 4/14A) adjacent to Ridge Road Overbridge (HUL4/14) and diversion of the gas main via a new micro-tunnel to be constructed under the railway (the 'Ridge Road Gas Main Diversion') located approximately 40 m west of Ridge Road. The structure is located 1.6 km east of East Garforth Railway Station; Grid Reference: SE 43070 32796 and Ch. 18875 within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.35 The Ridge Road Gas Main Diversion works also include the installation of gas main inspection points either side of the railway and works to reconnect the diversion into the gas main network.
- 3.2.36 Temporary construction compounds are required to the north-west of the railway (the 'Ridge Road Northwest Compound') and south of the railway (the 'Ridge Road South Compound'). Both compounds will be accessed from the A656 Ridge Road. The Ridge Road North and South Compounds will be required provisionally from Summer 2023 to Spring 2025 and the Ridge Road Gas Main Diversion works are anticipated to take place between Autumn 2023 and Autumn 2024.
- 3.2.37 An overview and guide to land acquisition for the Ridge Road Gas Main Diversion, The Ridge Road Northwest Compound and Ridge Road South Compound is shown in Figure 3.1.5 in Volume 2 of the Environmental Report [NR16].

The Replacement Ridge Road Bridge

- 3.2.38 The proposed works include the demolition and reconstruction of the Ridge Road Overbridge (HUL4/14) (the 'Replacement Ridge Road Bridge') incorporating a two-lane carriageway highway (6 m), one 1.45 m footway and one 2 m footway. Ridge Road Overbridge is a Grade II listed structure and a public highway (A656) and is located 1.6 km east of East Garforth Railway Station; Grid Reference; SE 43070 32796; Ch. 18875 within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.39 Permanent land acquisition is proposed to accommodate the highway realignment. The Replacement Ridge Road Bridge will also incorporate diverted utility services currently located within the existing masonry arch bridge.
- 3.2.40 The works at Ridge Road would be carried out from compounds (Ridge Road Northeast Compound and Ridge Road South Compound) located to the north and south of Ridge Road with construction access routes linking to the nearby highway

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network. Temporary construction routes and access points from Church Lane and the A656 are needed to access the proposed compounds from the local highway network.

- 3.2.41 The temporary construction compound immediately to the north-east of Ridge Road Overbridge ('Ridge Road Bridge Compound Northeast'), is to accommodate staff welfare, parking and material storage space, and is anticipated to be required from Summer 2023 to Spring 2025. Access to this Compound is proposed from an existing field access to the north.
- 3.2.42 The Replacement Ridge Road Bridge works are anticipated to take place from Autumn 2024 to Spring 2025.
- 3.2.43 A Listed Building Consent application for the required works to the listed bridge will be submitted separately to the application for the Order.
- 3.2.44 An overview and guide to land acquisition for the Replacement Ridge Road Bridge, The Ridge Road Northeast Compound and Ridge Road South Compound is shown in Figure 3.1.5 in Volume 2 of the Environmental Report [NR16].

The Micklefield TSC

- 3.2.45 Land off Phoenix Avenue, Micklefield is proposed for the construction of a permanent TSC ('The Micklefield TSC'), with vehicular parking and an area of land on the north side of Phoenix Avenue down to the current road-rail access point. Permanent rights of access are proposed along Phoenix Avenue from Ridge Road (A656).
- 3.2.46 The Micklefield TSC will be located 50 m to the west of the existing Peckfield Level Crossing; Grid Reference: SE 43977 32728 and Ch. 17925 within the metropolitan borough of the City of Leeds, West Yorkshire.
- 3.2.47 The works are expected to take place between Autumn 2024 and Summer 2026 for approximately four months.
- 3.2.48 An overview and guide to land acquisition for the Micklefield TSC is shown in Figure 3.1.6 in Volume 2 of the Environmental Report [NR16].

The Peckfield Level Crossing Closure

- 3.2.49 Works and associated land uses are proposed for the closure of Peckfield Level Crossing and construction of PRow diversion (the 'Peckfield Level Crossing Closure') with associated highways improvement and parking works ('The Lower Peckfield Lane Highway Works').
- 3.2.50 Peckfield Level Crossing is an existing public bridleway crossing with a telephone, located 340 m west of Micklefield Railway Station; Grid Reference: SE 44025 32739; and Ch. 17925 within the metropolitan borough of the City of Leeds, West Yorkshire.

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- 3.2.51 Peckfield Level Crossing provides access between Pit Lane to the north of the railway (also known as Lower Peckfield Lane) and Pit Lane to the south of the railway.
- 3.2.52 The scope of the Scheme at this location comprises the following listed items.
- The Closure of the Peckfield Level Crossing and extinguishment of the PRoW (bridleway) over the crossing.
 - The creation of a new public right of way footpath between the Great North Road and Lower Peckfield Lane to the north of the Railway to provide pedestrian access to residential properties north of Peckfield Level Crossing and adjacent to the railway (the Railway Properties) and a footpath or bridleway link to the PRoW (Micklefield 8) on Lower Peckfield Lane.
 - The Lower Peckfield Lane Highway Works to upgrade Pit Lane / Lower Peckfield Lane to the north of the railway (including three passing points) and to provide a small car parking area for residents of Railway Properties, including turning area.
 - The bridleway section between the level crossing and Great North Road, via Lower Peckfield Lane to the north of the railway, is not to be downgraded to a footpath.
- 3.2.53 Diversionary works are expected to take place between Winter 2024 and Summer 2024.
- 3.2.54 An overview and guide to land acquisition for the Peckfield Level Crossing Closure and Lower Peckfield Lane Highway Works is shown in Figure 3.1.6 in Volume 2 of the Environmental Report [NR16].

Construction Compounds

- 3.2.55 The siting of the Scheme compounds has taken into account the works and access requirements as well as any specific site constraints (e.g. land use and environmental constraints). General works that will be required to set up the Scheme compound sites include:
- marking-out of the site plus installation of preliminary temporary fencing (close boarded or Heras);
 - installation of boundary fencing and other fencing if required, such as solid hoardings;
 - vegetation clearance;
 - topsoil stripping (if necessary);
 - installation of compound surfaces;
 - erection of welfare facilities/ office blocks etc.;
 - establishment of car parking;
 - installation of plant, materials and fuel storage facilities etc.; and

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- provision of tower lights to be employed as necessary to provide safe working areas, particularly during winter months and also when night-time working is necessary.
- 3.2.56 The internal layout of compounds will be sensitively designed in regard to impact sources, potential impact pathways and receptors (e.g. avoiding a direct line-of-sight between generators or other static noise generating plant and residential properties by careful siting of office cabins).

On-Site Practices

3.2.57 As mentioned in Section 1.5, this Report is supported by a CoCP Part A [NR17]. The CoCP describes the general mitigation measures to be adhered to in order to reduce impacts from activities during construction, including within compounds for all components of the Scheme, including:

- construction traffic (including parking and access requirements);
- earthworks;
- noise and vibration;
- dust generation; and
- waste generation.

3.2.58 Further, specific details of these measures will be expanded upon in Part B of the CoCP, under draft condition 6 in the '*Request for deemed planning permission and statement of proposed conditions*' [NR12] applicable to the planning permission components of the Scheme. Part B of the CoCP shall include the following plans and programmes.

- i. An external communications programme.
- ii. A pollution prevention and incident control plan (PPICP).
- iii. A waste management and materials plan.
- iv. A nuisance management plan (NMP) concerning dust, wheel wash measures, air pollution and temporary lighting.
- v. A Noise and Vibration Management Plan (NVMP) including a construction methodology assessment.
- vi. A demolition methodology statement for relevant buildings.

3.2.59 The CoCP Part B environmental documents as listed in Section 3.2.58, will be submitted for conditional discharge to LCC in consideration of the relevant works components of the Scheme that require planning permission. However, as the CoCP is considered to be a document which oversees environmental management on a project wide basis, its implementation will be applied to all works in general with

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environmental mitigation for associated temporary land use secured through a letter of environmental commitment.

- 3.2.60 Additionally, a Construction Traffic Management Plan (CTMP) will be produced to provide details of traffic management both within compounds and on the nearby public roads, such as appropriate signage, access and egress points, and details of any necessary temporary road closures, including for deliveries of overlarge loads (if required). Under draft planning condition 7 in the '*Request for deemed planning permission and statement of proposed conditions*' [NR12] a CTMP is recommended to be in place for relevant works components of the Scheme that require planning permission, to be submitted to and approved in writing by the local planning authority.
- 3.2.61 Compounds will provide office space, welfare facilities and processing and storage of materials will also take place at these sites. Staff will be encouraged to travel to the compounds via public transport, where this is possible for them. However, compounds may serve as a hub for staff from which they may be transported to other compound(s) as necessary. Green travel plans to ensure that staff travel will be encouraged to travel as sustainably as possible will be produced as part of the CoCP/CTMP.
- 3.2.62 Standard working hours are expected to be as follows:
- 08:00 to 18:00 Monday to Friday, with 30 minutes either side for setting up and organising/ cleaning the site;
 - 08:00 to 13:00 Saturday, with 30 minutes either side for setting up and organising/ cleaning the site; and
 - No working on Sundays.
- 3.2.63 Standard working hours refer to all Scheme activities that do not interfere with or require a closure of the operating railway. This will apply to the majority of the works associated with the Scheme's construction.
- 3.2.64 Non-standard working hours, including night-time works will be required to bridge decks and spans immediately within the rail boundary. These works will be undertaken during a possession of the railway lines, which will be limited to 'routine' periods of non- or limited-operation of the railways allowing for the absorption of disruption, such as overnight, Bank Holiday weekends, and a 54-hour period at Christmas. Work outside of standard working hours and if required, the extension of daylight working hours during the Summer on Mondays to Sundays, will be agreed with LCC by exception.

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The Network Rail (Leeds to Micklefield Enhancements) Order*Environmental Report NR16 – Volume 1 – Main Text**July 2023 – Final P01***4. THE APPROACH TO THE ENVIRONMENTAL REPORT****4.1 Overview**

- 4.1.1 Each of the individual technical appendices to this Report, included in Volume 3 – Appendices of the Environmental Report [NR16] provides a detailed description of the assessment methods adopted for that environmental discipline and these are summarised in Chapters 5 - 15. The development of the Scheme has followed good practice by integrating environmental considerations into the design process at all stages. Desk studies and initial baseline surveys have been undertaken to inform the consideration of environmental effects through this process, and to determine (and incorporate) how the avoidance or reduction of impacts and effects can best be achieved.
- 4.1.2 The content of the Report has been based on a number of related activities including:
- establishing baseline conditions;
 - a review of secondary information, previous environmental studies and publicly-available information and databases;
 - physical surveys and monitoring undertaken within the relevant works components of the Scheme Area and the surrounding area;
 - desk studies;
 - consultation with statutory and non-statutory consultees throughout the TWAO application process;
 - consideration of relevant local, regional and national planning policies, guidelines and legislation;
 - consideration of technical standards and guidance to inform the methods and identification of effects; and
 - the professional judgement of technical specialists.
- 4.1.3 In most technical environmental aspects the baseline has been established using the existing environmental conditions. Where appropriate, a modified baseline has been established by incorporating the changes that will arise as a result of the permitted development works associated with the TRU programme, such as the installation of OLE.
- 4.1.4 An appraisal of impacts and effects associated with each technical environmental aspect has been undertaken for each relevant works component of the Scheme as applicable, on the basis of the scale of the impact and the importance or sensitivity of the receptors.
- 4.1.5 Measures to mitigate effects have been proposed and integrated into the Scheme design, construction methodology, and on-site procedures during construction and these are summarised in Chapter 16 of this Report.

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- 4.1.6 The technical studies included in this Report have been informed by a high-level appraisal carried out to inform the development of the design and based on feedback from the Secretary of State in the EIA Screening Decision letter [NR10] and technical consultation with statutory consultees. The rationale for including the specific technical studies is summarised in Table 4.1.
- 4.1.7 No technical study has been undertaken for materials and waste as potentially significant effects on materials and waste will be avoided through construction works being carried out in compliance with Network Rail's Environment and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015) and the CoCP Part B which will include a waste management and materials plan as detailed in 3.2.58.
- 4.1.8 No technical study has been undertaken for air quality as air quality impacts and effects related to the relevant works components of the Scheme will be restricted to construction phase works and will be highly localised and temporary in nature (such as might be associated with the establishment of construction compounds) and will be effectively controlled through well-established and routine mitigation measures to control dust and manage emissions that are a requirement of Network Rail's NR/L2/ENV/015 and the CoCP Part B which will include a Pollution Prevention Incident Control Plan and Nuisance Management Plan as detailed in 3.2.58.

Table 4.1: Table of technical aspects included within the Environmental Report

Chapter	Technical discipline	Rationale
5	Cultural Heritage	The relevant works components of the Scheme include works to a number of listed structures. Consideration of this topic in the Report will allow identification of suitable mitigation, which is a requirement for Network Rail standard NR/L2/ENV/015.
6	Archaeology	There is the potential for unknown archaeology to be present within the relevant works components of the Scheme Area. Network Rail has committed by planning conditions as included in the Order application document ' <i>Request for deemed planning permission and statement of proposed conditions</i> ' [NR12] to a written scheme of investigation for the Scheme.

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Chapter	Technical discipline	Rationale
7	Ecology	<p>Ecological features such as notable habitats and protected and notable species have been identified within the relevant works components of the Scheme Area, and the clearance of vegetation will be required.</p> <p>Inclusion in the Report will allow identification of suitable mitigation.</p>
8	Landscape and visual	<p>The Scheme will create locally-prominent above-ground structures in an area characterised by flat terrain, proximate to residential properties. The Scheme will also require clearance of vegetation.</p> <p>Inclusion in the Report will allow identification of suitable mitigation</p>
9	Arboriculture	<p>The Scheme will require clearance of vegetation, including mature trees and hedgerows.</p> <p>Inclusion in the Report will allow identification of suitable mitigation.</p>
10	Noise and Vibration	<p>The relevant works components of the Scheme are expected to generate highly localised, temporary noise impacts during construction, reflecting the scale and nature of construction required. Inclusion of this topic in the Report will allow for the identification of suitable mitigation, which is a requirement for Network Rail standard NR/L2/ENV/015.</p>
11	Traffic and Transport	<p>The Scheme will temporarily redirect existing traffic (residential and agricultural). A number of PRow will be temporarily and permanently affected by the Scheme. Inclusion in the Report will allow identification of suitable mitigation.</p>
12	Geo-environment	<p>Evidence of contamination has been identified within the relevant works components of the Scheme Area. A Phase 1 geo-environmental study is a requirement for planning.</p> <p>Inclusion in the Report will allow identification of suitable mitigation.</p>

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Chapter	Technical discipline	Rationale
13	Water environment	The relevant works components of the Scheme are located within Flood Zone 1. Flood Risk Assessment and Drainage Strategy are requirements for planning. Inclusion in the Report will allow identification of suitable mitigation.
14	Agriculture	The Scheme will require both permanent and temporary land-take within an area provisionally identified as Grade 2 (Best and Most Versatile) agricultural land. Inclusion in the Report will allow identification of suitable mitigation.
15	Sustainability and climate change	A Sustainability Statement is a requirement for planning. Inclusion in the Report will allow identification of suitable mitigation.

Approach to the Appraisal of Cumulative and Combined Effects

- 4.1.9 Consideration has also been given to the potential for cumulative and combined impacts and effects to arise.

Combined (In-combination) effects

- 4.1.10 Consideration has been given to combined (or in-combination) effects, where different topic issues associated with a project (or projects) may act together to produce an effect that is greater or lesser than each might otherwise be when considered in isolation (for example, where visual and noise influences act together to produce a greater level of disturbance collectively compared to either if considered in isolation). Combined effects are anticipated to be limited to activities during construction, notably combining to affect residential amenity and resulting in a nuisance that is potentially greater than each that caused by individual component parts. However, it is anticipated that with the implementation of mitigation measures and the adoption of the CoCP [NR17], the potential for in-combination effects would be minimised.

Cumulative effects

- 4.1.11 Cumulative impacts and effects are those that accrue over time and space from a number of developments. They have the potential to arise where two or more projects are progressed within close enough distance to one another to lead to effects from each being experienced by the same receptor.
- 4.1.12 Through review of the Leeds City Council (2023) public access planning portals (undertaken on 29 March 2023) an initial assessment of the potential for cumulative effects to occur during the construction phase of the relevant works components of

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the Scheme has been undertaken. Due to the nature of the relevant works components, this review has identified proposed developments within 250 m of the relevant works components. Fourteen proposed developments have been identified within 250 m of the relevant works components; none have been considered by Leeds City Council to exceed EIA screening thresholds.

- 4.1.13 Two of the proposed developments, though not EIA development, are either within or adjacent to the relevant works components of the Scheme, so have been included in the cumulative effects appraisal. These are:
- determination for 5G telecoms installation, H3G 15 m street pole and additional equipment cabinets (reference 22/07483/DTM), located within the area of permanent land use associated with Austhorpe Lane Bridge (HUL4/21); and
 - outline planning application for industrial development (Use Classes B2/B8) and ancillary office space (Use Class E(g)) with matters reserved except for access – on land bounded by the railway, the M1 and William Parkin Way and including part of the relevant works area for Crawshaw Woods Bridge (HUL4/20) (reference 22/08491/OT).
- 4.1.14 A further review has also been undertaken for projects within 10 km of the relevant works area, listed on either the Planning Inspectorate's National Infrastructure Planning website or the National Highways website, as well as those considered under the Transport and Works Act. One scheme has been identified on the National Highways website, this being the M621 Junctions 1 to 7, comprising additional lanes and technology upgrade and being located 1.4 km from Kirkgate to Marsh Lane Land. The environmental report for the scheme identifies no significant adverse residual effects.
- 4.1.15 Based on a review of the proposed developments within 250m of the relevant works components and considering their size and scale, there are not expected to be any potential cumulative impacts or effects.
- 4.1.16 The Scheme is part of the wider TRU Project E2 to E4 works, and therefore other works associated with TRU Project E2-E4 will take place in proximity to the relevant works components of the Scheme; these have been considered as part of the baseline for each assessment.
- 4.1.17 There will not be an overlap between the construction of the Scheme and the construction of the High Speed 2 (HS2) Phase 2b Eastern Leg. The design of the Scheme has taken the HS2 alignment into consideration, and moreover, authorisation of the Eastern Leg is not being progressed at this time. If works associated with HS2 were to progress it is inevitable that they would take place after TRU's completion by some length of time and are consequently excluded from further consideration.

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- 4.2.1 Stakeholder and public engagement and consultation regarding the Scheme took place between October 2022 and June 2023. This involved relevant statutory authorities, landowners, tenants, lessees and occupiers of land within the Scheme Area, and the general public. This consultation and engagement took the form of an iterative process, involving the sharing of emerging designs and plans for the Scheme and requests for feedback regarding these designs, with the opportunity for this to be incorporated within later designs.
- 4.2.2 This engagement and consultation has allowed for the collation of feedback in relation to the Scheme and for potential issues to be identified. Feedback has been considered by the TRU East Alliance and, where appropriate, allowed for issues to be mitigated or impacts reduced through amendments to the designs.
- 4.2.3 This engagement and consultation has been summarised in a Consultation Report for the Scheme [NR07]. Consultee feedback relevant to the environmental topics is included in Appendix 4 in Volume 3 of the Report [NR16]. The appendix includes a table that describes how the relevant consultees feedback has been addressed within the Report.
- 4.2.4 Further to this feedback, and as part of subsequent consultation with the relevant stakeholders, a series of measures have been developed to embed suitable mitigation for environmental and related impacts into the design and construction methodology of the Scheme.
- 4.2.5 Engagement and consultation with relevant parties, including statutory authorities and the public, will continue as the Scheme develops following submission of the TWAO application.

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5. CULTURAL HERITAGE

5.1 Introduction

5.1.1 Heritage Statements have been prepared in support of the Listed Building Consent (LBC) applications and are presented in Volume 3 - Appendices of the Report [NR16], Appendix 5A and 5B and comprise the:

- Heritage Statement for HUL4/21 Austhorpe Lane Overbridge (NHLE 1419065); HUL4/15 Brady Farm Overbridge (NHLE 1419091) and HUL4/14 Roman Ridge Road Overbridge (NHLE 1419084), presented in Appendix 5A; and
- Heritage Statement for HUL4/20 Crawshaw Woods Overbridge, presented in Appendix 5B.

5.1.2 Works to demolish Brady Farm Bridge (HUL4/15) are not included in this Report [NR16] because these works will be progressed under permitted development rights and LBC. However, Brady Bridge Farm is discussed in the Heritage Statement, reflecting the fact that the Heritage Statement in Appendix 5A has been prepared principally to support the LBC applications.

5.1.3 The overall planning legislation and policy context with regard to cultural heritage is detailed in Section 4 of Appendix 5A and 5B in Volume 3 - Appendices of the Report [NR16]. In summary the relevant legislation and policies for cultural heritage assets are:

- Planning (Listed Buildings and Conservation Areas) Act 1990: Sections 16, 17, and 66, which respectively detail the protections for listed buildings and the process of LBC, the conditions that may be attached to such a consent and requirements for ‘special regard’ in the granting of such a consent;
- National Planning Policy Framework (NPPF) (latest update 2021): Section 16 (and Annex 2) sets out the planning policies for England and how these should be applied in order to contribute to the achievement of sustainable development with regard to cultural heritage assets. Particular regard is given to the importance of being able to assess the significance of heritage assets that may be affected by development and in establishing that a range of harms (from less than substantial to substantial) may arise to heritage assets through alteration or destruction by development or development within their setting;
- Planning Practice Guidance (2019): provides further detail to the NPPF, including establishing how the term ‘significance’ is used in a heritage context and its importance to decision making, assessment of substantial harm and the consideration of public benefit from development weighted against such harm;
- Historic England Advice: provides further emphasis on the importance of understanding the significance of heritage assets likely to be affected by a development (Advice Note 2) and a recommended approach to assessing this significance in-line with NPPF requirements (Advice Note 12); and

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- LCC Local Planning Policy: including establishing aims to conserve and enhance the historic environment, highlighting the contribution of the 19th century transport network (Core Strategy P11), detailing protections for both listed buildings (including LBC) and features that contribute to their character (Unitary Development Plan N14 and N17), and the importance of design for new buildings that is complementary or sympathetic to historic environment (Unitary Development Plan N13).

5.2 Appraisal of Impacts and Effects

- 5.2.1 The cultural heritage context and significance of the three Grade II listed bridges that are part of the relevant works components of the Scheme (HUL4/21 Austhorpe Lane Overbridge (NHLE 1419065); HUL4/14 Roman Ridge Road Overbridge (NHLE 1419084) and HUL4/20 Crawshaw Woods Overbridge), is detailed in Section 5 of Appendix 5A and 5B in Volume 3 - Appendices of the Report [NR16]. The location of designated heritage assets within 250m of the Scheme Boundary for each relevant works component of the Scheme is shown on Figures 5.1.1 to 5.1.6 in Volume 2 - Figures of the Report [NR16].
- 5.2.2 The railway and the three bridges are located in the east of Leeds. Their surroundings reflect the former agricultural area that underwent striking changes to its landscape and surroundings with the arrival of the industrial age. Both HUL4/21 Austhorpe Lane Overbridge, HUL4/20 Crawshaw Woods Overbridge and HUL4/14 Roman Ridge Road Overbridge are located on the Leeds to Selby line (constructed as the Leeds and Selby Railway), which was one of the first mainline railways to open after the first inter-urban railway (Manchester and Liverpool Railway). It therefore formed an important part in industrialisation and associated landscape changes as recognised by the North Yorkshire, York and Lower Tees Valley Historic Landscape Characterisation (2010), including a distinct architectural style for railway buildings and assets. Railways additionally provided greater capacity for the movement of people relative to previous transport modes, such as canals, by linking more rural areas and smaller settlements such as those along the current route. The Leeds and Selby Railway was granted permission in 1830 and constructed to the designs of notable engineer James Walker, with several of Walker's designs/features remaining in place today (such as the distinctive single-span basket arch stone bridge, unique to Walker).
- 5.2.3 Spurred by further railway expansion, rapid urban growth continued in the vicinity of HUL4/21 Austhorpe Lane Overbridge. This reflected housing developments and the expansion of settlements to accommodate their increasing populations. Austhorpe Lane, which crosses HUL4/21, was lined with housing north of the line following the redevelopment of Cross Gates Station in 1902. Housing development had encroached to the south of the line by the mid-20th century. HUL4/21 remains outside of the Leeds urban area itself, though retail, housing, and road developments have occurred to the west of the bridge since 2010.
- 5.2.4 During the 19th century Leeds grew rapidly, funded by expanding industry. Much of this grew up around the railway itself with the viaduct running into the centre of the

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settlement. Either side of the railway are notable buildings, including the Corn Exchange, White Cloth Hall, City Markets and Parish Church of St Peter. The architectural and historic character of the area is reflected in its designation as part of the Leeds City Centre Conservation Area.

- 5.2.5 With regard to their heritage significance, both HUL4/21 Austhorpe Lane Overbridge and HUL4/14 (Roman) Ridge Road Overbridge are grade II listed sandstone bridges with quarry-cut limestone facings (including parapets) and brick soffits. The bridges are largely unaltered from their original design (aside from palisade and security fencing, which is not attached to the structure at Ridge Road Bridge). However Austhorpe Lane Overbridge is obscured to the west by an unsympathetic concrete footbridge. Both bridges remain of architectural interest due to the high level of craftsmanship and materials used in construction, with attention to detail in the ashlar voussoirs and, notably, pronounced tooling and curved piers on the parapets. The architectural interest is somewhat eroded at Austhorpe Lane Overbridge by the presence of the concrete footbridge and crash barriers at deck level. Ridge Road Bridge remains characteristic of the line, though both are part of the original 43 bridges on the route and survive relatively unaltered and in good structural condition (in spite of vegetation growth in its eastern footpath). Both bridges are of historic interest as an original feature of the Leeds and Selby Railway, one of the earliest mainline railways in the world. This historic interest is reinforced by both its association with the renowned engineer James Walker and its design to accommodate a four-track layout where only two were originally (and ultimately) constructed, leading to an unusual layout and design. Ridge Road Bridge has additional interest because it was the second bridge attempted at its location, highlighting the difficulties associated with its large span.
- 5.2.6 Both HUL4/21 Austhorpe Lane Overbridge and HUL4/14 Ridge Road Bridge are to be removed as part of the scheme, representing a substantial harm in NPPF terms. However both will be replaced with a modern bridge that is sympathetic to its location, and that whilst using modern materials to reveal the intervention, the bridges will also employ the unusual arch design of the historic structure and re-use materials from HUL4/15 Brady Farm Bridge structure as part of their abutments. Additionally, the works to Austhorpe Lane Overbridge will remove the need for a separate footbridge. The Replacement Austhorpe Lane Bridge will therefore not be obscured from the railway and this will contribute to an improved aesthetic.
- 5.2.7 These design interventions will not remove the substantial harm and the consent will need to balance this against the public benefits of the scheme as a whole. In accordance with the test presented in paragraph 201 of the NPPF, these works are considered necessary to achieve these public benefits.
- 5.2.8 A Grade II listed Milepost at SE431331 is located immediately adjacent to the Scheme Boundary of the Replacement Ridge Road Bridge, to the east of Ridge Road. It lies adjacent to a proposed access track to the Ridge Road Northeast Compound but will not be directly impacted. As such it is not considered that there will be any harm to the asset.

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- 5.2.9 HUL4/20 Crawshaw Woods Overbridge is a grade II listed cast iron overbridge (NHLE 1419062, listed as Crawshaw Woods Shippen House Farm bridge). It was designed by Walker and Burges as one of only two cast iron bridges built over the Leeds and Selby Railway between 1830-34, although the bridge itself has not been load-bearing since the 1940s due to the inclusion of a structurally independent deck and later steel panels. The reason for the use of cast iron is unclear but may have been due to concerns over the stability of foundations that would otherwise have been associated with a stone arch equivalent (Baxter *et al.*, 2014). It is of architectural interest, both as insight to original engineering solutions and the inclusion of aesthetic features in a utilitarian structure. HUL4/20 is of particular historic interest because it is the earliest built cast iron bridge still in-situ over an operational railway. This gives the structure elevated significance over its listed status. Further historic interest and heritage significance is associated with its prior use as access to the Barnbow National Filling Factory when this factory was operational. The site of the factory is now a Scheduled Monument.
- 5.2.10 HUL4/20 Crawshaw Woods Overbridge is to be significantly altered as part of the Scheme, reflecting a need to raise the abutment and reconstruct the deck. This will result in permanent physical change. However, the bridge itself is to be retained and restored, thereby retaining the key historic element of HUL4/20 Crawshaw Woods Overbridge. The restoration of the ironwork and the removal of the unsympathetic steel panels are considered beneficial to its heritage significance, while the new parapets, though higher, will be more appropriate than the current steel panels and will better reflect the historic arrangement. It is concluded that there will be less than substantial harm to the heritage asset in NPPF terms.
- 5.2.11 The Former World War I National Filling Factory, Barnbow Scheduled Monument is located within 500 m of Crawshaw Woods Bridge. Workers would have used Crawshaw Woods bridge as the main access to the factory and, while this functional relationship has been lost, the proximity of the assets allows for this former connection to be interpreted.
- 5.2.12 Works within the Leeds City Centre Conservation Area are limited to the installation of small-scale electrification and signalling infrastructure mounted on metal staging structures between Kirkgate Viaduct (HUL4/47) and Marsh Lane Viaduct (HUL4/44) at Penny Pocket Park in Leeds City Centre. The proposed works involve small-scale electrification and signalling infrastructure within an area of existing railway infrastructure. As such it is not considered that there will be any harm to the Conservation Area or heritage assets that lie within it.

5.3 Mitigation and Consideration of Control Measures

- 5.3.1 Substantial optioneering has been undertaken to identify a suitable solution for the three bridges that limits harm to the structures. Embedded mitigation has been incorporated into the final design for HUL4/21 Austhorpe Lane Bridge, HUL4/14 Ridge Road Bridge and HUL4/20 Crawshaw Woods Overbridge as detailed above and described in Section 7.2 of Appendices 5A and 5B. This work has been

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undertaken as an iterative process in consultation with both Historic England and the conservation team at Leeds City Council.

- 5.3.2 In addition to the embedded mitigation, compensation for the harm caused will also be secured through the LBC process. This will take the form of: archaeological recording of the bridges consistent with Historic England guidance, in agreement with historic environment stakeholders and in accordance with a Written Scheme of Investigation; and a Conservation Implementation Management Plan (CIMP) to define mitigation and compensation measures for all three listed bridges, as required for each. The CIMP will set out the methodology for deconstruction and reconstruction of structures as required, and will also set out any measures for improving and/ or enhancing the setting and sustainability of heritage assets affected. This includes maintenance schedules to secure the long-term condition of heritage assets affected. A draft CIMP will be provided as part of the LBC application(s).
- 5.3.3 Further, as discussed in Section 7.3 of Appendix 5A and 5B in Volume 3 - Appendices of the Report [NR16] and in the TWAO application document the Statement of Aims [NR04], the TRU represents a key commitment to creating a better railway for public benefit, part of which involves electrification to join communities, improve operations and facilitate decarbonisation. These listed structure works are essential for electrification of the route. Without these works to the listed structures the TRU Programme cannot be delivered, and the public benefits of the TRU Programme will not be realised.

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6. ARCHAEOLOGY

6.1 Introduction

6.1.1 An Archaeology Technical Note presenting an appraisal of the archaeology-related impacts and effects of the relevant works components of the Scheme is presented in Volume 3 of this Report [NR16], Appendix 6. This excludes impacts to structures or above-ground assets as a result of the relevant works components of the Scheme, which are covered in Chapter 5 of this Report and Appendices 5A and 5B in Volume 3 of this Report [NR16].

6.1.2 The overall planning legislation and policy context with regard to cultural heritage is detailed in Section 2 of Appendix 6 in Volume 3 of this Report [NR16]. In summary the relevant legislation and policies associated with the consideration of impacts to archaeology and resulting effects are:

- Ancient Monuments and Archaeological Areas Act 1979: which make provision for the investigation, preservation and recording of matters of archaeological or historical interest and regulates operations or activities which may affect them;
- National Planning Policy Framework (NPPF) (latest update 2021): Section 16 (and Annex 2) sets out planning policies regarding heritage assets, with particular emphasis given to the importance of assessing the significance of heritage assets that may be affected by development and that may experience a range of harms (from less than substantial to substantial) through alteration or destruction by development or development within their setting. Special attention is given to the need for a balanced judgement of the harms to, and significance of, non-designated assets, including those of demonstrably equivalent significance to ancient monuments;
- Planning Practice Guidance (2019): provides further detail to the NPPF, including consideration of the term 'significance' in a heritage context and its importance to decision making, the assessment of setting and its relation to the heritage significance of an asset and harm that might be experienced by that asset, the assessment of substantial harm in relation to significance, and the consideration of public benefit from development weighted against such harm;
- Historic England Advice: provides further emphasis on the importance of understanding the significance of heritage assets likely to be affected by a development (Advice Note 2), the setting of heritage assets (including flexibility and relation to views), how heritage significance may be affected by development (Advice Note 3), and a recommended approach to assessing this in-line with NPPF requirements (Advice Note 12); and
- LCC Local Planning Policy: aims to conserve and enhance the historic environment. It highlights the contribution of the 19th century transport network and the need to appraise the significance of heritage assets, the potential impacts arising from development, and suitable mitigation (Core Strategy P11), it identifies, classifies and details protections for sites and monuments of archaeological importance and details requirements for appropriate investigation

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(Unitary Development Plan N29 and Section A4), and outlines preservation priorities and planning decision-making principles for archaeological sites (including an implicit mitigation hierarchy) and the improvement of public understanding/ education of such sites (Unitary Development Plan ARC1-ARC8).

6.2 Appraisal of Impacts and Effects

- 6.2.1 The methodology of the appraisal, the archaeological context of the Scheme Area, and the impacts and effects of the relevant works components of the Scheme is detailed in Section 4 of Appendix 6 in Volume 3 of this Report [NR16]. A general study area of 250 m around the Scheme Area(s) was applied for this appraisal, based on professional judgement and extended where relevant to take account of the links of specific assets to the railway. Baseline data was sourced from the National Heritage List for England (NHLE), the West Yorkshire Historic Environment Record (WYHER) and prior TRU reports. The location of known archaeological assets are shown on Figures 6.1.1 to 6.1.5 in Volume 2 - Figures of this Report [NR16].
- 6.2.2 The Scheme is located in a diverse area of historic development both within and outside of Leeds. West Yorkshire had an agrarian based economy during the early Medieval period. Settlements consisted of small, nucleated villages, surrounded by regular and extensive open field systems. Towards the 15th and 16th centuries there was a shift towards an industrial based economy. By the early 17th century, the focus of the economy had shifted from agrarian to industrial, with coal fields providing a source of fuel for industry and the railway itself being a key driver and feature of such development and surroundings. The industrial transformation of West Yorkshire meant that by the early 19th century towns were rapidly expanding. The historic landscape character will not be affected because the relevant works components of the Scheme are relatively small and relate to, and form part of, the existing railway.
- 6.2.3 Kirkgate to Marsh Lane Land includes the site of St Peter's graveyard at Penny Pocket Park, where the railway embankment lies atop a graveyard dating to the early medieval period. Flat headstones indicate the position of underlying graves. Works will be sited to avoid affecting gravestones as far as practicable. Should any gravestones need to be moved, this will require suitable and sensitive management. Depending on the requirement for, and depth of, piled foundations, such works may affect the known gravesites below the embankment. Further mitigation (including exhumation under licence) might be necessary. This may prove complex due to the nature of burials. No known WYHER non-designated below-ground assets are present within 250 m of this Scheme Boundary.
- 6.2.4 Two known WYHER non-designated below-ground assets are present within 250 m of the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion. These consist of ridge and furrow within Austhorpe Lane Southeast Compound and a loopholed gatehouse north-east of the existing bridge. Consultation with West Yorkshire Archaeology Advisory Service indicates that there are potential earthworks associated with post-medieval mining overlying the ridge

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and furrow to the south of the railway, and Roman remains have been found to the east outside the study area.

- 6.2.5 The ridge and furrow will be permanently affected by temporary land use. Approximately a quarter of the ridge and furrow will be affected by the temporary land use with some additional limited fragmentation occurring of the remaining blocks of ridge and furrow. The harm is considered to be relatively minor and just over half the asset will remain unaffected and readable from a heritage perspective. Consultation with West Yorkshire Archaeology Advisory Service indicates there is the potential for evidence relating to post-medieval mining may also be affected, West Yorkshire Archaeology Advisory Service recommended archaeological evaluation to the south of the railway prior to any ground disturbance to further assess this and the possibility that Roman remains may be present.
- 6.2.6 A Scheduled Monument (The former Barnbow World War I National Filling Factory) is located approximately 166 m north of the Scheme boundary at Works to Raise Crawshaw Woods Bridge. The Works to Raise Crawshaw Woods Bridge will result in temporary and limited change to the setting and significance of this monument. Four known WYHER non-designated below-ground assets are present within 250 m of this Scheme Boundary. These consist of two medieval villages and evidence of Roman/ Iron Age field system crop marks north of the Scheme Boundary and remains of Manston Old Colliery west of the Scheme Boundary. Due to areas of permanent land acquisition, there is potential for minor impact on the remains of Manston Old Colliery.
- 6.2.7 Three known WYHER non-designated below-ground assets are present within 250 m of the New Barrowby Lane Bridge. These comprise crop mark indications of Iron Age activity south and immediately west of the New Barrowby Lane Bridge and to the north of the railway line, although none will be affected by the Scheme.
- 6.2.8 Ten known WYHER non-designated below-ground assets are present within 250 m of the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion. These comprise Sturton village, bellpits and two assets relating to lime kilns of medieval and post-medieval industrial origin north of the Scheme Boundary and six assets indicating the presence of Roman or Iron Age farming, landscaping/ earthmoving, or quarrying south of the Scheme Boundary. A small area of the bellpits and one of the Roman/ Iron Age field systems will be subject to soil stripping as part of temporary land use.
- 6.2.9 Six known WYHER non-designated below-ground assets are present within 250 m of the Peckfield Level Crossing Closure and the Micklefield TSC (in addition to two overlapping assets from the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion). These comprise four groups of field systems, a rectilinear enclosure and linear ditches that indicate Roman or Iron Age activity. None will be affected by the Scheme.
- 6.2.10 The palimpsest of land parcels of varying historic landscape character are illustrated on Figure 6.2.1 to 6.2.5 in Volume 2 – Figures of this Report [NR16].

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- 6.2.11 West Yorkshire has a diverse landscape character including open moorland, agricultural countryside, medieval villages and hamlets, market towns and urban centres such as Leeds, Bradford and Wakefield. The western border of the landscape is formed by the high Pennine watershed that slopes eastwards towards the Vale of York. The eastern Pennine slopes are characterised by five principal rivers; the Wharfe, Aire, Calder, Colne and Holme which drain eastwards. The region can be subdivided into three distinct geological groups: the Mill Stone Grit group, the Pennine Coal Measures and the Magnesian Limestone Belt with undifferentiated Permian sandstones. All of these factors have had an influence on the historic development of the area, particularly the rivers and coal measures that were important factors in West Yorkshire's industrial expansion. The geology has also influenced building patterns with a cohesion in the use of limestone in buildings and structures which give the area its characteristic vernacular.
- 6.2.12 There will be no impacts to historic landscape character because the relevant works components of the Scheme are relatively small in scale and relate directly to, and will form part of, the existing railway infrastructure.

6.3 Mitigation and Consideration of Control Measures

- 6.3.1 Substantial optioneering has been undertaken to incorporate embedded mitigation into the final designs for the relevant works components of the Scheme as detailed above and in Section 4 of Appendix 6 in Volume 3 of this Report [NR16]. For example, avoidance of impact on a loopholed gatehouse at Austhorpe Lane; and below-ground impacts within Penny Pocket Park at Kirkgate to Marsh Lane Land will be avoided as far as practicable and gravestone removals will be carefully considered (particularly if in-situ replacement is not feasible). It is also proposed to lay terram and geogrid protection following topsoil strip within all areas of temporary land use to minimise risk of below-ground impacts to previously-unknown potential archaeological assets. A summary of embedded mitigation for relevant works components of the Scheme is included in Chapter 16.
- 6.3.2 Further mitigation will be secured through Section 5 of the CoCP Part A (NR17) and an associated planning condition of the Order applicable to the relevant works components of the Scheme that require planning permission as described in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12]. This will ensure archaeological recording of assets affected by the relevant works components of the Scheme as detailed under Paragraph 5.1.3 of Appendix 6 in Volume 3 of this Report [NR16].
- 6.3.3 The draft Planning Condition for Archaeology (as detailed in Section 5 of Appendix 6 in Volume 3 of this Report [NR16]) will ensure that works (other than enabling works) will only commence in areas of archaeological interest with an agreed construction methodology approved by the local planning authority and, if necessary, a Written Scheme of Investigation (WSI) approved by the local planning authority. This WSI will identify where pre-construction survey or watching brief is required and measures to protect, record, and secure significant archaeological remains found, to be implemented by a suitably qualified person or body approved by the local authority.

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This would consist of archaeological investigation, recording, reporting, and publication if required. The scope and methodology for this would be agreed with the West Yorkshire Archaeology Advisory Service (consistent with Historic England guidance).

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7. ECOLOGY

7.1 Introduction

7.1.1 An Ecology Technical Note presenting an appraisal of the ecology-related impacts and effects of the Scheme is presented in Appendix 7 in Volume 3 of the Report [NR16]. The appraisal covers the relevant works components of the Scheme to identify any ecological impacts and effects that may arise during both the construction and operation phases.

7.1.2 The approach applied when undertaking the appraisal has taken account of the guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM; 2022). The overall planning, legislation and policy context with regard to ecology is outlined in Section 2 of Appendix 7 in Volume 3 of the Report [NR16] with further detail in Volume 3, Appendix 7.A. To summarise, the relevant legislation and policies for ecology are:

- Environment Act 2021: contains provisions to protect and enhance the environment through the restoration and creation of natural habitats, improving air and river quality and reducing waste. The Act requires 10% Biodiversity Net Gain as a mandatory commitment for all relevant future developments;
- The Conservation of Habitats and Species Regulations 2017: requires the Secretary of State to propose a list of sites important for habitats or species and ensures these are protected. Also makes an offence to generate specified harms or removal of listed animals (Schedule 2) or plants (Schedule 4) without a licence granted by an appropriate authority;
- Natural Environment and Rural Communities (NERC) Act 2006: Section 41 makes a requirement of the Secretary of State to propose a list of habitats and species important for biodiversity, and Section 40 establishes a duty for public bodies (including local authorities) to have regard to the conservation and enhancement of biodiversity when exercising functions;
- Countryside and Rights of Way (CROW) Act 2000: Part III requires government departments to have regard to the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in addition to increasing protections outlined in the Wildlife and Countryside Act 1981 for Sites of Special Scientific Interest (Schedule 9) and threatened species (Schedule 12);
- The Hedgerow Regulations 1997: protects important countryside hedgerows and imposes a requirement for the local authority to determine whether a hedgerow can be removed following submission of a Hedgerow Removal Notice where removal is to be undertaken outside of planning permission;
- Protection of Badgers Act 1992: makes it an offence to commit specified harms to badgers or badger setts, including disturbance, without a licence granted by an appropriate authority under Section 10. This includes licences to interfere with

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badgers or their setts for the purpose of development. Also specifies that sett closure is permitted only between July and November inclusive;

- Wildlife and Countryside Act 1981: establishes and/ or details protections for wildlife in the UK, detailing specified harms and measures for the protection of wild birds (Schedule 1), other animals (Schedule 5), and flora (Schedule 8) in addition to measures to prevent the establishment and spread of non-native species (Schedule 9);
- National Planning Policy Framework (NPPF) (latest update 2021): Section 15 (and Annex 2) sets out the planning policies for England and the requirement to consider biodiversity in planning decisions;
- Leeds City Council (LCC) Local Planning Policy: aims to protect and enhance biodiversity by requirements to refuse permission for development that may cause direct or indirect harm to various types of designated sites and populations or conservation status of specified species and habitats (Core Strategy G8); the requirement to assess the significance of harm to protected sites, species, and habitats against the needs of and for development and the extent to which such harm may be mitigated within the development (Core Strategy G8), and; requiring that development contributes to biodiversity net gain principles (to the scale of the development), enhances existing and provides additional areas for wildlife, and does not create a significant adverse impact on the Leeds Habitat Network (Core Strategy G9);
- Leeds (LCC) Biodiversity Action Plan: provides action plans for specific local priority habitats and species, of which those for ‘pipistrelle bat’, ‘great crested newt’, and ‘hedgerow and field margin’ are relevant to the Scheme; and
- Leeds Habitat Network: zone of environmental protection under LCC remit, intended to preserve connectivity and prevent fragmentation of ecological assets; LCC seek to ensure that development consolidates the Network and does not break its continuity.

7.2 Appraisal of Impacts and Effects

7.2.1 The methodology of the appraisal of impacts and effects, the ecological context of the Scheme, and the impacts and effects of the relevant works components of the Scheme are detailed in Appendix 7 (Sections 3.1, 3.2 and 3.6 respectively) in Volume 3 of the Report [NR16]. For this appraisal, suitable study areas were applied for ecological features based on CIEEM (2022) guidelines. The appraisal approach was also informed by consultation with LCC and Natural England. Baseline data was obtained from relevant online sources (as listed in Appendix 7.B in Volume 3 of the Report [NR16]), including West Yorkshire Ecology Services and ecology reports previously prepared for the TRU project, and was supplemented by appropriate field surveys.

7.2.2 Ecological features identified through desk study searches within the study area for each relevant works component of the Scheme are illustrated on Figures 7.1.1 to 7.1.6 in Volume 2 – Figures of the Report [NR16]. The results of field surveys,

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including an extended Phase 1 habitat survey are illustrated on Figures 7.2.1 to 7.2.6 in Volume 2 – Figures of the Report [NR16].

- 7.2.3 A full summary of ecological features that may be affected during construction and operation of each relevant works component of the Scheme and potential effects for each ecological feature is provided in Table 3.25 of Appendix 7 in Volume 3 of the Environmental Report [NR16].
- 7.2.4 No international or European-level designated sites are located in the study area of the Scheme Boundary. A total of one Site of Special Scientific Interest, two Local Nature Reserves, and twelve Local Wildlife Sites or Sites of Importance for Nature Conservation comprise the statutory and non-statutory designated sites located in the study area. The relevant works components of the Scheme will not result in direct loss to any of these designated sites and there are no observed impact pathways between the relevant works components of the Scheme and these sites. Therefore, designated sites have been scoped out of the appraisal.
- 7.2.5 Five of the relevant works components of the Scheme would result in direct impacts to the Leeds Habitat Network, including minor temporary habitat loss at four of the works components and a small permanent loss of habitat associated with the Micklefield TSC. In addition, there is the potential for indirect impacts through increases in dust, pollution incidents, and damage to root protection areas resulting in habitat degradation. None of the works components will result in significant adverse impacts on the integrity and connectivity of the Network. Direct and in-direct impacts are also predicted on deciduous woodland (priority habitat) located within the Scheme Boundary at the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion. No standing water/ ponds will be directly impacted by the works, however habitat degradation may result at ponds located adjacent to three of the relevant works components of the Scheme through indirect impacts such as increases in dust and pollution.
- 7.2.6 Suitable habitats for bat foraging and commuting, breeding birds, and (excluding Kirkgate to Marsh Lane Land) reptile foraging/ basking is located within and adjacent to all relevant works components of the Scheme, and therefore there is the risk of fragmentation or disturbance to bats, the destruction of birds' nests, or direct harm/ killing of reptiles. Suitable habitats for badger, bat roosts (including one confirmed roost in the existing Ridge Road Bridge), great crested newt, brown hare, common toad, hedgehog, and bluebell (notable flora) is present within or adjacent to the Scheme Boundary of at least one relevant works component of the Scheme. Therefore, there is the risk of disturbance to badger setts, bat roost destruction or disturbance to roosting bats, and direct harm or killing/ destruction of identified species during construction.
- 7.2.7 Invasive Non-Native Plant Species (INNPS) have been observed within the Scheme Boundary of the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion and The New Barrowby Lane Bridge, and on embankments near The Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion. There is

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a risk of construction activities causing the spread or dispersal of INNPS through disturbance or tracking of seeds/ plant material.

- 7.2.8 During operation, there is potential for the presence of the relevant works components of the Scheme to cause direct or indirect impacts to protected or notable species through changes to infrastructure or operation of the railway, such as lighting, noise, vibration, or visual changes, or to changes to the foraging, commuting, and shelter behaviours of such species during habitat restoration.

7.3 Mitigation and Consideration of Control Measures

- 7.3.1 Substantial optioneering has been undertaken to identify suitable designs for relevant works components of the Scheme to limit ecological impacts. Through this, embedded mitigation has been incorporated into the final designs as detailed in Section 4.1 of Appendix 7 and Chapter 16 and summarised as follows:

- Layout Design (Embedded Mitigation (EM)1): to avoid use of higher value habitats, including design refinements to minimise impacts to wet grassland and priority woodland at the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion, design refinements to the southern access track to avoid damage to a pond and existing hedgerow at Works to Raise Crawshaw Woods Bridge, and retention of trees with bat roost suitability at the New Barrowby Lane Bridge. Significant adverse effects on the integrity and connectivity of the LHN have been avoided due to the retention of habitats and the proposed creation/enhancement of new habitats;
- Lighting Measures (EM2): to avoid unnecessary lighting as far as is possible (included in Section 3.4 of the CoCP Part A [NR17] and as part of the CoCP Part B Nuisance Management Plan, secured through planning condition);
- Noise Reduction (EM3): measures to reduce noise as far as possible (included in Section 8 of the CoCP Part A [NR17] and as part of the CoCP Part B Noise and Vibration Management Plan, secured through planning condition);
- Surface Water Drainage and Pollution Prevention (EM4): pollution control and incident response measures (included in Section 7 of the CoCP Part A [NR17] and as part of the CoCP Part B Pollution Prevention and Incident Control Plan, secured through planning condition);
- Biosecurity Measures (EM5): specific and targeted measures to contain INNPS and prevent spread as part of INNPS Management Plan, supported by relevant Network Rail guidance notes and within the Landscape and Ecological Management Plan (LEMP), secured through planning condition as detailed in Section 4.4 of the CoCP Part A [NR17].

- 7.3.2 To mitigate impacts upon specific species and for specific works components of the Scheme, further mitigation will be implemented as detailed in Section 4.2 of Appendix 7 in Volume 3 of the Environmental Report [NR16] and summarised as follows:

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- Bat Mitigation – Confirmed Bat Roost (Specific Mitigation (SM)1): securing appropriate bat mitigation licence(s), supported by a detailed mitigation strategy, as outlined in Section 4.3 of the CoCP Part A [NR17];
- Bat Mitigation – Suitable Roosting Features (SM2): avoidance and/ or suitable timing of works and felling methodology for identified trees, supported by further pre-construction surveys;
- Habitat Demarcation for Trees and Hedgerows (SM3): measures to protect retained trees and hedgerows as outlined in the Tree Protection Plan and LEMP;
- Scheme Clearance and Preparation (SM4): measures for pre-construction works including watching brief, suitable timing of works, and further pre-construction surveys;
- Breeding Bird Mitigation (SM5): measures for vegetation clearance, including avoidance during bird-nesting season, or nest checks and watching briefs by trained personnel, as outlined in Section 4.2 of the CoCP Part A [NR17];
- Great Crested Newt Mitigation (SM6): working in accordance with Network Rail Great Crested Newt Organisational Licence and supporting measures, as outlined in Section 4.3 of the CoCP Part A [NR17];
- Ecology Tool Box Talks (SM7): delivery of relevant information to site workers.

7.3.3 Where not embedded or secured through licence, mitigation is to be integrated into the construction management programme (as part of the CoCP Part B) and secured through either a planning condition for a LEMP for relevant works components of the Scheme that require planning permission or else managed via measures set out within the CoCP Part A [NR17] and Network Rail environmental minimum requirements (set out within NR/L2/ENV/015) for associated temporary works components of the Scheme.

7.3.4 The overall intention of the mitigation measures is to reduce the potential impact on the identified protected and notable species (e.g. minimise risk of killing, injury and behaviour changes), retain and protect habitats of District and Local value including those classified as priority habitat (deciduous woodland) and those associated with the LHN to make sure the integrity and connectivity of the LHN is maintained.

7.3.5 As a result of this mitigation, summarised for each relevant works component of the Scheme in Table 4.1 in Appendix 7 in Volume 3 of the Environmental Report [NR16], no notable adverse residual construction or operational ecological effects are anticipated as a result of the relevant works components of the Scheme.

7.3.6 To compensate for permanent and temporary habitat losses, a Biodiversity Net Gain (BNG) assessment using Biodiversity Metric 3.0 will be undertaken and used to develop biodiversity enhancement, habitat creation, and management commitments. The assessment will be undertaken in accordance with the Network Rail/ TRU Net Positive Biodiversity Strategy and Environment Act 2021, both of which stipulate that 10% BNG be implemented (to be delivered across TRU as per the project-wide TRU Net Positive Biodiversity Strategy). A Biodiversity Strategy and LEMP will be produced to cover the relevant works components that require planning permission

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that will set out the biodiversity enhancement proposals and the habitat management and monitoring proposed to deliver these. The aims and objectives of the Biodiversity Strategy and LEMP will be secured through a planning condition as described in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12]. An Outline Landscape and Ecological Mitigation Proposals figure has been prepared for relevant works components of the Scheme (see Figures 8.5.1 to 8.5.6 in Volume 2 - Figures of the Report [NR16]), which will be referred to in the draft LEMP planning condition.

- 7.3.7 For associated temporary works components of the Scheme that fall under permitted development rights, land for temporary use will be restored to pre-works conditions as far as possible in accordance with the Outline Draft Land Restoration Proposals (Figures 8.6.1 to 8.6.5 in Volume 2 - Figures of the Report [NR16]). The restoration proposals which will aim to achieve 10% BNG by environmental agreement will be secured via a letter of environmental commitment following liaison with the relevant local authorities and landowners.
- 7.3.8 It is estimated that habitat creation and enhancement measures for the Scheme would deliver overall benefit to biodiversity via more species-rich and connected habitats.

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8. LANDSCAPE AND VISUAL AMENITY

8.1 Introduction

8.1.1 A Landscape and Visual Technical Note presenting an appraisal of the landscape and visual amenity-related impacts and effects of the Scheme is presented in Volume 3 of this Report [NR16], Appendix 8. For this appraisal, landscape effects relate to changes to the fabric, character and quality of the landscape and how it is experienced, while visual effects relate to changes to people's views, both as a result of the relevant works components of the Scheme.

8.1.2 The overall planning legislation and policy context with regard to landscape and visual amenity is detailed in Section 2 of Appendix 8 in Volume 3 of this Report [NR16]. In summary the relevant legislation and policies for landscape and visual impacts are:

- National Planning Policy Framework (NPPF) (latest update 2021): Paragraph 130 includes several core principles for planning policies and decisions to ensure that developments: function well and add to an area's quality over the development's lifespan; are visually attractive due to architecture, layout, and landscaping; are sympathetic to local character and history (including the built and landscape settings) whilst not preventing appropriate change; establish or maintain a strong sense of place by using various visual cues to create attractive, welcoming, and distinctive places to live, work, and visit; optimise site potential to include and sustain a suitable amount and mix of development whilst supporting local infrastructure, and; create safe, inclusive, and accessible places that promote health and wellbeing, with a high standard of current and future amenity, where crime, disorder, and the fear thereof do not undermine quality of life or community cohesion and resilience.
- Paragraph 134 of the NPPF states that significant weight should be given to development which reflects local design policies and government guidance on design. Local policies relevant to the Scheme are outlined below.
- LCC Local Planning Policy: aims to conserve and/ or enhance landscape quality and visual amenity, through continued investment in improving the offer of green spaces and infrastructure (Core Strategy SP13) or retaining and improving existing green infrastructure/ corridor function (Core Strategy G1), in addition to supporting the need and despite to increase native and appropriate tree cover (Core Strategy G2).
- LCC Adopted Natural Resources and Waste Local Plan: sets out how natural resources can be used in a more efficient way and provides policies for determining planning applications which have an effect on minerals, waste, energy, water or air. Whilst not directly applicable to the Scheme, the mitigation for tree loss is in accordance with Policy LAND 2.

8.1.3 The appraisal has also been informed by the following technical guidance relating to landscape and visual amenity impacts and effects:

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- Guidelines for Landscape and Visual Impact Assessment, Third Edition (Landscape Institute and Institute of Environmental Management and Assessment (IEMA), 2013);
- Technical Guidance Note (TGN) 06/2019: Visual Representation of Development Proposals (Landscape Institute, 2019); and
- Assessing Landscape Value Outside National Designations, TBN 02/21 (Landscape Institute, 2021).

8.2 Appraisal of Impacts and Effects

- 8.2.1 The methodology of the appraisal is detailed in Section 3 of Appendix 8 in Volume 3 of this Report [NR16], the landscape character and visual contexts of the Scheme Area is detailed in Section 4 of Appendix 8 in Volume 3 of this Report [NR16], and the impacts and effects of the relevant works components of the Scheme is detailed in Section 5 of Appendix 8 in Volume 3 of this Report [NR16]. For this high-level, qualitative appraisal, a general study area around the Scheme Boundary was applied based on professional judgement, and the appraisal assumes a 'worst case' scenario, whereby substantial changes to views as a result of new tall/ large structures in an existing relatively open area are generally considered to be adverse. The site context and study area for each relevant works component of the Scheme are illustrated on Figures 8.1.1 to 8.1.6 in Volume 2 – Figures of this Environmental Report [NR16]. Baseline data was sourced from Ordnance Survey (OS) mapping, local authority landscape character assessments and Natural England national character mapping. Representative viewpoints were determined by a Chartered Landscape Architect.
- 8.2.2 The Scheme Boundary falls within two National Character Areas and one Regional Landscape Character Type, as shown on Figures 8.2.1 to 8.2.6 in Volume 2 of this Report [NR16], however due to the scale of these designations and the scale of the relevant works components of the Scheme it is considered that these designations are unlikely to be affected by the Scheme and have consequently not been appraised.
- 8.2.3 The Scheme Boundary falls within two local Landscape Character Types: Arable Fringe Farmland and Open Arable, which are summarised in Tables 4.3 and 4.4 of Appendix 8 in Volume 3 of this Report [NR16] and shown on Figures 8.2.1 to 8.2.6 in Volume 2 of this Report [NR16]. One Conservation Area, Central Area – Leeds City Centre, is present within the study area of Kirkgate to Marsh Lane Land as illustrated on Figure 8.1.1 in Volume 2 of this report [NR16]. No other designations are present within any other study area.
- 8.2.4 Inner City Leeds and the urban edge of East Leeds is a defining characteristic of the western Study Areas (Kirkgate to Marsh Lane Land and The Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion). The built-up nature associated with this area restricts views across the landscape and the infrastructure networks erode sense of tranquillity. Further east, the character of the Study Areas becomes more rural and open and low-lying topography allow for longer distance

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- views across the landscape, however these are influenced by detracting features such as pylons and elements associated with roads and rail corridors.
- 8.2.5 The published landscape character assessments recognise that transport routes are a characteristic element of the landscape. As such it is considered that the operation of the relevant works components of the Scheme will not introduce any new uncharacteristic landscape elements to the Study Areas.
- 8.2.6 The baseline of each representative viewpoint (minimum of two per Scheme Boundary) is detailed in Table 4.6 of Appendix 8 in Volume 3 of this Report [NR16]. Viewpoint locations are shown in Figure 8.3.1 to 8.3.6 and viewpoint photography is shown in Figure 8.4.1 to 8.4.17, both in Volume 2 of this Report [NR16]. Though some views are recognised as including positive features or lacking/ filtered detracting features, all views are stated to have no recognised quality or value with the exception of Viewpoint 1 at Kirkgate to Marsh Lane Land, which includes Penny Pocket Park and the railway viaduct.
- 8.2.7 The potential visual impacts of the relevant works components of the Scheme relate to the visibility of proposed temporary and permanent structures from the identified visual receptors, such as residents and recreational users.
- 8.2.8 The potential landscape impacts of the relevant works relate to the removal of landscape features, such as woodland and effects to perceptual qualities including tranquillity. With regard to the construction and operation of relevant works components associated with the Scheme, consideration is given to the: movement of plant and heavy goods vehicles within the relevant works area and surrounding area; establishment of compounds resulting in temporary structures to serve the workforce; establishment of haul roads for the movement of plant and heavy goods vehicles; removal of landscape features, and; installation or use of external lighting to illuminate relevant works operations after dark.
- 8.2.9 The overall appraisal of anticipated landscape and visual effects on receptors during construction and operation of the relevant works components of the Scheme identifies that the defining characteristics and components within the landscape will remain unchanged. Effects on visual amenity will be avoided and reduced where possible and mitigation will be provided where adverse effects are unavoidable. The appraisal is detailed further in Table 5.1 of Appendix 8 in Volume 3 of this Report [NR16].
- 8.2.10 Changes to landscape character are expected to be small within the existing context (dependent on the extent of vegetation removal) during construction and operation at the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion, the Peckfield Level Crossing Closure, and the Micklefield TSC. Temporary noticeable machinery/ construction activities are expected during construction only at Works to Raise Crawshaw Woods Bridge, the New Barrowby Lane Bridge, and the Replacement Ridge Road Bridge and Ridge Road Gas Main Diversion.

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8.2.11 Changes to viewpoint quality are anticipated as a result of a reduction of visual amenity during construction and operation at the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion and the Micklefield TSC. Temporary changes to visual amenity associated with all other Scheme Boundaries are expected to be limited to construction disturbances such as compounds and machinery, given that land used on a temporary basis will be restored to pre-works condition. Boundary vegetation will filter impacts arising from construction activities and the existing surrounding landscape context has the capacity to absorb the relevant works components of the Scheme that require planning permission.

8.3 Mitigation and Consideration of Control Measures

8.3.1 Substantial optioneering has been undertaken to identify suitable designs for all relevant works components of the Scheme, in consideration of the local planning policy and published landscape character assessments, to limit visual and landscape impacts and effects, including minimising loss of trees and woodland through the mitigation hierarchy. In addition, embedded mitigation has been incorporated into the final designs as detailed above, which will maintain the existing landscape character and visual amenity where possible as described in Chapter 16 and Section 6 of Appendix 8 in Volume 3 of this Report [NR16].

8.3.2 Further mitigation will be secured through a Landscape and Ecological Management Plan (LEMP) for relevant works components of the Scheme that require planning permission and Network Rail Environmental and Social Minimum Requirements for Projects (set out in NR/L2/ENV/015) for associated temporary works components of the Scheme, or will otherwise be integrated into construction management programmes and method statements in compliance with the CoCP Part A [NR17]).

8.3.3 The LEMP will include details of hard and soft landscaping works, covering the locations where landscaping will be undertaken to compensate for the loss of mature vegetation, provide habitat connectivity, and to integrate the Scheme elements into the receiving landscape. The LEMP will also set out the aims and objectives of the Biodiversity Strategy and will itself be secured through a planning condition as described in the draft planning condition 5 as described in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12]. An Outline Landscape and Ecological Mitigation Proposals figure has been prepared for relevant works components of the Scheme that require planning permission (see Figures 8.5.1 to 8.5.6 in Volume 2 of this Report [NR16]), which will be referred to in the draft LEMP planning condition. Figures 8.5.1 to 8.5.6 Outline Landscape and Ecological Mitigation Proposals illustrate the extent of existing vegetation to be retained and soft landscape treatments to mitigate for the anticipated landscape and visual effects of the Scheme.

8.3.4 For associated temporary works components of the Scheme that fall under permitted development works, land will be restored to pre-works conditions as far as practicable in accordance with the Outline Draft Land Restoration Proposals (Figures 8.6.1 to 8.6.5 in Volume 2 of this Report [NR16]), themselves secured via a

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letter of environmental commitment following liaison with the local authority and landowner(s).

- 8.3.5 Example standard impact avoidance measures across relevant works components of the Scheme are detailed in Section 6.1.7 of Appendix 8 in Volume 3 of this Report **[NR16]**. Mitigation specific to relevant works components of the Scheme are detailed in Table 6.1 of Appendix 8 in Volume 3 **[NR16]**.

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9. ARBORICULTURE

9.1 Introduction

- 9.1.1 An Arboricultural Technical Note presenting an Arboricultural impact assessment of the relevant works components of the Scheme is presented in Appendix 9 in Volume 3 of this Report [NR16]. It details the results of walkover tree surveys to BS 5837: 2012 (Trees in relation to design, demolition and construction – Recommendations) of the relevant works components of the Scheme and includes a brief summary of relevant national (NPPF) and local (Leeds City Council) planning policy and statutory and non-statutory designations relating to trees. It also reports on the results of a desk top review of the proposed Scheme that identifies the likely direct and indirect impacts of the relevant works components of the Scheme. Finally, it includes outline tree protection measures to be implemented to ensure retained trees are suitably protected.

9.2 Appraisal of Impacts

- 9.2.1 The tree survey identified 242 tree features across the relevant works components of the Scheme that were typically of low to moderate quality and in fair to good condition. The results of the tree survey are shown on Figure 9.1 – Tree Constraints Plans, in Volume 2 – Figures of this Report [NR16].
- 9.2.2 The Replacement Ridge Road Bridge and Peckfield Level Crossing Closure and Micklefield TSC sites include trees subject to Tree Preservation Order (TPO). A TPO is also present outside the boundary of the Replacement Austhorpe Lane Bridge site.
- 9.2.3 A Conservation Area is in place within the Kirkgate to Marsh Lane Land site.
- 9.2.4 There are no Sites of Special Scientific Interest (SSSI) or recorded ancient woodlands within or adjacent to any of the relevant works components of the Scheme.
- 9.2.5 The Replacement Austhorpe Lane Bridge and Peckfield Level Crossing Closure and Micklefield TSC sites include priority habitats relating to trees and the Works to Raise Crawshaw Woods Bridge and New Barrowby Lane Bridge sites have priority habitats relating to trees nearby.
- 9.2.6 No recorded ancient or veteran trees have been identified by the desk study however four veteran trees were identified via the tree survey, with two identified within the Scheme Boundary at New Barrowby Lane Bridge, one at Crawshaw Woods Bridge and one in Micklefield Recreation Ground, associated with the Peckfield Level Crossing Closure.
- 9.2.7 Following a desk top review of the likely direct and indirect impacts of the relevant works components of the Scheme 25 tree features and part of 14 tree features are to be removed to facilitate the Scheme (this consists of two high quality, 17 moderate quality, 18 low quality and two very low quality trees).

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- 9.2.8 This is summarised along with any additional impacts or pruning identified at this stage on a site-by-site basis below.
- 9.2.9 No trees are to be removed to facilitate the works at Kirkgate to Marsh Lane Land however, the proposed land acquisition for works along the railway, including the installation of electrical cabinets, Lock Out devices and signal gantry have the potential to require incursions into the RPA for two individual trees of high quality and one individual tree and two tree groups of moderate quality.
- 9.2.10 Nine individual trees, one tree group, part of two tree groups and part of one woodland are to be removed to facilitate The Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion works; this includes one tree and one partial woodland classed as high quality (Category A), three individual trees and one tree group classed as moderate quality (Category B) and five individual trees and part of two tree groups classified as low quality (Category C). Where part of a group of trees is to be removed the final extent of tree loss will be determined on site by an arboriculturist.
- 9.2.11 The proposed temporary access route passes through the north of a woodland group, but will use an existing cleared corridor where possible. Ground protection will be used to protect roots and soil structure. Any pruning within this group will be determined on site by an arboriculturist.
- 9.2.12 One individual tree and two part-groups are to be removed to facilitate the Crawshaw Woods Bridge Compound North and Crawshaw Woods Bridge Compound South Scheme. This includes one tree and two part groups classified as low quality (Category C).
- 9.2.13 The proposed Crawshaw Woods Bridge Compound North and Crawshaw Woods Bridge Compound South, together with associated access tracks, are unlikely to require the removal of any further trees.
- 9.2.14 Five individual trees, four groups, parts of two groups and part of one hedge are to be removed to facilitate the New Barrowby Lane Bridge works component of the Scheme. This includes four trees, two groups and one part group classed as moderate quality (Category B), two groups, one partial group and one partial hedge classified as low quality (Category C) and the remaining tree classified as very low quality (Category U).
- 9.2.15 Two trees within the Scheme Boundary of the New Barrowby Lane Bridge (T3, T6) have been identified as of veteran status and as such are considered to be of irreplaceable habitat value within paragraph 180c of the NPPF (where it is stated that they must be retained and protected from detrimental impacts except in wholly exceptional circumstances).
- 9.2.16 T6, a mature veteran oak is located within the Barrowby Lane Bridge Compound and its RPA extends within proximity of the New Barrowby Lane Bridge. The Barrowby Lane Bridge Compound and working area for the New Barrowby Lane Bridge will be

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positioned to avoid the adjusted RPA and canopy spread of this irreplaceable tree feature that will be maintained as a fenced exclusion zone.

- 9.2.17 T3 is located adjacent to Nanny Goat Lane to the north-east of this Scheme Boundary. Access may be required along this existing route for this works component of the Scheme. If access requires a greater clearance than that currently available (*circa* 4 m), pruning of this tree may be required to provide a greater clearance. Any pruning will be agreed on site in advance with an arboriculturist. Where feasible, pruning could be reduced or avoided by widening the track to the south where the crown of the tree offers greater clearance and comprises branches of a smaller diameter. Any widening of the existing surface would also involve robust ground protection measures to avoid soil compaction and root disturbance within the amended RPA of T3. The final solution will be developed on site with advice from an arboriculturist balancing the relative merits of pruning vs widening.
- 9.2.18 The New Access Tracks to New Barrowby Lane Bridge will likely occur within the RPA and canopy spread of a number of trees that are positioned along the northern edge of an existing hardcore track and to the east of the existing farm access route heading north to the New Barrowby Lane Bridge. The footprint of the existing hard surfaced track should be used for access. Any requirement for widening of this track will take place to the south of the existing track. New surfacing on previously unsurfaced ground within an RPA will involve the use of a temporary ground protection to mitigate the potential impact on tree roots within RPA.
- 9.2.19 Some limited pruning to seven trees, one group and one hedge is likely to be required along the New Access Track. These works are not likely to result in substantial negative effects on tree health or amenity.
- 9.2.20 One individual tree and five partial groups are to be removed to facilitate the Replacement Ridge Road Bridge works components of the Scheme. This includes three partial groups classified as moderate quality (Category B) and one individual tree and two part groups classified as low quality (Category C).
- 9.2.21 There may be a requirement for access to encroach within the RPA of two tree groups (G138 and G139) to facilitate access to the existing Ridge Road Bridge and Replacement Ridge Road Bridge. If necessary, this will be achieved using ground protection to protect roots and soil structure, whilst fencing will be installed to protect the RPA beyond this point.
- 9.2.22 One individual tree, one group and part of two groups are to be removed to facilitate the Peckfield Level Crossing Closure and the Micklefield TSC works components of the Scheme; this includes no tree features classified as high quality (Category A), one group and one part group classed as moderate quality (Category B), part of one group classified as low quality (Category C) and one dead individual tree classed as Category U.
- 9.2.23 A new footpath or bridleway is proposed through Micklefield Recreation Ground as a result of the Peckfield Level Crossing Closure. This has the potential to impact

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upon many trees with proposed incursions across their RPA and within their canopy spread.

9.2.24 The proposed footpath or bridleway would incur within the amended RPA of T44, a veteran tree. Any new surfacing will be achieved using a ‘no-dig’ construction installed under the supervision of an arboriculturist (such as the use of a proprietary 3D cellular confinement system (such as Cellweb or equivalent)) and this will avoid any requirement for excavation and will help to maintain soil structure and prevent compaction.

9.2.25 This approach will also be used to mitigate the impacts to/ effects experienced by adjacent trees associated with any areas of new surfacing within an RPA.

9.2.26 The potential requirement for pruning will be reviewed and confirmed via a site walkover as part of the detailed design stage. However, any pruning is unlikely to have a substantial impact on the health or amenity value of the trees.

9.2.27 The Lower Peckfield Lane Highway Works, including the creation of passing places, has the potential to affect a number of trees located along its length. In accordance with the Landscape and Ecological Management Plan (LEMP), the detailed design (including the position of any passing spaces) will be micro-sited to avoid moderate and high-quality trees and to avoid any requirement for excavation or compaction within RPA for resurfacing or widening.

9.3 Mitigation and Consideration of Control Measures

9.3.1 The detailed design will seek to avoid or reduce impacts to important tree features where feasible.

9.3.2 Indicative Tree Protection Plans have been prepared to indicate trees to be removed and those to be retained, construction exclusion zones and construction working zones – refer to Figure 9.2 in Volume 2 of this Report [NR16]. Tree protection measures, including the use of temporary fencing and ground protection, will be employed to ensure retained trees are suitably protected.

9.3.3 A LEMP will be prepared as a planning condition as described in the Order application document ‘*Request for deemed planning permission and statement of proposed conditions*’ [NR12]. Outline Landscape and Ecological Mitigation Proposals Figures have been prepared for relevant works components of the Scheme that require planning permission, showing trees to be retained and protected and locations of proposed planting (refer to Figure 8.5.1 to 8.5.6 in Volume 2 of this Report [NR16]. These figures will be referred to in the draft LEMP planning condition. The LEMP will include an Arboricultural Method Statement that sets out the phasing of construction, the finalised tree protection measures and to provide detail on how sensitive components of work are to be achieved in proximity to retained trees.

9.3.4 Any associated temporary land use will fall under permitted development and will be covered by a similar Arboricultural Method Statement in accordance with the CoCP Part A [NR17] and Network Rail’s Environment and Social Minimum Requirements

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for Projects – Design and Construction (set out within NR/L2/ENV/015). The draft Tree Protection Plans (Figure 9.2 in Volume 2 of this Report **[NR16]**) and the Outline Land Restoration Proposals (Figure 8.6.1 to 8.6.5 in Volume 2 of this Report **[NR16]**) have been prepared for these areas showing trees proposed to be retained and protected and proposals to restore temporarily used land to its pre-works activity condition to the satisfaction of the landowner under a letter of environmental commitment.

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10. NOISE AND VIBRATION

10.1 Introduction

10.1.1 A Noise and Vibration Technical Note presenting an appraisal of the noise and vibration-related impacts and effects of the relevant works components of the Scheme is presented in Volume 3, Appendix 10 of this Report **[NR16]**.

10.1.2 This chapter provides a summary of the appraisal and discusses the mitigation and control of the noise and vibration-related impacts and effects.

10.1.3 The overall planning legislation and policy context with regard to noise and vibration is detailed in Section 2 of Appendix 10 in Volume 3 of this Report **[NR16]**. In summary the relevant legislation and policies for noise and vibration are:

- The Control of Pollution Act, 1974;
- National Planning Policy Framework, 2021;
- Noise Policy Statement for England, 2010;
- Planning Practice Guidance, 2019;
- Leeds Local Plan Core Strategy, Policy P10;
- Leeds City Council Planning Consultation Guidance: Noise and Vibration, 2019; and
- British Standards (BS).

10.2 Appraisal of Impacts and Effects

10.2.1 Relevant policy for the appraisal of effects in relation to noise and vibration is set out in the National Planning Policy Framework; Noise Policy Statement for England; and the associated Planning Practice Guidance. Relevant local policy is included in Policy P10 of the Leeds City Council Core Strategy. Within these, there is a requirement to avoid/ minimise significant adverse noise/ vibration effects.

10.2.2 The relevant works components of the Scheme will not result in any change to the noise and vibration currently generated by the operation of trains on the railway, with the exception of the introduction of a new noise source: the Track Sectioning Cabin (TSC) at Phoenix Avenue, Micklefield. Additionally, the relevant works components of the Scheme are not expected to result in any notable increase compared with existing levels of road traffic noise and vibration. Therefore, the appraisal will focus on the impacts and effects of the construction of the relevant works components of the Scheme on nearby potential noise and vibration sensitive receptors.

10.2.3 At this stage, the required detailed information on the construction activities and programme are not available and therefore the appraisal of the construction noise and vibration will be carried out during the detailed design process as is typical on projects of this type.

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- 10.2.4 BS 5228 Parts 1 and 2 will be used to determine the noise and vibration resulting from the construction of the relevant works components and, if required, the best practicable means for control, which are defined in Section 72 of the Control of Pollution Act 1974. Section 61 of the Control of Pollution Act 1974 states that consent may be sought from the relevant local authorities prior to the construction works commencing.
- 10.2.5 The impacts and effects from operational noise of the TSC at Phoenix Avenue, Micklefield will be determined using BS 4142, and used to influence detailed design as appropriate.
- 10.2.6 Receptors potentially sensitive to noise and vibration impacts arising from the relevant works components of the Scheme principally comprise residential properties. The closest residential properties are 5 m from the proposed works at Austhorpe Lane Overbridge and 5 m from the proposed works at the New Barrowby Lane Bridge. Ambient sound measurements have been undertaken at locations adjacent to residential properties potentially sensitive to noise impacts arising from the relevant works components of the Scheme in order to define existing conditions at receptors, as illustrated in Figure 10.1.1 to 10.1.6 in Volume 2 – Figures of this Report **[NR16]**. The baseline monitoring identified the dominant noise sources to be trains at most locations and road traffic noise at locations relevant to the Works to Raise Crawshaw Woods Bridge and the New Barrowby Lane Bridge. These baseline sound levels have been used to determine values under British Standard 5228 Part 1, against which construction noise impacts have been considered.
- 10.2.7 There are five Noise Important Areas (NIA) in proximity to the relevant works components of the Scheme, with one between the Kirkgate to Marsh Lane Land and Marsh Lane viaduct, one adjacent to Austhorpe Lane bridge, one east of Barrowby, one at Pit Lane close to the Micklefield TSC and one at Peckfield. One NIA to the east of the Kirkgate to Marsh Lane Land is attributed to road noise and the remainder are attributed to railway noise. These NIA are acknowledged as part of the baseline environment, but since NIA are identified to help achieve reductions in operational noise from the attributed source (rail or road), the NIA are not directly relevant to the Scheme works described in Table 1.1 in Chapter 1 of this Report **[NR16]** (reflecting the fact that the impacts and any adverse effects associated with the Scheme works will be temporary and only experienced during the construction period).
- 10.2.8 No measurements of existing vibration levels were collected because the assessment of vibration is based on absolute rather than relative levels. Increases in road traffic noise resulting from construction traffic flows will be short-term in duration and have been considered. The operational impact/ effects of the TSC at Phoenix Avenue, Micklefield have been determined using BS 4142, reflecting the anticipated tonal sound that will be emitted during the day and night that could affect nearby receptors.

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- 10.3.1 Site-specific measures to mitigate the localised and temporary construction phase noise and vibration impacts and effects will be implemented during the works to minimise the disturbance and disruption experienced by local receptors, particularly with respect to works during the night. Construction noise and vibration mitigation for relevant works components that require planning permission will be secured through planning conditions, with requirements anticipated to include the preparation of a Noise and Vibration Management Plan (NVMP) (that will form part of the CoCP Part B). Mitigation associated with temporary land use areas will similarly be identified and delivered in compliance with Section 5 of the CoCP Part A [NR17], Network Rail guidance set out within NR/L2/ENV/015 and NR/L2/ENV/121 and implemented in accordance with a NVMP.
- 10.3.2 These documents will incorporate summaries of the baseline surveys undertaken, the appraisal of construction noise and vibration impacts and effects, and describe mitigation measures identified to reduce residual effects as far as practicable. This information will then be used to inform an exercise to distinguish which works components are appropriate for consent under the provisions of Section 61 of the Control of Pollution Act 1974, and which might appropriately be managed through best practicable means (BPM) in the absence of a Section 61 consent. Through the consistent application of best practicable means, contractors can introduce principles and methods to reduce noise levels during works throughout the works programme.
- 10.3.3 Mitigation for the operation of the Micklefield TSC and associated emergency plant to comply with the Leeds City Council Planning Consultation Guidance will include using the prefabricated structure that houses the TSC itself, which is to be designed in accordance with Network Rail standard NR/SP/ELP/21030.
- 10.3.4 Further details on mitigation measures are included in Section 4 of Appendix 10, in Volume 3 of this Report [NR16].

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11. TRAFFIC AND TRANSPORT

11.1 Introduction

11.1.1 A Transport Technical Note presenting an appraisal of the traffic and transport-related impacts and effects of the Scheme is presented in Volume 3, Appendix 11 of this Report [NR16]. Separate Transport Assessments for specific works components of the Scheme have been prepared as follows and presented in Appendices 11A and 11B in Volume 3 of this Report [NR16]:

- The Transport Assessment for the temporary closure of Austhorpe Lane Bridge during the Replacement Austhorpe Lane Bridge works is presented in Appendix 11A; and
- The Transport Assessment for the temporary closure of Ridge Road Bridge during the Replacement Ridge Road Bridge works is presented in Appendix 11B.

11.1.2 The overall planning policy context with regard to traffic and transport is detailed in Section 2 of Appendix 11 in Volume 3 of this Report [NR16]. To summarise, the relevant policies for traffic and transport impacts are:

- National Planning Policy Framework (NPPF) (latest update 2021): Paragraph 111 states that development should only be prevented or refused on highway grounds if there would be an unacceptable impact on highway safety or where the residual cumulative impacts of development would be severe;
- Local and Regional Planning Policy: aims to improve provision of sustainable and high-quality transport and associated infrastructure, through:
 - investment in improved transport, including improvement to the existing public transport network (including rail) so it is affordable, zero-carbon, and accessible across Leeds (Connecting Leeds – Transforming Travel: Transport Strategy (2021));
 - aims for increases to bus (25%), rail (75%), and cycling (300%) use alongside reductions to journey times, in addition to rail station improvements and electrification roll-out, and increased transport safety by 2040 (West Yorkshire Transport Strategy 2040 (2017)); and
 - wider aims for the creation of strategic development corridors and effective transport links, environmental protection by decarbonising transport, and investment in rail infrastructure, alongside aims for better health, inclusivity, and access and built environment protection (Transport for the North: Strategic Transport Plan (2019)).

11.2 Appraisal of Impacts and Effects

11.2.1 The methodology of the appraisal, the transport context of the Scheme Boundary, and the impacts and effects of the relevant works components of the Scheme is detailed in Section 3 of Appendix 11 in Volume 3 of this Report [NR16] (and

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Appendices 11A and 11B for specific works). The Scheme is located both within and south-east of Leeds and its urban road network.

- 11.2.2 Construction traffic is anticipated during construction at the relevant works components of the Scheme, associated with material deliveries/ removal and staff movements. A number of Public Rights of Way (PRoW) (public footpaths and bridleways) are located within, and in proximity to, the Scheme Boundary as illustrated on Figure 11.1.1 to 11.1.6 in Volume 2 of this Report [NR16]. A number of these will be impacted by the relevant works components of the Scheme. Works to these rights of way may include diversions (temporary and permanent) and also the closure of some routes.
- 11.2.3 Works at Kirkgate to Marsh Lane Land will be undertaken from the railway itself without need for a temporary compound. There will be no impacts on PRoW.
- 11.2.4 The Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion will use two temporary compounds south-east and north-west of the existing bridge, accessing off the 7 m – 8 m wide (narrowing to 5 m at the existing bridge), 20 mph Austhorpe Lane, which forms part of two bus routes in a residential area. Access points will have to be created for the two compounds. The Austhorpe Lane Footbridge will be demolished and a footpath provided as part of the Replacement Austhorpe Lane Bridge. The distance and journey time from the north side of Austhorpe Lane to the south side, via the new footpath, is equal to the existing pedestrian footbridge and the gradient of the public highway on the bridge, including the footpath, will be built to accessibility standards as required by the local highway authority. Pedestrian/ cycle access will be maintained throughout the construction works via a temporary scaffold bridge. There will be key short periods during the works when this access will not be available, however suitable diversions will be provided.
- 11.2.5 Works to Raise Crawshaw Woods Bridge will use two temporary compounds north and south of the existing bridge, accessing via William Parkin Way (A6120) to the west of the compounds, which then links to (in order) a Public Right of Way (PRoW), a gated junction with Nanny Goat Lane, and the 6 m – 7 m wide, 30 mph Manston Lane, which is suitable for HGV traffic and in an area of recent highway and retail development. The PRoW and Nanny Goat Lane are advisory cycle lanes. A temporary haul road will be required along the PRoW route. The works will require the temporary closure of the PRoW footpath and farm access which cross Crawshaw Woods Bridge. Details of the temporary diversion route are still under development. The existing access arrangements will be maintained during operation once the Works to Raise Crawshaw Woods Bridge are completed. In order to tie-in the PRoW either side of the bridge to the increased height of the bridge deck, small embankment works will be constructed on the north and south sides, with gradients no steeper than the existing situation. The southern approach ramp gradient will be 1:22 and the northern ramp gradient will be reinstated as per the existing 1:8 gradient.

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- 11.2.6 The New Barrowby Lane Bridge will use one temporary compound south of the railway, accessing via an existing gated, dropped access point off the 5 m wide, 30 mph Barrowby Lane in a residential area. This forms part of National Cycle Network Route 66 and has connections to several PRoW routes. The existing Barrowby Foot Level Crossing which carries a PRoW footpath across a level crossing, accessed by steps; and the Barrowby Lane Level Crossing which is a bridleway crossing, both connecting Barrowby Lane to the south of the railway to Nanny Goat Lane to the north of the railway, will be permanently closed. The PRoW will be replaced by The New Barrowby Lane Bridge, proposed to be located approximately 190 metres to the west of the existing bridleway crossing and will be a ramped bridleway bridge with additional steps for pedestrians. The bridleway PRoW diversion from the Barrowby Lane level crossing involves a short diversion of up to approximately 600m. The footpath PRoW diversion involves a longer diversion of approximately 1.2km via a route (from north to south) westwards along Nanny Goat Lane and then eastwards along Barrowby Lane. However, this is considered an acceptable diversion given the survey data indicated very low usage of Barrowby Foot level crossing and the limited demand for short-distance journeys from one side of the railway to the other. There is also an alternative access north-south across the railway via Barwick Road underbridge approximately 300m to the east of the Barrowby Foot level crossing.
- 11.2.7 The Replacement Ridge Road Bridge and The Ridge Road Gas Main Diversion will use three temporary compounds north-west, north-east, and south of the railway, accessing via existing gated, dropped access points off an existing access track, the 6 m wide, 60 mph Church Lane, and the 7 m – 8 m wide, 60 mph Ridge Road, respectively. All are in rural areas. Church Lane is an advisory cycle route and there are several PRoW connections in vicinity of (though not affected by) the compounds. Pedestrian/ cycle access over Ridge Road Bridge will be maintained throughout the construction works via a temporary scaffold bridge. There will be key short periods during the works when this access will not be available, however suitable diversions will be provided. A footway will be maintained along either side of Ridge Road Bridge during operation.
- 11.2.8 The Peckfield Level Crossing Closure and the Micklefield TSC will use one temporary compound, accessing off the 6 m – 7 m wide, 30 mph Phoenix Avenue in a light-industrial area with PRoW connections (not expected to be affected by the compound). An access point will be created for this compound. Peckfield Level Crossing, providing access between Pit Lane to the north of the railway (also known as Lower Peckfield Lane) and Pit Lane to the south of the railway, which also forms part of a Definitive Bridleway Micklefield 8 route, will be permanently closed. A new PRoW footpath or bridleway will be created between the Great North Road and Lower Peckfield Lane to the north of the Railway. No pedestrian or bridleway bridge over the railway is proposed as survey data (see document [NR15]) indicates usage of the existing crossing is low and the alternative access route of approximately 900m via level ground will be mitigated by improving connectivity between Railway Properties, the Recreation Ground and Micklefield.

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- 11.2.9 Locations for baseline traffic count data representing two-way 24 hour Annual Average Daily Traffic (AADT) are illustrated in Figure 11.2.1 to 11.2.3 in Volume 2 – Figures of this Report [NR16]. Baseline traffic has been recorded in the vicinity of the relevant works components of the Scheme where temporary road closures will be required (Replacement Austhorpe Lane Bridge and Replacement Ridge Road Bridge) using Automated Traffic Counts and Manual Classified Counts, programmed and undertaken in-line with the Design Manual for Roads and Bridges. This is presented in Table 3.1 of Appendix 11 in Volume 3 of this Report [NR16]. Estimated future baseline figures for the construction period have been generated by applying TEMPro software v8.0 to the observed baseline and are presented in Table 3.6 of Appendix 11.
- 11.2.10 Expected construction traffic volumes (see Table 3.4 of Appendix 11 in Volume 3 of this Report [NR16]) of up to ten staff-related and up to six HGV delivery (no more than 16 in total) two-way daily trips are expected to account for a maximum increase of 0.5% in car and 2.5% in HGV traffic at each traffic count location relative to the future baseline, and therefore is not expected to generate a significant effect (expected with a 30% increase in general areas or with a 10% increase in sensitive areas). Expected HGV construction access routes are summarised in Table 3.5 of Appendix 11 in Volume 3 of this Report [NR16].
- 11.2.11 Operational traffic would only be required at the Micklefield TSC, presenting a maximum of two two-way daily trips, and therefore is not expected to generate a significant effect. The additional lane created by the Replacement Austhorpe Lane Bridge is not itself expected to generate additional traffic and has therefore not been appraised.
- 11.2.12 Personal injury collision data between 01/01/2017 – 31/12/2021 has been analysed to determine the existence of underlying highway safety issues in the vicinity of the Scheme Boundary. A total of five ‘slight’ and two ‘serious’ accidents were recorded in this five-year period. Therefore, the relevant works components of the Scheme will not exacerbate the current accident situation, such that further investigation or mitigation measures would be required.
- 11.3 Mitigation and Consideration of Control Measures**
- 11.3.1 No significant effects are expected during construction, however, further mitigation is recommended to minimise risk and as part of best-practice measures or established standards.
- 11.3.2 Construction traffic routing is described in Section 3.4 of Appendix 11.1 in Volume 3 of the Report [NR16]. A Construction Traffic Management Plan (CTMP) and Construction Worker Travel Plan (CWTP) will be produced in liaison with, and approved by, the local authority for relevant works components of the Scheme requiring planning permission, through the forum of a Highways Working Group. The CTMP will detail the transport requirements associated with the relevant works components of the Scheme requiring planning permission, measures to direct and monitor Scheme traffic and transport, and measures to reduce impacts and

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nuisance. Measures to be included at a minimum are summarised in Paragraph 4.1.1 of Appendix 11 in Volume 3 of the Report [NR16], and described below:

- The CTMP shall contain at a minimum:
 - temporary and permanent road closures and diversions as identified in the draft Order;
 - construction traffic routes including access and egress from the main trunk roads and also at site level, as indicated in Section 3.4 of Appendix 11A in the Report [NR16];
 - imposed time restrictions on use and any routes strictly prohibited from use;
 - controls to minimise any interference with a carriageway or footway, including control of tracking of mud and rubble by construction traffic from the Site;
 - temporary traffic control measures as may be required;
 - means of monitoring construction HGV compliance with the agreed traffic routes;
 - site specific controls in consideration of the potential for nuisance (noise and vibration, mud and dust);
 - mirrors placed at critical turning junctions to assist drivers, if requested by and agreed with the Local Highway Authority; and,
 - prohibition of parking of any construction site vehicles along public roads
- A Travel Plan for project staff will be produced as required to encourage a sustainable arrangement for travel to and around the relevant works components of the Scheme requiring planning permission.
- Nuisance management measures, such as wheel wash facilities, sheeting to cover HGV loads, usage of a road sweeper, directional reversing alarms will be used.
- The Nuisance Management Plan and a Noise and Vibration Management Plan will form part of Part B of the CoCP which will be subject to approval by the local authority under a planning condition.

11.3.3 A Travel Plan for Scheme staff will be produced to encourage sustainable travel and transport use in relation to relevant works components of the Scheme requiring planning permission. Construction traffic (in conjunction with the CTMP) will be directed to use specific and appropriate routes as approved by the local authority. Nuisance management systems specific to transport will also be used as outlined in a Nuisance Management Plan and Noise and Vibration Management Plan, to be approved by the local authority and included in the CoCP – Part B. Example measures are included in Section 4 of Appendix 11 in Volume 3.

11.3.4 The above is aligned with the Section 11 on Traffic and Transport within the CoCP Part A [NR17].

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- 11.3.5 Permanent PRow diversions for Peckfield Level Crossing and Barrowby Lane Level Crossing will be provided by the Scheme as detailed in Section 11.2 of this Report.
- 11.3.6 The closures of the existing Barrowby Foot Level Crossing and the Barrowby Lane Level Crossing will be mitigated by the provision of The New Barrowby Lane Bridge, providing a ramped bridleway bridge with additional steps for pedestrians, providing accessibility for all users.
- 11.3.7 The closure of Peckfield Level Crossing will be mitigated through the provision of a new level PRow footpath or bridleway between the Great North Road and Lower Peckfield Lane to the north of the Railway to provide pedestrian access on level ground to residential properties north of Peckfield Level Crossing and adjacent to the railway (the Railway Properties) and a link to the PRow (Micklefield 8) on Lower Peckfield Lane. Details of surfacing and widths of the footpath or bridleway will be submitted to the local planning authority for approval under a planning condition.
- 11.3.8 Temporary PRow diversion, and non-PRow public access diversions, will be provided for users of Crawshaw Woods Bridge, and Austhorpe Lane Bridge and Ridge Road Bridge, respectively. Mitigation measures for temporary compound access junctions (e.g. temporary traffic lights or bellmouth widening) will be included within the CTMP as required.
- 11.3.9 Mitigation for relevant works components of the Scheme requiring temporary land use will be delivered in accordance with the CoCP Part A and Network Rail commitments set out within NR/L2/ENV/015 and will be supported by similar CTMP, Travel Plan(s), Nuisance Management Plan(s), and Noise and Vibration Management Plan(s) as summarised in Paragraph 4.1.1 of Appendix 11 in Volume 3 of this Report **[NR16]**.

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12. GEOENVIRONMENT

12.1 Introduction

12.1.1 The Geo-environment Technical Note, which reports the findings of a Phase 1 Desk Study (Environmental Report [NR16]:Volume 3: Appendix 12), includes an appraisal of the predicted geo-environmental impacts and consequential effects of the relevant works components of the Scheme.

12.1.2 The purpose of the Geo-environment Technical Note is to:

- summarise relevant policy and guidance;
- describe the baseline environment in relation to ground conditions, and identify the potential effects on the geo-environmental conditions that may arise as a result of the relevant works components of the Scheme; and
- identify suitable mitigation for these potential effects of the relevant works components of the Scheme.

12.1.3 The following legislation has informed the appraisal of potential impacts to the geo-environmental conditions:

- The Water Framework Directive (2000/60/EC);
- The Groundwater Daughter Directive (2006/118/EC);
- The Environmental Liability Directive (2004/35/EC);
- The Dangerous Substances Directive (2006/11/EC) as amended;
- Part 2A of the Environmental Protection Act 1990;
- The Environment Act 1995;
- The Environment Act 2021;
- The Water Act 2003;
- The Water Act 2014;
- The Water Resources Act 1991;
- Anti-Pollution Works Regulations 1999 (as amended);
- The Environmental Permitting (England and Wales) Regulations 2016 (as amended);
- The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 (as amended);
- The Contaminated Land (England) Regulations 2006 (as amended);
- The Contaminated Land (England) (Amendment) Regulations 2012; and
- The Waste (England and Wales) Regulations 2011 (as amended).

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12.1.4 The Leeds Local Plan Core Strategy (2019) contains local policies that have informed the appraisal of impacts to the geo-environmental conditions

12.1.5 The following guidance documents have informed the appraisal of impacts to the geo-environmental conditions:

- Environment Agency guidance on Land Contamination Risk Management (LCRM), April 2021;
- Construction Industry Research and Information Association publication Research & Development (R&D) Publication 66, National House Building Council (NHBC)/ Environment Agency/ Chartered Institute of Environmental Health (CIEH) 2008;
- Environment Agency guidance: The Environment Agency's approach to groundwater protection, February 2018; and
- Environment Agency guidance: Guiding Principles for Land Contamination, 2016

12.2 Appraisal of Impacts and Effects

12.2.1 A Phase 1 Desk Study was undertaken including each Scheme Area of the relevant works components of the Scheme to identify potential contamination issues from current and historic land uses, which may be related to onsite and offsite sources. The Scheme Area relates to the relevant works components of the Scheme and the areas of permanent land acquisition and temporary land use required to facilitate these (the 'Scheme Area(s)').

12.2.2 Baseline information was obtained from Envirocheck Reports and publicly available information including geology, hydrology, hydrogeology and mining. Potential sources of contamination were identified by a review of available sources of information including, but not limited to, historical maps acquired as part of Envirocheck Reports, regulatory information, contaminative land uses, historical land and waste and landfill history. The Environment Agency guidance on Land Contamination Risk Management (LC:RM) is used to identify if risk ratings for potential contamination are acceptable or unacceptable. Table 12.1 presents a summary of the baseline conditions for each relevant works component of the Scheme.

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Table 12.1: Summary of baseline information for each Scheme Area

Scheme Area	Geology	Hydrogeology	Hydrology	Landfills	Potential Contamination Sources
Kirkgate to Marsh Lane Land	<ul style="list-style-type: none"> Made Ground is not mapped beneath the Scheme Area, however, it is anticipated beneath the railway lines. The superficial deposits comprise Alluvium Deposits. The bedrock comprises the Pennine Lower Coal Measures. The northern area of the Scheme Area is underlain by the Thick Stone Sandstone of the Pennine Lower Coal Measures. The nearest fault is located approximately 90 m south-east. Probable unrecorded shallow coal mine workings are located beneath the Scheme Area. 	<ul style="list-style-type: none"> The Alluvium Deposits and Pennine Lower Coal Measures are designated as Secondary A Aquifers. The groundwater vulnerability is designated as Medium. There are no Source Protection Zones (SPZ) within a 1 km radius. There are seven groundwater abstractions within a 1 km radius. 	<ul style="list-style-type: none"> The Scheme Area is located within the River Aire catchment. The River Aire is located approximately 205 m south. There are two surface water abstractions within a 1 km radius. The nearest inland river is located approximately 80 m east. 	<ul style="list-style-type: none"> There are three records for landfills within a 1 km radius. The nearest landfill is located approximately 400m south-west. 	<ul style="list-style-type: none"> Existing railway within the Scheme Area (source of Made Ground / spillages / leakages). Infilled Ground within the Scheme boundary. Potential shallow mine workings beneath the Scheme Area. Nearby historical and current landfill sites within a 1 km radius Industrial legacy of the surrounding area comprising the following: garages; printing works; car dealerships; food manufacturing; brewers; timber yards; warehouses; mills; factories; works; depots; electric sub stations and tanks. Potential ground gas associated with Made Ground and potential shallow workings beneath the railway lines. Potential ground gas generation from the mine workings beneath the Scheme Area and outside the Scheme Area. LC:RM Risk Ratings: Acceptable
The Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas	<ul style="list-style-type: none"> Made Ground is not mapped beneath the Scheme Area, however, it is anticipated beneath the railway lines. 	<ul style="list-style-type: none"> The Pennine Lower Coal Measures, which underlie the entire Scheme Area are designated as a 	<ul style="list-style-type: none"> The Scheme Area is located within the Wyke Beck from Source to River Aire Water Body 	<ul style="list-style-type: none"> There are no landfills within a 1 km radius from the Scheme Area. 	<ul style="list-style-type: none"> Railway infrastructure within the Scheme Area and outside the Scheme Area (source of Made Ground / spillages / leakages). Mine workings beneath the Scheme Area and in the surrounding area.

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Scheme Area	Geology	Hydrogeology	Hydrology	Landfills	Potential Contamination Sources
Main Diversion	<ul style="list-style-type: none"> There are no superficial deposits beneath the Scheme Area. The bedrock comprises the Pennine Lower Coal Measures. The Slack Back Rock Sandstone of the Pennine Lower Coal Measures Formation underlies the Scheme Area to the north of the railway. Two faults are located through the western and eastern areas of the Scheme Area orientated north-east to southwest, with downthrow to the southeast. Probable unrecorded shallow mine workings are located beneath the Scheme Area. The Middleton Main and Top Beeston coal seams were worked beneath the Scheme Area. 	<ul style="list-style-type: none"> Secondary A Aquifer. The groundwater vulnerability is designated as Medium. There are no SPZ within a 1 km radius. There is one groundwater abstraction within a 1 km radius. 	<ul style="list-style-type: none"> Catchment and the Cock Beck Catchment (tributary of Wharfe) Water Body. There are no surface water abstractions within 1 km from the Scheme Area. The nearest inland river is located approximately 465 m east. 		<ul style="list-style-type: none"> Electrical substations located approximately 140 m south-west and 50 m north. Industrial legacy of the surrounding area including a former Gas Works located 450 m west, former Motor Body Works located 330 m north-east, a Cable and Plastic Works located 450 m north-east and former unspecified works within the vicinity. Contemporary Trade Directory Entries for t-shirt printing, air conditioning and refrigeration, cleaning services, refractory materials and supplies, fibre optics, car dealerships, air conditioning and refrigeration and plant and machinery repairs between 102 m and 250 m from the Scheme Area. Former sewage tank located 180 m north. Potential ground gas associated with Made Ground beneath the railway lines. Potential ground gas generation from the mine workings beneath the Scheme Area and outside the Scheme Area. Former munitions factory. LC:RM Risk Ratings: Acceptable
Works to Raise Crawshaw	<ul style="list-style-type: none"> Made Ground is anticipated beneath the railway lines. Infilled Ground is located to the south of the railway lines 	<ul style="list-style-type: none"> The Pennine Lower Coal Measures, which underlie the entire 	<ul style="list-style-type: none"> The Scheme Area is located within the Cock Beck 	<ul style="list-style-type: none"> There are two records for landfills within a 1 km 	<ul style="list-style-type: none"> Made Ground underneath the railway lines.

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Scheme Area	Geology	Hydrogeology	Hydrology	Landfills	Potential Contamination Sources
Woods Bridge	<p>associated with a former unlicensed opencast mining.</p> <ul style="list-style-type: none"> There are no superficial deposits beneath the Scheme Area. The bedrock comprises the Pennine Lower Coal Measures. The nearest fault to the Scheme Area is located in the western area of the Scheme Area. Probable unrecorded shallow mine workings are located beneath the Scheme Area. The Middleton Main and Top Beeston coal seams were worked beneath the Scheme Area. A disused adit is located approximately 120 m north-west and a disused mine entry is located approximately 30 m north 	<p>Scheme Area are designated as a Secondary A Aquifer.</p> <ul style="list-style-type: none"> The groundwater vulnerability is designated as Medium. There are no SPZ within a 1 km radius. There are three groundwater abstractions within a 1 km radius. 	<p>Catchment (tributary of Wharfe) Water Body.</p> <ul style="list-style-type: none"> There are no surface water abstractions within 1 km from the Scheme Area. The nearest surface water feature is located approximately 10 m from the Scheme Area. 	<p>radius. The nearest landfill is located 495 m north-west.</p>	<ul style="list-style-type: none"> Railway lines (source of Made Ground / spillages / leakages) beneath the bridge. Stockpile of waste ground observed during the Scheme Area reconnaissance. Mine workings beneath the Scheme Area Refuse tip approximately 130 m north-west from the Scheme Area. Landfills within a 1 km radius. Potential ground gas associated with mine workings, landfills and Made Ground. Former munitions factory located nearby within Cross Gates. LC:RM Risk Ratings: Acceptable
The New Barrowby Lane Bridge	<ul style="list-style-type: none"> Made Ground is anticipated beneath the railway lines. Infilled ground encroaches on the northern boundary of the Scheme Area. There are no superficial deposits beneath the Scheme Area. 	<ul style="list-style-type: none"> The Pennine Lower Coal Measures, which underlie the entire Scheme Area are designated as a Secondary A Aquifer. 	<ul style="list-style-type: none"> The Scheme Area is located within the Cock Beck Catchment (tributary of Wharfe) Water Body. 	<ul style="list-style-type: none"> There is one Historical Landfill within a 1 km radius located approximately 930 m south. 	<ul style="list-style-type: none"> Made Ground and the stockpile of waste ground observed during the Scheme Area reconnaissance. Mine workings beneath the Scheme Area. Railways (source of Made Ground / spillages / leakages) within the Scheme Area and outside the Scheme Area.

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Scheme Area	Geology	Hydrogeology	Hydrology	Landfills	Potential Contamination Sources
	<ul style="list-style-type: none"> The bedrock comprises the Pennine Lower Coal Measures. The nearest fault is located approximately 330 m east from the Scheme Area. Probable unrecorded shallow mine workings are located beneath the Scheme Area. The Top Beeston coal seams was worked beneath the Scheme Area. Three mine entries (shafts) are located between 75 m and 405 m from the Scheme Area. A former licensed opencast mining site is located 80 m north and unlicensed opencast mining sites are located 240 m north and 420 m west. A subsidence damage notice or claim was filed for White House Farm in the north of the Scheme Area in August 1998, which was subsequently rejected. Two remediated sites are located approximately 17 m and 27 m north respectively. 	<ul style="list-style-type: none"> The groundwater vulnerability is designated as High. There are no SPZ within a 1 km radius. There are two groundwater abstraction within a 1 km radius. 	<ul style="list-style-type: none"> There is one surface water abstractions within 1 km from the Scheme Area. The nearest surface water feature is located approximately 295 m from the Scheme Area. 		<ul style="list-style-type: none"> Scrap yard / recycling site located 130 m east from the proposed Barrowby Lane Bridge Compound. Industrial land use within 250 m including a former works. Historical landfill located 930 m south. Ground gas associated with mine workings beneath the Scheme Area and historical landfills in the surrounding area. LC:RM Risk Ratings: Acceptable

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Scheme Area	Geology	Hydrogeology	Hydrology	Landfills	Potential Contamination Sources
The Replacement Ridge Road Bridge and The Ridge Road Gas Main Diversion	<ul style="list-style-type: none"> • Made Ground is anticipated beneath the railway lines and immediately east from the Scheme Area. Worked Ground (Void) is located to the north of the railway line near the junction of Ridge Road and Church Lane. • There are no superficial deposits underlying the Scheme Area. • The bedrock comprises of dolostones of the Cadeby Formation. • A fault orientated north-east to south-west is located in the southern area of the Scheme Area through the access road. • The Coal Authority Report for the Scheme Areas between Ridge Road and Peckfield indicates the Middleton Main, Top Beeston and Black Bed coal seams were worked beneath the Scheme Area. • The nearest mine entry is located approximately 600 m east. 	<ul style="list-style-type: none"> • The Cadeby Formation is designated as a Principal Aquifer. • The groundwater vulnerability is designated as High. There is a soluble rock risk across the Scheme Area. • There are no SPZ within a 1 km radius. • There are four groundwater abstractions within a 1 km radius. 	<ul style="list-style-type: none"> • The Scheme Area is located within the Mill Dike catchment. • There are no surface water abstractions within a 1 km radius. • The nearest inland river is located approximately 290 m east from Ridge Road. 	<ul style="list-style-type: none"> • There are seven records for landfills within a 1 km radius. The Old Quarry Plantation historical landfill underlies the northern extent of the Scheme Area. 	<ul style="list-style-type: none"> • Railway lines (source of Made Ground / spillages / leakages) beneath Ridge Road bridge. • Made Ground in the surrounding area. • Mine workings in the surrounding area of the Scheme Area, including the former Garforth Colliery and Peckfield Colliery and associated infrastructure (railway sidings and mineral railway). • Historical slag heaps/ refuse heaps/ tips/ spoil heaps to the east and north of the Scheme Area. • Historical and current landfills within a 1 km radius. • Former and current manufacturing and trade within a 250 m radius including, building and tool manufacturing, shop fitting manufacturing and agricultural vehicle trade. • Ground gas associated with Made Ground, mine workings and landfills. • LC:RM Risk Ratings: Acceptable

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Scheme Area	Geology	Hydrogeology	Hydrology	Landfills	Potential Contamination Sources
The Micklefield TSC	<ul style="list-style-type: none"> • Made Ground is not mapped beneath the Scheme Area, however, it is anticipated to underlie the land adjacent to the southern and western Scheme Area borders. • There are no superficial deposits underlying the Scheme Area. • The bedrock comprises of dolostones of the Cadeby Formation. • The Coal Authority Report for the Scheme Areas between Ridge Road and Peckfield indicates the Middleton Main, Top Beeston and Black Bed coal seams were worked beneath the Scheme Area. • Three mine entries are located approximately 40 m south-west. 	<ul style="list-style-type: none"> • The Cadeby Formation is designated as a Principal Aquifer. • The groundwater vulnerability is designated as High. There is a soluble rock risk across the Scheme Area. • There are no SPZ within a 1 km radius. • There is one groundwater abstraction within a 1 km radius. 	<ul style="list-style-type: none"> • The Scheme Area is located within the Mill Dike catchment. • The nearest inland river is located approximately 7 m south from the Scheme Area. • There are no surface water abstractions within a 1 km radius from the Scheme Area. 	<ul style="list-style-type: none"> • There are eight records for landfills within 1 km. The nearest landfill is located approximately 94 m south-east. 	<ul style="list-style-type: none"> • Former railway sidings and infrastructure within the Scheme Area and in the surrounding area • Unknown infilled ground underlying the Scheme Area. • Existing railway lines (source of Made Ground) to the north of the Scheme Area. • Industrial land use outside of the Scheme Area within 120 m associated with contemporary trade directory entries such as manufacturing, printing, industrial engineer trade, sealant trade and energy production. • Former mine workings (Peckfield and Micklefield Colliery) and associated infrastructure including tanks located to the west and south-east from the Scheme Area. • Electric sub stations previously located 200 m west from the Scheme Area. • Refuse and slag heaps denoted on historical mapping in the surrounding area. • Nearby historical and current landfill sites within a 1 km radius. • Ground gas associated with mine workings and landfills within a 1 km radius. • LC:RM Risk Ratings: Acceptable

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Scheme Area	Geology	Hydrogeology	Hydrology	Landfills	Potential Contamination Sources
The Peckfield Level Crossing Closure	<ul style="list-style-type: none"> • Made Ground is not mapped underlying the Scheme Area, however, it is anticipated beneath Pit Lane. • There are no superficial deposits underlying the Scheme Area. • The bedrock comprises of dolostones of the Cadeby Formation. • The nearest fault is located approximately 470 m south. • The Coal Authority Report for the Scheme Areas between Ridge Road and Peckfield indicates the Middleton Main, Top Beeston and Black Bed coal seams were worked beneath the Scheme Area. • Three mine entries are located approximately 160 m south-west. 	<ul style="list-style-type: none"> • The Cadeby Formation is designated as a Principal Aquifer. • The groundwater vulnerability is designated as High. There is a soluble rock risk across the Scheme Area. • There are no SPZ within a 1 km radius. • There is one groundwater abstraction within a 1 km radius. 	<ul style="list-style-type: none"> • The Scheme Area is located within the Mill Dike catchment. • The nearest inland river is located approximately 10 m from the Scheme Area. • There are no surface water abstractions within a 1 km radius from the Scheme Area. 	<ul style="list-style-type: none"> • There are eight records for landfills within a 1 km radius. The nearest landfill is located approximately 115 m south. 	<ul style="list-style-type: none"> • Existing railway (source of Made Ground / spillages / leakages) immediately south • Nearby historical and current landfill sites within a 1 km radius. • Former mine workings (Peckfield and Micklefield Colliery) and associated infrastructure including tanks located to the south of the Scheme Area. • Sewage works located approximately 250 m from the Scheme Area. • Industrial land use outside of the Scheme Area within 50 m associated with contemporary trade directory entries such as cleaning solutions, extractive industries, energy production, industrial engineer trade, sealant trade. • Ground gas associated with mine workings and landfills within a 1 km radius. • LC:RM Risk Ratings: Acceptable

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- 12.2.3 For each Scheme Area, the potential risk to the human health of future site visitors from sources listed in Table 12.1 via direct contact, ingestion and inhalation of metals, inorganic or organic contaminants that may be present in soil, soil leachate and groundwater has been categorised. The methodology for determining the risk follows Environment Agency Land Contamination: Risk Management Guidance (2021) and is presented in Volume 3 Appendix 12 – Geoenvironment, Annex C [NR16]. There is also potential for future site users to be affected by ground gas associated with Made Ground and natural strata. However, it is noted that most future site users will be transient in nature and therefore experience limited periods of exposure. Under LC:RM the risks to human health of future site users is considered to be *Acceptable*.
- 12.2.4 Construction and maintenance workers at each Scheme Area may be potential receptors from sources listed in Table 12.1 via direct contact, ingestion and inhalation of metals, inorganic or organic contaminants that may be present in soil, soil leachate and groundwater. Under LC:RM the risks to human health of construction and maintenance workers is considered to be *Acceptable*.
- 12.2.5 There is potential for off-site human health to be affected by possible contamination sources listed in Table 12.1 via direct contact, ingestion or inhalation of potential contaminants in Made Ground, natural soils, groundwater and leachate. In particular, the risk to off-site human health would be associated with off-site migration of contamination, for instance, in the form of wind-blown dust and organic vapours. Exposure via inhalation of dust is considered to be negligible for off-site receptors following development works, and as such there is not considered to be plausible contaminant linkage during operation. Under LC:RM the risks to off-site human health is considered to be *Acceptable*.
- 12.2.6 The nearest potential off-site human health receptors for each Scheme Area are:
- users of the commercial property approximately 20 m west from Kirkgate to Marsh Lane Land;
 - occupiers within the residential buildings located immediately south-east and north-east of the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion;
 - occupiers of Shippen House Farm near the Works to Raise Crawshaw Woods Bridge;
 - occupiers of White House Farm immediately adjacent to the New Barrowby Lane Bridge;
 - occupiers of Ridge Cottage located approximately 30 m from the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion and occupiers of industrial properties located 175 m east from the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion;
 - occupiers within the residential and industrial properties within 45 m from the Micklefield TSC; and

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- occupiers within the residential and industrial properties directly adjacent to the Peckfield Level Crossing Closure.

12.2.7 Controlled waters within and in the vicinity of each Scheme Area may be a potential receptor to the contamination sources listed in Table 12.1. There is potential for contaminants to migrate laterally and vertically via permeable strata, particularly within Alluvium Deposits at Kirkgate to Marsh Lane Land and via sandstones of the Pennine Lower Coal Measures at Kirkgate to Marsh Lane Land, the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion, Works to Raise Crawshaw Woods Bridge, and the New Barrowby Lane Bridge Scheme Areas. High permeability strata within the Cadeby Formation may also result in lateral and vertical migration of potential contaminants within the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion, the Peckfield Level Crossing Closure, and the Micklefield TSC Scheme Areas. Furthermore, where the relevant works components of the Scheme require piled foundations, there is potential to create preferential migration pathways to the aquifers. The following aquifers were identified as potential receptors:

- Secondary A Aquifer within Alluvium Deposits underlying Kirkgate to Marsh Lane Land;
- Secondary A Aquifer within Pennine Lower Coal Measures underlying the following Scheme Areas: Kirkgate to Marsh Lane Land, the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion, Works to Raise Crawshaw Woods Bridge, and the New Barrowby Lane Bridge; and
- Principal Aquifer within the Cadeby Formation underlying the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion, the Micklefield TSC and the Peckfield Level Crossing Closure Scheme Areas.

12.2.8 Under LC:RM the risks to aquifers is considered to be *Acceptable*.

12.2.9 The potential contamination sources identified in Table 12.1 may migrate to surface water receptors via surface run-off, site drainage and lateral migration via permeable strata. The following surface water features were identified as potential receptors:

- River Aire catchment and associated watercourses for Kirkgate to Marsh Lane Land;
- Wyke Beck from Source to River Aire catchment and associated watercourses for the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion;
- Cock Beck catchment and associated watercourses for the Works to Raise Crawshaw Woods Bridge and the New Barrowby Lane Bridge Scheme Areas; and
- Mill Dike catchment and associated watercourses for the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion, the Micklefield TSC and the Peckfield Level Crossing Closure Scheme Areas.

12.2.10 Under LC:RM the risks to surface waters is considered to be *Acceptable*.

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12.2.11 The flora and fauna within each site may be a potential receptor to the contamination sources described in Table 12.1. There are no environmental designations at the relevant works components of the Scheme.

12.3 Mitigation and Consideration of Control Measures

12.3.1 Table 12.2 presents a summary of the mitigation and control measures proposed for each Scheme Area.

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Scheme areas	Permitted development mitigation measures	Mitigation measures secured through planning conditions and legislation	General control measures (applicable to all sites)
Kirkgate to Marsh Lane Land Micklefield TSC Peckfield Level Crossing Closure	Not applicable.	<ul style="list-style-type: none"> Standard good practice health and safety measures will be implemented including a Scheme Area-specific risk assessment and the use of personal protective equipment to mitigate the potential impacts to construction workers. The potential risk associated with ground gas generation associated with Made Ground and probable shallow coal mine workings will be mitigated through compliance with confined space legislation. Before construction works start, a health and safety risk assessment will be carried out in accordance with current health and safety regulations. Any confined spaces will be assessed prior to entry. Dust generation will be kept to a minimum in compliance with the CoCP Part B PPICP and Nuisance Management Plan (NMP) planning conditions. Compliance with the CoCP Part B PPICP will also mitigate the potential risk to controlled waters. The potential risks associated with piling at the Kirkgate to Marsh Lane Land and the Micklefield TSC Scheme Areas would be considered within a piling risk assessment, as required, with the appropriate mitigation implemented through the CoCP Part B PPICP. 	<p>The following general control measures are applicable to all Scheme Areas:</p> <ul style="list-style-type: none"> Development infrastructure will be designed using concrete and service pipes appropriate for any chemically aggressive ground conditions at the Scheme Area. Soil and / or rock materials arising from construction will be sampled, tested and assessed with the aim of re-use either at the originating site or at a receiving site in accordance with the CL:AIRE Definition of Waste Development Industry Code of Practice. Re-use criteria will be devised by means of risk assessment specific to the receiving site. Any site-won and / or imported soil and / or soil forming materials that may be reused on site will be appropriately sampled, tested and risk assessed to ensure they are safe for the intended use. Any materials that do not meet the suitable for re-use criteria and that require disposal off-site will be sampled, tested, assessed and characterised in line with BS EN
The Replacement Austhorpe Lane Bridge and	<ul style="list-style-type: none"> The risk to future site users of the temporary compounds will be mitigated 	<ul style="list-style-type: none"> Standard good practice health and safety measures will be implemented including a Scheme Area-specific risk assessment and the use of 	

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Scheme areas	Permitted development mitigation measures	Mitigation measures secured through planning conditions and legislation	General control measures (applicable to all sites)
<p>Austhorpe Lane Gas Main Diversion</p> <p>Works to Raise Crawshaw Woods Bridge</p> <p>The New Barrowby Lane Bridge</p> <p>The Replacement Ridge Road Bridge and The Ridge Road Gas Main Diversion</p>	<p>through the implementation of control measures outlined in CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015), including an Environment and Social Management Plan and a health and safety file.</p> <ul style="list-style-type: none"> The risk to construction workers will be mitigated through compliance with CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015), including a hazard review, preliminary risk assessment and compliance with the health and safety file. 	<p>personal protective equipment to mitigate the potential impacts to construction workers.</p> <ul style="list-style-type: none"> The potential risk associated with ground gas generation associated with Made Ground and probable shallow coal mine workings will be mitigated through compliance with confined space legislation. Before construction works start, a health and safety risk assessment will be carried out in accordance with current health and safety regulations. Any confined spaces will be assessed prior to entry. Dust generation will be kept to a minimum in compliance with the CoCP Part B PPICP and Nuisance Management Plan planning conditions. Compliance with the CoCP Part B PPICP will also mitigate the potential contamination risk to controlled waters. The potential risks associated with piling would be considered within a piling risk assessment with the appropriate mitigation implemented as part of the CoCP Part B PPICP. 	<p>14899:2005. If unexpected contamination is identified and any remediation strategies are required, LCC will be consulted to agree a remedial strategy and a copy of the remediation strategy and verification reports will be provided to LCC.</p> <ul style="list-style-type: none"> If dewatering activities are required within excavations and these exceed 20 m³/ day, then Network Rail will apply for a water abstraction licence. Dust generation will be kept to a minimum in compliance with CoCP Part A and general best practice, as outlined in, for example, “Environmental Good Practice on Site,” 3rd Edition, CIRIA Publication C692. Appropriate gas protection measures, where ground gas monitoring results indicate that protection is necessary, will be sufficient to mitigate the potential risk from ground gas within temporary compound buildings at the Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion, Works to Raise Crawshaw Woods Bridge, and

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Scheme areas	Permitted development mitigation measures	Mitigation measures secured through planning conditions and legislation	General control measures (applicable to all sites)
			<p>the New Barrowby Lane Bridge.</p> <ul style="list-style-type: none"> • A supplementary ground investigation is to be undertaken within the boundary of the Scheme Area at detailed design stage to investigate the strata, obtain soil and groundwater samples for chemical and geotechnical testing and monitor groundwater and ground gas. Following the supplementary ground investigation, an interpretative report will be produced.

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13. WATER ENVIRONMENT

13.1 Introduction

- 13.1.1 Flood Risk and Drainage and Drainage Study Technical Notes have been included in Volume 3 [NR16], Appendices 13A and 13B and present the findings of an assessment of flood risk and a preliminary drainage study undertaken to inform the initial design of the relevant works components of the Scheme. The assessment of flood risk covers components that require planning permission and their associated temporary construction compounds and access routes as described in Section 3.2 in Chapter 3 of Volume 1 [NR16]. The preliminary drainage assessment covers only the permanent components with drainage for associated temporary works considered separately under the CoCP Part A [NR17] and Network Rail Standard Measures (NR/L2/ENV/015).
- 13.1.2 The works will not involve any direct impacts to watercourses. The potential for adverse effects on water quality in nearby watercourses during construction (for example from accidental spillage or deposition of contaminants near surface waters) will be avoided through the management of works in line with CoCP Part A [NR17] and Network Rail Standard Measures (NR/L2/ENV/015). A Pollution Prevention and Incident Control Plan (PPICP) will also be prepared and implemented in accordance with the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12] for relevant works components that require planning permission. Works will be undertaken in accordance with the measures described in PPICP, which will include good practice measures and protocols for the storage, use and management of potential contaminants on site, criteria for adequate bunding and hardstanding and silt fencing.
- 13.1.3 Likewise, the works will not involve any direct risks to Water Framework Directive (WFD) objectives, and any indirect risks can be mitigated with the implementation of the CoCP Part A [NR17] and the PPICP. It is therefore not necessary to include a WFD compliance appraisal in this Report.
- 13.1.4 The Report focuses on the effects relating to flood risk and drainage. The following national and local planning policies have been considered in relation to the relevant works components of the Scheme with regards to flood risk and drainage:
- National Planning Policy Framework (NPPF) (2021);
 - Flood Risk and Coastal Change Planning Policy Guidance (2019);
 - West Yorkshire Combined Authority Leeds City Region Sustainable Drainage Systems Guidance (2020);
 - Leeds City Council Local Plan (2019), including: Core Strategy; Natural Resources and Water Local Plan; Aire Valley Leeds area Action Plan; Site Allocations Plan and the Unitary Development Plan Review;
 - Leeds City Council Strategic Flood Risk Assessment (SFRA) (2007);

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- Leeds Local Flood Risk Management Strategy (LFRMS) (2018); and
- Leeds City Council Minimum Development Control Standards (2022).

13.2 Appraisal of Impacts and Effects

13.2.1 In Volume 2 of this Report [NR16] the Figures listed below provide the following background information:

- Figures 13.1.1 to 13.1.6 - Hydrological Site Context - includes locations of watercourses and high level information on the topography of the terrain.
- Figure 13.2.1 – shows the extents of Flood Zones 2 and 3 from the Environment Agency (EA) Flood Map for Planning for the Kirkgate to Marsh Lane Land.
- Figures 13.3.1 to 13.3.3 shows the location of Ordinary Watercourses where they are in the vicinity of relevant scheme components.
- Figures 13.4.1 to 13.4.6 – indicates the extents of Risk of Flooding from Surface Water.

13.2.2 An assessment of flood risk and a preliminary drainage study was undertaken for each relevant works component of the Scheme. Climate change has been accounted for in the drainage study which utilised climate projections from Leeds City Council's Minimum Development Control Standards for Flood Risk. A design lifetime beyond the year 2100 has been assumed with upper end climate change allowances used. The following bullet points provide a summary of the main findings and further details can be found in Appendices 13A and 13B in Volume 3 of this Report [NR16].

- There are no significant constraints to the relevant works components of the Scheme in relation to flooding that cannot be mitigated during construction and operation.
- All of the relevant works components of the Scheme are located in Environment Agency Flood Zone 1 and are therefore not at risk of fluvial flooding.
- The risk of surface water flooding across the relevant works components of the Scheme is variable, and mitigation will be required in some locations to minimise the impact of flooding to and from the relevant works components both during construction and operational phases. A drainage study has been conducted to identify relevant works components of the Scheme where drainage may be required.
- The drainage study has concluded that two components of the scheme, the Replacement Austhorpe Lane Bridge and Micklefield TSC, will require an outline design drainage strategy. A meeting was held with the EA and LCC on 27 February 2023 to agree an approach for the drainage strategy. It was determined that the outline design drainage strategy is to be completed in tandem with further development of the design. The strategies are expected to comply with Leeds City Council Validation Requirements for Flood Risk and Surface Water Drainage Outline Planning criteria and Leeds City Council Minimum Development Control Standards for Flood Risk. The other relevant components of the Scheme can maintain existing drainage principles subject to final detailed design site surveys

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and will not require the completion of an outline design drainage strategy. The preliminary drainage study details for each Works Component are summarised in Section 13.3 below and the study is included as Appendix 13B Technical Note: Drainage Study in Volume 3, Appendix 13B.

13.3 Mitigation and Consideration of Control Measures

- 13.3.1 Mitigation measures for the relevant works components of the Scheme are required in both construction and operation and these have been detailed in the assessment of flood risk to and from the relevant works components of the Scheme.
- 13.3.2 Through compliance with measures set out within Network Rail's NR/L2/ENV/015, and Chapter 7 of the CoCP Part A [NR17], a construction phase surface water management plan will be produced and implemented to manage the risk of surface water ponding at the Austhorpe Lane Southeast Compound. Construction materials will not be stored in areas of the compound that are deemed to be at a high risk of flooding from surface waters. Materials stored here would displace surface waters to offsite areas, presenting a risk of flooding to these areas.
- 13.3.3 If the Austhorpe Lane Southeast Compound is to be covered to enable access track installation, permeable materials will be used to ensure that water can still infiltrate into the soil. This would reduce the risk of surface water flooding at the site and minimise surface runoff to other adjacent areas.
- 13.3.4 As a result of these measures, risk of flooding to and from the compounds is considered to be low or negligible and no further action will be required.
- 13.3.5 The additional impermeable area from the wider (relative to the existing structure) Replacement Austhorpe Lane Bridge is likely to increase surface water runoff from the bridge. The additional highway surface area is to be adopted by Leeds City Council highways department. The additional area will be less than 250 m² and consequently this works component of the Scheme could be adopted under 'Small Developments' criteria, complying with Leeds City Council Minimum Development Control Standards for Flood Risk (and therefore does not require a formal outline design drainage strategy). Agreement will be sought from the Sewer Authority to discharge the additional surface water runoff to the existing surface water sewers in the vicinity via a pre-planning sewer enquiry. No mitigation is therefore required.
- 13.3.6 Surface waters may present a risk of flooding to and from the temporary haul road to the Ridge Road South Compound. To mitigate this risk, it is recommended a temporary haul road constructed of permeable paving be built. Moreover, a construction phase surface water management plan will be implemented and adhered to in compliance with measures set out within Chapter 7 of the CoCP Part A [NR17] and Network Rail's NR/L2/ENV/015 guidance. During operation, subject to the total impermeable area not increasing compared to the existing situation and existing drainage principles being maintained, there is no change in risk of flooding to or from the works when compared to the baseline risk and mitigation is not required at the Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion.

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- 13.3.7 During construction, surface waters present a risk of flooding to the section of Lower Peckfield Lane to the north of the Leeds to Selby line and the eastern section of Pit Lane at the Junction with Great North Road. It is recommended that materials should not be stored within surface water flow paths. Through compliance with measures outlined in Chapter 7 of the CoCP Part A [NR17] and Network Rail's NR/L2/ENV/015 guidance, the risk is deemed as low and no further mitigation is required.
- 13.3.8 To mitigate operational effects, an outline drainage strategy will be prepared for the Micklefield TSC, reflecting current design proposals to discharge runoff from the Scheme Area to the existing track drainage and existing highway drainage. Discharge is recommended via infiltration or, if infiltration is not viable, discharge to local ditches/ drainage before considering local or highway drainage. The surface water discharge drainage hierarchy is to be followed and justified as part of the outline design drainage strategy. The findings of drainage surveys of the Scheme Area are expected to confirm the findings within this study and conclude the preferred method of discharge.
- 13.3.9 No mitigation is required during operation at the Peckfield Level Crossing Closure Scheme as the risk of flooding is the same as the current baseline risk.
- 13.3.10 No specific mitigation measures are required at Kirkgate to Marsh Lane Land, Works to Raise Crawshaw Woods Bridge or the New Barrowby Lane Bridge. However, mitigation measures will be implemented during construction. These include adhering to the measures set out within Chapter 7 of the CoCP Part A [NR17] and following Network Rail's NR/L2/ENV/015 guidance. During operation, there is no change in risk of flooding to or from the works when compared to the baseline risk, except at the New Barrowby Lane Bridge where the existing informal drainage principles will be maintained. As such, mitigation is not required for these works components of the Scheme.

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14. AGRICULTURE

14.1 Introduction

14.1.1 An appraisal has been undertaken of the predicted agriculture-related impacts and consequential effects of the relevant works components of the Scheme, as detailed in Chapter 3 of this Report and shown on Figures 1.1.1 to 1.1.3 and 3.1.1 to 3.1.6 in Volume 2 of this Report **[NR16]**.

14.1.2 This appraisal:

- summarises relevant policy and guidance;
- describes the baseline environment in relation to agriculture and soils;
- identifies the potential effects on agriculture and soil assets that may arise as a result of the relevant works components of the Scheme; and
- identifies suitable mitigation for these potential effects of the relevant works components of the Scheme.

Relevant Legislation, Policy and Guidance

Policy

14.1.3 Paragraph 174 of the National Planning Policy Framework (NPPF; Ministry for Housing, Communities and Local Government, 2021) indicates that planning policies and decisions should contribute to and enhance the natural and local environment by (amongst other matters) protecting and enhancing soils and recognising the wider benefits from natural capital and ecosystem services, including the economic and other benefits of the best and most versatile (BMV) agricultural land.

14.1.4 Policy N35 of the Leeds Unitary Development Plan 2006 (Leeds City Council 2006) aims to avoid development that conflicts with the interests of protecting areas of the best and most versatile agricultural land.

Guidance

14.1.5 The Department for Environment, Food and Rural Affairs (2009) 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' is a practical guide to assist the construction industry to protect the soil resources with which it works and achieve good soil management at all stages of the construction process. It advises that the protection, use and movement of soils should be considered from the outset of a development project's planning, through its design and construction phases and on into future maintenance and operation. The sustainable use and management of soil resources during construction can help with the re-establishment of soil functions following their storage or movement, including food production, habitat provision and support, and natural cycling of elements such as carbon and nitrogen.

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14.2 Appraisal of Impacts and Effects

Study Area

- 14.2.1 The agriculture and soils study area extends to all the agricultural land within the limits of the relevant works components of the Scheme, encompassing approximately 9.16 ha in three blocks, adjacent to Crawshaw Woods bridge, the new Bridleway Bridge and Access Tracks at Barrowby and Ridge Road bridge and Ridge Road gas main diversion and Peckfield level crossing closure associated with the Lower Peckfield Lane Highway Works, as illustrated in Figure 14.1.1 to 14.1.4 in Volume 2 of this Report [NR16].

Baseline Soil and Agricultural Land Quality Conditions

- 14.2.2 A desk-based assessment of provisional Agricultural Land Classification (ALC) (England) mapping at a scale of 1:250,000 shows the area of the relevant works components of the Scheme as comprising agricultural land of both Grade 2 and Grade 3 (Grades 3a and 3b undifferentiated in the data) with Grade 3 in the west, between Austhorpe and Crawshaw Woods and Grade 2 in the east, between Barrowby and Peckfield (Department for Environment, Food and Rural Affairs, 2021a). The Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion lies within an area of land with provisional ALC Grade 3, however this area is allocated for future use as a Green Park and is therefore not considered further in this appraisal.
- 14.2.3 No detailed soil and ALC surveys have been undertaken due to the small footprint of permanent works.

Baseline Farm Holding Conditions

- 14.2.4 There are six farm holdings within the study area.
- Shippen House Farm is owned by Leeds City Council and operated by a tenant farmer. It is located surrounding Crawshaw Woods Bridge and to the south of the new Bridleway Bridge and Access Tracks at Barrowby and comprises a large holding of predominantly grass and livestock.
 - White House Farm is located at Nanny Goat Lane to the north of the new Bridleway Bridge and Access Tracks at Barrowby. It comprises approximately 12 acres (4.9 ha), with a three-bed house, stables and range of outbuildings. The agricultural land at White House Farm is used for grassland and equine livery.
 - Land at Wellhouse Farm is located to the north-east of Ridge Road bridge and Ridge Road gas main diversion and comprises arable land.
 - Land at Sturton Grange Farm is located to the north-west of Ridge Road bridge and Ridge Road gas main diversion. The land is used for mixed farming including arable and a soft fruit farm.
 - Land at Peckfield House Farm is located to the south-west of Ridge Road bridge and Ridge Road gas main diversion and comprises arable land.

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- Land at Hall Farm, Micklefield is located to the west of the Lower Peckfield Lane Highway Works.

Identification of Impacts and Effects

14.2.5 The relevant works components of the Scheme will involve the use of approximately 9.16 ha of agricultural land during construction, of which approximately 1.52 ha will be required permanently for the Scheme. Agricultural land will be impacted at the Works to Raise Crawshaw Woods Bridge, the New Barrowby Lane Bridge and New Access Tracks to New Barrowby Lane Bridge, Replacement Ridge Road Bridge and Ridge Road gas main diversion and Peckfield Level Crossing Closure associated with the Lower Peckfield Lane Highway Works.

14.2.6 Table 14.1 summarises the area of temporary and permanent agricultural land to be used and the impacts at each applicable relevant works component.

Table 14.1: Area of permanent and temporary impact on agricultural land

Scheme component	Agricultural Holding	Area of permanent impact on agricultural land (ha)	Area of temporary impact on agricultural land (ha)
Works to Raise Crawshaw Woods Bridge	Shippen House Farm	Grade 3 - 0.111	Grade 3 – 1.814
New Barrowby Lane Bridleway Bridge and New Access Tracks to New Barrowby Lane Bridge	White House Farm	Grade 2 – 0.280	0
	Shippen House Farm	Grade 2 – 0.319	Grade 2 – 1.624
Replacement Ridge Road Bridge and Ridge Road Gas Main Diversion	Wellhouse Farm	0	Grade 2 – 1.904
	Sturton Grange Farm	Grade 2 - 0.066	Grade 2 – 0.863
	Peckfield House Farm	Grade 2 – 0.121	Grade 2 – 1.444
Peckfield Level Crossing Closure (Lower Peckfield Lane Highway Works ¹)	Hall Farm	Grade 3 – 0.214 Grade 2 - 0.403	0

¹ Area of loss of agricultural land at Hall Farm associated with Lower Peckfield Lane Highway Works is calculated as a worst case. However, only approximately 200m² land take is required to accommodate three passing places along Lower Peckfield Lane.

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- 14.2.7 Adverse effects occurring from the temporary and permanent loss of agricultural land to holdings will be negligible due to the limited extent of permanent loss of approximately 1.52 ha. The majority of land use is to be used temporarily for construction and will be returned to its current condition, using best practice means in handling and restoring soils.

14.3 **Mitigation and Consideration of Control Measures**

- 14.3.1 The primary measures to mitigate the impacts on soil resources and ensure that land used temporarily will be returned to the landowner in the same condition as existing will be set out in the waste management and materials plan as required by Section 10.4 of the CoCP (Part A) [NR17].
- 14.3.2 Materials management to be implemented during construction will include good practice measures for storage, handling and reinstatement of soils to avoid compaction and biodegradation of soils, and maintain their quality.
- 14.3.3 The waste management and materials plan will include specifications of the appropriate moisture content and consistency of soils to be moved into and out of stockpiles, the design of stockpiles, and methods to replace and re-use soils within the Scheme design. Soils reused on-site would be able to continue such functions as carbon and water storage, and support of habitats and landscape planting.
- 14.3.4 An Outline Landscape and Ecological Mitigation Proposals Figure has been prepared for the relevant works components that require planning permission (refer to Figure 8.5.1 to Figure 8.5.6 included in Volume 2 of this Report [NR16]). These identify where land within the deemed planning permission boundary is proposed to be restored to agriculture, with materials management measures secured through a planning condition as part of CoCP Part B.
- 14.3.5 Where planning permission is not required for associated temporary land use and works are being completed under permitted development rights, upon completion of the use of the land temporarily used it will be restored to its pre-works activity condition as far as practicable in accordance with the Outline Draft Land Restoration Proposals Figures 8.6.1 to 8.6.5 included in Volume 2 of the Environmental Report [NR16]. Liaison with the local authority and landowners will take place prior to the restoration proposals being implemented and the restoration proposals will be secured through a letter of environmental commitment.
- 14.3.6 As described in Chapter 3 at Section 3.2.58 of this Report, the CoCP Part B, applicable to relevant works components of the Scheme that require planning permission, will also include a Nuisance Management Plan that will include measures to control dust from the construction works. Similar measures will be implemented for associated temporary land use areas through compliance with Section 9 of the CoCP Part A [NR17] and Network Rail commitments as set out within NR/L2/ENV/015.

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- 15.1.1 A Sustainability Statement has been prepared as part of the Leeds City Council (LCC) validation requirements checklist for the relevant works components of the Scheme. This is presented in Appendix 15 in Volume 3 of this Report [NR16].
- 15.1.2 Sustainability is fundamental to current and emerging government policy. This is reinforced in the UK's commitments to the Committee on Climate Change's (CCC) Sixth Carbon Budget (CCC, 2020) and the Industrial Decarbonisation Strategy (Department for Business, Energy, and Industrial Strategy (BEIS), 2021a), which makes it clear there is a presumption in favour of sustainable development at the heart of the planning system, and should be central to the approach taken to both planning and decision making.
- 15.1.3 The overall planning legislation and policy context with regard to climate change and sustainability is detailed in Section 1.3 and Appendix A in Appendix 15 in Volume 3 of this Report [NR16]. To summarise, the relevant legislation and policies for the Sustainability Statement are:

International Policy

- The Paris Agreement 2015.

National Policy

- The Environment Act 2021;
- The Climate Change Act 2008 (2050 Target Amendment) Order 2019;
- UK Transport Decarbonisation Plan 2021;
- National Planning Policy Framework (NPPF);
- Planning Practice Guidance;
- A Green Future: Our 25-year plan to improve the environment 2019; and
- Net Zero Strategy: Build Back Greener 2021.

Local Policy

- Core Strategy for Leeds 2019;
- Adopted Local Plan – Carbon Reduction Update 2021;
- Yorkshire and Humber Plan – Regional Spatial Strategy to 2026 2008;
- Leeds Unitary Development Plan 2006;
- Leeds City Council Validation Requirements 2022; and
- Building for Tomorrow Today Supplementary Planning Document (SPD) 2011.

Network Rail TRU Strategies and Plans

- TRU Carbon Reduction Strategy;

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- TRU Sustainability Strategy;
- TRU Sustainability Certification Plan; and
- TRU Resource Efficiency Materials Sourcing Strategy.

15.1.4 Crucially, the TRU works facilitate the electrification of the railway. Whilst some relevant works components of the Scheme that require planning permission have the potential to be carbon intensive, for example the deconstruction and modification of bridges, these are outweighed by the reduction in emissions that is achieved by the overall electrification of the railway. This electrification aligns with the goals of the above relevant legislation, policy, and guidance.

15.2 Appraisal of Impacts and Effects

15.2.1 The Sustainability Statement provides a summary of how the design of the relevant works components of the Scheme align with LCC aspirations for sustainable development. It is structured around a set of sustainability criteria that will be used to inform the approach to integrating sustainability into subsequent design stages and construction.

15.2.2 The criteria are taken directly from the Checklist for Developers set out in the Building for Tomorrow Today Supplementary Planning Document, as required by LCC for all major developments. The criteria have been considered, and items applicable to the relevant works components of the Scheme have been noted in Table 15.1. Appendix 15 in Volume 3 of this Report [NR16] includes those criteria deemed out of scope.

Table 15.1: Criteria considered in relation to the relevant works components of the Scheme

Topic	Criteria
Energy and carbon dioxide (CO ₂) emissions	What measures have been included to limit CO ₂ emissions: <ul style="list-style-type: none"> • by providing local energy generation and generation from renewable energy; • from appliances; • by providing reduced energy means of drying clothes; • from lighting; • by encouraging cycling; • by reducing the need to commute to work; and • by providing units that show how much energy is being used.
Water	What measures have been included to reduce internal and external water use?
Materials	What measures have been included to: <ul style="list-style-type: none"> • make use of materials with low environmental impacts; and • specify responsibly sourced materials for basic building and finishing elements.
Surface water run-off	What measures have been included to: <ul style="list-style-type: none"> • avoid, reduce, and delay the discharge of rainfall to public sewers and watercourses; and • avoid or reduce the risk of flooding.
Waste	What measures have been included to provide:

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Topic	Criteria
	<ul style="list-style-type: none"> adequate indoor and outdoor storage for non-recyclable and recyclable waste; and facilities for composting waste.
	Does the development have a Site Waste Management Plan (SWMP)?
Pollution	What measure have been included to reduce global warming from the emission of nitrogen dioxides into the atmosphere?
Management	Will the development operate under the Considerate Constructors Scheme (CCS)?
	What measures have been included to: <ul style="list-style-type: none"> mitigate against construction site environmental impacts; and design the development so people feel safe and secure.
Ecology	What measures have been included to: <ul style="list-style-type: none"> enhance the ecological value of the site; encourage development on land with limited wildlife value and avoid development on ecologically valuable sites; protect existing ecological features; encourage an improvement in ecological value; and make most efficient use of land and materials.
Climate change resilience	Different areas should be used to demonstrate that climate change effects have been taken into account: site appraisal, overall design of the building, building energy efficiency, use of materials, management of waste etc.

15.3 Mitigation and Consideration of Control Measures

- 15.3.1 Appendix 15 in Volume 3 of this Report [NR16] presents a full overview of how the criteria described in Table 15.1 have been adopted or will be implemented for the relevant works components of the Scheme. The overview is drawn heavily from the measures adopted as good practice in construction, which are secured through the Code of Construction Practice (CoCP) Part A [NR17] and Part B, in addition to the TRU Carbon Strategy, Sustainability Certification Plan, and Resource Efficiency and Materials Sourcing Strategy for temporary land areas.
- 15.3.2 As mentioned in Section 15.1.4, the electrification of the railway is central to the relevant works components of the Scheme addressing the sustainable development goals of both LCC and the UK Government. Network Rail has a strategic objective to achieve a 4% reduction in carbon during the design and implementation of the wider TRU programme, with a stretch target of 12%. The relevant works components of the Scheme will be incorporated within this aspiration.
- 15.3.3 Measures that have been implemented to realise carbon savings to date include a switch from diesel generators to mains connection for compounds. The relevant works components of the Scheme have been designed, as far as practicable to avoid and minimise impacts relating to climate change by embedding mitigation measures during the design process, including minimising tree loss and using lower carbon materials such as fibre reinforced plastic, as well as material reuse where practicable.

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- 15.3.4 Further mitigation measures include tracking usage of hybrid or solar power energy, limiting greenhouse gas (GHG) emissions through trialling and adopting new plant and machinery where practicable (including hybrid/ electric vehicle plant and machinery), and following requirements set out in a waste management and materials plan for the CoCP Part B under a planning condition.
- 15.3.5 Further, the TRU represents a key commitment to creating a better railway for public benefit, part of which involves electrification to join communities, improve operations and facilitate decarbonisation. The relevant works elements of the Scheme are essential for electrification of the route; without these works, the TRU Programme cannot be delivered, and the public benefits of the TRU Programme will not be realised.

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16. SUMMARY OF MITIGATION

16.1 Introduction

- 16.1.1 This chapter provides an overview of the mitigation to be provided for the relevant works components of the Scheme. Throughout the Report, both embedded and additional mitigation measures are identified. These mitigation measures follow the mitigation hierarchy of avoid, then reduce, then mitigate and as a last resort compensate.

16.2 Mitigation Measures

Embedded Mitigation Measures

- 16.2.1 Where reasonably practicable, environmental effects have been avoided through the incorporation of embedded mitigation, developed as an integral part of the Scheme design itself. Details of these measures are described in Chapter 3 (The Scheme), and where relevant, in Chapters 5 to 15 of this Report and relevant appendices in Volume 3 [NR16].
- 16.2.2 Embedded mitigation in the Scheme design seeks to ensure that impacts likely to result in adverse effects will be avoided or minimised as far as practically possible.
- 16.2.3 The layouts of the relevant works components of the Scheme have been designed to use land supporting habitats of low ecological value where practicable and minimise loss of trees. Specific examples of avoidance of higher value habitats include:
- Kirkgate to Marsh Lane Land: Boundary allows for design refinements to avoid tree loss along the embankments and minimise the area of land required outside the railway boundary during installation of the new railway assets, with works being undertaken from the railway line.
 - The Replacement Austhorpe Lane Bridge and Austhorpe Lane Gas Main Diversion: Design of Austhorpe Lane Southeast Compound to exclude a central area of land to reduce the loss of wet grassland and ephemeral water areas, and the extension of the compound into the grassland area to the east of the woodland block to minimise priority woodland loss and to retain trees with bat roost suitability.
 - Works to Raise Crawshaw Woods Bridge: Design of northern access track to avoid a mature hawthorn and design of southern access track to avoid damage to a pond and an existing hedgerow.
 - The New Barrowby Lane Bridge: Extension of Barrowby Lane compound further west to enable two mature trees to be retained that have bat roost suitability, one of which is a veteran tree.
 - The Replacement Ridge Road Bridge and the Ridge Road Gas Main Diversion: Access routes and compounds amended to reduce tree and scrub loss along the embankments and along the edge of Ridge Road.

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- The Peckfield Level Crossing Closure and the Micklefield TSC: Micro-siting of passing places along Lower Peckfield Lane to avoid tree loss.

16.2.4 Other examples of embedded mitigation include:

- retention and restoration of Crawshaw Woods Overbridge, thereby retaining the key historic element of the cast iron overbridge. The restoration of the ironwork and the removal of the unsympathetic steel panels will enhance its heritage significance, whilst the new parapets, though higher, will be more appropriate than the current steel panels and reflect the historic arrangement;
- provision of a new ramped bridleway bridge at Barrowby Lane, with integrated steps to provide pedestrians with a shorter access route across the railway line, to mitigate for the closure of the Barrowby lane Level Crossing and Barrowby Foot Level Crossing by providing convenient connections to the existing PRoW network and to minimise land take;
- provision of an alternative footpath or bridleway route via level ground on existing footways/ a new footpath or bridleway between the Great North Road and Lower Peckfield Lane to the north of the Railway, to provide pedestrian access to residential properties north of Peckfield Level Crossing and adjacent to the railway (the Railway Properties) and a link to the PRoW (Micklefield 8) on Lower Peckfield Lane to mitigate for the closure of the Peckfield Level Crossing;
- reuse of materials to be reclaimed from the bridge to be demolished (Brady Farm Bridge) in the reconstruction of other bridges (The Replacement Austhorpe Lane Bridge, Crawshaw Woods Bridge and the Replacement Ridge Road) to minimise waste and maintain the aesthetic of the retained historic elements;
- avoiding works within Flood Zones 2 and 3 at Kirkgate to Marsh Lane Land.
- employing geogrid or similar materials for temporary construction compounds, to help avoid risk of impact to unknown archaeology and allow for permeability of the ground to be retained; and
- colour and design of bridge structures will be sympathetic to the local context to minimise visual impact.

Additional Mitigation Measures

16.2.5 This chapter presents a summary of the environmental mitigation measures or management actions to be implemented during construction and operation of the relevant works components of the Scheme, in addition to the embedded mitigation measures summarised above.

16.2.6 The mechanism for securing implementation of mitigation measures for relevant works components of the Scheme that require planning permission will be through planning conditions as included in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12]. The mechanism for implementation of mitigation measures for associated temporary land use to facilitate these planning permission works, will be through compliance with the CoCP Part A [NR17] and Network Rail's Environment and Social Minimum

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Requirements for Projects – Design and Construction (NR/L2/ENV/015), with a commitment that construction environmental management documents prepared for planning conditions will also apply to associated temporary land use, secured through an environmental commitments letter.

- 16.2.7 The tables within this chapter provide cross references to the chapters and appendices of the Report (Volume 3 ([**NR16**])) where mitigation measures are outlined. An overview of the key documents which will provide the mechanism for implementation of mitigation measures is provided as follows:

Code of Construction Practice

- 16.2.8 Best practice environmental management measures will be implemented on-site during construction through application of the CoCP, which is split into Part A and Part B.
- 16.2.9 Part A of the CoCP is provided in document **NR17** and sets out the general principles, relevant measures, standards and environmental management requirements to be adhered to during construction.
- 16.2.10 Part A of the CoCP is applicable to all components of the Scheme, including the relevant works components that require planning permission and associated temporary land used to facilitate these planning permission works, delivered under permitted development rights. The application of CoCP Part A to the permitted development works will ensure environmental management in general in respect of these works complies with legislation and Network Rail's Contract Requirements – Environment (as set out within NR/ENV/015).
- 16.2.11 The key or cornerstone document of the CoCP, in accordance with NR/ENV/015, will be the Construction Environment and Social Management Plan (ESMP) as this document sets out the environmental objectives and targets for the Scheme and how the environmental requirements stipulated in the CoCP will be delivered. This is an internal management document that ensures all commitments are implemented. The ESMP is also the document that details the processes in place to manage environmental issues as they arise during construction such that there is compliance with relevant legislation and regulations.
- 16.2.12 Part B of the CoCP is applicable to the relevant works components of the Scheme that require planning permission and will be secured through a planning condition as described in the draft planning condition 6 Code of Construction Practice in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [**NR12**].
- 16.2.13 The CoCP Part B will be a series of standalone reports and delivery plans comprising:
- an external communications programme;
 - a pollution prevention and incident control plan (PPICP);

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- a waste management and materials plan;
 - a nuisance management plan (NMP) concerning dust, wheel wash measures, air pollution and temporary lighting;
 - a noise and vibration management plan (NVMP) including a construction methodology assessment; and
 - a demolition methodology statement for relevant buildings.
- 16.2.14 No stage of the relevant works components of the Scheme that require planning permission (excluding preliminary works) is to commence until the contents of the CoCP Part B environmental documents as listed in Section 16.2.13, for that stage have been submitted and approved in writing by LCC, as stipulated by planning condition [NR12], as part of the deemed planning permission. Preliminary works will comply with the environmental controls as set out in the CoCP Part A.
- 16.2.15 As the CoCP is considered to be a document which oversees environmental management on a Scheme wide basis, its implementation will be applied to all works in general and therefore similar measures shall also apply to the associated temporary land used to facilitate the planning permission works as standard practice, with this being secured through an environmental commitments letter.
- 16.2.16 Management and monitoring actions are to be undertaken following completion of the Scheme, as covered by the CoCP.

Landscape and Ecological Mitigation Proposals

- 16.2.17 Ecology and biodiversity will be appropriately protected through the application of a comprehensive Landscape and Ecological Management Plan (LEMP). The LEMP is the subject of a draft planning condition 5 Landscaping and Ecology and applies to the relevant works components of the Scheme that require planning permission, as described in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12].
- 16.2.18 The LEMP will be informed by the Outline Landscape and Ecological Mitigation Proposals provided in Figure 8.5 in Volume 2 of this Report [NR16].
- 16.2.19 In accordance with the draft planning condition 4, no preliminary works associated with relevant works components of the Scheme that require planning permission will commence for that relevant stage until the following have been submitted and approved in writing by LCC.
- A plan of existing trees and tree features (such as groups of trees or woodland) to be retained and protected and to be removed in accordance with BS5837(2012).
 - A plan identifying how ecological assets will be protected as identified in the Environmental Report [NR16] with all agreed measures being in place prior to the commencement of works within the specified stage.

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- The preliminary works shall be implemented in accordance with the approved plans.
- 16.2.20 In addition, within six months of the commencement of the development for that stage, or the completion of the works for that stage, whichever is sooner, a Landscape and Ecological Management Plan (LEMP) Part B must be submitted to and approved in writing by the local planning authority. The proposed LEMP Part B for each Stage will include the following details:
- a plan of ecological mitigation details including areas of new plantings and details of any habitats created or enhanced;
 - an implementation timetable and a programme for initial aftercare, long term management and maintenance responsibilities for a period of five years post-completion; and
 - details of organisation(s) responsible for maintenance and monitoring.
- 16.2.21 The LEMP will reflect the survey results and ecological mitigation and enhancement measures set out in this Report by including ecological measures such as:
- the aims and objectives of the management to be undertaken;
 - a programme of monitoring with thresholds for action as required; and
 - full details of measures to ensure protection and suitable mitigation to all relevant protected species and those species identified as being of importance to biodiversity (including any European Protected Species Licensing (EPSL) mitigation requirements).
- 16.2.22 The LEMP will also include details on hard and soft landscaping works, covering the locations where landscaping will be undertaken, including:
- full detailed landscape plans indicating full planting specification, including layout, species, number, density and size of trees, shrubs, plants, hedgerows and/or seed mixes and sowing rates, including extensive use of native species;
 - any structures, such as street furniture, any non-railway means of enclosure and lighting;
 - any details of regrading, cut and fill, earth screen bunds, existing and proposed levels;
 - any areas of grass turfing or seeding and depth of topsoil;
 - a timescale for the implementation of hard landscaping works;
 - details of monitoring and remedial measures, including replacement of any trees, shrubs or planting that fail or become diseased within the first five years from completion; and
 - details of protective measures for retained trees, in accordance with BS5837.
- 16.2.23 Whilst Conditions 4 and 5 Landscaping and Ecology only apply to the relevant works components of the Scheme that require planning permission, in compliance with CoCP Part A [NR17] and Network Rail's NR/ENV/015, ecological effects are

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assessed and will be mitigated for the associated temporary land use through delivery of the Outline Draft Land Restoration Proposal Figures (refer to Figures 8.6.1 to 8.6.6 in Volume 2 – Figures of the Report [NR16]). This will be secured through an environmental commitments letter made to LCC and agreed with the relevant landowners.

- 16.2.24 The request for planning permission [NR12] includes draft condition 10 Biodiversity Net Gain (BNG) that will secure a 10% habitat net gain (offset all habitat loss and add 10% enhancement to that loss) in accordance with DEFRA metric 3.0. In conditioning this commitment for approval with LCC, this safeguards the overall contribution to ecology and conservation for the relevant works components of the Scheme that require planning permission.
- 16.2.25 A strategy to achieve an overall 10% net gain in biodiversity for the relevant works components of the Scheme that require planning permission, including monitoring, maintenance, management and reporting arrangements, will be submitted for approval to LCC. The strategy will be implemented within six months after the formal completion of the last bridge to be completed.
- 16.2.26 In addition, Network Rail commits to a BNG of 10% across the whole Scheme to include the general permitted development components in accordance with the wider TRU Key Performance Indicator (KPI) for that programme of works covering the line of route from Manchester Victoria Station through to York Station, in which the Scheme is located.

Construction Traffic Management Plan

- 16.2.27 Separate to Part B of the CoCP, a Construction Traffic Management Plan (CTMP) will be produced to provide details of traffic management both within compounds and on the nearby public roads, such as appropriate signage, access and egress points, and details of any necessary temporary road closures for works to reconstruct bridges and deliveries of overlarge loads (if required).
- 16.2.28 The CTMP is the subject of a draft planning condition 7 Construction Traffic Management and Travel Plan and applies to the relevant works components of the Scheme that require planning permission, as described in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12].
- 16.2.29 No stage of the relevant works components of the Scheme that require planning permission (except preliminary works) will commence until a CTMP for that stage has been submitted to and approved in writing by LCC.
- 16.2.30 The CTMP will include measures to be undertaken during the construction stage and will address the requirements for traffic management measures such as:
- traffic route signage;
 - signing and guarding of compound access and egress; and

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- details on temporary diversions of both highways and rights of way required as part of the relevant works components of the Scheme, including co-ordination of temporary road closures during demolition and reconstruction of bridges and for delivery of overlarge loads (if required).
- 16.2.31 The CTMP will also include a Travel Plan for construction staff to encourage the reduction of the use of single occupancy private vehicles to travel to the worksite or compound and the use of sustainable modes of transport.
- 16.2.32 Whilst planning condition 7 Construction Traffic Management and Travel Plan only applies to the relevant works components of the Scheme that require planning permission, in compliance with the CoCP Part A and Network Rail's NR/ENV/015, similar measures will also apply to the associated temporary land used to facilitate the planning permission works as standard practice, with this being secured through an environmental commitments letter made to LCC.

Archaeological Written Scheme of Investigation

- 16.2.33 Archaeological recording of assets affected will be secured through the implementation of Section 5 of the CoCP Part A [NR17]. Where required, protection of archaeological assets from accidental damage during works will be secured through the implementation of Section 5 of the CoCP Part A [NR17.] An Archaeological Written Scheme of Investigation (WSI) is the subject of a draft planning condition 9 Archaeology and applies to the relevant works components of the Scheme that require planning permission, as described in the Order application document '*Request for deemed planning permission and statement of proposed conditions*' [NR12]. No stage of the relevant works components of the Scheme that require planning permission (except preliminary works) will commence until a WSI for that stage has been submitted to and approved in writing by LCC.
- 16.2.34 The WSI will take the form of archaeological investigation, recording, reporting; and publication if required. The WSI will identify areas where field work and/ or a watching brief are required and the measures to be taken in order to protect, record or preserve any significant archaeological remains that may be found. The scope and methods of the WSI will be agreed with West Yorkshire Archaeology Advisory Service.
- 16.2.35 In compliance with the CoCP Part A [NR17] and Network Rail's NR/ENV/015, archaeological effects are assessed and will also be mitigated for the associated temporary land use through a WSI where required, secured through an environmental commitment letter made to LCC.

16.3 Mitigation Measures Summary

- 16.3.1 Tables 16.1 and 16.2 present a summary of environmental mitigation measures and management actions required for the relevant works components of the Scheme which have been identified for the construction and operation phases, respectively.

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- 16.3.2 Where reference is made to the planning conditions, these relate only to the relevant works components of the Scheme that require planning permission. As detailed in 16.2.6, mitigation for associated temporary land use will be delivered through compliance with CoCP Part A [NR17] and Network Rail's commitments set out within NR/L2/ENV/015 and secured through an environmental commitments letter made to LCC.

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
Heritage	Environmental Report Volume 1: Chapter 5, Section 5.3.2 and Volume 3: Appendix 5 Heritage Statement	Listed Building Consent – Written Scheme of Investigation and Conservation Implementation Management Plan	Listed buildings	Archaeological recording of the bridges consistent with Historic England guidance, in agreement with historic environment stakeholders and in accordance with a Written Scheme of Investigation, and a Conservation Implementation Management Plan (CIMP) to define mitigation and compensation measures. The CIMP will set out the methodology for demolition and construction of structures, any measures for improving and/ or enhancing the setting and sustainability of heritage assets affected and maintenance schedules to secure the long-term condition of heritage assets affected.
Archaeology	Environmental Report Volume 1: Chapter 6, Section 6.3 and Volume 3: Appendix 6	Part A of CoCP [NR17] NR/L2/ENV/015	Previously-unknown potential archaeological assets	To minimise risk of impact and so as to preserve unknown archaeological remains within temporary land use, terram and geogrid protection will be laid over temporary land use areas following topsoil strip.
		Part A of CoCP [NR17] NR/L2/ENV/015 Written Scheme of Investigation (as part of Planning Conditions [NR12])		Any requirement for further archaeological works will be secured through a planning condition [NR12]. This will include the Written Scheme of Investigation that will be prepared for the relevant works components of the Scheme that require planning permission and submitted for approval by the local authority, that will be followed in the event of the discovery of previously-unknown potential archaeological assets during construction. Section 5 of the CoCP Part A [NR17] will also act as the mechanism to ensure that any potential archaeological finds of importance are appropriately protected.
		Legislative requirement	Gravestones Burials	Burials and gravestones within the graveyard at Penny Pocket Park within the Kirkgate to Marsh Lane Land will be avoided as far as practicable. However, should exhumation of burials be

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
				<p>required, either a licence under the Burials Act will be sought or the exhumations will be carried out in accordance with specific provisions in the Order.</p> <p>Should moving gravestones be necessary, this would take the form of recording in situ prior to removal, safe storage and replacement in the same location following completion of works.</p>
Ecology	Environmental Report Volume 1: Chapter 7, Section 7.3 and Volume 3: Appendix 7	Scheme Design British Standard 5837:2012 LEMP (as part of Planning Conditions [NR12]) Part A of CoCP [NR17] NR/L2/ENV/015	All identified ecological features	<p>The layouts of the relevant works components of the Scheme have been designed to make use of habitats of lower ecological value where possible. Habitat losses will largely be restricted to areas of arable, amenity grassland, poor semi-improved neutral grassland and improved grassland. The removal of higher value habitats such as trees, sections of hedgerow and scrub has been minimised where possible through design.</p> <p>Protection of retained trees and hedgerows will be implemented to prevent accidental damage, through suitable tree protection in accordance with British Standard 5837:2012, as detailed within the LEMP. Protection of trees and hedgerows within associated temporary land use will be implemented through CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015).</p>
				<p>Baseline data and the impact appraisal will be updated if conditions change or if ecological features not previously identified and assessed are discovered once works commence.</p>
		Legislative requirement	INNPS	<p>Implementation of biosecurity mitigation measures to prevent the spread of INNPS. As described in Section 4.4 of the CoCP Part A [NR17] these will be outlined in a LEMP for the relevant</p>

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
		Part A of CoCP [NR17] LEMP (as part of Planning Conditions [NR12]) NR/L2/ENV/015		works components of the Scheme that require planning permission. Removal of any invasive or injurious species will comply with the relevant Network Rail guidance notes, whether as part of the LEMP or in connection to general Permitted Development for associated temporary land use work areas.
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) Scheme Design NR/L2/ENV/015	Standing water and associated protected and notable fauna species	A PPICP will be prepared as part of Part B of the CoCP and will include best-practice measures for preventing pollution incidents during construction of the Scheme. Pollution control measures will be implemented in order to avoid and minimise adverse effects of pollution and runoff on the adjacent water environment. This will be further supported by measures that will be employed to mitigate and control the generation of dust during the construction activities, secured by CoCP Part B NMP to be approved by the local planning authority as required by a planning condition. Similar measures in the PPICP and NMP will also be complied with for associated temporary land use in accordance with CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015).
		Part A of CoCP [NR17] Network Rail standards	All identified ecological features	As part of the Scheme induction for staff, relevant information on the ecological features identified will be provided through toolbox talks. This will encourage staff to be considerate to wildlife that may be using habitats adjacent to the Scheme Area and to report any discoveries or incidents involving wildlife. In particular, staff will be informed of the potential to encounter wildlife during construction activities and will be requested to have due care and consideration when driving within the Scheme Area and completing construction activities.

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
				Environmental information will be displayed at site welfare compounds that will remind staff about the key environmental issues.
		Legislative Requirement Local Planning Policy Network Rail standards	Protected and notable fauna species	During Scheme Area clearance and preparation, an appropriately trained person will be present to provide a watching brief during vegetation removal and disturbance of natural and artificial refugia materials that could provide shelter habitat for breeding birds, amphibians, common reptile species, hedgehog and brown hare to reduce the risk of killing and injury. Any strimming will be undertaken using a phased approach to reduce habitat to a low level so it can be checked by the appropriately trained person for sheltering animals prior to full removal. Natural and man-made refugia items will be relocated where possible so there is no net loss of shelter habitat available.
		Legislative Requirement Local Planning Policy Network Rail standards	Amphibians, reptiles and hedgehog	Removal of vegetation and refugia materials suitable for shelter by amphibians, reptiles and hedgehog will avoid periods of frost or temperatures below 5°C as this could disturb hibernating animals, this will reduce the risk of killing and injury. Any common amphibian species, reptiles or hedgehog discovered will be moved to an area of suitable habitat outside the works area.
		Legislative Requirement	Bats	An EPSM licence will be applied for and obtained from Natural England prior to the demolition and reconstruction of the existing Ridge Road Bridge due to the presence of a single common pipistrelle summer bat roost that is used on a transient basis. It is a legal requirement to obtain a licence before commencement of any work that has potential to affect a bat roost or cause harm to bats. Further survey work will be undertaken in the survey season prior to removal (anticipated

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				<p>2024) to affirm the status of the roost at the time of the licence application and to ensure that current roost information is available for the application. An appropriate mitigation strategy will be developed such as timing of the demolition works to reduce the overall effect will be implemented. The roost identified is a transient summer roost, therefore the most appropriate time for removal would be between late-October and late-February when there is minimal risk that bats would be present and therefore harmed during the dismantling works.</p> <p>The felling or pruning of trees with suitability for bat roosts will be carried out with caution under the assumption that there is a low risk that bats may still be present. The trees will be re-checked for signs of bats in the survey season prior to felling or pruning and as a precaution, works will be undertaken under the supervision and watching brief of a suitably trained ecologist.</p> <p>Due to the historic presence of a bat roost at the existing Crawshaw Woods Bridge, a precautionary approach will be taken during the dismantling and reconstruction works. If any evidence of bats is identified, mitigation principles outlined for the Replacement Ridge Road Bridge will be implemented.</p>
		BS 5837:2012 Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Bats	A suitable buffer in accordance with British Standard 5837:2012 will be retained around any trees identified as being at risk from accidental damage. This will include trees that have been identified as providing suitability for supporting bat roosts to avoid potential disturbance effects in the event roosting bats are present, it will also ensure that potential access to roost features are not obstructed. Additional measures such as making sure that lighting does not illuminate features with bat roost suitability will also be implemented.

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		Legislative Requirement	Great Crested Newt	The Austhorpe Lane Southeast Compound encroaches to within 50 m of known great crested newt ponds within the Thorpe Park development. The Scheme Areas at Works to Raise Crawshaw Woods Bridge and the New Barrowby Lane Bridge encroach within 40 m and 120 m of ponds where great crested newt presence is unconfirmed. Works in these locations will progress using the Network Rail Great Crested Newt Organisational Licence which is granted by Natural England and delivered through NatureSpace and the Newt Conservation Partnership. Works will be carried out in accordance with reasonable avoidance measures, including undertaking works during the active period for amphibians, using capture methods prior to ground clearance and using exclusion fencing.
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Nocturnal wildlife	Temporary lighting for construction will be designed to be directional and avoid illumination of adjacent natural habitats to minimise indirect disturbance effects to nocturnal wildlife. The NMP that will be prepared as part of Part B of the CoCP will include best-practice measures for any construction lighting that is required. Similar measures to the NMP will also be complied with for associated temporary land use in accordance with CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015).
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12])	Protected and notable fauna species	A NVMP (as part of Part B of the CoCP) will be prepared that will include best-practice measures for reducing impacts from noise during the construction phase; by minimising disturbance to residents through best-practice measures, this will help to minimise disturbance to noise sensitive features such as bats and breeding birds.

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		NR/L2/ENV/015		Similar measures to the NVMP will also be complied with for associated temporary land use in accordance with CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015).
		Legislative requirement	Breeding birds	<p>Mitigation is required to meet legal requirements for breeding birds during Scheme Area construction clearance. All birds are protected while nest building and when nesting under the Wildlife and Countryside Act 1981, and it is an offence to destroy or damage an occupied bird nest. The following mitigation will be implemented:</p> <ul style="list-style-type: none"> Where possible vegetation removal will be undertaken outside the nesting season (i.e. avoiding 01 March to 31 August). Checks for ground nesting bird species would also be undertaken during Scheme Area clearance and preparation works undertaken in the bird breeding season. Network Rail guidance recommends that checks for nesting birds must be made at all times of the year when clearing vegetation due to the fact that certain species can nest all year round. A breeding bird and nest check form will be completed prior to removal of vegetation. If this is not possible then the works will be subject to supervision by appropriately trained personnel prior to removal who will check for bird nests and advise on any mitigation requirements to ensure legal compliance. <p>A stand-off area (the size of which will vary depending on the bird species concerned and level of legal protection) will be maintained around any active bird nests found, to protect against potential impacts during works until young have fledged. If this cannot be achieved, then relevant works will</p>

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				need to be delayed until nesting activity is completed (as confirmed by the ecologist).
Landscape and visual	Environmental Report Volume 1: Chapter 8, Section 8.3; Volume 3: Appendix 8	Part A of CoCP [NR17] LEMP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Trees	Protection of retained trees will be implemented to prevent accidental damage, through suitable tree protection in accordance with BS 5837:2012, as detailed within the LEMP. Protection of trees within associated temporary land use will be implemented through CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015).
		Part A of CoCP [NR17] NR/L2/ENV/015		Upon completion of the temporary use of land, it will be restored to its pre-works activity condition as far as possible in accordance with the Outline Draft Land Restoration Proposals Figures 8.6.1 to 8.6.2 included in Volume 2 of this Report [NR16].
		Part B of CoCP (as part of Planning Conditions [NR12])	All visual impact receptors	Construction directional lighting required during the construction stage will be designed to reduce unnecessary light spill outside of the Scheme boundary and designed in accordance with CoCP Part B NMP, which is to be approved by the local planning authority as required by a planning condition [NR12].
		Part A of CoCP [NR17] Construction Methodology	All visual impact receptors	The design of construction hoarding around compounds will be appropriate to the location to minimise visual impacts.
		LEMP (as part of Planning Conditions [NR12])	All visual impact receptors	Existing vegetation along the boundary of the Scheme will be retained wherever possible and managed to ensure its continued presence to aid the screening of low-level views of construction activity.

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				Mitigation planting will comprise native species, with trees lost to development replanted, on site where practicable, at a ratio of 3:1.
Arboriculture	Environmental Report Volume 1: Chapter 9, Section 9.3; Volume 3: Appendix 9	Scheme Design Part A of CoCP [NR17] LEMP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Trees	<p>Detailed design will avoid or reduce tree loss or impacts where possible.</p> <p>Tree loss will be mitigated with a scheme of new tree planting as per the LEMP. Protection of retained trees and hedgerows will be implemented to prevent accidental damage, through suitable tree protection in accordance with British Standard 5837:2012. An Arboricultural Method Statement (to BS5837:2012) (that will form part of the LEMP) will be in place and will be secured by a planning condition [NR12]. Issues that will be addressed by the method statement comprise of:</p> <ul style="list-style-type: none"> • pre commencement meeting and site briefing; • order and phasing of operations; • tree works; • tree protection fencing; • construction storage and facilities; • movement of people, plant and materials; • demolition; • enabling works; • installation of new surfacing; • installation of new structures; • installation of new services and/ or diversion of existing services; • hard landscaping; • soft Landscaping; and • removal of tree protection measures.

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				<p>Where root loss is required this will be achieved using a clean sharp tool via a hand dug trench under the supervision of an arboriculturist.</p> <p>Where service diversions are required these will generally be designed to avoid tree positions and where this is not feasible will be installed under arboricultural supervision using trenchless or hand excavation techniques to allow important roots to be retained.</p> <p>Trees will be protected with temporary tree protection fencing from the outset to create a construction exclusion zone.</p> <p>All materials, arisings, plant storage, use and access requirements will be carefully managed to avoid trees including bunded areas for refuelling, the use of banksmen where plant must operate within 5 m of any part of a retained tree.</p> <p>Areas for new tree planting will be protected from damage to soil structure with fencing or ground protection.</p> <p>Protection of trees and hedgerows within associated temporary land use will be implemented in accordance with the draft Tree Protection Plans (Figure 9.2 in Volume 2 of this Report [NR16]) and the Outline Land Restoration Proposals (Figure 8.6.1 to 8.6.6 in Volume 2 of this Report [NR16]) and through CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015).</p>
Noise and Vibration	Environmental Report Volume 1: Chapter 10, Section 10.3; Volume 3: Appendix 10	Part A of CoCP [NR17] Part B of CoCP (as part of Planning	Residential receptors	Site specific measures to mitigate the localised and temporary construction phase noise and vibration impacts and effects will be implemented during the works in order to minimise the disturbance and disruption experienced by local receptors, particularly with respect to works during the night. These will

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		<p>Conditions [NR12])</p> <p>Network Rail guidance in NR/L2/ENV/015 and NR/L2/ENV/121</p> <p>Legislative requirement</p>		<p>be comprised of Best Practicable Means incorporated into a NVMP and include, but not be limited to:</p> <ul style="list-style-type: none"> • providing accurate and reliable advance notice of forthcoming works to nearby residents to help prepare them for disturbance events and reduce the levels of stress, anger and surprise that might otherwise exacerbate the negative effects experienced. • ensuring that modern plant is used, complying with the latest European noise emission requirements and selection of inherently quiet plant where possible; • use of lower noise and vibration piling (such as vibratory, rotary bored or hydraulic jacking) rather than driven piling techniques where possible; • off-site pre-fabrication, where practical; • movement of plant within the compounds will be reduced as much as possible during the night-time period; • where noise mitigation is required for noise sensitive receptors near compounds, the boundary fence of the compound will be constructed to provide noise attenuation; • maintenance of all plant and equipment being used for the works, silenced where appropriate, and operated to prevent excessive noise and switched off when not in use; • ensuring contractors are made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2; British Standards Institute, 2014a; 2014b) by sharing relevant information in Works Package Plans, task briefings, toolbox talks and periodic site audits;

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				<ul style="list-style-type: none"> ensuring the manner in which site activities are carried out minimise noise generation, including limiting workers shouting, not using car radios, avoiding vehicle doors being slammed, loading and unloading of vehicles quietly where possible and dismantling of site equipment or moving equipment or materials around the site in a considerate way; providing advance communication with local residents to give notice of potential noisy works that are due to take place, offering use of the Network Rail helpline, monitoring of noise complaints and reporting of these to the contractor for immediate investigation, responding to enquiries within 24 hours and putting in place a real-time response during possessions by briefing the helpline and providing on-site contact details during works taking place over an extended possession. <p>This information will then be used to inform an exercise to distinguish which works components are appropriate for consent with the local authority under the provisions of Section 61 of the Control of Pollution Act 1974, and which might appropriately be managed through best practicable means in the absence of a Section 61 consent.</p>
Transport	Environmental Report Volume 1: Chapter 11, Section 11.3; Volume 3: Appendix 11	Part A of CoCP [NR17] Planning Condition [NR12] NR/L2/ENV/015	Users of the local road network	<p>A Construction Traffic Management Plan (CTMP) will be produced in close liaison with, and be approved by, the local authority as required by a planning condition [NR12]. The CTMP shall contain at minimum:</p> <ul style="list-style-type: none"> temporary and permanent road closures and diversions as identified in the draft Order; construction traffic routes including access and egress from the main trunk roads and also at site level;

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				<ul style="list-style-type: none"> imposed time restrictions on use and any routes strictly prohibited from use; controls to minimise any interference with a carriageway or footway, including control of tracking of mud and rubble by construction traffic from the Site; temporary traffic control measures as may be required; means of monitoring construction Heavy Goods Vehicle (HGV) compliance with the agreed traffic routes; site specific controls in consideration of the potential for nuisance (noise and vibration, mud and dust); mirrors placed at critical turning junctions to assist drivers, if requested by and agreed with the Local Highway Authority; and, prohibition of parking of any construction site vehicles along public roads. <p>Construction traffic will be directed to use specific routes which are appropriate for the types of vehicle to be approved by the local authority as required by the planning condition [NR12] for the CTMP.</p> <p>Mitigation measures for temporary compound access junctions such as temporary traffic lights or bellmouth widening will be included within the CTMP as required.</p> <p>Details of surfacing and widths of the footpath or bridleway between Great North Road and Lower Peckfield Lane will be approved by the local authority as required by the planning condition [NR12]</p> <p>Construction traffic management for associated temporary land use will be implemented in accordance with the CoCP Part A [NR17] and Network Rail commitments (set out within NR/L2/ENV/015).</p>

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
		Part A of CoCP [NR17] Planning Condition [NR12] NR/L2/ENV/015	Users of the local road network	A Travel Plan for project staff will be produced as required by a planning condition [NR12] to encourage a sustainable arrangement for travel to and around the relevant works components of the Scheme that require planning permission.
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Residents Users of the local road network	A NMP and NVMP (both Part B of CoCP) will include measures such as wheel wash facilities, sheeting to cover HGV loads, usage of a road sweeper, and directional reversing alarms.
		Part A of CoCP [NR17]	Pedestrians	A temporary diversion will be provided for the Public Right of Way at Crawshaw Woods bridge. Temporary provision will be made for pedestrians during temporary road closures at Austhorpe Lane and Ridge Road.
Geoenvironment	Environmental Report Volume 1: Chapter 12, Section 12.3; Volume 3: Appendix 12	Scheme Design	All	Supplementary ground investigations will be undertaken at detailed design stage to confirm ground conditions and any potential for contamination to further assess the levels of contamination and geotechnical constraints across the Scheme Area, and identify any further mitigation measures required.
		Part A of CoCP [NR17] Part B of CoCP (as part of	Construction workers	Site-specific risk assessments will be undertaken prior to all construction works to define health and safety measures, including the use of personal protective equipment. The potential risk associated with ground gas generation

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
		Planning Conditions [NR12]) NR/L2/ENV/015		associated with Made Ground and probable shallow coal mine workings will be mitigated through compliance with confined space legislation. Before construction works start, a health and safety risk assessment will be carried out in accordance with current health and safety regulations. Any confined spaces will be assessed prior to entry.
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Offsite human health	To avoid the risk to offsite receptors from direct contact, ingestion or inhalation of potential contaminants in Made Ground, natural soils, groundwater and leachate, dust generation will be kept to a minimum in compliance with the CoCP Part B PPICP, NMP and in accordance with general best practice.
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Surface water	There is potential for contaminants to be mobilised to surface water. The CoCP Part B PPICP will include measures to avoid risk to surface waters from potential contamination.
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning	Groundwater; Principal Aquifer and Secondary A Aquifers	There is the potential for future construction involving piling to create preferential pathways for migration of impacted groundwater into the Secondary A Aquifers. The potential risks associated with piling would be considered within a piling risk assessment as part of the CoCP Part B PPICP, with the appropriate mitigation implemented.

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
		Conditions [NR12]) NR/L2/ENV/015 Legislative requirements		There may be potential for shallow groundwater to be encountered beneath the Scheme Area which may need to be controlled during excavation. If dewatering activities are required and these exceed 20m ³ per day, Network Rail will apply for a water abstraction licence.
		Scheme Design	Development infrastructure/ Foundation design	<p>The presence of probable unrecorded coal mine workings beneath the Scheme Area may result in potential chemically aggressive ground conditions within natural strata and groundwater and be a source of ground gas. Potential risks will be mitigated by using concrete and service pipes appropriate for any chemically aggressive ground conditions identified at the Scheme Area.</p> <p>The gas potential for the Scheme Area will be assessed using ground gas monitoring and appropriate gas protection measures implemented into the design where necessary.</p> <p>Areas of Made Ground are anticipated to be present in the local area. If piled foundations are required and contamination is identified, a piling risk assessment will be carried out during the detailed design stage and documented as part of the CoCP Part B PPICP.</p> <p>There is also the potential for buried structures/ infrastructure to be encountered due to mine workings beneath the Scheme Area. The presence of mine workings will be considered in the foundation and earthworks design.</p> <p>Footings will be taken deeper than the minimum depth specified, where structures are located within influencing distance of any existing or future trees to avoid impacting on tree roots.</p>

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
				Temporary buildings will be portable structures with a void between the ground and the floor of the structure to avoid risk from ground gas.
		Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015		Soil and/ or rock materials arising from construction will be sampled, tested and assessed with the aim of re-use either at the originating site or at a receiving site in accordance with the CL:AIRE Definition of Waste Development Industry Code of Practice. Re-use criteria will be devised by means of risk assessment specific to the receiving site detailed within CoCP Part B waste management and materials plan. Any materials that do not meet the suitable for re-use criteria and that require disposal off-site will be sampled, tested, assessed and characterised in line with BS EN 14899:2005. If unexpected contamination is identified and any remediation strategies are required, Leeds City Council will be consulted to agree a remedial strategy and a copy of the remediation strategy and verification reports will be provided to Leeds City Council.
Flood Risk and Drainage	Environmental Report Volume 1: Chapter 13, Section 13.3; Volume 3: Appendix 13	Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Surface water	The PPICP will include a construction surface water management plan to manage surface water during construction. Construction materials will not be stored in areas of the compound that are deemed to be at a high risk of flooding from surface waters and permeable materials will be used to ensure that water can still infiltrate into the soil.
		Part B of CoCP (as part of Planning	Groundwater	Where below-ground works are included within the design, these will be designed to be capable of withstanding

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
		Conditions [NR12]) NR/L2/ENV/015		hydrostatic pressure and groundwater ingress to avoid vulnerability to groundwater flooding.
Agriculture and Soils	Environmental Report Volume 1: Chapter 14, Section 14.3; Volume 3: Appendix 14	Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12])	Soil quality	Materials management will be implemented during construction as part of the waste management plan and will include good practice measures for storage, handling and reinstatement of soils to avoid compaction and biodegradation of soils, and maintain their quality. The waste management and materials plan will include specifications of the appropriate moisture content and consistency of soils to be moved into and out of stockpiles, the design of stockpiles, and methods to replace and re-use soils within the Scheme design. Soils reused on-site would be able to continue such functions as carbon and water storage, and support of habitats and landscape planting.
		Part B of CoCP (as part of Planning Conditions [NR12]) NR/L2/ENV/015	Soil quality	The CoCP Part B NMP will include measures to control dust from the construction works.
Sustainability and Climate Change	Environmental Report Volume 1: Chapter 15, Section 15.3; Volume 3: Appendix 15	Part A of CoCP [NR17] Part B of CoCP (as part of Planning Conditions [NR12])	Resource efficiency	The energy requirements of the Leeds City Council SPD emphasise measures should be taken to limit GHG emissions from energy use. The relevant works components of the Scheme will achieve this by: <ul style="list-style-type: none"> • trialling and adopting new plant and machinery where practicable (including hybrid/ electric vehicle (EV) plant and machinery, including at temporary compounds. In addition, CoCP Part A [NR17] Section 7.5 describes

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
		NR/L2/ENV/01		<p>plant and machinery maintenance to manage oil and diesel storage (a potential source of pollution);</p> <ul style="list-style-type: none"> • implementing solar CCTV, collar lighting, and solar/hybrid generators where practicable; • applying CEEQUAL - the TRU programme Sustainability Certification Plan sets out the plan of delivering the desired outcome of an 'Excellent' rating using CEEQUAL v6; and • following the TRU Carbon Reduction Strategy, which is required to meet wider Network Rail and energy reduction requirements, including connecting compounds to the national grid, where possible, using green tariffs for electricity supply.
				<p>A waste management and materials plan will be produced as part of the CoCP Part B. The procurement of materials will be considered as part of the plan and it will include strategies to reduce the amounts of material required and the likely waste to be generated.</p>
				<p>Resource efficiency measures will be delivered through compliance with Network Rail commitments (set out within NR/L2/ENV/015 which specifies:</p> <ul style="list-style-type: none"> • responsible sourcing of materials such as timber; • adopting industry best practice targets for the proportion of responsibly sourced concrete and/ or aggregates in a project for any works using more than 50 tonnes of aggregate-based materials; and • appraising the range of products and materials proposed for use, identifying those with harmful constituents, and subsequently selecting low environmental impact products.

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Mitigation measures
	Environmental Report Volume 1; Volume 3		All	Other sustainability mitigation measures relating to water, waste, pollution, ecology and climate change resilience are addressed within the relevant environmental topic above.

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Proposed mitigation measures
Cultural Heritage and Archaeology	The mitigation proposed during construction is applicable for effects identified during the operational phase and is not duplicated here. (Impacts start during construction and continue during operation).			
Ecology	Environmental Report Volume 1: Chapter 7; Volume 3: Appendix 7	Scheme Design	Badger, Bats and Breeding Birds	Behaviour changes on foraging and commuting animals due to fragmentation of habitats and increased disturbance from road users has been minimised by the location and design of the Scheme.
Landscape and Visual	Environmental Report Volume 1: Chapter 8; Volume 3: Appendix 8	Scheme Design	All visual impact receptors	Colour and design of bridge structures will be sympathetic to the local context to minimise visual impact.
		LEMP (as part of Planning Conditions [NR12])	All visual impact receptors	The proposed LEMP will be implemented at the earliest opportunity and maintained for a period of time to ensure the successful establishment of planting to aid in the reduction of long-term impacts on landscape character and visual amenity. Land restoration for temporary land used under permitted development rights will be undertaken at the earliest opportunity.
Arboriculture	The mitigation proposed during construction is applicable for effects identified during the operational phase and is not duplicated here. (Impacts start during construction and continue during operation).			
Noise and Vibration	Environmental Report Volume 1: Chapter 10; Volume 3: Appendix 10	Scheme Design	Residential receptors	The Micklefield TSC will incorporate a steel housing around the TSC, designed in accordance with Network Rail standard NR/SP/ELP/21030, to minimise noise during operation. If further noise mitigation is required for the TSC, a solid barrier or wall of surface density of between 10 to 15 kg/m ² can reasonably be expected to provide up to 10 dB of sound reduction at noise sensitive receptors if constructed around the sound source.

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Proposed mitigation measures
				To comply with the Leeds City Council Planning Consultation Guidance, the emergency plant that is required when there is a power outage of more than 8 – 12 hours will have a maximum sound power level of 81 dB LWA and should be located on the furthest side of the TSC, facing away from noise sensitive receptors.
Transport	The operation of the relevant works components of the Scheme is not predicted to have a significant effect on traffic and transport and therefore mitigation measures are not proposed.			
Geoenvironment	Environmental Report Volume 1: Chapter 12; Volume 3: Appendix 12	Scheme design	Future site users and maintenance workers	Most future site users and maintenance workers would be transient in nature. It is anticipated that appropriate gas protection measures, where ground gas monitoring results indicate that protection is necessary, will be sufficient to mitigate the potential risk from ground gas.
Flood Risk and Drainage	Environmental Report Volume 1: Chapter 13; Volume 3: Appendix 13	Drainage Strategy	Drainage	<p>For the majority of the relevant works components of the Scheme that require planning permission, there is either no or only limited change to the impermeable area and no drainage strategy is required.</p> <p>The Drainage Strategy for Micklefield TSC will follow the drainage hierarchy for surface water discharge by confirming infiltration and discharge to local ditches/ drainage is not possible before proceeding with any attenuation and discharge to highway drainage systems with the following proposed in order of preference: formal infiltration, discharging to the ditch (and the potentially associated culvert) along Pit Lane or discharging into the drainage on Phoenix Avenue.</p> <p>The Micklefield TSC will be built with raised finished floor levels to mitigate against a risk of out of bank flows during heavy rainfall from a small land drain located in proximity to the TSC and also to provide mitigation for groundwater flood risk.</p>

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Environmental topic	Cross-reference for further detail	Mechanism by which the measures are secured	Receptor	Proposed mitigation measures
Agriculture and Soils	The mitigation proposed during construction is applicable for effects identified during the operational phase and is not duplicated here. (Impacts start during construction and continue during operation).			
Sustainability and Climate Change	The operation of the Scheme is not predicted to have a significant effect on sustainability and climate change and therefore mitigation measures are not proposed.			

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17.1.1 Below is the full list of reference documents for Volume 1 of the Environmental Report, using the Harvard style (to the best of available information). References are listed in order of alphabetical by (lead) author's surname or publishing organisation (or title for legislation only), then chronological with oldest first, and then finally by order of appearance within the Report as indicated by letter following the date.

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17.2 Volume 2

- 17.2.1 Volume 2 of the Environmental Report comprises figures to support Volume 1 of the Report and its technical chapters, particularly for visual or mapping purposes. References are expected to be minimal and are contained within the information for each figure.

17.3 Volume 3

- 17.3.1 Volume 3 of the Environmental Report comprises appendices containing supporting information for Volume 1 and its technical chapters, including but not limited to survey methodologies, supporting technical assessments, and detailed results or technical data. References are self-contained within each appendix.

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The Network Rail (Leeds to Micklefield Enhancements) Order*Environmental Report NR16: Volume 1 – Main Text**July 2023 – Final P01***18. DEFINED TERMS AND ABBREVIATIONS****18.1 Volume 1**

- 18.1.1 Below are the full lists of defined terms (Table 18.1) and abbreviations (Table 18.2) for Volume 1 of the Report. Defined terms are intended to provide clarity with regard to components of the Scheme, terms used for technical appraisals or in specific technical contexts, or terms which are specific to the rail industry. Abbreviations are written in full in each chapter in the first instance they appear, abbreviated in brackets, then abbreviated in the main text through the remainder of each chapter. Each are listed in alphabetical order as per their appearance in the text (rather than the definition).

Table 18.1: Alphabetical list of defined terms used within Volume 1 of the Environmental Report

Defined Term	Definition for Environmental Report
Austhorpe Lane Gas Main Works	Removal of existing Northern Gas Networks high-pressure gas main pipe bridge (HUL4/20B), located adjacent to Austhorpe Lane Overbridge (HUL4/21) and diversion of the gas main via a new micro-tunnel under the railway. Permanent works also include the installation of gas main inspection points either side of the railway and works in the highway to reconnect the diversion into the gas main network.
Austhorpe Lane Northwest and Southeast Compounds	Temporary construction compounds north-west and south-east of Austhorpe Lane Overbridge
Barrowby Lane Bridge Compound	The temporary use of land for construction of the ramped bridge
Chainage	Project-specific unit of measure between two defined locations along the railway line, measured in metres.
Crawshaw Woods Bridge Compound North and Crawshaw Woods Bridge Compound South	Temporary use of land for construction compounds north and south of the railway
Eastern Leg	High Speed Two (HS2) Phase 2b Eastern Leg – section of HS2 comprising route between Birmingham and Leeds and its construction.
Kirkgate to Marsh Lane Land	Installation of small-scale electrification and signalling infrastructure between Kirkgate Viaduct (HUL4/47) and Marsh Lane Viaduct (HUL4/44) at Penny Pocket Park in Leeds City centre.
Peckfield PRow Diversion	Works and land use for the closure of Peckfield Level Crossing and construction of Public Right of Way diversion (footpath or bridleway link to PRow Micklefield 8) with associated highways improvement and parking works ('The Lower Peckfield Lane Highway Works').

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Defined Term	Definition for Environmental Report
Micklefield TSC	Permanent acquisition of land off Phoenix Avenue, Micklefield and the construction of a permanent Track Sectioning Cabin (TSC) – a small structure which houses electrical equipment to support the newly electrified railway. The Micklefield TSC includes a TSC building, vehicular parking, security fencing and an access gate.
Network Rail	Network Rail Infrastructure Limited
Network Rail standard NR/L2/ENV/015	Network Rail standard for Environmental Minimum Requirements.
New Access Tracks to New Barrowby Lane Bridge	The diversion of Public Right of Way associated with the New Barrowby Lane Bridge.
New Barrowby Lane Bridge and New Access Tracks to New Barrowby Lane Bridge	Works for the closure of the Barrowby Lane and Barrowby Foot Level Crossings and construction of a ramped bridleway bridge at Barrowby Lane, including the permanent acquisition of land required for the new bridge, Public Right of Way diversion (Austhorpe 9)
Lower Peckfield Lane Highway Works	Highways improvement and parking works associated with the Peckfield Level Crossing Closure PRoW Diversion.
Project E2 to E4	Subsection of Transpennine Route Upgrade works, comprising works between Leeds Station (exclusive of the station) and Church Fenton Station (inclusive of the station).
Promotor	Body overseeing and funding development of the Scheme.
Relevant works components of the Scheme	The components of the Scheme for which deemed planning permission is being sought as part of the TWAO application and the associated temporary construction compounds and accesses required to deliver those components.
Replacement Austhorpe Lane Bridge	Demolition of the Grade II listed public highway Austhorpe Lane Overbridge (HUL4/21) and Austhorpe Lane Footbridge (HUL4/21A) and the construction of a new dual-purpose overbridge (the 'Replacement Austhorpe Lane Bridge') incorporating a two-lane carriageway highway (5.5 m) and 2 m footway on the western side.
Replacement Ridge Road Bridge	Demolition and reconstruction of the Grade II Listed Ridge Road Overbridge (HUL4/14), incorporating a two-lane carriageway highway (6 metres), one 1.45 metre footway and one 2 metre footway.
Report/ Environmental Report	Environmental Report [NR16] – appraisal of environmental impacts and effects of material consideration, presented topic-by-topic, following receipt of the Screening Decision of the Department for Transport's Transport Infrastructure Planning Unit.
Ridge Road Gas Main Diversion	Removal of existing Northern Gas Networks high-pressure Gas Main Pipe Bridge (HUL 4/15) adjacent to Ridge Road Overbridge (HUL4/14) and diversion of the gas main via a new micro-tunnel under the railway.
Ridge Road Northeast Compound and	Temporary use of land for a construction compound

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Defined Term	Definition for Environmental Report
Ridge Road South Compound	
Screening Decision	The Department for Transport's Transport Infrastructure Planning Unit (TIPU) decision that an Environmental Impact Assessment (EIA) is not required for the Scheme
Screening Opinion Request Letter	Request for a Screening Opinion from Department for Transport's Transport Infrastructure Planning Unit (TIPU), including a summary of potential environmental impacts that might arise from a proposed development (the Scheme) and associated mitigation, with a summary of expected residual effects. Included an invitation to determine whether the proposed development was EIA development.
Scheme	The works and land included in the Leeds to Micklefield Enhancements Order.
Scheme Area	Footprint of the relevant works components of the Scheme including all temporary and permanent land-take.
Scheme boundary	Perimeter of the Scheme Area, including all temporary and permanent land-acquisition and use for the relevant works components of the Scheme.
Transpennine Route Upgrade	Major investment project made to the railway between York and Manchester via Leeds and Huddersfield. It aims to deliver faster and more frequent rail services, increase passenger capacity and improve connectivity between these locations and, by doing so, with the wider rail network.
TWAO Rules	The Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006
Works to Raise Crawshaw Woods Bridge	Works to partially dismantle and reinstate the Grade II Listed Crawshaw Woods Overbridge (HUL4/20) in an elevated position to allow sufficient headroom for the installation of OLE, including the permanent acquisition of land required for embankment works.

Table 18.2: Alphabetical list of abbreviations used within Volume 1 of the Environmental Report

Abbreviation	Definition for Environmental Report
AADT	Average Annual Daily Traffic
ALC	Agricultural Land Classification
AM	Ante Meridian (midnight to 12-noon)
AOD	Above Ordnance Datum ('sea level')
ATC	Automated Traffic Counts
BAP	Biodiversity Action Plan
BEIS	Business, Energy and Industrial Strategy
BGS	British Geological Society/Survey
BoCC	Birds of Conservation Concern
BMV	Best and Most Versatile

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Abbreviation	Definition for Environmental Report
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
BS	British Standards
CCC	Climate Change Committee
CFA	Continuous Flight Auger (rotary)
Ch	Chainage
CHIA	Cultural Heritage Impact Assessment
CIEEM	Chartered Institute for Ecology and Environmental Management
CIEH	Chartered Institute of Environmental Health
CIfA	Chartered Institute for Archaeologists
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CoPA	Control of Pollution Act (1974)
CoCP	Code of Construction Practice
CO ₂	Carbon Dioxide
CroW	Countryside and Rights of Way (Act 2000)
CTMP	Construction Traffic Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DTM	Digital Terrain Model
EC	European Commission (singular) / European Community (within Directives)
EcIA	Ecological Impact Assessment
eDNA	Environmental DNA
e.g.	exempli gratia (for example)
EIA	Environmental Impact Assessment
EM	Embedded Mitigation
EPSM	European Protected Species Mitigation
ER	Environmental Report
ES	Environmental Statement
EU	European Union
FRA	Flood Risk Assessment
GCN	Great crested newt(s)
GHG	Greenhouse Gas
GPA	Good Practice Advice

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Abbreviation	Definition for Environmental Report
GWDTE	Groundwater Dependant Territorial Ecosystems
ha	Hectare
HER	Historic Environment Record
HGV	Heavy goods vehicle
HLC	Historic Landscape Character
HS2	High Speed Two
HSI	Habitat Suitability Index
HUL	
ID	Identification
IDB	Internal Drainage Board
IEA	Institute of Environmental Assessment
IEMA	Institute for Environmental Management and Assessment
INNS	Invasive Non-Native Species
km	Kilometre
LBAP	Local Biodiversity Action Plan
LBC	Listed Building Consent
LCA	Landscape Character Area
LCC	Leeds City Council
LCRM	Land Contamination Risk Management
LCT	Landscape Character Type
LDF	Local Development Frameworks
LED	Light-Emitting Diode
LEMP	Landscape and Ecological Mitigation Plan
LFRMS	Leeds Flood Risk Management Strategy
LHA	Local Highway Authority
LI	Landscape Institute
LiDAR	Light Detection and Ranging
LILA	Locally Important Landscape Area
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LOWW	Lower Ouse and Wharfe Washlands
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
m	Metre

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Abbreviation	Definition for Environmental Report
mm	Millimetre
m ²	Metre squared
m ³	Metre cubed
MAGIC	Multi-Agency Geographic Information for the Countryside
MAFF	Ministry of Agriculture, Fisheries and Food
MCC	Manual Classified Count
MMP	Materials Management Plan
NCA	National Character Area
NERC	Natural Environment and Rural Communities (Act 2006)
NGR	National Grid Reference
NHBC	National House-Building Council
NHLE	National Heritage List for England
NIA	Noise Important Area
NJUG	National Joint Utilities Group
NPPF	National Planning Policy Framework
NPSE	Noise Policy Statement for England
NPS(NN)	National Policy Statement for National Networks
NSIP	Nationally Significant Infrastructure Project
NVMP	Noise and Vibration Management Plan
OLE	Overhead line equipment (for electrification)
OS	Ordnance Survey
PIC	Personal Injury Collision
PINS	Planning Inspectorate
PLU	Primary Landscape Unit
PM	Post Meridian (12-noon to midnight)
PPG	Planning Practice Guidance
PPICP	Pollution Prevention and Incident Control Plan
ProW	Public Right of Way
RBMP	River Basin Management Plan
R&D	Research and Development
RoFfSW	Risk of Flooding from Surface Water
RPA	Root Protection Area
RSSB	Rail Safety and Standards Board
SDR	Speed Detection Radar
SE	South East

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Abbreviation	Definition for Environmental Report
SFRA	Strategic Flood Risk Assessment
SI	Système Internationale
SINC	Site(s) of Importance for Nature Conservation
SM	Specific Mitigation
SoS	Secretary of State
sp	Species (multiple within a single genus)
SPD	Supplementary Planning Document
SPZ	Source Protection Zone
SRMP	Soil Resource Management Plan
SRN	Strategic Road Network
SSSI	Site(s) of Special Scientific Interest
SuDS	Sustainable Drainage System(s)
TAG	Transport Analysis Group
TCPA	Town and Country Planning Act 1990
TGN	Technical Guidance Note
TIPU	Transport Infrastructure Planning Unit
TN	Target Note
TPO	Tree Preservation Order
TRU	Transpennine Route Upgrade
TRUe	TRU East Alliance (former abbreviation)
TSC	Track Sectioning Cabin
TWAO	Transport and Works Act (1992) Order
UK	United Kingdom (of Great Britain and Northern Ireland)
WC	Wetness Class
WFD	Water Framework Directive
WMP	Waste Management Plan
WYCA	West Yorkshire Combined Authority
WYHER	West Yorkshire Historic Environment Record
ZTV	Zone of Theoretical Visibility

18.2 Volume 2

18.2.1 Volume 2 of the Report [NR16] comprises figures to support Volume 1 of the Report [NR16] and its technical chapters, particularly for visual or mapping purposes. Use of defined terms and abbreviations are expected to be minimal and are contained within the information for each figure.

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18.3 Volume 3

- 18.3.1 Volume 3 of the Report [**NR16**] comprises appendices containing supporting information for Volume 1 and its technical chapters, including but not limited to survey methodologies, supporting technical assessments, and detailed results or technical data. The use of defined terms (other than for Scheme elements) and abbreviations are self-contained within each appendix.