

Trans-Pennine Upgrade

Preliminary Environmental Information Report

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Infrastructure Planning

Trans-Pennine Upgrade

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

Author:	Various
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ABBREVIATIONS

Abbreviation	Meaning
AD	Anno Domini is Medieval Latin for 'in the year of the Lord', AD is referred to the time after the death of Christ
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
BC	Before Christ refers to the time before the birth of Christ
BGS	The British Geological Survey
CD&E	Construction, Demolition and Excavation
CEMP	Construction Environmental Management Plan
DBA	Desk Based Assessment
DCC	Derbyshire County Council
DCO	Development Consent Order
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DPWF	Dark Peak Western Fringe
EA	Environment Agency
EGL	Existing Ground Level
EIA	Environmental Impact Assessment
ELZ	Environmental Lighting Zone
ES	Environmental Statement
FRA	Flood Risk Assessment
GHG	Greenhouse Gas Emissions
GMSF	Greater Manchester Spatial Framework
GPA	Good Practice Advice
HAWRAT	Highways Agency Water Risk Assessment Tool
HER	Historic Environment Record
HPBC	High Peak Borough Council
HRA	Hydrogeological Risk Assessment
IRZs	Impact Risk Zones
LB	Listed Building
LCA	Landscape Character Area
LCT	Landscape Character Types
LNR	Local Nature Reserves
LPA	Local Planning Authority
LWS	Local Wildlife Sites
MMP	Materials Management Plan
MPA	Marine Protected Area
NCA	National Character Area
NMP	National Mapping Programme
NMU	Non-Motorised User
NN NPS	National Networks National Policy Statement
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
PDNPA	Peak District National Park Authority
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate

Abbreviation	Meaning
PRoW	Public Rights of Way
PSSR	Preliminary Sources Study Report
RIGS	Regionally Important Geology Sites
RIS	Road Investment Strategy
SAC	Special Areas of Conservation
SBI	Sites of Biological Importance
SCI	Sites of Community Importance
SM	Scheduled Monument
SoCC	Statement of Community Consultation
SoS	Secretary of State
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
TCA	Townscape Character Area
TMBC	Tameside Metropolitan Borough Council
UXO	Unexploded Ordnance
VOC	Volatility of Organic Compounds
WFD	Water Framework Directive
ZTV	Zone of Theoretical Visibility

1 INTRODUCTION

1.1 Background to the Scheme and this Report

- 1.1.1 The main Trans-Pennine route between the Manchester and Sheffield City Regions is the trunk road route consisting of the A57, A628, and A61. It connects the M67 at Mottram in the south east of the Manchester City Region with the M1 in the north west of the Sheffield City Region. Current journey times and reliability of the connecting routes compare unfavourably with links between other cities a similar distance apart.
- 1.1.2 The purpose of the Trans-Pennine Upgrade is to address longstanding issues of connectivity, congestion, reliability and safety of strategic Trans-Pennine routes between the M67 at Mottram and the M1 J36 and J35A north of Sheffield.
- 1.1.3 In accordance with paragraph 22 of the [Highway and Railway \(Nationally Significant Infrastructure Project\) Order 2013](#), the two Nationally Significant Infrastructure Project (NSIP) schemes identified within the Trans-Pennine Upgrade are:
- Mottram Moor Link Road Scheme; and
 - A57(T) to A57 Link Road Scheme.
- 1.1.4 This is because both schemes are ‘construction of a highway wholly in England’ (paragraph 22 (1) (a) and (2) (a)), ‘the Secretary of State will be the highway authority for the highway’ (paragraph 22 (2) (b)) and ‘the area of development of each scheme (the land on which the highway is to be constructed and any adjoining land expected to be used in connection with its construction) is greater than 7.5ha’ (paragraph 22 (2) (c) and (4) (c)). Therefore, an application for Development Consent Order (DCO) is required to be submitted by Highways England to the Secretary of State (SoS) for transport via the Planning Inspectorate (PINS). This application will be accompanied by an Environmental Statement (ES) prepared in accordance with the [Infrastructure Planning \(Environmental Impact Assessment\) Regulations 2017 \(SI No. 572\)](#) (hereafter referred to as the ‘EIA Regulations’).
- 1.1.5 As set out in Paragraph 1.1.4 of the [Environmental Impact Assessment Scoping Report](#), Mottram Moor Link Road and the A57(T) to A57 Link Road will be combined and assessed as one scheme (hereafter termed ‘the Scheme’) in recognition that neither scheme can happen without the other, they are inextricably linked, and they have been combined for assessment purposes during the options development stage. Furthermore, it is considered that this approach accords with paragraph 9 of the [Guidance on associated development applications for major infrastructure projects](#) (Department for Communities and Local Government (DCLG), April 2013), which states “*a single application can cover more than one project requiring development consent under the Planning Act. Applicants are encouraged, as far as is possible, to make a single application where developments are clearly linked*”.
- 1.1.6 This Preliminary Environmental Information Report (PEIR) has been prepared at an early stage in the pre-application process and provides a description of the Scheme, outlines the alternatives to the Scheme and presents a preliminary review of the likely environmental effects of the Scheme and how they could be mitigated.

Consultees and the local community can then respond to the information in this report and make representations. Representations received can then be taken into consideration in progressing the Scheme design and preparing the ES that will accompany the DCO application. Further details on the Environmental Impact Assessment (EIA) process are provided in Chapter 4 of this PEIR.

1.2 The Consenting Process

1.2.1 The legal structure within which the DCO application will be determined is governed by the [Planning Act 2008](#). The [Planning Act 2008](#) required the preparation of new policy to inform decisions made on NSIPs in England and sets out the principles that should be applied in the assessment of DCO applications.

1.2.2 In December 2014, the [National Road and Rail Networks: National Policy Statement for National Networks \(NN NPS\)](#) was published. The [NN NPS](#) sets out Government policy for the development of NSIPs on the national road and rail networks in England. It provides national planning guidance. The SoS will use this [NN NPS](#) as the primary basis for making decisions on DCO applications for national networks NSIPs in England.

1.3 Purpose of this Report

1.3.1 Under the [Planning Act 2008](#), there are two separate formal stages of pre-application consultation:

- Section 42 with prescribed consultees (e.g. Natural England, Environment Agency, Historic England), local authorities, landowners and others with interests in land
- Section 47 consultation with the local community in accordance with the Statement of Community Consultation (SoCC)

1.3.2 For the purposes of this Scheme, both consultation stages will run in parallel.

1.3.3 The PEIR will be submitted to the prescribed consultees, local authorities, and landowners and made available to members of the public and the wider community.

1.3.4 Consultees are encouraged to respond to the information contained in this PEIR and other reports (see Section 1.5). The responses received will be taken into account in preparing the finalised design of the Scheme.

1.3.5 The final ES will be published as part of the application to PINS for an order granting Development Consent for the Scheme.

1.4 Structure of this PEIR

1.4.1 The structure of this PEIR is as follows:

- Non-Technical Summary
- The Scheme
- Assessment of Alternatives
- Environmental Assessment Methodology

- For each Specialist topic: Existing environmental conditions, Other baseline information to be obtained/surveys to be undertaken, Potential Effects and Mitigation Measures
- Assessment of Cumulative Effects
- Reference and Glossary
- Figures

1.4.2 The specialist topics covered comprise:

- Air Quality
- Cultural Heritage
- Biodiversity
- Landscape and Townscape
- People and Communities
- Noise and Vibration
- Road Drainage and the Water Environment
- Geology and Soils
- Materials
- Climate

1.5 Responding to Consultation

1.5.1 Comments made at all stages of the consultation process will be recorded and carefully considered by the project team. Should other potentially viable options be raised during consultation, their relative merits will be considered and reported on. How feedback has been taken into account will be explained by direct communications, local meetings, media and project updates.

1.5.2 Ultimately, how comments received have shaped and influenced the Scheme will be reported to PINS in a Consultation Report prepared by Highways England which will accompany the DCO application as required by Section 37(3) (c) of the [Planning Act 2008](#).

1.6 Pre-Application Consultation Programme

1.6.1 Pre-application consultation is an important requirement for DCO applications. It allows for potential issues to be raised, taken into account and, where possible, addressed before the DCO application is submitted for examination. During the consultation, Highways England will seek comment on:

- The Scheme (including its alignment)
- Information on the possible environmental effects of the Scheme, as understood at the time and detailed in this PEIR

1.6.2 The consultation will run from 12 February 2018 to 25 March 2018.

2 THE SCHEME

2.1 Background to the Scheme

2.1.1 The Trans-Pennine Upgrade is made up of measures announced in March 2015's [Road Investment Strategy](#) (RIS), published by the Department for Transport (DfT). These measures comprised the following schemes:

- Mottram Moor Link Road - a new dual-carriageway link road from the M67 terminal roundabout to a new junction at A57(T) Mottram Moor;
- A57(T) to A57 Link Road – a new single carriageway link from the A57 at Mottram Moor to a new junction on the A57 at Brookfield, bypassing the existing A628/A57 and A57 Woolley Lane/Woolley Bridge Road junctions;
- A628 Climbing Lanes – consideration of the provision of two overtaking lanes on the A628 near Woodhead Bridge;
- Safety and Technology Improvements – safety measures focused on addressing accident hotspots and the provision of electronic signs; and
- Upgrade of the A61 at Tankersley to dual carriageway (referred to as 'A61 Dualling').

2.1.2 However, since the RIS was published, the development of 'A628 Climbing Lanes' and 'A61 Dualling' schemes have been postponed until a later date to allow further consideration of the benefits associated with them.

2.1.3 Outside of the RIS, Highways England has previously considered a scheme to improve the junction of the A616 and A61 known as the 'Westwood Roundabout' to reduce congestion and improve the flow of traffic through the roundabout. Although not specifically stated in the RIS, this scheme is now being progressed as part of the Trans-Pennine Upgrade.

2.1.4 Further to public consultation on the schemes outlined above that constitute the Trans-Pennine Upgrade, a 'Preferred Route Announcement' was made on 2 November 2017. The 'Preferred Route' comprises:

- Mottram Moor Link Road and A57(T) to A57 Link Road (Option A);
- Safety and Technology Improvements; and
- Westwood Roundabout.

2.1.5 As stated in Chapter 1 above, and also in the [Environmental Impact Assessment Scoping Report](#), the Mottram Moor Link Road and the A57(T) to A57 Link Road are considered to be NSIPs in their own right, in accordance with paragraph 22 of the [Highway and Railway \(Nationally Significant Infrastructure Project\) Order 2013](#).

2.1.6 The other 'Preferred Route' schemes (Safety and Technology Improvements and Westwood Roundabout) are not considered to be NSIPs. Furthermore, following a review of the advice provided in [Guidance on associated development applications for major infrastructure projects](#) (DCLG, April 2013), neither are they considered to be associated development.

2.1.7 Therefore, the Safety and Technology Improvements and Westwood Roundabout schemes will not be referenced in the remainder of this PEIR.

2.2 Scheme Objectives

2.2.1 The Scheme objectives are listed below:

- **Connectivity** – By reducing congestion and improving the reliability of people’s journeys between the Manchester and Sheffield city regions.
- **Environmental** – By improving air quality and reducing noise levels in certain areas, through reduced congestion and removal of traffic from residential areas. The scheme is also being designed to avoid unacceptable impacts on the natural environment and landscape in the Peak District National Park.
- **Societal** – By re-connecting local communities along the Trans-Pennine route.
- **Capacity** – By reducing delays and queues that occur during busy periods and improving the performance of junctions on the route.
- **Reliability** – By reducing the number of incidents and by the use of technology to advise drivers of incidents along the route.
- **Safety** – By reducing the number of accidents along the route through targeted improvement measures.

2.3 Overview

2.3.1 The red line boundary for the Scheme can be seen on Figure 2.1 at Appendix B. The red line boundary, and permanent and temporary land take, for the Scheme is shown on Figure 2.3 at Appendix B. A Scheme Overview drawing is shown on Figure 2.2 at Appendix B. The Scheme includes the following components:

- A new offline bypass of 1.12 miles (1.8km) of dual carriageway road connecting the junction of the M67, A57(T) and A560 to the A57(T) Mottram Moor
- A new offline bypass of 0.81 mile (1.3km) of single carriageway connecting the A57(T) Mottram Moor to the A57 Woolley Bridge
- Creation of four new junctions (Roe Cross Road Junction on Roe Cross Road, Cricket Ground Junction on the new bypass, Mottram Moor Junction on Mottram Moor, and Brookfield Junction on A57 Woolley Bridge) and improvement works to the existing M67 terminal roundabout
- Creation of four new structures (Old Hall Farm underpass, Mottram Underpass, Carr House Farm underpass, and River Etherow Bridge).
- One main temporary construction compound area located close to the M67/A57(T)/A560 Junction, with three other locations along the route for storage.

2.3.2 Associated works for temporary access, temporary lay-down, work areas and ancillary works will also be required.

2.4 Scheme Alignment

2.4.1 The Scheme commences with a new connection to the existing roundabout at the western end of the M67 at its junction with the A57(T) and the A560, known as M67 Junction 4.

- 2.4.2 From the M67 Junction 4 roundabout an all-purpose dual carriageway will run to the north east across existing farmland toward Mottram Moor.
- 2.4.3 A new junction in the form of a roundabout, Cricket Ground Junction, will be created to the west of Roe Cross Road. From this junction there will be a single carriageway road forming a connection with a new junction on Roe Cross Road. The new Roe Cross Road Junction will take the form of a signalised 'T' junction connecting the new bypass to Roe Cross Road.
- 2.4.4 From Cricket Ground Roundabout, the Scheme will enter the proposed Mottram Underpass. Mottram Underpass is proposed to be a dual bore underpass constructed using the cut and cover method to carry the new road beneath Roe Cross Road, Old Road and the community of Mottram.
- 2.4.5 After exiting the Mottram Underpass, the Scheme will be in cutting of approximately 12m deep known as Mottram Cutting, and will turn southwards as it continues towards a new junction, Mottram Moor junction, immediately south of the existing Mottram Moor. Mottram Moor Junction will take the form of a roundabout connecting Mottram Moor with the new Mottram Moor Link Road.
- 2.4.6 The separated sections of Mottram Moor would be connected with the realigned Mottram Moor in the form of an uncontrolled junction to retain access to the existing properties on Mottram Moor.
- 2.4.7 The route then continues as an all-purpose single carriageway, across existing farmland heading toward the River Etherow. A new structure would be constructed to carry the Scheme over the River Etherow.
- 2.4.8 The route would then terminate to a new signal controlled 'T' junction on Woolley Bridge, known as Brookfield Junction.
- 2.4.9 The final layout of all junctions will be dependent upon the results of traffic modelling.

2.5 Earthworks Design

- 2.5.1 All junctions would be as close to grade to avoid significant construction costs and access issues. Between the junctions, the existing ground levels (EGLs) rise and fall between 4mAOD and 23mAOD. To achieve the required profile, there are various locations where the route goes into cutting or is on embankment. Tables 2-1 and 2-2 below highlight the locations of the cutting and embankment slopes.

Table 2-1: Eastbound Cutting and Embankment Slopes

Eastbound Cutting/Embankment	Chainage (location of chainage shown on Figure 2.2 at Appendix B)	Maximum Slope Height (from EGL)
SECTION 1		
False Cutting (1:2 inner face, 1:3 outer face)	0-120	2.00m inner face height, 2.70m outer face height
Embankment	120-200	0.63m
Cutting	200-290	-0.68m
Embankment	290-550	3.40m

Eastbound Cutting/Embankment	Chainage (location of chainage shown on Figure 2.2 at Appendix B)	Maximum Slope Height (from EGL)
False Cutting (1:2 inner face, 1:3 outer face)	550-610	4.00m inner face height, 6.20 outer face height
SECTION 2		
Embankment	670-760	4.70m
Cutting	760-870	-6.29m
Cutting (Steepened)	1020-1100	-10.78m
Cutting (Benched)	1100-1450	-17.37m (13.37m to bench, 4m to verge)
Cutting	1450-1510	-4.00m
Embankment	1510-1690	13.17m
SECTION 3		
False Cutting (1:2 inner face, 1:3 outer face)	1810-2250	2.50m inner face height, 9.82 outer face height
Cutting	2250-2360	-1.59m
Embankment	2360-2920	3.51m
Embankment	2985-3070	3.05m

Table 2-2: Westbound Cutting and Embankment Slopes

Westbound Cutting/Embankment	Chainage (location of chainage shown on Figure 2.2 at Appendix B)	Maximum Slope Height (from EGL)
SECTION 1		
False Cutting (1:2 inner face, 1:3 outer face)	0-60	2.00m inner face height, 6.20m outer face height
Embankment	60-550	7.78m
False Cutting (1:2 inner face, 1:3 outer face)	550-640	3.50m inner face height, 10.53m outer face height
SECTION 2		
False Cutting (1:2 inner face, 1:3 outer face)	640-750	3.50m inner face height, 10.53m outer face height
Cutting	750-800	-2.20m
Cutting (steepened)	800-890	-7.37m

Westbound Cutting/Embankment	Chainage (location of chainage shown on Figure 2.2 at Appendix B)	Maximum Slope Height (from EGL)
Cutting (steepened)	1020-1075	-8.55m
Cutting (Benched)	1075-1450	-13.82m (7.82m to bench, 4m to verge)
Cutting	1450-1530	-4.00m
Embankment	1530-1690	8.57m
SECTION 3		
False Cutting (1:2 inner face, 1:3 outer face)	1830-2170	4.00m inner face height, 7.10m outer face height
Embankment	2170-2250	3.14m
False Cutting (1:2 inner face, 1:3 outer face)	2250-2700	2.50m inner face height, 9.12m outer face height
Embankment	2700-2920	4.25m
Embankment	2985-3070	4.82m

2.6 Highways Structures

2.6.1 Table 2-3 presents a list of the proposed structures along the Scheme.

Table 2-3: List of Structures

Name of Structure	Details of Proposed Works
Old Mill Farm Underpass	New 30m length precast concrete farm access/public right of way (PRoW) underpass (5.5m wide x 4.5m high in cross section) beneath main carriageway at chainage 514.622
Mottram Underpass	New 140m long, two-cell reinforced concrete underpass carrying the carriageway mainline beneath Roe Cross Road, Old Road and the community of Mottram. The top of the underpass would be 2m below ground level.
Carr House Lane Underpass	New 38m length precast concrete access road/PRoW underpass (6.0m wide x 5.5m high in cross section) beneath main carriageway at chainage 2173.544
River Etherow Bridge	Construction of new 75.5m long, three span (35.5m, 20.0m, 20.0m) river bridge formed from precast prestressed concrete beams between chainage 2912.500 and 2988.000

Name of Structure	Details of Proposed Works
Drainage Culvert Chainage 0030	New 2m x 1.5m precast concrete box culvert
Drainage Culvert Chainage 0150	New 1200ø precast concrete pipe culvert
Drainage Culvert Old Mill Farm	New 1200ø precast concrete pipe culvert
Drainage Culvert Chainage 0700	New 1200ø precast concrete pipe culvert
Drainage Culvert Chainage 1650	New 3m x 2m precast concrete box culvert
Drainage Culvert Chainage 2020	New 1500ø precast concrete pipe culvert

2.6.2 Construction details of all proposed structures will be determined through the design phase.

2.7 Highways Drainage

2.7.1 The new highway drainage will be designed to meet the requirements of Highways England, as well as stakeholders including the Environment Agency, local authorities and United Utilities where possible. It is envisaged that along the length of the Scheme, attenuation ponds will be used to reduce the flow into outfall to existing watercourses.

2.8 Highways Lighting

2.8.1 The requirement for lighting is currently being developed and the extent of any new lighting is not yet confirmed.

2.8.2 The lighting design would minimise light pollution which can cause sky glow, glare and light trespass. The design of the lighting would take into account potential landscape and ecological effects.

2.9 Improvements to Local Roads

2.9.1 We are proposing a package of measures to improve local roads that are affected by the Scheme. These are split into two categories, detrunked roads are roads that are currently maintained by Highways England which we intend to transfer the responsibility to the relevant local highway authorities, and secondly roads that are and will remain in the ownership of the local highway authority.

2.9.2 For both categories of roads, we are working with the relevant highway authorities to establish a suitable package of measures to improve the local roads and maximise the benefits of the Scheme.

2.10 Non-Motorised User (NMU) Provision

2.10.1 Where the proposed route would affect existing PRoW, network provision would be made to ensure routes remain open by providing suitable crossing points or diversions.

2.10.2 All junctions that interface with NMUs will be designed to take account of NMUs.

2.10.3 All NMU provision on the existing A57(T) and A57 will be maintained with possible improvements that will be agreed with the relevant local highway authorities.

- 2.10.1 NMUs will be encouraged to use facilities provided along the existing A57 corridor. For safety reasons, NMUs (pedestrians, cyclists and equestrians) will be prohibited from using the section of the Mottram Moor Link Road between the Cricket Ground and Mottram Moor Junctions due to the Mottram Underpass.

2.11 Flood Risk Assessment

- 2.11.1 In accordance with the requirements of the [National Planning Policy Framework](#) a Flood Risk Assessment (FRA) is currently being prepared to demonstrate how flood risk to the Scheme would be managed now, and when taking future climate change into account. The FRA also considers the flood risks generated as a result of the Scheme's construction.

- 2.11.2 The FRA is being prepared for the Scheme in consultation with the Environment Agency (EA) and informed by hydrological and hydraulic modelling of a number of watercourses within the vicinity, taking account of the influence of the Longdendale reservoir chain. The FRA would be further developed to inform the design of any necessary flood risk management measures and to provide data to feed into the ES.

2.12 Construction

- 2.12.1 Construction is anticipated to last for approximately 3 years and would commence in March 2020.

M67 Junction 4

- 2.12.2 Construction of the new connection onto the existing terminal roundabout would be likely to require some lane closures on the roundabout carriageway to allow the new connection to be built.

Roe Cross Road Junction

- 2.12.3 Construction of the Roe Cross Road Junction would be likely to require a series of lane closures on the existing Roe Cross Road. It is anticipated that after discussion with the local highway authority, it will be necessary to ensure that a minimum of a single lane is required at this location.

Mottram Moor Junction

- 2.12.4 Construction of Mottram Moor Junction will require a series of lane closures. It is anticipated that once parts of the new carriageway are complete, traffic will be temporarily diverted onto them to facilitate construction of the remaining sections of the junction. Access will be maintained to all existing properties at all times.

Brookfield Junction

- 2.12.5 Construction of Brookfield Junction would be likely to require a series of lane closures on the existing Woolley Bridge Road. It is anticipated that after discussion with the local highway authority, it will be necessary to ensure that a minimum of a single lane is required at this location.

Mottram Underpass

- 2.12.6 Mottram Underpass is proposed to be constructed using the cut and cover method. It is currently planned that the underpass will be constructed in a number of sections. Three existing roads cross the underpass - Roe Cross Road, Old Road and Old Hall Lane. It is currently proposed that traffic flows will be maintained on

Roe Cross Road and Old Road during underpass construction. This would be by the use of a temporary road which would be constructed adjacent to the existing roads. Traffic would then be diverted onto the temporary road until the works were completed and the existing roads reinstated in their previous locations. Proposals are currently being considered for Old Hall Lane, but Old Hall Lane may be temporarily severed for the duration of the works in that area. Access would be provided from either side of the works, and NMUs along Old Hall Lane would be provided with a temporary diversion for the duration of the closure.

Mottram Moor Link Road and the A57(T) to A57 Link Road

- 2.12.7 The construction of the Mottram Moor Link Road and the A57(T) to A57 Link Road will require significant excavations and deposition of fill material to achieve the required vertical profile. Interfaces with existing ProW would need to be managed. Most of the Scheme can be constructed in a sterile site.

Haulage Routes and Construction Traffic Management

- 2.12.8 Access for construction vehicles to the site would be from the trunk road network on designated routes which would be clearly signposted.
- 2.12.9 Haul routes within the Scheme area would be dictated by the balance of cut and fill within the site areas. This itself would be dictated by the design of the new roads and the suitability of the materials arising and their suitability for beneficial re-use.
- 2.12.10 The main areas where the construction sites would interface with the travelling public would be at locations where connections to the existing network would be created. In these locations, extensive traffic management would be required to segregate the construction sites from road vehicles.

2.13 Demolition

- 2.13.1 A number of buildings would need to be demolished to construct the Scheme. These are:
- 36, 38 and 40 Four Lanes;
 - Sheds on Land at 40 Four Lanes;
 - 8A, 8B and 8C Old Road;
 - 17, 19, 21 and 21a Old Road;
 - 5, 6, 7, 8 and 9 Tollemache Close (including garages);
 - Garages only of 3 and 4 Tollemache Close;
 - 2a, 2b, The Chestnuts, 4 and 6 Old Hall Lane;
 - Stables, 103 Mottram Moor;
 - Outbuildings (greenhouses/polytunnels) within Red Line Boundary at Robin Hood Farm; and
 - Outbuildings within Red Line Boundary at Tara Brook Farm.
- 2.13.2 The following buildings could potentially require to be demolished dependent upon the developing construction methodology:
- 25 Four Lanes;

- Units J, H, K and L, Roe Cross Industrial Estate; and
- 21-23 Woolley Bridge (Home Farm).

2.13.3 The right to compensation and methods and procedures for assessing appropriate levels of such would be identified in relation to the National Compensation Code.

2.14 Services and Utility Diversions

2.14.1 A number of services will be required to be diverted where the new junctions intersect with the existing highway network.

2.14.2 A significant number of utilities will also be required to be diverted on Roe Cross Road, Old Road and Old Hall Lane due to the construction of Mottram Underpass.

2.15 Waste Management

2.15.1 An Outline Site Waste Management Plan and a Materials Management Plan (MMP) would be prepared (and submitted in support of the DCO application) following the protocols within the '*CL:AIRE Definition of Waste: Development Industry Code of Practice*' to ensure that excavated material is re-used appropriately, sustainably and remain outside the waste hierarchy. These documents would be further developed by the appointed contractor(s) prior to construction.

2.16 Environmental Design

2.16.1 One of the key functions of undertaking an EIA for a scheme is to inform the design. This Scheme design is an iterative process which would take into consideration the key significant effects on environmental receptors and the mitigation proposed.

2.16.2 For example, environmental barriers in the form of earth mounding or acoustic fencing can provide screening from increased noise levels during the Scheme's operation phase. If utilised as part of a landscaping strategy, the earthworks can also be planted to minimise visual impacts on the landscape.

2.16.3 Landscape integration can also be designed within the landscaping strategy for the Scheme to integrate the new highway with the local character of the surrounding landscape and soften the visual impact. This landscaping strategy should aim to maintain local vegetation patterns and landform.

2.16.4 To mitigate potential impacts on the water environment associated with the construction and operation phases of the Scheme, the design should include measures to control water pollution and methods to drain surface water from the site effectively. This could include surface water outfalls, soakaways, and the creation of balancing ponds.

2.16.5 Scheme design should also consider biodiversity and include opportunities for habitat creation and enhancement. This may provide suitable conditions for species of nature conservation value. Understanding the impacts on habitats and the species they support at an early stage can help inform the design process so that linkages between habitats and new wildlife corridors may be incorporated within Scheme design.

2.16.6 Furthermore, Highways England's [Biodiversity Plan](#), published in June 2015, details the aims and obligations it has to deliver as part of the Government's RIS in terms of biodiversity. Highways England is expected to ensure the design of

their road schemes reduce impacts on the environment by delivering a reduction in habitat fragmentation and enhancing biodiversity value. They should also actively manage habitats to ensure high species diversity and reduced fragmentation. This is further supported by Highways England's Licence (April 2015) within paragraphs 4.2g, 4.2h (principles of sustainable development) and 5.2.

2.17 Embedded Mitigation

2.17.1 The embedded design features that are considered to be part of the Scheme are identified within Table 2-4 below. Additional mitigation measures proposed to avoid, prevent, reduce or, if possible, offset the effects of the Scheme are discussed within each relevant environmental topic specific chapters (refer to Chapters 5 to 14).

Table 2-4: Embedded Mitigation Considered to be Part of the Scheme Design

Relevant ES Topic to which the Design Measures/Consideration Relates	Design Measures/Considerations
Cultural Heritage	False cuttings and cuttings along much of the Scheme will aid in the reduction of visual and auditory intrusion into the settings of historic assets and the historic landscape.
Cultural Heritage	Retention, where possible, of footpaths and other ProW will aid in the retention of time depth within the historic landscape.
Cultural Heritage	The Scheme route does not damage the fabric of any designated heritage assets.
Cultural Heritage/Landscape and Townscape	The consideration of landscape and environment, including landscape impact, during the design of lighting and road furniture requirements will aid in reducing visual intrusion by the Scheme (including the setting of historic assets and the historic landscape).
Cultural Heritage/Landscape and Townscape	Limitation of removal and replacement of hedges and woodland will assist in the retention of the fabric of the landscape/ historic landscape and minimise change to the visual settings/settings of historic assets).
Biodiversity	Minimising land take/habitat loss during construction. Access tracks/haul roads and site compound/material storage areas will be located outside of ecologically sensitive habitats (i.e. woodland, hedgerows, marsh/marshy grassland, unimproved acid grassland, watercourses, waterbodies, badger setts and bat roosts). Clearly demarcated, dedicated access routes will be provided during construction and, where possible, any areas required for temporary works to be reinstated on completion. Habitat losses to be quantified to ensure no net loss (and where possible increase to provide more robust and resilient ecosystem) in quantity and quality.
Biodiversity	Post-construction planting will aim to enhance the ecological value of the Highways England soft estate. Where possible, this will

Relevant ES Topic to which the Design Measures/Consideration Relates	Design Measures/Considerations
	include reinstating and re-linking severed linear wildlife corridors with new planting. Locally sourced native plant species will be used. Sensitive management and monitoring regimes will be applied during operation to ensure maintenance and enhancement of the habitats. Provision of new native species would be pre-adapted to warmer conditions and more resilient to climate change.
Biodiversity	Landscape planting would be designed to avoid providing food sources away from the edge of the road and, as a result, prevent traffic collisions.
Biodiversity	Replacement planting would be provided for habitat losses.
Biodiversity	The proposed bridge crossing over the River Etherow will be appropriately designed to maintain connectivity for wildlife along the river.
Biodiversity	Road lighting would be designed to minimise light spill.
Biodiversity	Mammal passes would be installed along the road network to increase the permeability of the Scheme for badgers and reduce the barrier effect.
Biodiversity	The proposed River Etherow bridge crossing would be designed appropriately to maintain a corridor and allow animal passes. Fencing would be installed to direct otters toward the underpass and deter them from accessing the road.
Biodiversity	Appropriate design of culverts and bridges to allow animal passes.
Landscape and Townscape	During construction, the loss to existing features and the footprint of construction areas would be minimised. A 3m high perimeter fencing would be installed around construction areas.
Landscape and Townscape	(Chainage 0-500, & 500-870, east and westbound) Combination of 2.5m deep false cuttings, and embankments, with 1(v) to 2(h) inward and 1(v) to 3(h) outward facing slopes. In part new woodland block planting, and hedgerow planting along top of slopes.
Landscape and Townscape	(Chainage 950-1050, east and westbound): New woodland planting to replace lost elements on the eastern edge of the Old Hall Lane and help establish the baseline character.
Landscape and Townscape	(Chainage 1600-1850, westbound, including junction and links with Mottram Moor): Hedgerow planting along top of slopes adjacent to the highway alignment.
Landscape and Townscape	(Chainage 1100-1450, east and westbound): New vegetation planting on the deep cutting slopes. New hedgerow planting at the top of the cutting slopes, and infill of existing hedgerows within the wider landscape to enhance existing feature. New woodland

Relevant ES Topic to which the Design Measures/Consideration Relates	Design Measures/Considerations
	planting to replace lost elements along Old Hall Lane adjacent to the Mottram Underpass entrance.
Landscape and Townscape	(Chainage 1550-1700, eastbound): Hedgerow planting along top of embankment slopes adjacent to the highway alignment.
Landscape and Townscape	(Chainage 1850-2900, east and westbound): A combination of 2.5m deep false cutting, with 1(v) to 2(h) inward and 1(v) to 3(h) outward facing slopes with new woodland block and hedgerow planting.
Landscape and Townscape	New hedgerow planting, and new woodland block planting to integrate with the wider landscape and replace lost features.
People and Communities	The Scheme would be developed to minimise land-take, where possible.
People and Communities	New footpaths would be designed to be as fully accessible as possible.
People and Communities	Permanent surface water/ agricultural drains will be re-installed to reinstate any pre-existing field drainage systems to pre-construction condition.
Noise	New or altered links will use a low noise or thin surface coarse system in accordance with Highways England policy.
Road Drainage and the Water Environment	The number of watercourse crossings required would be minimised, and the design of crossings would be informed by detailed flood risk modelling and in accordance with the Environment Agency and Lead Local Flood Authority requirements.
Road Drainage and the Water Environment	Compensation would be provided, along with appropriate hydraulic links, where there is any loss of floodplain storage.
Road Drainage and the Water Environment	Attenuation would be provided within the drainage design to ensure no increase in the rates of discharge of rainfall run-off to receiving waterbodies in line with current guidelines (CIRIA, 2015). Climate change resilience would also be included within the drainage design.
Road Drainage and the Water Environment	Treatment measures would be incorporated within the drainage design to ensure no detrimental effects on the water quality of receiving waterbodies.
Road Drainage and the Water Environment	The drainage strategy solution would maintain existing groundwater flows and levels, particularly for the section of the Scheme in cut.
Road Drainage and the Water Environment	The Scheme design would comply with the Water Framework Directive to limit effects on groundwater resources by avoiding sensitive receptors (e.g. floodplain areas) wherever reasonably practical.
Geology and Soils	Embankments are proposed within the Scheme design. Construction design of the embankments is currently

Relevant ES Topic to which the Design Measures/Consideration Relates	Design Measures/Considerations
	unknown, however band drains or other geotechnical techniques may be considered to aid with the consolidation of these features. Piling may be required associated with the new bridge crossing the River Etherow. Such techniques can introduce pathways for contaminants in pore water to migrate into underlying groundwater. Appropriate techniques would be reviewed and appropriate design will be included to safeguard the underlying groundwater regime to ensure that groundwater quality is not compromised. Materials used to create the embankments (site won or imported) would be chemically analysed to ensure that they are of suitable chemical quality as detailed in the earthworks specification.
Geology and Soils	The design of the Mottram Underpass would incorporate appropriate design measures/requirements to ensure that the structural integrity and long-term performance of the underpass is not compromised.
Geology and Soils	Suitable well drained landforms would be created and field drains and borrow pits would be installed.
Geology and Soils	Landscape and habitat design would include potential for increasing soil carbon and therefore carbon sequestration.
Materials	Designing for site conditions measures would be implemented to manage constraints which may impact on waste. All junctions would be as close to grade as possible to avoid significant construction costs, access issues, waste quantities and requirement of additional aggregates. Excavated material would be targeted for embankments and screen mounding where this is feasible, and the material is suitable.
Materials	The design complexity would be reduced by standardising the construction process and reducing the quantity of material resources required. The design would also avoid over specification and minimise variation in components and joints.
Climate	Embedded mitigation measures associated with climate adaptation have been included above under relevant topic sections (refer to air quality, geology and soils, materials, etc.).
Climate	Consideration of potential health issues would be an integral part of the planning and design of the Scheme.
Climate	Publicly Available Specification (PAS) 2080 would be adopted for the ES as a best practice framework for managing and minimising the whole lifecycle carbon emissions, the approach would continue to be developed and applied to the Scheme.

Relevant ES Topic to which the Design Measures/Consideration Relates	Design Measures/Considerations
Climate	During the construction of the Scheme, the majority of roads crossing the Scheme would be maintained or locally diverted to limit traffic diversion onto alternative routes.
Climate	The design would encourage the reduction of property and community assets loss.
Climate	<p>A methodology for selecting the material resources suppliers would be outlined prior to construction. The environmental criteria by which material products will be selected and Scheme-specific targets for the recycled content would be set and committed to prior to commencement of the material procurement process for the Scheme.</p> <p>Materials with an optimum design life and less embodied carbon would be specified, when possible. The use of recycled materials or materials sourced from nearer to site would be encouraged in order to minimise transportation movements.</p>

2.18 The Rochdale Envelope

- 2.18.1 PINS [Advice Note 9: Using the 'Rochdale Envelope'](#) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the [Planning Act 2008](#). The Advice Note acknowledges that there may be parameters of a Scheme's design that are not yet fixed and, therefore, it may be necessary for the ES to assess likely worst-case variations to ensure that the likely significant environmental effects of the Scheme have been assessed.
- 2.18.2 Within this PEIR, a more developed concept design (when compared with the [Environmental Impact Assessment Scoping Report](#)) for the Scheme is presented. The Scheme is to be developed further through the reference design and this would form the basis for the DCO application. Therefore, when presenting the Scheme design in the ES and the accompanying assessment, the requirements of PINS Advice Note 9 would be reflected. This would ensure that the likely significant effects of the Scheme are assessed. Furthermore, the reference design would be informed by the EIA and the outcome of the pre-application consultation process, with the design reflecting iterative working between the designers and the environmental specialists.

3 ASSESSMENT OF ALTERNATIVES

3.1 Assessment Methodology

3.1.1 A sifting exercise has been undertaken in order to identify the most optimal options in terms of development design, technology, location, size and scale. Section 3.2 details the sifting processes undertaken, but is summarised as follows:

Early Options Sifting Exercise

3.1.2 Initial options in relation to the Trans-Pennine Upgrade at the time of sifting were in relation to the Mottram Moor Link Road and A57(T) to A57 Link Road. Assessment considerations for overall recommendation were based on value for money; journey time benefits; delay reductions and least environmental impacts.

First Sift (Strategic Sift)

3.1.3 Assessment was undertaken using the Early Assessment and Sifting Tool (EAST); an Additional Sifting Tool and a high level economic assessment using Transport User Benefit Appraisal (TUBA).

Long List Sift Exercise

3.1.4 Assessment was undertaken using the EAST, alongside an Additional Sift Tool which considered the performance of each option against the project objectives.

Second Sift Exercise

3.1.5 The assessment was undertaken using the Options Appraisal Framework.

3.2 Reasonable Alternatives Studied

3.2.1 A scheme to help alleviate traffic congestion along the A57/A628 trunk road through Mottram, Hollingworth (in the Tameside district of Greater Manchester) and Tintwistle (in the High Peak district of Derbyshire and partly within the Peak District National Park) was first introduced to the Roads Programme in 1989. Following appraisal of alternatives, two routes were presented at Public Consultation in 1992 and in October 1993, the Secretary of State announced a Preferred Route for a bypass scheme. However, the bypass was suspended from the Roads Programme in 1996.

3.2.2 In 'A New Deal for Trunk Roads in England' published in July 1998, the A57/A628 Mottram -Tintwistle Bypass and A628/A616 Route Restraint Measures was listed as a scheme for which preparation would continue to enable it to be taken forward without delay, subject to full appraisal and the views of the Regional Planning Bodies. The Scheme was approved in principle, subject to further appraisal, at the North West Regional Planning Conference in April 1999.

3.2.3 In January 2000, the Highways Agency conducted an assessment of the impacts of various strategies to solve the traffic problems within the three villages of Mottram, Hollingworth and Tintwistle and within the wider area. The results of these assessments were presented to the Regional Planning Bodies in November 2002 and, following their approval, a scheme was included in the Government's Targeted Programme of Improvements (TPI) in April 2003. The assessment concluded that there were no realistic alternatives to a bypass of the villages.

3.2.4 The preferred route promoted in 2003 was a bypass of approximately 5.7km in length, which would bypass the existing A57/A628 route in the villages of Mottram,

Hollingworth and Tintwistle, with a link road connecting to the A57 at Mottram Moor between Mottram and Hollingworth. An extension of this link road from the A57 Mottram Moor to the A57 Woolley Lane was being promoted jointly as the Glossop Spur by Tameside Metropolitan Borough Council and Derbyshire County Council. This followed the same alignment as the Brown Route considered in the Early Options Sifting Exercises (see paragraphs 3.2.10 to 3.2.15 below and Figure 3.3 at Appendix B).

- 3.2.5 Both the A57/A628 Mottram - Tintwistle Bypass and A628 Route Restraint Measures, and the Glossop Spur projects were subject to public inquiry in 2007. The public inquiry closed in 2009 and the A57/A628 Mottram - Tintwistle Bypass and A628 Route Restraint Measures project was removed from the Highways Agency programme.

Historic Scheme Options

- 3.2.6 During the intricate history of work in this area, numerous options have been considered and discarded. A review was undertaken during the early sifting exercises to capture these historic options and the reasons for rejection at the time.
- 3.2.7 The Mottram Moor Link Road and the A57(T) to A57 Link Road options presented for consideration within this PEIR have been informed by learning from historic options studies. For example, options generally considered to be less preferable have not been reconsidered at this time, and design development has been informed by historic study information where applicable.

The Trans-Pennine Feasibility Study

- 3.2.8 In 2015, the DfT commissioned a series of feasibility studies to investigate solutions to some of the most significant and longstanding congestion hotspots in the country. A study was undertaken to identify the opportunities and understand the case for future investment on Trans-Pennine routes that will improve connectivity between Manchester and Sheffield, and that are deliverable, affordable and offer value for money. This study considered three western end variants of:
- Bypass of Mottram, Hollingworth and Tintwistle;
 - Mottram Moor Link Road; and
 - A57 Mottram One Way.

- 3.2.9 The study also recognised a need for a central package of improvements along the A57/A628/A61 to accompany each western end variant, which included the A57(T) to A57 Link Road.

Early Options Sifting Exercises

Coverage of the Sifting Process

- 3.2.10 The initial options at the time of sifting were in relation to the Mottram Moor Link Road and A57(T) to A57 Link Road.
- 3.2.11 This decision to progress this western end variant (in conjunction with the central package of improvements) was based on this option having a good strategic fit and alignment with stakeholder aspirations and is expected to deliver a positive effect on the economy at a lower cost than the full Mottram, Hollingworth and Tintwistle bypass whilst providing good journey time and reliability benefits. The overall

recommendation for this option being progressed was based on:

- High value for money case and it would improve connectivity between Manchester and Sheffield to some extent but recognises that it does not provide significant additional capacity for these trips.
- Journey time benefits for both local trips from in and around the Mottram/Tintwistle/Glossop area and for existing Trans-Pennine trips using the A628 or A57 with an expected improvement in reliability for all users.
- Effective in reducing delays on the A628 and A57 and moves traffic from the village of Mottram which will bring benefits for local residents in the form of improved air quality, less noise, reduced accidents and reduced severance.
- Expected to bring slight adverse impacts to the landscape, noise, historic environment, biodiversity and the water environment.
- Anticipated that delivery of all elements of the package could be completed by early 2023.

3.2.12 A decision was made to extend the brief to include options to benefit Hollingworth and Tintwistle; and so the Brown Route, Red Route and Blue Route options were brought into the sifting process. These were considered with the intention of progressing a longer bypass option as part of a phased approach due to funding being unavailable within the current RIS.

3.2.13 An original long list of nine Mottram Moor Link Road options were presented to Highways England in September 2015. In accordance with the design brief, these included long bypass options (of Mottram, Hollingworth and Tintwistle) and short bypass options (of Mottram only) and included the option to include or exclude the A57(T) to A57 Link Road.

3.2.14 These nine options were:

- Options 0, 3 & 4 – options for A57(T) to A57 Link Road crossing the A57(T) close to Mottram (Figure 3.1 at Appendix B).
- Options 1, 2 & 5 – options for A57(T) to A57 Link Road crossing the A57(T) closer to the Gun Inn junction at Hollingworth (Figure 3.2 at Appendix B).
- Brown Route, Blue Route and Red Route – options for a Mottram, Hollingworth, and Tintwistle Bypass (Figure 3.3 at Appendix B). The Brown Route was the preferred route for the Mottram, Hollingworth and Tintwistle Bypass taken to Public Inquiry in 2007.

First Sift (Strategic Sift)

3.2.15 This sift was completed using EAST, alongside an Additional Sift Tool which considered the performance of each option against the Trans-Pennine Upgrade objectives.

3.2.16 Highways England decided that a sifting exercise should be completed in an attempt to inform a strategic decision as to whether to pursue a long or short bypass. For this reason, the First Sift exercise was completed using one long and one short bypass option (Option A and Brown Route), considering these both with and without the inclusion of the A57(T) to A57 Link Road.

3.2.17 The first sift included the following elements:

- Appraisal using an additional sift tool;
- Appraisal using the EAST; and
- A high level economic assessment using TUBA.

3.2.18 The following broad conclusions were drawn from the first sift.

- The Brown Route performs better economically than Option A route (both with and without the A57(T) to A57 Link Road).
- Options with the A57(T) to A57 Link Road perform better than the comparative option without the A57(T) to A57 Link Road.

3.2.19 A decision was made to remove options without the A57(T) to A57 Link Road, as these performed less well. However, a strategic decision between long and short bypass options could not be made at the time of sifting, and so it was decided to proceed to a Long List Sift.

Long List Sift Exercise

3.2.20 This sift was completed using the EAST, alongside an Additional Sift Tool which considered the performance of each option against the Trans-Pennine Upgrade objectives.

3.2.21 The nine Mottram Moor Link Road options presented in September 2015 were all considered as part of the Long List Sift, all with the inclusion of the A57(T) to A57 Link Road.

3.2.22 The options discarded at this stage were:

- Options 1 and 2: The proximity of these two options to the Gun Inn junction affected the potential deliverability and feasibility in comparison to Option B which is of a similar alignment.
- Options 3 and 4: The highway alignment of these two options was less preferable in terms of Highways Standards in comparison to Option A.
- Blue Route: This route would pass directly between Hollingworth and Tintwistle, potentially bringing additional severance issues between the two villages. The route would also include the upgrade of the existing road within Tintwistle Conservation Area.
- Red Route: This route would require construction over the top of Arnfield Reservoir, which was considered to pose deliverability challenges.

3.2.23 The best performing options that were taken forward to the Second Sift Exercise were:

- Brown Route. It was the better performing of the Mottram, Hollingworth, & Tintwistle type options considered in the Long List Sift.
- Option 0. This option was appraised in the original first sift and was considered the better performing of the Mottram Moor Link Road options considered which cross the A57(T) closer to Mottram.
- Option B. This option was considered to be the better performing of the Mottram Moor Link Road options considered which cross the A57(T) closer to the Gun Inn at Hollingworth.

3.2.24 As a result of the historic options review exercise undertaken as noted in

paragraphs 3.2.6 to 3.2.7, a potentially feasible option was rediscovered that had not been previously rejected. This option is referred to as 'DfT Low Cost Option 1' and is shown on Figure 3.4 at Appendix B. This option was also considered a viable alternative to the Brown Route and was therefore taken through to the Second Sift Exercise, alongside Options 0, 5 and Brown Route.

Second Sift Exercise

3.2.25 The second sift exercise was undertaken using the Options Appraisal Framework.

3.2.26 The options presented for Second Sift were:

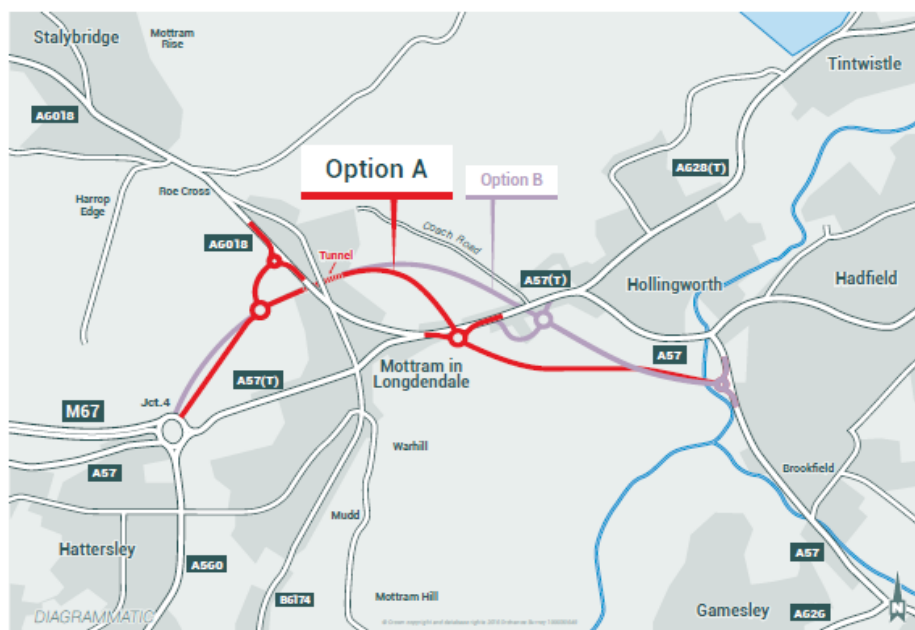
- Brown Route including A57(T) to A57 Link Road (long bypass);
- DfT Low Cost Option 1 including A57(T) to A57 Link Road (long bypass);
- Mottram Moor Link Road Option A including A57(T) to A57 Link Road (short bypass); and
- Mottram Moor Link Road Option B including A57(T) to A57 Link Road (short bypass).

3.2.27 During a Value Management workshop, the benefits and dis-benefits of the four options were considered. The two long bypass options were expected to attract significantly more traffic to the area, plus bring about additional impacts in relation to the Peak District National Park, air quality and noise. The two long bypass options did provide the higher cost-benefit ratio in comparison to the short bypass options.

3.2.28 At the Value Management workshop, the risk relating to funding for a long bypass being unavailable within the current RIS was highlighted, and the decision was made to take the following two options through to the next stage, see Figure 3-1 below:

- Mottram Moor Link Road Option A (short bypass); and
- Mottram Moor Link Road Option B (short bypass).

Figure 3-1 Mottram Moor Link Road Option A and Option B



3.3 Justification for Chosen Option

3.3.1 On 22 June 2017, a Value Management Workshop was held to ensure the options proposed for the 'Preferred Route Announcement' met the high level strategic drivers defined in the Client Scheme Requirements, which are:

- Encouraging economic growth;
- Making the network safer;
- Keeping the network in good condition;
- Supporting the smooth flow of traffic;
- Delivering better environmental outcomes;
- Helping cyclists, walkers and other vulnerable users of the network;
- Improving user satisfaction; and
- Achieving real efficiency.

3.3.2 Whilst considering the merits of Option A and Option B of the Mottram Moor Link Road/A57(T) to A57 Link Road, Option A and Option B both meet the transport objectives as defined in the Client Scheme Requirements, the workshop identified Option A as the preferable option due to:

- Less impact on properties;
- Lower cost than Option B; and
- Option A was preferred by the majority of respondents to the non-statutory consultation undertaken in March and April 2017.

3.3.3 It has therefore been recommended that Option A is progressed as the preferred route and was subsequently included in the 'Preferred Route Announcement' made on 2 November 2017.

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

4.1 Purpose of EIA Process

- 4.1.1 EIA is the process of compiling, evaluating and presenting environmental information in support of an assessment of all likely significant environmental effects of a proposed development. The assessment is designed to inform the development of a scheme and to provide decision makers and statutory consultees with the environmental information they require during the determination of an application for consent. The process allows mitigation measures to be identified to avoid, prevent, reduce or, if possible, offset significant environmental effects and incorporated into the design of the Scheme ('embedded mitigation') and commitments to be made to environmentally sensitive construction methods and practices.
- 4.1.2 The collation of environmental information and analysis of this information against the scheme proposals continues throughout the scheme's development and is recorded in the final ES which is submitted with the application for consent.
- 4.1.3 The following sections provide background to the EIA work that has been completed to date for this Scheme and also explain how this PEIR has been prepared.

4.2 EIA Work Completed to Date

Scoping

- 4.2.1 On 08 November 2017, in accordance with Regulation 8(1) of the [Planning Act 2008](#), Highways England requested PINS provide its opinion on the scope of the information to be included in the ES for the Scheme. To inform the PINS scoping opinion, an [Environmental Impact Assessment Scoping Report](#) was submitted by Highways England, clearly outlining the intended scope of each environmental topic assessment and prepared in accordance with the Regulation 10(3) of the [EIA Regulations](#), the Planning Inspectorate's [Advice Note 7: Preliminary Environmental Information, Screening and Scoping](#) (Version 5, March 2015) and Highways England's Environmental Scoping Report structure document (Version 2, 01/06/17). Drawing upon [PINS Scoping Opinion](#) and the ongoing surveys and assessment work, the ES will include an assessment of the potential significant environmental effects of the Scheme.

Collation of Data

- 4.2.2 To date, the collation of data for the environmental assessment has included the following:
- Review of desk-based sources including MAGIC <http://www.magic.gov.uk/>, Environment Agency and local authority websites.
 - Site visits to understand the characteristics of the study area by ecologists, cultural heritage specialists, chartered landscape architects and EIA specialists.
 - Ecological surveys comprising an extended Phase 1; passage, wintering and breeding bird; badger; reptiles; water vole; otter; hedgerow; woodland and bat.

- Consultation with key stakeholders including meetings, telephone conversations and data requests. A summary of the consultation undertaken to date is presented in Table 4-1 below.

Table 4-1: Consultation Undertaken to Date during the Environmental Assessment Process to date

Consultee	Type and Date of Consultation	Information Requested/Issues Discussed
Environment Agency	By email –13 October 2017	Request for River Etherow gauging station data records, River Etherow hydraulic model and flood defence data.
Environment Agency	By email – various dates November 2017 to January 2018	Scope of the Flood Risk Assessment has been discussed and agreed including the technical methodologies to be adopted for flood flow estimation and hydraulic modelling of the River Etherow and its tributary the Glossop Brook.
United Utilities	By email – 11 January 2018	Requested information on the operation and maintenance of the Longendale Reservoir chain and any available reservoir outflow records.
Derbyshire Bat Group	By email - 20 January 2017	Records of bats within a 1km search radius of the Scheme where this search area fell within Derbyshire. Data received 23 January 2017.
Derbyshire Wildlife Trust	By email - 20 January 2017	Protected and notable species records within a 1km search radius of the Scheme where this search area fell within Derbyshire. Data received 23 January 2017.
Greater Manchester Local Record Centre	By email - 23 January 2017	Protected and notable species records within a 1km search radius of the Scheme where this search area fell within Greater Manchester. These records also include bat records for Greater Manchester. Data received 26 January 2017.
Derbyshire & Nottinghamshire Entomological Society	By email - 20 January 2017	Invertebrate species records within a 1km search radius of the Scheme. Data received on 17 February 2017.
Natural England	Telephone - February 2017	Initial conference call to discuss the Scheme and work required.

Consultee	Type and Date of Consultation	Information Requested/Issues Discussed
Natural England	Telephone – 8 June 2017	Progress update conference call.
Natural England	Telephone – 10 July 2017	Progress update conference call.
Natural England	Telephone – 5 September 2017	Progress update conference call.
Natalie Ward (Archaeological Officer) Peak District National Park	By email – 10 January 2018	Request for commencement of consultation for the purpose of checking scope of assessments and expectations of local authorities. Comment on proposed monitoring of GI works was also requested.
Norman Redhead (Archaeological Officer) Greater Manchester Archaeological Advisory Service (GMAAS)	By email – 10 January 2018	Request for commencement of consultation for the purpose of checking scope of assessments and expectations of local authorities. Comment on proposed monitoring of GI works Was also requested.
Steve Baker (Archaeological Officer) Derbyshire County Council	By email – 10 January 2018	Request for commencement of consultation for the purpose of checking scope of assessments and expectations of local authorities. Comment on proposed monitoring of GI works Was also requested.
Natalie Ward (Archaeological Officer) Peak District National Park	Telephone – 11Jan 2018	Response to request for consultation - At present they have no further comments to add above the scoping response. This is due to the Scheme lying largely beyond the Peak District National Park boundary
Norman Redhead (Archaeological Officer) Greater Manchester Archaeological Advisory Service (GMAAS)	Telephone - 16 Jan 2018	Response to request for consultation - Visit to be arranged at the HER/GMAAS Offices to properly discuss the Scheme, survey requirements, and possible mitigation.
General Public	Public Consultation Event. Saturday 18 March 11:00 – 12:00 preview	Public Consultation at Mottram Community Centre.

Consultee	Type and Date of Consultation	Information Requested/Issues Discussed
	12:00 – 18:00	
General Public	Public Consultation Event Wednesday 22 March 11:00 – 12:00 preview 12:00 – 18:00	Public Consultation at Tankersley Welfare Hall.
General Public	Public Consultation Event Friday 24 March 14:00 – 20:00	Public Consultation at Bradbury Community.
General Public	Public Consultation Event Saturday 25 March 11:00 – 19:00	Public Consultation at Tesco Hattersley.
General Public	Public Consultation Event Saturday 1 April 10:00 – 18:00	Public Consultation at St Mary's Church.
Peak District National Park Authority, Natural England, Environment Agency & Historic England	Statutory Environmental Body Meeting No.1 27 June 2016	Introduction to the Scheme and the options.
Peak District National Park Authority, Natural England, Environment Agency & Historic England	Statutory Environmental Body Meeting No.2 24 May 2017	Discussed results from the public consultation.
Peak District National Park Authority, Natural England, Environment Agency & Historic England	Statutory Environmental Body Meeting No.3	Discussed the Preferred Route Announcement and DCO process.

Consultee	Type and Date of Consultation	Information Requested/Issues Discussed
	25 September 2017	
Planning Inspectorate Meeting to discuss received scoping opinion	Meeting at The Planning Inspectorate, Bristol – 8 January 2018	Meeting to discuss the received scoping opinion (adopted by the SoS on 19 December 2017).

4.2.3 Engagement with consultees and collation of additional baseline data will continue as part of the environmental assessment. Consultation will focus in particular upon the assessment of significant environmental effects and appropriate mitigation/enhancement measures.

4.3 Approach to the PEIR

Topics Included

4.3.1 The following environmental topics are included within this PEIR:

- Air quality
- Cultural heritage
- Biodiversity
- Landscape and Townscape
- People and Communities
- Noise and Vibration
- Road drainage and the Water Environment
- Geology and Soil
- Materials
- Climate
- Assessment of cumulative effects

Structure of Each Topic Chapter

4.3.2 For each environmental topic, the following is reported:

- Summary of the baseline information obtained to date
- Other baseline information to be obtained and surveys to be undertaken
- Receptors potentially affected
- Potential effects and mitigation measures

4.3.3 Owing to the preliminary nature of this assessment, detailed assessment criteria are not reported in each environmental topic assessment chapter. Rather, the environmental topic assessments chapters provide an indication of those effects that are considered likely to occur as a result of the Scheme based on current knowledge of the environment and the Scheme components.

- 4.3.4 In the final ES, the significance of environmental effects will be assessed using appropriate criteria that reflect current best practice.
- 4.3.5 Embedded mitigation is described in Section 2.17. The nature of effects identified within in the topic assessment chapters take account of all relevant embedded mitigation measures. Where further 'additional' mitigation is considered appropriate, i.e. over and above the embedded mitigation measures proposed, these are set out in the relevant topic assessment chapter tables under 'additional mitigation'.

5 AIR QUALITY

5.1 Existing Environmental Conditions

- 5.1.1 The Scheme is located within the administrative boundaries of Tameside Metropolitan Borough Council and High Peak Borough Council.
- 5.1.2 As required by the [Environment Act 1995](#), Tameside Metropolitan Borough Council and High Peak Borough Council have undertaken Review and Assessment of air quality within their boroughs. This process has indicated that within Tameside annual mean concentrations of nitrogen dioxide (NO₂) are above the Air Quality Strategy (AQS) objective of 40µg/m³. As such, Tameside Metropolitan Borough Council has declared an Air Quality Management Area (AQMA) for NO₂. The Scheme study area, as defined in Section 5.2.1 of the [Environmental Impact Assessment Scoping Report](#), is located within the Tameside AQMA.
- 5.1.3 Tameside Metropolitan Borough Council undertakes automatic and diffusion tube monitoring at a number of locations within the study area, illustrated on Figure 5.1 at Appendix B. NO₂ concentrations at Mottram Moor automatic station were recorded at 47.2µg/m³ in 2015, exceeding the AQS objective of 40µg/m³. The 2015 diffusion tube monitoring data identified three sites of exceedance within the study area; along the A57 in Denton and along the A57 and A628 in Mottram. NO₂ concentrations at these locations were recorded as 45.7µg/m³, 53.4µg/m³ and 61.1µg/m³ respectively.
- 5.1.4 High Peak Borough Council undertakes diffusion tube monitoring at 11 locations, including two within the study area, illustrated on Figure 5.1 at Appendix B. Neither site recorded an exceedance of the AQS objective in 2015.
- 5.1.5 In 2016, Highways England completed diffusion tube monitoring at 82 locations within Tameside Metropolitan Borough Council's and High Peak Borough Council's areas of jurisdiction, illustrated on Figure 5.2 at Appendix B. Within the study area, NO₂ concentrations ranged between 15.2 – 89.5µg/m³. Exceedances of the AQS objective for annual mean NO₂ concentrations were observed along the A57 through Mottram and Glossop, with the highest concentration recorded at the A57/B6174 cross-roads in the centre of Mottram.
- 5.1.6 Receptors potentially sensitive to changes in air quality as defined in [DMRB HA 207/07](#) have been identified throughout the study area. The location of these sensitive receptors is outlined in Table 5-1 and shown on Figure 5.3 at Appendix B.

Table 5-1: Locations of Sensitive Receptors to Air Quality

Receptor		NGR (m)	
		X	Y
R1	Residential – Melyncourt Drive	398347	395331
R2	Residential – Harrop Edge Road	398365	395405
R3	Residential – Colbourne Way	398461	395097
R4	Residential – Dewsnap Way	398474	394972
R5	Residential – Kennedy Square	398759	394968

Receptor		NGR (m)	
		X	Y
R6	Residential – Ashworth Lane	398815	394939
R7	Residential – John Kennedy Road	398809	394971
R8	Residential – Ashworth Lane	398861	394949
R9	Residential – Ashworth Lane	399319	395427
R10	Residential – Marple Road	400519	392899
R11	Residential – Glossop Road (A626)	401759	394524
R12	Residential – Dinting Vale (A57)	401819	394501
R13	Residential – High Street West	402322	394148
R14	Residential – Victoria Street	403286	393557
R15	Residential – Charlestown Road	403382	392901
R16	Residential – Mottram Road	398477	396621
R17	Residential – Roe Cross Road	398833	396330
R18	Residential – Four Lanes	399042	395972
R19	Residential – Old Hall Lane	399191	395949
R20	Residential – Back Lane	399216	395932
R21	Residential – Stalybridge Road	399208	395913
R22	Residential – Hyde Road	399063	395569
R23	Residential – Ford Grove	399090	395532
R24	Residential – Hyde Road	399288	395637
R25	Residential – Mottram Moor	399315	395639
R26	Residential – Back Moor	399538	395802
R27	Residential – Mottram Moor	399651	395817
R28	Residential – Mottram Moor	399705	395827
R29	Residential – Mottram Moor	399801	395849
R30	Residential – Mottram Moor	399943	395855
R31	Residential – Woolley Lane	400375	395997
R32	Residential – Market Street	400369	396008
R33	Residential – Woolley Lane (A57)	401030	395639
R34	Residential – Woolley Lane (A57)	401066	395485
R35	Residential – Norfolk Street	403700	394660
R36	Residential – Talbot Road	403694	394700
R37	Residential – Cemetery Road	403669	395293

Receptor		NGR (m)	
		X	Y
R38	Residential – Mottram Moor	400026	395915
R39	Residential – Mottram Moor	400231	395960
R40	Residential – Coach Road	399970	396041
R41	Residential – Osborne Road	392961	395681
R42	Residential – Heaton Street	391568	395491
R43	Residential – Holland Street East	392057	395572
R44	Residential – York Close	392773	395802
R45	Residential – Kingston Gardens	393999	395424
R46	Residential – Brook Street	395362	395147
R47	Residential – Clarendon Road	394978	395377
R48	Residential – Victoria Street	395467	395719
R49	Residential – Ashton Road	395043	396295
R50	Residential – Talbot Road	395539	396235
R51	Residential – Matley Lane	398137	396650
R52	Residential – Manchester Road	428632	386943
R53	Residential – Manchester Road	425872	387773
R54	Residential – Woodcock Road	405544	394315
R55	Residential – Town Lane	400771	392884

- 5.1.7 Three ecological receptors have been identified within 200m of the Affected Road Network (ARN), as defined in the [Environmental Impact Assessment Scoping Report](#), comprising:
- South Pennine Moors Special Area of Conservation (SAC);
 - Peak District Moors Special Protection Area (SPA); and
 - Dark Peak Site of Special Scientific Interest (SSSI).
- 5.1.8 Air quality impacts from the Scheme on ecological receptors will be fully assessed within the ES.
- 5.1.9 It should be noted that the ARN is defined by traffic flows on the local network, as outlined in the [Environmental Impact Assessment Scoping Report](#), and is, therefore, subject to change in the ES, as the traffic data used in this assessment is currently being revised. Only those ecological receptors located within 200m of the ARN at ES stage will be assessed.
- 5.1.10 The Department for Environment, Food and Rural Affairs (Defra) is responsible for reporting on the UK's compliance with the [EU Ambient Air Quality Directive](#). The UK is split into a number of zones/agglomerations for the purpose of the reporting. A zone is deemed compliant with the Directive when pollutants are predicted or

measured to be below the EU Limit Values. Defra currently undertakes modelling using their Pollution Climate Mapping (PCM) model. Defra chooses representative links in the zone to predict pollutant concentrations. The ARN is located in three of these areas the North West & Merseyside, East Midlands and Greater Manchester Urban Area. There are PCM modelled links on the following roads within the study area:

- M67 from M60, Denton to Halton Street, Godley;
- A57 from M60 in Denton to Hattersley Road West, Hyde;
- A560 Stockport Road;
- A627 Clark Way, Hyde;
- A6018 Roe Cross Road;
- A57 Mottram Moor to Shaw Lane;
- A628 Market Street;
- A57 from Dinting Lane through Glossop and onto Snake Pass;
- A6016 Primrose Lane and Turnlee Road, Glossop; and
- A624 from Whitfield Avenue to A57.

5.1.11 The Scheme Opening Year maximum PCM concentration of NO₂ along these links is 28.1 µg/m³. Therefore, there is no likelihood of impacting on reported compliance with the [EU Ambient Air Quality Directive](#).

5.2 Other baseline information to be obtained/surveys to be undertaken

5.2.1 As stated in paragraph 5.1.5 above, Highways England undertook diffusion tube monitoring during 2016 at 82 locations within Mottram and the surrounding local areas. This, along with the local authority monitoring, provides a good indication of baseline conditions throughout the study area and no further monitoring/baseline information is required.

5.3 Potential Effects and Mitigation Measures

5.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined below. These have been determined with reference with the methodologies outlined in the [Environmental Impact Assessment Scoping Report](#). This assessment is not a full assessment of the Scheme's potential air quality impacts but provides an assessment of the Scheme's potential air quality impacts utilising the traffic data that is currently available. The impacts are therefore subject to change once the final set of traffic data becomes available and will be reported in the ES.

Construction

5.3.2 A construction phase dust assessment has been completed in accordance with [DMRB HA 207/07](#). Approximately 1,800 sensitive receptors are located within 200m of the construction site boundary and therefore, have the potential to be affected by fugitive construction dust emissions. Industry best practice mitigation measures will be implemented to ensure that construction dust does not result in a significant impact. Mitigation measures include: positioning dust generation activities as far away as possible from sensitive receptors, seeding or covering

long-term stockpiles and damping down surfaces. A Stakeholder Communication Plan and regular inspections would assist in monitoring the success of any mitigation measures employed.

5.3.3 These measures will be included within and managed through a Construction Environmental Management Plan (CEMP).

Operation

5.3.4 An operational phase assessment has been completed with regard to [DMRB HA 207/07](#) and in accordance with the following Interim Advice Notes (IANs):

- [IAN 170/12 v3](#), Updated air quality advice on the assessment of future NO_x and NO₂ projections for users of DMRB Volume 11, Section 3, Part 1, Air Quality;
- [IAN 174/13](#), Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07); and
- [IAN 175/13](#), Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for users of DMRB Volume 11, Section 3, Part 1 Air Quality.
- [IAN 185/15](#), Updated traffic, air quality advice on the assessment of link speeds and generation of vehicle data into 'speed-bands' for users of DMRB Volume 11, Section 3, Part 1 Air Quality.

5.3.5 Pollutant concentrations have been predicted for the following scenarios and compared against the AQS objectives:

- Base year 2015 (model verification using 2015 monitoring data);
- Do Minimum 2023 (Opening Year without the Scheme); and
- Do Something 2023 (Opening Year with the Scheme).

5.3.6 The updated DMRB Air Quality Spreadsheet model (version 6, provided by Highways England) has been used to predict air quality concentrations at worst-case sensitive receptors located along the ARN. The modelling will determine whether the Scheme is likely to lead to exceedances of the relevant AQS objectives and therefore have the potential to lead to a significant impact on air quality. Once the final set of traffic data has been provided, the air quality modelling for the ES will be undertaken using the detailed dispersion model ADMS (Roads).

5.3.7 The full extent of the ARN is illustrated on Figure 5.4 at Appendix B. It should be noted that the ARN is defined by traffic flows on the local network, as outlined in the [Environmental Impact Assessment Scoping Report](#), and is, therefore, subject to change in the ES, as the traffic data used in this assessment is currently being revised.

5.3.8 Table 5-2 provides the NO₂ concentrations at each receptor (refer to Figure 5.3 at Appendix B for receptor locations) with and without the Scheme. Exceedances of the AQS objective are highlighted in **bold**.

Table 5-2: Predicted Annual Mean NO₂ Concentrations at Receptors within 200m of the Affected Road Network

Receptor	NGR (m)		LTT Adjusted 2023 Annual Mean NO ₂ Concentrations (µg/m ³)		Difference between Projected Do Minimum and Do Something Concentration
	X	Y	Do Minimum	Do Something	
R1	398347	395331	14.9	16.1	1.2
R2	398365	395405	13.7	14.7	1.0
R3	398461	395097	14.3	13.6	-0.7
R4	398474	394972	14.1	13.2	-0.9
R5	398759	394968	14.0	12.1	-1.9
R6	398815	394939	13.5	11.9	-1.6
R7	398809	394971	13.7	11.9	-1.8
R8	398861	394949	14.4	12.3	-2.1
R9	399319	395427	21.5	16.5	-5.0
R10	400519	392899	15.7	13.8	-1.9
R11	401759	394524	28.8	30.1	1.3
R12	401819	394501	29.1	30.6	1.5
R13	402322	394148	20.5	21.1	0.6
R14	403286	393557	11.7	11.6	-0.1
R15	403382	392901	13.8	13.9	0.1
R16	398477	396621	23.5	22.6	-0.9
R17	398833	396330	21.3	20.9	-0.4
R18	399042	395972	12.3	16.2	3.9
R19	399191	395949	22.1	17.2	-4.9
R20	399216	395932	20.2	15.6	-4.6
R21	399208	395913	20.7	16.1	-4.6
R22	399063	395569	23.5	15.8	-7.7
R23	399090	395532	19.5	14.5	-5.0
R24	399288	395637	41.4	20.4	-21.0
R25	399315	395639	73.0	19.1	-53.9
R26	399538	395802	41.3	14.7	-26.6
R27	399651	395817	30.6	17.5	-13.1
R28	399705	395827	18.5	19.5	1.0

Receptor	NGR (m)		LTT Adjusted 2023 Annual Mean NO ₂ Concentrations (µg/m ³)		Difference between Projected Do Minimum and Do Something Concentration
	X	Y	Do Minimum	Do Something	
R29	399801	395849	21.4	22.3	0.9
R30	399943	395855	15.9	15.3	-0.6
R31	400375	395997	31.8	22.7	-9.1
R32	400369	396008	31.8	27.2	-4.6
R33	401030	395639	24.0	19.4	-4.6
R34	401066	395485	25.3	28.2	2.9
R35	403700	394660	12.7	13.5	0.8
R36	403694	394700	15.0	16.3	1.3
R37	403669	395293	11.1	11.9	0.8
R38	400026	395915	38.5	30.4	-8.1
R39	400231	395960	23.3	19.7	-3.6
R40	399970	396041	11.7	11.2	-0.5
R41	392961	395681	22.0	22.4	0.4
R42	391568	395491	23.9	24.2	0.3
R43	392057	395572	23.2	23.6	0.4
R44	392773	395802	21.8	22.1	0.3
R45	393999	395424	19.0	19.2	0.2
R46	395362	395147	17.5	18.0	0.5
R47	394978	395377	18.6	18.2	-0.4
R48	395467	395719	16.5	15.4	-1.1
R49	395043	396295	21.1	20.7	-0.4
R50	395539	396235	14.3	13.7	-0.6
R51	398137	396650	13.6	11.7	-1.9
R52	428632	386943	14.0	14.6	0.6
R53	425872	387773	11.7	12.3	0.6
R54	405544	394315	11.9	12.9	1.0
R55	400771	392884	12.7	11.8	-0.9

LTT=Long Term Trend. Predicted NO₂ concentrations were adjusted using a Gap Factor based on the long-term adjustment factor calculated by the Highways Agency's "Interim Highways Agency Alternative Long-Term Gap Analysis Calculator v1.1". All values reflect predicted concentrations for the Opening Year 2023.

- 5.3.9 The largest improvement in air quality is observed at receptors R24, R25 and R26, all of which are predicted to experience an exceedance of the AQS objective in the Do Minimum but not in the Do Something. This is due to a reduction in the total traffic along the local roads due to re-routing of the majority of traffic onto the Scheme.
- 5.3.10 Receptor R24 is located adjacent to A57 Hyde Road and B6174 Stalybridge Road in the centre of Mottram. Both roads experience a decrease in traffic volume of 20,771 and 1,194 vehicles per day respectively. These equate to an 81% and 27% change in total vehicles per day from Do Minimum to Do Something. Additionally, speeds have also increased, changing from heavy congestion to light congestion along the A57. These decreases in traffic volume and reduction in congestion have resulted in a $21\mu\text{g}/\text{m}^3$ reduction in NO_2 concentrations at R24 in the Do Something.
- 5.3.11 Receptor R25 is located adjacent to A57 Mottram Moor and B6174 Market Street in the centre of Mottram. Whilst the A57 is predicted to experience a decrease of 22,278 vehicles per day, the B6174 is predicted to experience a slight increase in vehicles by 1,152. Additionally, speeds have also increased, changing from heavy congestion along both roads to light congestion. The decrease in traffic along the A57 equates to a 93% reduction in the total traffic volume resulting in a $54\mu\text{g}/\text{m}^3$ reduction in NO_2 concentrations at R25 in the Do Something. The large reduction is due to removing the majority of traffic from close to this receptor; the receptor is also located approximately 1m from the edge of the road.
- 5.3.12 Receptor R26 is located between the A57 Mottram Moor and A6018 Back Moor in Mottram. Both links are predicted to experience a decrease in traffic volume of 22,278 and 9,516 vehicles per day respectively. These equate to a 93% and 91% change in total vehicles per day from Do Minimum to Do Something. Additionally, speeds have also increased, changing from heavy congestion to light congestion along the A57. The decrease in traffic along both roads and reduction in congestion has resulted in a $27\mu\text{g}/\text{m}^3$ reduction in NO_2 concentrations at R26 in the Do Something.
- 5.3.13 No exceedances of the AQS objective are predicted in the Do Something scenario at any of the sensitive receptors located along the ARN to date. As such, it is not considered that mitigation measures to minimise air quality effects will be required. This will be confirmed when the assessment is updated in the ES.

6 CULTURAL HERITAGE

6.1 Existing Environmental Conditions

- 6.1.1 Baseline cultural heritage data has been collated for an area extending 1km from either side of the Scheme for designated assets and 500m for non-designated assets and is presented on Figures 6.1 to 6.5 at Appendix B. In addition, the Zone of Theoretical Visibility (ZTV) has been used to aid in identifying designated assets laying beyond the 1km study area which have the potential to be affected by the Scheme.
- 6.1.2 The study area contains one Scheduled Monument (Melandra Castle Roman Fort) (**SM1**) which dates to the roman period (AD 43 to 410); two Grade II* listed buildings ('Church of St Michael (**LB2**) and All Angels' and 'Cross' (**LB1**)) and 46 Grade II listed buildings (**LB3-48**) (see Figure 6.2 at Appendix B).
- 6.1.3 The entire Mottram in Longdendale Conservation Area (**CA1**) and a portion of the Hadfield Conservation Area (**CA2**) lie within the 1km study area. Mottram in Longdendale Conservation Area (**CA1**) contains 18 Grade II listed buildings (**LB6-14, LB21-23, LB32, LB36, LB38, LB39, LB42, LB47**). The portion of the Hadfield Conservation Area (**CA2**) that lies within the 1km study area does not contain any listed buildings.
- 6.1.4 In addition, the Tintwistle Conservation Area (**CA3**) lies partially within the ZTV and has key views which may include the Scheme location. The conservation area contains four additional Grade II listed buildings (**LB49-52**). Other assets which will be considered due to potential intervisibility with the Scheme, based on the ZTV, are two scheduled monuments and eight Grade II listed buildings.
- 6.1.5 The Greater Manchester and Derbyshire Historic Environment Records list 156 non-designated heritage assets relating to known or potential archaeological remains within the 500m study area (see Figure 6.3 at Appendix B). Of these heritage assets, six (**2, 3, 4, 5, 125, 140**) date to the prehistoric period and demonstrate human activity within the study area from the Mesolithic (12,000-4,000 BC) onwards.
- 6.1.6 In addition to the Melandra Castle roman fort (**SM1**), evidence of human activity and settlement within the study area during the roman period (AD 43 to 410) is represented by 17 (**6, 7, 29, 106, 126, 127, 128, 129, 130, 131, 135, 137, 138, 143, 144, 136, 139**) non-designated heritage assets, ranging from earthwork enclosures to possible evidence for human burials.
- 6.1.7 Nine (**84, 72, 73, 96, 110, 111, 112, 113, 123**) of the non-designated assets date to the medieval period (AD 1066 to 1540 respectively) and represent an increase in known settlement activity within the study area.
- 6.1.8 80 non-designated heritage assets date to the post-medieval period (AD1540 to 1901), particularly from around AD 1750 onwards. Of these 42 are archaeological (**78, 79, 88, 51, 105, 108, 119, 75, 121, 122, 118, 148, 150, 151, 53, 54, 92, 99, 70, 124, 17, 101, 27, 102, 97, 90, 149, 31, 49, 50, 56, 58, 64, 65, 66, 67, 68, 47, 147, 86, 109, 80**) and 36 are built heritage (**15, 48, 52, 55, 57, 59, 60, 62, 63, 69, 71, 74, 76, 77, 81, 82, 85, 89, 91, 93, 94, 95, 97, 98, 100, 103, 104, 107, 114, 115, 116, 117, 120, 133, 145, 146**). One asset (**46**) dates to the modern period (AD 1901 to present). These assets relate to agricultural, domestic, and industrial activity. Most notable of these assets is the Mottram Tunnel and Air Shafts (part of

the Longdendale Aqueduct) (**156**), which is a water delivery tunnel running from Tintwistle to Manchester and passes through the Scheme at two points.

- 6.1.9 Finally, five assets are of unknown date (**8, 9, 61, 83, 87**) and contribute to the general understanding and baseline of the study area.
- 6.1.10 There is potential for currently unknown sub-surface archaeological remains to be present within the study area. These archaeological remains may date from the prehistoric periods to the post-medieval period and include settlement and industrial activity.
- 6.1.11 In terms of historic landscape character, the study area contains areas of 20th century settlement, 20th century industry, 20th century communications, 20th century agricultural improvement, 19th century field systems, post-medieval settlement, post-medieval communications, and late post-medieval agricultural improvement. Within the red line boundary the land is mostly enclosed fields which date to the post-medieval period and show some degree of survival from this earlier period through historic hedgerows. The historic landscape has experienced some decline due to modern incursions by urban form which have fragmented it. However, some areas still show a certain amount of time depth.
- 6.1.12 There are no Registered Parks and Gardens, Battlefields, or Grade I Listed Buildings within the 1km study area.
- 6.1.13 In addition to the above, one asset has been identified as at high risk by Historic England's Heritage at Risk register. This is the Grade II* listed Church of St Michael and All Angels (**LB2**) which is at risk due to fabric loss and ingress of water.

6.2 Other baseline information to be obtained/surveys to be undertaken

- 6.2.1 The ZTV will be used to assess designated assets within the wider landscape and their potential to be affected by the Scheme.
- 6.2.2 A further walkover survey is proposed to assess assets identified during the preliminary site visit and perform additional settings and landscape assessments. During this visit buildings proposed for demolition will be assessed for heritage potential.
- 6.2.3 LiDAR data will be assessed to identify further landscape and earthwork features.
- 6.2.4 An analysis of aerial photographs will be undertaken to identify further landscape and earthwork features.
- 6.2.5 Consultation with key stakeholders will be undertaken. This will include:
- Historic England;
 - Greater Manchester Archaeological Advisory Service;
 - Derbyshire County Council; and
 - Peak District National Park Authority.
- 6.2.6 Pre-application surveys are planned as part of the assessment process. These surveys include geotechnical monitoring and assessment, and targeted geophysical survey. The scope of these surveys will be agreed with stakeholders during consultation and will also inform the need (or otherwise) for further archaeological investigations.

6.2.7 These surveys would be used to inform assessment within the ES and aid in mitigation design.

6.3 Potential Effects and Mitigation Measures

6.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined in Table 6-1 below. Embedded mitigation measures can be found in Section 2.17.

6.3.2 During the construction phase all effects on designated assets are temporary negative effects unless stated otherwise. All effects on non-designated assets would be permanent and negative unless stated otherwise. During the operation phase all effects on assets are negative effects unless stated otherwise.

6.3.3 It should be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Table 6-1: Potential effects and mitigation on Cultural Heritage receptors

Receptor – Melandra Castle Scheduled Monument (SM1)
<p><i>Nature of Effect During Construction:</i> The monument is located on a bluff approximately 100m to the southeast of the Scheme. The monument’s setting comprises, in part, views across the Etherow Valley including the route of the roman road which crosses the Scheme. Construction activities and associated dust would temporarily affect these views.</p> <p><i>Nature of Effect During Operation:</i> This asset has the potential to experience permanent visual changes to its landscape setting. There may also be additional noise and dust intrusion into the setting of this landscape.</p>
<p><i>Duration of Effect During Construction:</i> Throughout the construction phase (approximately 3 years).</p> <p><i>Duration of Effect During Operation:</i> The lifetime of the Scheme.</p>
<p><i>Additional Mitigation During Construction:</i> Damping down would aid in reduction of dust produced by construction activities. However, all effects within the construction phase would be temporary.</p> <p><i>Additional Mitigation During Operation:</i> Refer to Chapter 10 for proposed noise mitigation.</p>
Receptor - Church of St Michaels and All Angels Grade II* Listed Building (LB2)
<p><i>Nature of Effect During Construction:</i> The church sits on a bluff overlooking the Scheme, approximately 488m to the southwest. The setting of the asset comprises, in part, views across the Etherow Valley to the north and east of the asset, towards Hollingworth. Construction activities and associated dust would temporarily affect these views.</p> <p><i>Nature of Effect During Operation:</i> This asset has the potential to experience permanent visual changes to its landscape setting. In addition, there may be additional noise and dust intrusion into the setting of this landscape.</p>

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

Damping down would aid in reduction of dust produced by construction activities. However, all effects within the construction phase would be temporary.

Additional Mitigation During Operation:

Refer to Chapter 10 for proposed noise mitigation.

Receptor – Grade II Listed Buildings

Woolley Bridge Farm (Tara Brook Farm) (LB37)

Nature of Effect During Construction:

This asset lies approximately 12m to the north of the Scheme. The setting of this asset is linked to the agricultural landscape within which it sits. There would be a temporary impact to this setting during the construction phase comprising visual intrusion by plant and the working area, noise intrusion caused by plant, and dust caused by plant movement and construction works.

Nature of Effect During Operation:

This asset has the potential to experience permanent visual changes to its landscape setting. In addition, there may be additional noise and dust intrusion into the setting of this landscape.

Mottram Old Hall/Dial House and Cottage (LB18, LB3, LB28)

Nature of Effect During Construction:

A collection of Grade II listed buildings which lie a maximum of 71m to the north and northwest of the Scheme. These assets have the potential to experience a temporary impact to their settings. This temporary impact during the construction phase would comprise visual intrusion by plant and the working area, noise intrusion caused by plant, and dust caused by plant movement and works.

Nature of Effect During Operation:

These assets have the potential to experience a permanent change to their setting due to increased noise intrusion.

Lower Roe Cross Farmhouse and Edge Lane House (LB24, LB40)

Nature of Effect During Construction:

These assets lie a maximum of 135m to the northwest of the Scheme and have the potential to experience a temporary impact to their settings. This temporary impact during the construction phase would comprise visual intrusion by plant and the working area, noise intrusion caused by plant, and dust caused by plant movement and works.

Nature of Effect During Operation:

These assets have the potential to experience a permanent change to their setting due to increased noise intrusion.

Grade II listed buildings in Mottram in Longdendale Conservation Area (CA1) and Gun Inn and War Memorial, Hollingworth (LB16, LB48)

Nature of Effect During Construction:

These assets have potential to experience temporary effects to their settings due to increased traffic associated with the construction phase.

Nature of Effect During Operation:

There is potential for the Scheme to have a positive effect on some assets through the reduction of traffic within the Conservation Area. This will address one of the key threats to the Conservation Area according to the Conservation Area appraisal (Tameside 2013). The Gun Inn and War Memorial, Hollingworth (**LB16, LB48**) have potential to experience a neutral or positive effect during the operation phase due to reduced traffic flow around the assets.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

Damping down would aid in reduction of dust produced by construction activities. However, all effects within the construction phase would be temporary.

Additional Mitigation During Operation:

No additional mitigation is required for Mottram in Longdendale Conservation Area (**CA1**) and other assets which would largely experience a positive effect from the Scheme. Additional mitigation for adverse effects on identified listed buildings may include additional screening to provide a reduction in visual intrusion into the setting of assets. Screening should be in keeping with the local landscape and materials wherever possible. Refer to Chapter 10 for proposed noise mitigation.

Receptor - Conservation Areas

Nature of Effect During Construction:

Mottram in Longdendale Conservation Area (CA1)

This asset has potential to experience temporary effects to its setting and character due to increased traffic associated with the construction phase.

Tintwistle Conservation Area (CA3)

This asset has potential to experience temporary effects to its character and setting due to increased traffic associated with the construction phase.

Nature of Effect During Operation:

Mottram in Longdendale Conservation Area (CA1)

There is potential for the Scheme to have a positive effect on this asset through the reduction of traffic within the Conservation Area. This will address one of the key threats to the Conservation Area according to the Conservation Area appraisal (Tameside 2013).

Tintwistle Conservation Area (CA3)

Assessment is ongoing on this asset but at present it is considered that there would be no impact to the asset during the operation phase.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

Routing and control of construction traffic to avoid the Conservation Area may aid in the reduction of these effects. However, all effects within the construction phase would be temporary.

Additional Mitigation During Operation:

No additional mitigation is considered feasible at this stage.

Receptor – Non-statutory heritage assets

Nature of Effect During Construction:

Mottram Tunnel and Air shafts (156) – The Scheme has potential to impact directly on this asset and may result in removal of parts of this asset which lie within the Scheme.

The Scheme has the potential to remove the following assets in whole or part where they lie within the Scheme:

- Potential archaeological remains at Mottram Old Hall (**LB18/27**) (identified through Geophysics)
- Roman road (**134**) and settlement at Woolley Bridge (**127/128**)
- Remains of Isolation Hospital (**47**)
- Site of Mottram Old Mill (**125**) and nearby assets
- Former settlement of Woolley Bridge (within site – earthworks/below ground remains) (**110**)
- Potential remains of mining activity associated with site at Carrhouse (**108**)
- Prehistoric activity (**136**) close to the River Etherow.

Nature of Effect During Operation:

As for construction.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

Archaeological excavation and recording before and during construction would preserve assets by record and mitigate the impacts of the Scheme.

Additional Mitigation During Operation:

As for construction.

Receptor – Historic Landscape

Nature of Effect During Construction:

The historic landscape has the potential to experience negative effects from activities associated with construction activity due to increases in visual intrusion into the landscape through traffic, dust, and excavations. In addition, increase in noise may affect this asset.

These intrusions have the potential to affect the character of the landscape within certain areas.

Nature of Effect During Operation:

The historic landscape has the potential to experience negative effects from the Scheme due to visual intrusion into the fabric of the landscape which may affect its character. In addition, these changes may result in alteration of the setting of some assets.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

Damping down would aid in reduction of dust produced by construction activities. However, all effects within the construction phase would be temporary.

Additional Mitigation During Operation:

No additional mitigation is considered feasible at this stage.

7 BIODIVERSITY

7.1 Existing Environmental Conditions

7.1.1 Baseline data collection has been undertaken, at various scales, within an approximate 30km radius from the Scheme. The study area was based on requirements of [DMRB Volume 11, Section 3, Part 4](#), environmental assessment documents for European protected sites and professional judgement.

7.1.2 Distances from the Scheme within which desk-based studies were undertaken comprised:

- 1km for records relating to protected or notable species and habitats;
- 2km for statutory and non-statutory designated sites comprising:
 - Special Areas of Conservation (SACs), with the exception of SACs where bats are noted as a qualifying interest (30km);
 - Sites of Community Importance (SCIs) and candidate SACs;
 - Special Protection Areas (SPAs) and potential SPAs;
 - Ramsar sites;
 - Sites of Special Scientific Interest (SSSIs);
 - Local Nature Reserves (LNRs);
 - Sites of Biological Importance (SBIs); and
 - Local Wildlife Sites (LWSs).

7.1.3 A Phase 1 Habitat survey was undertaken to produce baseline information on habitats within the study area. The survey comprised a walkover of the land and habitats present, with a classification of the habitats to Phase 1 Habitat Survey standard. The survey followed the method described in the [‘Handbook for Phase 1 Habitat Survey – a technique for environmental audit’](#) (Joint Nature Conservation Committee, 2010).

7.1.4 The study area used for the field survey included the land situated within the Scheme footprint and extended to include all accessible land within a 1km route corridor surrounding the Scheme (i.e. 500m either side of the Scheme).

7.1.5 Only receptors which will be subject to detailed assessment in the ES are discussed in detail within this PEIR.

Statutory Designated Sites

7.1.6 In relation to the Scheme, the Dark Peak SSSI, the Peak District Moors (South Pennine Moors Phase 1) SPA and the South Pennine Moors SAC share the same boundary situated at its nearest point to the Scheme, approximately 2.25km north east.

7.1.7 Three additional statutory sites lie within 2km of the Scheme:

- Hurst Clough LNR, approximately 600m south of the Scheme and potentially connected to the Scheme via Hurstclough Brook.
- Swallows Wood LNR, situated approximately 1.45km north of the Scheme.

- Great Wood LNR, which is an extension of Hurst Clough, situated approximately 1.6km to the south of the Scheme.

7.1.8 The approximate location of the above statutory designated sites in relation to the red line boundary is highlighted on Figure 7.1 at Appendix B.

Non-Statutory Designated Sites

7.1.9 There are 14 non-statutory designated sites within 2km of the Scheme, these being (listed in distance order):

- Melandra Castle and Railway LWS;
- Westwood Clough & Longlands Hall Grade B SBI;
- Hurst Clough Grade B SBI;
- Dinting Nature Reserve LWS;
- Clough at Hattersley Grade B SBI;
- Dinting Lodge Grassland LWS;
- Dinting Vale Reservoir & Brook LWS;
- Banks Wood LWS;
- Robin Wood LWS;
- Hollingworth Hall Wood Grade B SBI;
- Clough at Mattley Grade A SBI;
- Gamesley Sidings & Railway LWS;
- Dinting Pond Junction LWS; and
- Godley Hill Heathland Grade B SBI.

Habitats and Species

7.1.10 The main habitats within the study area are shown on Figure 7.2 at Appendix B.

7.1.11 Targeted surveys for great crested newts, reptiles, breeding birds, badgers, water voles, otters, bats (roost and activity survey) and Phase 2 habitat surveys for woodlands and hedgerows were undertaken between April and October 2017. The species surveys have been undertaken during specified and appropriate survey seasons, and this will be detailed within the technical survey reports of the ES.

Receptors to be Scoped into the Assessment

South Pennine Moors SAC

7.1.12 The South Pennine Moors SAC is located approximately 2.25km north east of the Scheme.

7.1.13 The primary reasons for designation of the SAC are: dry heath for which the site was the habitat's most south-easterly upland location in the UK; blanket bog, the most south-easterly occurrence in the UK; and old Sessile Oak (*Quercus*) woods. Blanket bogs are a priority feature of the site.

7.1.14 Other qualifying features that are not primary reasons for designation: northern Atlantic wet heaths with Cross-leaved Heath (*Erica tetralix*); and transition mires and quaking bog.

Peak District Moors (South Pennine Moors Phase 1) SPA

- 7.1.15 The Peak District Moors (South Pennine Moors Phase 1) SPA is located approximately 2.25km north east of the Scheme.
- 7.1.16 The primary reasons for designation of the SPA are: during the breeding season the site supports at least 2.2% of the British breeding population of short-eared owl (*Asio flammeus*); at least 2.3% of the British breeding population of merlin (*Falco columbarius*); and at least 1.9% of the British breeding population of golden plover (*Pluvialis apricaria*).
- 7.1.17 Non-qualifying species of interest: the also site supports a rich upland breeding bird assemblage which, as well as the qualifying species listed above, includes important numbers of peregrine (*Falco peregrinus*), lapwing (*Vanellus vanellus*), dunlin (*Calidris alpina schinzii*), snipe (*Gallinago gallinago*), curlew (*Numenius arquata*), redshank (*Tringa tetanus*), common sandpiper (*Actitis hypoleucos*), whinchat (*Saxicola rubetra*), wheatear (*Oenanthe oenanthe*), ring ouzel (*Turdus torquatus*) and twite (*Carduelis flavirostris*).

The Dark Peak SSSI

- 7.1.18 The Dark Peak SSSI is located approximately 2.25km north east of the Scheme. While its Impact Risk Zones (IRZs) encompass the Scheme, the IRZ does not list transport proposals (including roads) as a potential adverse impact at this distance.
- 7.1.19 The SSSI is designated for its moorland habitats (blanket mires, wet and dry heaths and acid grasslands) and moorland breeding bird assemblage (internationally important populations of short-eared owl (*Asio flammeus*), merlin (*Falco columbarius*), golden plover (*Pluvialis apricaria*), meadow pipit (*Anthus pratensis*), red grouse (*Lagopus lagopus*), dunlin (*Calidris alpina schinzii*), ring ouzel (*Turdus torquatus*), breeding curlew (*Numenius arquata*) and twite (*Carduelis flavirostris*)). The SSSI also supports other birds, including smaller populations of a number of riparian and woodland birds; invertebrates, including beetles, moths and golden-ringed dragonfly (*Cordulegaster boltonii*); and a number of moorland/heathland plant species. Several of the site's vegetation types, plants and animals are at the southern or northern limits in England.

Semi-natural Broadleaved Woodland

- 7.1.20 This habitat is occasional and widespread within the study area, within which there are three areas recognised on the Priority Habitat Inventory (but not confirmed by survey) as Lowland Mixed Deciduous Woodland S41 Habitat (i.e. [Section 41 of the Natural Environment and Rural Communities Act 2006](#); hereafter referred to as S41). One of these areas falls within the footprint of the Scheme.

Hedgerows

- 7.1.21 A network of hedgerows is interspersed throughout the study area. Although these hedgerows were predominantly gappy, species-poor and dominated by Hawthorn (*Crataegus monogyna*), they all met the criteria for S41 Hedgerow.
- 7.1.22 Additionally, two hedgerows were assessed to meet the criteria of 'important hedgerow' in accordance with the Hedgerows Regulations 1997. Sections of one of these hedgerows fall within the red line boundary of the Scheme. The other 'important hedgerow' was situated immediately east of the red line boundary.

Marsh/Marshy Grassland

- 7.1.23 This habitat was rare within the study area and there are small localised areas within the Scheme footprint.

Unimproved Acid Grassland

- 7.1.24 This habitat was rare within the study area and there are small localised areas within the Scheme footprint.

Rivers and Streams S41 Habitat

- 7.1.25 All natural and near-natural running waters in the UK qualify as Rivers and Streams S41 Habitat. Within the red line boundary this includes the River Etherow, an extensive watercourse extending under the Scheme at Brookfields, and a number of small watercourses.

Ephemeral Drainage Ditches

- 7.1.26 This habitat was frequent along field boundaries throughout the study area.

Ponds

- 7.1.27 A total of 22 ponds were identified within the study areas; 12 are situated within the red line boundary of the Scheme and these vary in terms of size and permanence.

Fish

- 7.1.28 Based on desk study information (including historic survey), there is a high likelihood that brown trout (*Salmo trutta*) and European bullhead (*Cottus gobio*) are present within the section of River Etherow within the study area. However, there was a negligible likelihood that the other watercourses within the study area will support notable fish.

Breeding Birds

- 7.1.29 Breeding bird surveys comprised monthly diurnal visits in April, May and June 2017.

- 7.1.30 Sixteen species of nature conservation importance were observed which comprised: black-headed gull (*Chroicocephalus ridibundus*), Brent goose (*Branta bernicla*), song thrush (*Turdus philomelos*), mistle thrush (*Turdus viscivorus*), dunnoek (*Prunella modularis*), linnet (*Carduelis cannabina*), starling (*Sturnus vulgaris*), grasshopper warbler (*Locustella naevia*), house martin (*Delichon urbicum*), house sparrow (*Passer domesticus*), lapwing (*Vanellus vanellus*), mallard (*Anas platyrhynchos*), meadow pipit (*Anthus pratensis*), skylark (*Alauda arvensis*) and reed bunting (*Emberiza schoeniclus*).

- 7.1.31 Evidence of one Schedule 1¹ species (barn owl *Tyto alba*) was also recorded in the form of pellets and droppings. Other non-notable species typical of scrub/woodland/edge of woodland habitat were also recorded.

Bats

- 7.1.32 Bat surveys comprising roost surveys (preliminary roost assessments and emergence/re-entry surveys) and activity surveys (static monitoring and transect surveys) were undertaken to generate baseline data on bats. Roost surveys were

¹ Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)

undertaken between May and September 2017. Activity surveys were undertaken monthly between April and October 2017.

- 7.1.33 The results of the roost surveys, combined with the desk study information suggests that there are a number of colonies of common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*P. pygmaeus*) which move between the buildings within the study area regularly throughout the maternity season and between years.
- 7.1.34 The activity surveys identified a species assemblage typical of the region and included: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), noctule bat (*Nyctalus noctula*), *Myotis* spp and brown long-eared bat (*Plecotus auritus*).

Badger

- 7.1.35 Badger surveys were undertaken within the study area between March and October 2017.
- 7.1.36 A total of 24 badger setts (eight main, seven annexe, eight outlier, one disused) were found within the study area. Of these, 12 setts are situated within red line boundary (four main, three annexe, four outlier, one disused). Badger activity (in the form of sightings and latrines) was also recorded throughout the study area during various field visits in 2017.

Otter

- 7.1.37 Otter surveys were undertaken within the study area in April and August 2017.
- 7.1.38 Otter field signs were present on the River Etherow, which is bisected by the Scheme. Based on the results of the survey and the quality of habitats within the River Etherow, otters are likely to use the River Etherow for commuting only.
- 7.1.39 Other watercourses (i.e. drains and ditches) within the study area were considered sub-optimal for otter and not likely to be used by this species.

Water Vole

- 7.1.40 Water vole surveys were undertaken within the study area in April and August 2017.
- 7.1.41 No water vole signs were identified along watercourses to the north of Mottram Moor (i.e. the Mottram Moor Link Road section); however, presence was established on two watercourses bisected by the A57(T) to A57 Link Road section: River Etherow and an unnamed watercourse associated with Mottram Moor Farm.

Receptors to be Scoped out of the Assessment

- 7.1.42 Based on data obtained to date through desk studies and targeted surveys, it is considered likely that the following species/species groups are absent from the study area and can therefore be scoped out of further assessment. Further justification (i.e. detailed desk study and survey results) will be provided within the ES.
- White-clawed crayfish: Due to the lack of records, unsuitability of the habitats within the study area, geographical location and the nationally declining nature of this species.

- Aquatic invertebrates: No notable aquatic invertebrates were recorded during targeted surveys within the study area in 2000, and due to the lack of records and unsuitability of the habitats within the study area; which are likely to be of value only to common, widespread species.
- Terrestrial invertebrates: No notable terrestrial invertebrates were recorded during targeted surveys within the study area in 2001, and suitable habitats for terrestrial invertebrates within the study area are of limited extent and likely to only support an invertebrate assemblage typical of the region.
- Reptiles: No reptiles were recorded during targeted surveys in 2017.
- Dormice: Due to the lack of records, geographical location and the nationally declining nature of this species.

7.1.43 The additional features below either are present or may be present within the study area; however, due to their local status and low value, or distance from the Scheme, significant adverse effects are considered very unlikely. These features will therefore be scoped out of further assessment:

- Hurst Clough LNR, Swallows Wood LNR and Great Wood LNR: Situated sufficiently far from the Scheme and separated by natural and anthropogenic barriers. Note that although Hurst Clough LNR (and SBI) may be hydrologically connected to the Scheme, the sites are important for non-aquatic receptors (ancient semi-natural woodland habitat, bryophytes, and fungi) that can be safeguarded via standard best practice measures implemented within a CEMP.
- Non-statutory designated sites: Due to the nature of the designations, and because these sites are situated sufficiently far from the Scheme, it is not considered that there would be any direct impact pathways. Furthermore, habitat degradation from increased air pollution can also be scoped out due to distance of all sites from the Scheme, and, with the exception of Hurst Clough SBI, none of the other sites appear to be hydrologically connected to the Scheme.
- Other S41 and non-S41 Habitats: Other S41 habitats identified within the study area (such as traditional orchard) are situated sufficiently far from the Scheme, and it is not considered that there would be any direct impact pathways. No other non-S41 habitats of note were recorded within the study area, and all were considered typical of the region.
- Protected and Notable Plants (including Fungi): The study area supports a restricted diversity and distribution of protected and notable plants (including fungi), limited to widespread presence of Bluebell within woodlands (recorded in 2007).
- Invasive flora: The study area supports a restricted diversity and distribution of invasive flora. Responsibilities relating to invasive flora would be managed through standard mitigation procedures detailed within a CEMP.
- Amphibians: No great crested newts were recorded during targeted surveys. Common amphibians were found to be locally common and widespread and all ponds affected by the Scheme would be replaced by ponds of better quality.

- Other Mammals (hedgehog, polecat and brown hare): Habitats within the study area are broadly suitable for these species, and the Scheme will therefore result in the loss of a nominal proportion of the available habitat. However, the implementation of a CEMP and mitigation/habitat provision for other species and habitats will sufficiently minimise impacts to these species.

7.2 Other baseline information to be obtained/surveys to be undertaken

- 7.2.1 Changes to the red line boundary in November 2017 led to a modification of the study area. As a result, additional building inspection surveys for bats and barn owl will be undertaken in 2018.
- 7.2.2 Following the comments received from the PINS on the [Environmental Impact Assessment Scoping Report](#), river corridor surveys will also be undertaken in 2018 at any watercourse impacted by the Scheme.
- 7.2.3 Detailed traffic information (and the subsequent air quality and noise modelling) is required to assess the potential for impacts on South Pennine Moors SAC, Peak District Moors SPA and the Dark Peak SSSI as a result of increased traffic on the wider road network as a result of the Scheme. This will be reviewed to inform the ES.

7.3 Potential Effects and Mitigation Measures

- 7.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined in Table 7-1 below. Embedded mitigation measures can be found in Section 2.17.
- 7.3.2 It should be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Table 7-1: Potential effects and mitigation on Biodiversity receptors

Receptor – Statutory Designated Sites

South Pennine Moors SAC

Nature of Effect During Construction:

Potential for increased traffic volume in the wider road network due to road diversions. This could lead to increased deposition of atmospheric pollutants (principally Nitrogen), degrading SAC habitats by reducing species richness and/or the capacity for these habitats to recover from historic pollution events.

Nature of Effect During Operation:

Potential for increased traffic volume in the wider road network. This could lead to increased deposition of atmospheric pollutants (principally Nitrogen), degrading SAC habitats by reducing species richness and/or the capacity for these habitats to recover from historic pollution events.

Peak District Moors SPA

Nature of Effect During Construction:

Potential for an increase in traffic volume in the wider road network due to road diversions. This could lead to increased visual and noise disturbance, degrading habitats. Further, increased road kills may attract greater numbers of predators which would indirectly affect ground-nesting birds associated with the SPA by increasing nest predation risk.

Nature of Effect During Operation:

There is potential for an increase in traffic volume in the wider road network. This could lead to increased visual and noise disturbance, degrading habitats. Further, increased road kills may attract greater numbers of predators which would indirectly affect ground-nesting birds associated with the SPA by increasing nest predation risk.

The Dark Peak SSSI

Nature of Effect During Construction:

Potential for increased traffic volume in the wider road network due to road diversions. This could lead to increased deposition of atmospheric pollutants (principally Nitrogen), degrading SSSI habitats by reducing species richness and/or the capacity for these habitats to recover from historic pollution events. The degradation of SSSI habitats could have a detrimental effect on SSSI qualifying invertebrate species. Visual/noise disturbance and traffic collisions with SSSI qualifying bird species and other non-qualifying species associated with the SSSI (such as S41 species mountain hare *Lepus timidus*) may also increase. Finally, increased road kills may attract greater numbers of predators which would indirectly affect ground-nesting birds associated with the SSSI by increasing nest predation risk.

Nature of Effect During Operation:

Potential for increased traffic volume in the wider road network. This could lead to increased deposition of atmospheric pollutants (principally Nitrogen), degrading SSSI habitats by reducing species richness and/or the capacity for these habitats to recover from historic pollution events. The degradation of SSSI habitats could have a detrimental effect on SSSI qualifying invertebrate species. Visual/noise disturbance and traffic collisions with SSSI qualifying bird species and other non-qualifying species associated with the SSSI (such as S41 species mountain hare *Lepus timidus*) may also increase. Finally, increased road kills may attract greater numbers of predators which would indirectly affect ground-nesting birds associated with the SSSI by increasing nest predation risk.

South Pennine Moors SAC

Duration of Effect During Construction:

At least for the duration of construction (approximately 3 years) and potentially longer whilst habitats recover.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Peak District Moors SPA

Duration of Effect During Construction:

At least for the duration of construction (approximately 3 years) and potentially longer whilst populations recover.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

The Dark Peak SSSI

Duration of Effect During Construction:

At least for the duration of construction (approximately 3 years) and potentially longer whilst habitats recover.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

South Pennine Moors SAC

Additional Mitigation During Construction:

Measures to mitigate impacts on the SAC will be developed if necessary, following a Habitats Regulations Assessment.

Additional Mitigation During Operation:

Measures to mitigate impacts on the SAC will be developed if necessary, following a Habitats Regulations Assessment.

Peak District Moors SPA

Additional Mitigation During Construction:

Measures to mitigate impacts on the SPA will be developed if necessary, following a Habitats Regulations Assessment.

Additional Mitigation During Operation:

Measures to mitigate impacts on the SPA will be developed if necessary, following a Habitats Regulations Assessment.

The Dark Peak SSSI

Additional Mitigation During Construction:

The area covered by the Dark Peak SSSI overlaps with the South Pennine Moors SAC and Peak District Moors SPA. If necessary, a Habitat Regulations Assessment will be undertaken, and this document would provide measures to mitigate impacts on the SAC and SPA as a result of the Scheme. Although not all SSSI qualifying features are shared with the SAC and SPA, it is considered that they are functionally linked to some degree. As such, mitigation measures developed during the Habitats Regulations Assessment process would also be applicable to the SSSI.

Additional Mitigation During Operation:

The area covered by the Dark Peak SSSI overlaps with the South Pennine Moors SAC and Peak District Moors SPA. If necessary, a Habitat Regulations Assessment will be undertaken, and this document would provide measures to mitigate impacts on the SAC and SPA as a result of the Scheme. Although not all SSSI qualifying features are shared with the SAC and SPA, it is considered that they are functionally linked to some degree. As such, mitigation measures developed during the Habitats Regulations Assessment process would also be applicable to the SSSI.

Receptor – Lowland Mixed Deciduous Woodland S41 Habitat

Nature of Effect During Construction:

The red line boundary includes a section of recognised (but unconfirmed) Lowland Mixed Deciduous Woodland S41 Habitat at Old Hall Lane (SJ 9938 9599). Potential effects include physical loss, damage and fragmentation which could also lead to negative edge effects (such as adverse microclimate conditions) on retained sections. There would also be potential for habitat damage/degradation to arise during construction in the form of dust deposition and chemical pollution.

Nature of Effect During Operation:

There is potential for habitat degradation/pollution via road drainage, run-off, de-icing salts, spray from road traffic and air pollution (primarily Nitrogen deposition).

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent or until replacement planting establishes to provide appropriate functionality. Residual damage/pollution impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss (and where possible increase to provide more robust and resilient ecosystem) in area and quality. Provision of new native species would be pre-adapted to warmer conditions and more resilient to climate change. Dust deposition and pollution events would be controlled through implementation of a CEMP.

Where tree surgery to the crown or roots is necessary, this would be undertaken in accordance with British Standard (BS) 3998:2010 'Tree Work. Recommendations' and appropriate Arboricultural Association advice notes. Retained trees would be adequately protected from construction, with particular attention when adjacent to ancient woodland, in accordance with BS 5837:2005 'Trees in Relation to Construction – Recommendations', Arboricultural Association and Forestry Authority Advice Notes, and the National Joint Utilities Group (2004) '[Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees](#)'.

Appropriate measures would be taken to avoid the spread of invasive and non-native plants.

Additional Mitigation During Operation:

Measures to mitigate impacts from changes in road drainage are described in Chapter 11. Additional mitigation with regards air quality to be developed as appropriate and as informed by Chapter 5.

Receptor – 'Important Hedgerow' and Hedgerow S41 Habitat

Nature of Effect During Construction:

The red line boundary includes 23No. S41 hedgerows (wholly or partially), including one 'important' hedgerow. Potential effects include physical loss, damage and fragmentation. There would also be potential for habitat damage/degradation to arise during construction in the form of dust deposition and chemical pollution.

Nature of Effect During Operation:

Habitat degradation/pollution via road drainage, run-off, de-icing salts, spray from road traffic and air pollution (primarily Nitrogen deposition).

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent or until replacement planting establishes to provide appropriate functionality. Residual damage/pollution impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss (and where possible increase to

provide more robust and resilient ecosystem) in length and quality. Provision of new native species would be pre-adapted to warmer conditions and more resilient to climate change. Appropriate measures would be taken to avoid the spread of invasive and non-native plants.

Additional Mitigation During Operation:

Measures to mitigate impacts from changes in road drainage are described in Chapter 11. Additional mitigation with regards air quality to be developed as appropriate and as informed by Chapter 5.

Receptor – Marsh/Marshy Grassland

Nature of Effect During Construction:

Direct physical loss, damage and pollution.

Nature of Effect During Operation:

Habitat degradation/pollution via road drainage, run-off, de-icing salts, spray from road traffic and air pollution (primarily Nitrogen deposition). Improved drainage and changes in local hydrological conditions (i.e. through realigning Hurstclough Brook) could cause further losses to this habitat.

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent or until the replacement habitat establishes to provide appropriate functionality. Residual damage/pollution impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss (and where possible increase to provide more robust and resilient ecosystem) in area and quality. Pollution events would be controlled through implementation of a CEMP.

Additional Mitigation During Operation:

Measures to mitigate impacts from changes in water quality are described in Chapter 11. Additional mitigation with regards air quality to be developed as appropriate and as informed by Chapter 5.

Receptor – Unimproved Acid Grassland

Nature of Effect During Construction:

Unimproved acid grassland was scarce within the study area and survived mainly on steeper ground; for instance, on the banks associated with watercourses and in very small fragments alongside lanes and field edges. Potential effects include habitat loss, damage and degradation (from dust or chemical pollution).

Nature of Effect During Operation:

Habitat degradation/pollution via road drainage, run-off, de-icing salts, spray from road traffic and air pollution (primarily Nitrogen deposition).

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent or until the replacement habitat establishes to provide appropriate functionality. Residual damage/pollution impacts may last

for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss (and where possible increase to provide more robust and resilient ecosystem) in area and quality. Pollution events would be controlled through implementation of a CEMP.

Additional Mitigation During Operation:

Additional mitigation with regards air quality to be developed as appropriate and as informed by Chapter 5.

Receptor – Rivers and Streams S41 Habitat

Nature of Effect During Construction:

The red line boundary includes a section of the River Etherow and smaller watercourses, comprising a total length of approximately 2.6km. Potential effects include physical loss, damage and fragmentation. Accidental spills of chemicals and other potentially toxic substances may also occur from machinery and stripping of topsoil may encourage particulates to be washed into water.

Nature of Effect During Operation:

Habitat degradation/pollution via road drainage, run-off, de-icing salts, spray from road traffic and air pollution (primarily Nitrogen deposition).

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent or until the replacement habitat establishes to provide appropriate functionality. Residual damage/pollution impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss of aquatic/riparian habitat, either in length/quantity and quality.

Pollution events would be controlled through implementation of a CEMP.

Spill kits would be available on site and potential polluting materials would not be stored within 50m of watercourses or areas of significant biodiversity value.

Appropriate measures would be taken to avoid the spread of invasive and non-native plants.

A suitable undisturbed buffer zone will be established along all retained sections of watercourse.

Additional Mitigation During Operation:

Measures to mitigate impacts from changes in water quality are described in Chapter 11.

Receptor – Ephemeral Drainage Ditches

Nature of Effect During Construction:

The red line boundary includes a number of ephemeral drainage ditches, comprising a total length of approximately 1.1 km. Potential effects include physical loss, damage and fragmentation. Accidental spills of chemicals and other potentially toxic substances may also occur from machinery, and stripping of topsoil may encourage particulates to be washed into water.

Nature of Effect During Operation:

Habitat degradation/pollution via road drainage, run-off, de-icing salts, spray from road traffic and air pollution (primarily Nitrogen deposition).

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent or until the replacement habitat establishes to provide appropriate functionality. Residual damage/pollution impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss of aquatic/riparian habitat, either in length/quantity and quality.

Pollution events would be controlled through implementation of a CEMP.

Spill kits would be available on site and potential polluting materials would not be stored within 50m of watercourses or areas of significant biodiversity value.

Appropriate measures would be taken to avoid the spread of invasive and non-native plants.

Any works that disturb drainage features would include for any necessary mitigation or reinstatement to ensure the features retain their correct working function.

A suitable undisturbed buffer zone will be established along all retained sections of ditch.

Additional Mitigation During Operation:

Measures to mitigate impacts from changes in water quality are described in Chapter 11.

Receptor – Ponds S41 Habitat

Nature of Effect During Construction:

There are 12 ponds within the red line boundary. Potential effects include physical loss, damage and fragmentation. Accidental spills of chemicals and other potentially toxic substances may also occur from machinery and stripping of topsoil may encourage particulates to be washed into water.

Nature of Effect During Operation:

No adverse impacts anticipated.

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are indefinite or until replacement ponds establish to provide appropriate functionality. Residual damage/pollution impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

N/A

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss of ponds, either in area/quantity and quality.

Pollution events would be controlled through implementation of a CEMP.

Appropriate measures would be taken to avoid the spread of invasive and non-native plants.

Additional Mitigation During Operation:

N/A

Receptor – Fish

Nature of Effect During Construction:

The construction of a bridge crossing over the River Etherow has the potential to cause direct loss and degradation of habitats used by brown trout and European bullhead. There is also the potential for indirect habitat loss/degradation through pollution, sediment deposition and shading.

Nature of Effect During Operation:

Habitat degradation/pollution via road drainage, run-off, de-icing salts, spray from road traffic and air pollution (primarily Nitrogen deposition).

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent or until the replacement habitat establishes to provide appropriate functionality. Residual damage/pollution impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst the habitat recovers.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss of aquatic/riparian habitat, either in length/quantity and quality.

Pollution events would be controlled through implementation of a CEMP.

Spill kits would be available on site and potential polluting materials would not be stored within 50m of watercourses or areas of significant biodiversity value.

A suitable undisturbed buffer zone will be established along retained sections of the river.

Additional Mitigation During Operation:

Measures to mitigate impacts from changes in water quality are described in Chapter 11.

Receptor – Breeding Birds

Nature of Effect During Construction:

Potential impacts include habitat loss, severance and fragmentation (breeding and foraging) and mortality, injury and disturbance whilst breeding. Increased visual (including light pollution) or noise disturbances during the construction phase could also cause displacement and changes in behaviour.

Nature of Effect During Operation:

Road lighting and visual disturbance from a more elevated and/or wider road may result in birds altering their use of habitat through avoidance of the road (i.e. it becomes a barrier to movement), mortality through traffic collisions, or an alteration to commuting routes which may expose birds to different risks that would normally be avoided.

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are indefinite or until replacement habitats establish to provide appropriate functionality. Residual disturbance impacts may last for the duration of construction (approximately 3 years) and potentially longer whilst populations recover from the temporary loss of resource.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Pre-construction ecological checks for breeding birds would be carried out. Breeding birds would be adequately protected from construction activities during the breeding bird season and visual/noise disturbance would be minimised through implementation of a CEMP. Bird boxes would be provided to mitigate the loss of breeding bird habitat in the short-term until replacement planting establishes.

Additional Mitigation During Operation:

Noise and landscape mitigation will serve to limit noise and visual disturbance to breeding birds.

Receptor – Bats

Nature of Effect During Construction:

The red line boundary includes several bat roosting features (at least seven confirmed roosts and 23 suitable roost features) and flight paths used by foraging/commuting bats. Potential effects include damage/destruction to roosts, foraging habitat and commuting routes which could lead to fragmentation. Also, there is potential for disturbance/degradation of habitats (i.e. noise, vibration and light pollution) and death/injury of individuals from construction related hazards (such as collision with construction vehicles) which could cause displacement and changes in behaviour.

Nature of Effect During Operation:

Road lighting and visual disturbance from a more elevated and/or wider road may result in bats altering their use of habitat through avoidance of the road (i.e. it becomes a barrier to movement), mortality through traffic collisions, or an alteration to commuting routes which may expose bats to different risks that would normally be avoided.

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent. Risk of residual disturbance/pollution and construction hazards present for the duration of construction (approximately 3 years) and potentially longer whilst the species recover.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Bat boxes would be provided to mitigate the loss of suitable roost features in the short-term until replacement planting establishes and matures.

Pre-construction ecological checks for roosting bats would be carried out.

A lighting plan and sensitive timing of works would be implemented via a CEMP, minimising disturbance effects.

Any work that may affect known roost sites will be facilitated through a European Protected Species Licence to ensure works are undertaken sensitively and with adequate mitigation.

Additional Mitigation During Operation:

Appropriate crossing points to be integrated at key flight corridors to increase the permeability of the Scheme for bats, prevent traffic collisions, and reduce the barrier effect. Additionally, noise and landscape mitigation will increase terrestrial habitat quality and connectivity.

Receptor – Badger

Nature of Effect During Construction:

There are badger setts within the red line boundary and many more locally. Potential effects include damage/destruction of setts and the loss and fragmentation of foraging habitat. Also, there is potential for disturbance (i.e. noise, vibration, light and chemical pollution) and death/injury of individuals from construction related hazards (such as collision with construction vehicles, entrapment in excavations, etc).

Nature of Effect During Operation:

Increased risk of collision with traffic and habitat fragmentation.

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent. Badgers are highly dynamic; however, the excavation of replacement setts may take many years and the population may take longer to recover. Risk of residual disturbance/pollution and construction hazards present for the duration of construction (approximately 3 years) and potentially longer whilst the habitat/species recover.

Duration of Effect During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Disturbance/pollution and construction hazards would be managed through implementation of a CEMP.

All trenches and work excavations within sensitive areas would either be backfilled or covered overnight, fenced off to prevent badgers falling in, or battered with earth ramp(s) to allow badgers a means of escape.

Pre-construction ecological checks for badger setts would be carried out.

Any works that may cause damage or destruction of badger setts, or disturbance to badgers occupying a sett would be facilitated through a Natural England development licence to ensure works are undertaken sensitively and with adequate mitigation.

Additional Mitigation During Operation:

No additional mitigation is considered feasible at this stage.

Receptor – Otter

Nature of Effect During Construction:

The River Etherow is known to support commuting otter and approximately 315m of the River extends within the red line boundary. Potential effects include loss and fragmentation

of habitat. Also, there is potential for disturbance of commuting otters (i.e. noise, vibration, light and chemical pollution) and death/injury of individuals from construction related hazards (such as collision with construction vehicles, entrapment in excavations, etc).

Nature of Effect During Operation:

Visual disturbance from a bridge crossing may result in otters altering their use of habitat through avoidance (i.e. it becomes a barrier to movement) or resulting in an alteration to commuting routes which may expose them to different risks (such as traffic collision). There is also potential for polluted road run-off affecting the water environment and for impacts through traffic noise and road lighting.

Duration of Effects During Construction:

Effects of habitat loss and fragmentation are permanent. Risk of residual disturbance/pollution and construction hazards present for the duration of construction (approximately 3 years) and potentially longer whilst the habitat/species recover.

Duration of Effects During Operation:

The lifetime of the Scheme (permanent).

Additional Mitigation During Construction:

Habitat losses would be quantified to ensure no net loss of aquatic/riparian habitat, either in length/quantity and quality.

Disturbance/pollution and construction hazards would be managed through implementation of a CEMP.

Spill kits would be available on site and potential polluting materials would not be stored within 50m of watercourses or areas of significant biodiversity value.

Additional Mitigation During Operation:

Additionally, noise and landscape mitigation will also serve to limit noise and visual disturbance to otters. Measures to mitigate impacts from changes in water quality are described in Chapter 11.

Receptor – Water Vole

Nature of Effect During Construction:

Approximately 315m of the River Etherow and 575m of the unnamed watercourses known to support water vole are present within the red line boundary. Potential effects include damage/destruction of burrows and fragmentation of habitat. Also, there is potential for disturbance (i.e. noise, vibration, light and chemical pollution) and death/injury of individuals from construction related hazards (such as collision with construction vehicles, entrapment in excavations, etc).

Nature of Effect During Operation:

Impacts addressed during construction to facilitate Natural England licence; no adverse impacts anticipated during operation.

Duration of Effect During Construction:

Effects of habitat loss and fragmentation are permanent. Risk of residual disturbance/pollution and construction hazards present for the duration of construction (approximately 3 years) and potentially longer whilst the habitat/species recover.

Duration of Effect During Operation:

N/A

Additional Mitigation During Construction:

Where habitat losses are unavoidable, the Scheme would only proceed under a licence issued by Natural England to ensure works are undertaken sensitively and with adequate mitigation. Mitigation to be developed but likely to include enhancement of existing watercourses and habitat creation.

Disturbance/pollution and construction hazards would be managed through implementation of a CEMP.

Spill kits would be available on site and potential polluting materials would not be stored within 50m of watercourses or areas of significant biodiversity value.

Additional Mitigation During Operation:

N/A

8 LANDSCAPE AND TOWNSCAPE

8.1 Existing Environmental Conditions

- 8.1.1 At the national level, the Scheme falls entirely within [National Character Area \(NCA\) 54: Manchester Pennine Fringe](#) (NE397, NCA Profile, Natural England, 2012). The NCA covers the transitional zone between the open moorlands of the Dark Peak and Southern Pennines, and the densely populated urban conurbation of Manchester. It is a landscape influenced by the adjacent Pennine moors, and the deeply incised, steep valleys that characterise the transition from moorland to urban area. The elevation of the area is generally between 100m and 300m Above Ordnance Datum, between the lower plains and higher Pennine moors.
- 8.1.2 The Scheme lies within Tameside Metropolitan Borough Council, and close to the west boundary of High Peak Borough Council and Derbyshire County Council. The Scheme also lies within the setting of the Peak District National Park. As such the Scheme falls across a number of local Landscape Character Area studies, including the Peak District National Park Authority) [Landscape Strategy and European Landscape Convention Action Plan \(2009\)](#), Derbyshire County Council's [The Landscape Character of Derbyshire \(2013\)](#), and High Peak Borough Council's [High Peak Landscape Character Supplementary Planning Document \(2006\)](#). These studies and the relevant landscape character types (LCTs) landscape character areas (LCAs) located within the 1km study area are presented in Table 8-1.

Table 8-1: Local Landscape Character Areas

Local Authority & Landscape Character Assessment	Landscape Character Area (LCA)/Landscape Character Type (LCT)	Description
Peak District National Park Authority; Landscape Strategy and European Landscape Convention Action Plan (2009)	LCA Dark Peak Western Fringe (DPWF)	Lying on the western edge of the Peak District National Park, described as a sloping and lower lying landscape with, deep and narrow, steep sided cloughs, within this sloping ground, including the Valley Pastures with Industry LCT, Riverside Meadows LCT, and Moorland Slopes & Cloughs LCT.
	DPWF - Valley Pastures with Industry LCT	A low-lying undulating valley topography, with a network of streams with dense tree cover interspersed between pastoral farmland, with small to medium sized fields enclosed by hedgerows and drystone walls; and dispersed settlement.
	DPWF - Riverside Meadows LCT	A flat alluvial meandering river corridor, with grazing meadows, and dense waterside and scattered hedgerow trees.

Local Authority & Landscape Character Assessment	Landscape Character Area (LCA)/Landscape Character Type (LCT)	Description
Derbyshire County Council; The Landscape Character of Derbyshire (2013)	LCT Riverside Meadows	The Derbyshire landscape characterisation refers to the higher level NCAs and sub-divides these into LCTs. The Riverside Meadows LCT is a landscape with fast flowing meandering rivers which form gentle valley floors with narrow flood plains, with low intensity permanent pasture, dense trees cover and a strong sense of enclosure from adjacent slopes.
High Peak Borough Council; High Peak Landscape Character Supplementary Planning Document (2006)	LCT Riverside Meadows	The High Peak landscape characterisation follows a similar approach as the previous Derbyshire work i.e. it refers to the higher level LCAs and sub-divides these into LCTs, therefore the previous description is considered.

8.1.3 Tameside Metropolitan Borough Council has not prepared a landscape character study and given there is a degree of overlap between the published local character areas, a Scheme specific landscape character study has been prepared and referenced here.

8.1.4 The study area has been sub-divided into seven homogeneous LCAs and eleven townscape character areas (TCAs) based on their physical and cultural elements. Their locations are shown on Figure 8.2 at Appendix B and are presented below in Table 8-2.

Table 8-2: Scheme Level Character Areas

Scheme Level Landscape/Townscape Character Areas	Description
Landscape	
LCA 1: Harrop Edge Valley Pasture	A predominantly undeveloped landscape located west of Mottram in Longendale and north of Hattersley which is strongly influenced by the surrounding urban edge and M67.
LCA 2: Hollingworth Hall Moorland Slopes	A pastoral landscape located on the lower part of the Hollingworth Hall Moor.
LCA 3: Mottram Moor	A pastoral landscape located on the upper part of

Scheme Level Landscape/Townscape Character Areas	Description
Pasture	the Hollingworth Brook Valley. The landscape is defined by pasture fields which are small to medium scale, bordered by hedgerows with scattered tree cover. Semi-natural deciduous woodland slopes are also common features, along the network of local streams and watercourses. Overall this is an intricate intimate landscape with some distinct local features, a sense of place and few detracting features giving it a high level of tranquillity.
LCA 4: Etherow Valley Pasture	A landscape located on the lower slopes of the Etherow Valley between the undeveloped valley floor and the urban A57(T) corridor at Mottram Moor and includes the south east facing slopes at Mottram & Targeton Hill.
LCA 5: Etherow Valley Floor with Woodland	A landscape located on the valley floor of the Etherow Valley, containing Woodland groups along and adjacent to the river corridor.
LCA 6: Brookfield Valley Floor	A pastoral landscape located along the valley floor of the Glossop Brook containing reservoir water bodies.
LCA 7: Swallows Valley with Woodland	A narrow-wooded valley landscape containing Swallows Wood Nature Reserve north west of Arnfield Reservoir and the Hollingworth Brook.
Townscape	
TCA 1: South Stalybridge	A townscape area located along the A6108 corridor and its environs, south of Stalybridge.
TCA 2: West Mottram and Hattersley	A townscape area encompassing post war ribbon development along the A57(T) Hyde Road and along the B6174 Ashworth Lane, together with the larger planned modern urban residential estate of Hattersley to the south west.
TCA 3: Mottram Spout Green	A townscape area encompassing part of Mottram which lies north of the A57(T) including a mix of 19th century ribbon and inter and post war residential development and clusters of modern residential estates interspersed with isolated older buildings.
TCA 4: Old Mottram	A part of Mottram which encompasses the high density organic late medieval old village core, which is centred on Market Square and along Church Brow, which climbs up to Warhill.

Scheme Level Landscape/Townscape Character Areas	Description
TCA 5: Mottram Moor	A townscape area which links the east part of Mottram, at the junction of the A57(T) and A6018 in the west, to the west part of Hollingworth at the junction of the A57(T) and A628(T) in the east.
TCA 6: Wednesough Green	An area located immediately adjacent to the Mottram Moor TCA to the south and the Hollingworth TCA to the east, encompassing the old village core of Hollingworth, located immediately to north of the junction of the A57(T) and the A628(T)
TCA 7: Hollingsworth	A townscape area located north of the River Etherow Valley, along the lower Valley sides containing residential development.
TCA 8: Gamesley	A townscape area located on the elevated position south of the River Etherow, above the River Etherow Floor.
TCA 9: Brookfield Industrial Valley	A townscape area located along Glossop Brook, within the Valley Floor containing Industrial scale-built form.
TCA 10: Hadfield	The residential townscape area of Hadfield located on the southern valley side of the River Etherow valley.
TCA 11: Etherow Industrial Valley Floor	A townscape area located along the River Etherow, within the Valley Floor containing Industrial scale-built form.

- 8.1.5 The Scheme falls within four LCAs (LCA 1, LCA 3, LCA 4 & LCA 5) and five TCAs (TCA 2, TCA 3, TCA 4, TCA 5, & TCA 10). The landscape is typically considered to be of good quality with some important local landscape feature of high quality. The townscape is typically considered to be of medium quality, although TCA 4 Old Mottram and TCA 8 Wednesough Green are considered to be high quality with some recognisable townscape features. Landscape, townscape and visual receptor sensitivity is considered at Appendix A.
- 8.1.6 With reference to the [Lighting Research Centres' work on Light Pollution, 2007](#) this area is considered to predominately fall within Environmental Lighting Zone (ELZ) E2: Areas of low ambient brightness and ELZ E3: Outer urban or rural residential areas, however this would be confirmed during the preparation of the ES.
- 8.1.7 Site visits were undertaken during summer 2016, to record views and establish the likely visual influence of the Scheme, and potential visual receptors with a view to it. Seven views are presented within Figure 8.3 at Appendix B as a representation of the landscape character and visual amenity of the study area.
- 8.1.8 The study area contains a relatively dense network of public rights of way (PRoW) and recreational routes which include the Trans-Pennine National Trail, National

Cycle Route 62, and two regional long-distance paths, Tameside Trail (LON-90) and Etherow-Goyt Valley Way (LON-90). The study area also lies within the setting of the Peak District National Park and greenbelt. A number of Conservation Areas and listed buildings are also found within the study area (please refer to Chapter 6 for further detail).

8.1.9 The study area contains a number of residential properties, present as both scattered properties/farmsteads and clusters within the rural areas, and larger settlement groups within the urban areas.

8.1.10 Landscape, townscape and visual receptors are summarised at Appendix A.

8.2 Other baseline information to be obtained/surveys to be undertaken

8.2.1 Prior to preparation of the ES, the following would be undertaken:

- Refinement of the Zone of Theoretical Visibility (ZTV) to confirm the extent of the Scheme's visibility, and study area;
- Consultation with statutory consultees to agree/select representative viewpoints for consideration;
- Winter and summer visual surveys to capture photography from the agreed representative viewpoints; and
- A night time survey to confirm baseline environmental lighting zones.

8.2.2 Tree Preservation Order information would also be collated from the relevant local planning authorities.

8.2.3 Landscape, townscape and visual receptors are summarised at Appendix A. For ease of interpretation these have been grouped into four geographic zones. It should be noted that the nature of the receptor given for the landscape and townscape receptors is an initial indication only and would be re-evaluated during the assessment process, and included in the ES, to account for their condition/quality, value and susceptibility to accommodate change.

8.3 Potential Effects and Mitigation Measures

8.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined in Table 8-3 below. Embedded mitigation measures can be found in Section 2.17.

8.3.2 It should be noted that Table 8-3 only considers receptors that have the potential to be significantly affected by the Scheme. However, all receptors identified would be considered during the preparation of the ES.

8.3.3 It should be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Table 8-3: Potential effects and mitigation on Landscape/Townscape/Visual receptors

Receptor – LCA 1: Harrop Edge Valley Pasture

Nature of Effect During Construction:

The receiving landscape would experience the loss of arable agriculture and sections of hedgerow removal, together with diverting/culverting an existing watercourse, and alteration to the existing topography and landform. These rural elements are common to the wider area, resulting in a negative effect.

Nature of Effect During Operation:

The new carriageway would be on low embankment with a large section in 2.5m deep false cutting, before passing into deep cutting on the approach to the Mottram Underpass entrance as it passes under the A6018. The Scheme and its associated traffic would form a noticeable new feature as it traverses this character area resulting in disruption and loss of existing elements including hedgerows and a section of watercourse, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Severance of the landscape for the lifetime of the Scheme (permanent), with integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

New woodland block planting within the wider landscape to integrate with landscape, and infill of existing hedgerows within the wider character area.

Receptor – PRoW - LON/46 including Edge Lane, PRoW - LON/50, PRoW - LON/51, and PRoW - LON/52

Nature of Effect During Construction:

Users on the PRoW (within LCA 1: Harrop Edge Valley Pasture) would experience sequential views of construction activity, including compounds and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features visible within the fore to mid-ground and occupying a large proportion of the view, resulting in a negative effect.

Nature of Effect During Operation:

Users of the PRoW would experience sequential views of the Scheme and associated traffic, comprising the proposed link road and the proposed slip road access to the A6018 forming a noticeable linear feature resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

New woodland block planting to integrate within wider landscape, and infill of existing hedgerows within the wider character area.

Receptor – Grange Farm & Farmstead on Edge Lane

Nature of Effect During Construction:

The occupiers (within LCA 1: Harrop Edge Valley Pasture) would experience easterly views from lower storey windows to activity in the foreground of the view associated with the Scheme linking into the M67 terminal junction. Could potentially include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature would be noticeable intrusive features visible within the foreground, resulting in a negative effect.

Nature of Effect During Operation:

The occupier would experience easterly views from lower storey windows to the Scheme and associated traffic in the foreground comprising the new junction with the M67 and the proposed link road resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

New woodland block planting to integrate within wider landscape, and infill of existing hedgerows within the wider character area.

Receptor – Cluster of residential properties on Edge Lane

Nature of Effect During Construction:

The occupier (within LCA 1: Harrop Edge Valley Pasture) would experience south easterly views from lower storey windows to activity in the foreground of the view associated with Mottram Underpass construction and slip road access from the A6018. Could potentially include compounds and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature would be noticeable intrusive features visible within the foreground, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers would experience south easterly views from lower storey windows to the new slip road access from the A6018 and roundabout and associated traffic in the foreground with the west Mottram Underpass portal approach beyond resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

New woodland block planting to integrate within wider landscape, and infill of existing hedgerows within the wider character area.

Receptor – Residential Properties on Four Lanes, Ash Close, Meadowcroft and Littlefields

Nature of Effect During Construction:

The occupiers (within TCA 3: Mottram Spout Green) would experience northerly views from rear elevation windows to activity in the foreground of the view associated with Mottram Underpass construction, property demolition (Property Nos. 36, 38 & 40 on Four Lanes) and slip road access from the A6018. Could potentially include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features visible within the foreground, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers would experience northerly views from rear elevation windows to the severed townscape area above Mottram Underpass, and new public open space. The scale and layout of this area would be altered from the baseline situation with the parapet being a noticeable feature, together with the loss of the woodland planting along Old Hall Lane, which will result in an overall negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the woodland mitigation establishes (15 years).

Additional Mitigation During Construction:

Retain urban vegetation within TCA 3: Mottram Spout Green.

Additional Mitigation During Operation:

Re-introduce new built form within the townscape to reduce severance. It is considered that through integrating a new built form that potential impacts from those remaining residential properties will be reduced.

Receptor – LCA 3: Mottram Moor Pasture

Nature of Effect During Construction:

The receiving landscape would experience the loss of existing elements including hedgerows, hedgerow trees, woodland blocks and agricultural land, together with alteration to the existing topography and landform. Of note the loss of the defining woodland feature at the east edge of TCA 3: Mottram Spout Green would have a particularly noticeable change resulting in the urban form being more prominent in this relatively enclosed landscape. The activities associated with the excavation of the deep cutting and infilling the steep sided clough north of TCA 5: Mottram Moor within this landscape would create a series of new

uncharacteristic conspicuous features. Rural elements which are common to the wider area would be lost in the short term as a result of construction activity, resulting in a negative effect.

Nature of Effect During Operation:

The Scheme would be in deep cutting as it leaves the eastern Mottram Underpass portal at Mottram Spout Green. The cutting slopes would be located at a central position within this area forming a noticeable new feature. The scale of the cuttings associated disruption and loss of existing elements including hedgerows and watercourses. Of note is the loss of the defining woodland feature at the east edge of TCA 3: Mottram Spout Green which would result in the urban form being more prominent in this relatively enclosed landscape resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Infill of existing hedgerows and new woodland blocks within the wider character to enhance existing feature.

Receptor – TCA 3: Mottram Spout Green

Nature of Effect During Construction:

The Scheme would require the demolition of 20 residential properties and the loss of the woodland belt at the east edge of this area. As a result, there would be a noticeable change in the scale, layout and intimacy of this townscape. In addition, the activity associated with Mottram Underpass excavation and installation would sever the existing townscape character, resulting in a negative effect.

Nature of Effect During Operation:

Above the Mottram Underpass, a lack of built form together with the loss of the mature trees along Old Hall Lane at the eastern periphery of this area, including trees which are protected by a Tree Preservation Order, would result in a noticeable change to the character and a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Re-introduce new built form within the townscape to reduce severance and integrate a new public open space.

Receptor – TCA 5: Mottram Moor

Nature of Effect During Construction:

The Scheme would result in the modification of the existing A57(T) corridor, with the construction of a new large-scale roundabout and loss of roadside vegetation. This would be positioned in close proximity to linear groups of residential properties which flank the north side of the existing A57(T). The construction activity would create an uncharacteristic conspicuous feature, resulting in a negative effect.

Nature of Effect During Operation:

The Scheme would result in the modification of the existing A57(T) infrastructure, with the new roundabout and associated traffic forming a large-scale focal feature and creating severance within the townscape area. The introduction of the roundabout would result in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

At Mottram Moor a faced stone wall (2-2.5m high), with a re-defined public realm containing new urban planting and car parking to integrate the Scheme within the townscape character. Furthermore, new hedgerow planting/woodland block planting to the edge of the urban areas to re-establish baseline character, provide screening and integration with the wider landscape.

Receptor – Residential Properties and PRow - LON/35 along Old Hall Lane

Nature of Effect During Construction:

The occupiers and users of the adjacent PRow would experience easterly views to activity in the foreground associated with the removal of existing vegetation bounding Old Hall Lane, together with the excavation and installation of Mottram Underpass and demolition of five residential properties (2a, 2b, The Chestnuts, 4 and 6 Old Hall Lane). This could potentially also include compounds and storage areas, new night time light sources, noise and movement of plant. It is considered that these activities, albeit being short term in nature, would be noticeable intrusive features visible within the foreground, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers and users of the PRow would experience easterly views of the Scheme which would be in deep cutting. The cutting and cutting slopes would be a noticeable feature due to the loss of the existing woodland, change in the intimate/enclosure and sense of scale, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Re-location of Old Hall Lane to increase distance between Mottram Underpass portal and integrate further woodland planting above Mottram Underpass portal. Re-introduce new built form within the townscape to reduce severance and integrate a new public open space.

Receptor – PRoW - LON/108 Coach Road

Nature of Effect During Construction:

Users on the PRoW would experience sequential views of construction activity, including compounds and storage areas, new night time light sources, noise and movement of plant. These activities would be in the foreground, resulting in disruption to and loss of important landscape features including woodland blocks and field hedgerows. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features visible within the foreground occupying a large proportion of the contained view and resulting in a negative effect.

Nature of Effect During Operation:

Users on the PRoW would experience sequential views of the Scheme in the foreground with the cutting slopes forming a noticeable new feature along with the associated loss of tree cover, particularly where they previously formed the backdrop to the view and replaced by views to the exposed urban form within TCA 3: Mottram Spout Green. It is considered, in the long term, that this would result in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

New woodland planting to replace lost elements along Old Hall Lane adjacent to Mottram Underpass portal, and infill of existing hedgerows within the wider character to enhance existing features.

Receptor – Residential Properties along Old Road

Nature of Effect During Construction:

The occupiers would experience views from the front elevation windows of activity in the foreground associated with the demolition of properties Nos. 8A, 8B, 8C, 17, 19, 21, and 21a on Old Road and Mottram Underpass excavation and installation. This could also potentially include compounds and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable features visible within the foreground, resulting in a negative effect.

Nature of Effect During Operation:

From Old Road, the views would be focused on the new public open space, with some more open views as a result of the loss of the existing woodland block along Old Hall Lane, which would allow visibility to the Scheme in the new cutting slopes within LCA 3: Mottram Moor Pasture, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Re-introduce new built form within the townscape to reduce severance and integrate a new public open space.

Receptor – Residential Properties along Lodge Court

Nature of Effect During Construction:

The occupiers would experience easterly views from the upper storey rear windows to construction activity in the foreground associated with the removal of the existing vegetation bounding Old Hall Lane, together with the demolition of properties and activity excavation and installation of Mottram Underpass and the deep cutting within the adjacent LCA 3: Mottram Moor Pasture. This would also potentially include the introduction of compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers would experience easterly views from their upper storey rear windows to the Scheme which would be present in deep cutting. The cutting slopes would form a noticeable feature as a result of the loss of the adjacent existing woodland block at the edge of TCA 3: Mottram Spout Green, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Re-location of Old Hall Lane to increase distance between Mottram Underpass portal and integrate further woodland planting above Mottram Underpass portal. Re-introduce new built form within the townscape to reduce severance and integrate a new public open space.

Receptor – Residential Properties along Tollermache Close

Nature of Effect During Construction:

The occupiers would experience views from the front and rear elevation ground floor and first storey windows of activity in the foreground associated with the demolition of properties Nos.5, 6, 7, 8 and 9 Tollermache Close (including garages), and the garages to property Nos.3 and 4 associated with Mottram Underpass excavation and installation. It could also potentially include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

From Tollermache Close, the views would be predominantly contained by the existing built form which would focus views on the new public open space. Some views however may be more open as a result of the loss of the existing woodland block and built form along Old Hall Lane, which would allow visibility to the Scheme to the eastern edge of TCA 3: Mottram Spout Green, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Re-location of Old Hall Lane to increase distance between Mottram Underpass portal and integrate further woodland planting above Mottram Underpass portal. Re-introduce new built form within the townscape to reduce severance and integrate a new public open space.

Receptor – Nettle Hall and Residential Properties along Coach Road

Nature of Effect During Construction:

The occupiers would experience views from the rear elevation first storey windows of activity in the mid-ground associated with the installation of the adjacent Scheme embankment as it traverses the steep side clough on the north side of TCA 5: Mottram Moor. This could also potentially include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers would experience views from their rear elevation first storey windows of the Scheme and associated traffic in the mid-ground as it emerges from the deep cutting, although cars would potentially be screened by a new 2.5m high road side stone faced wall on the approach to Mottram Moor, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

A 2.5m high stone-faced wall at the back of verge with woodland planting to the outward facing side to integrate with the wider landscape and adjacent townscape, and to provide screening from Coach Road within the steep sided Clough in LCA 3: Mottram Moor Pasture as the Scheme emerges from the cutting.

Receptor – LCA 4: Etherow Valley Pasture

Nature of Effect During Construction:

The receiving landscape would experience loss of arable agriculture, sections of hedgerow including some hedgerow trees, culverting existing watercourses, and alteration to the existing topography and landform, resulting in a negative effect.

Nature of Effect During Operation:

The Scheme would be on low embankment with a large section of it in a 2.5m deep false cutting. The loss of hedgerows and associated hedgerow trees, along with alteration to the existing topography and landform, would have a noticeable change on the character of this area, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

The installation of a green bridge with vegetation (scrub/woodland) westbound over Carr House Lane would enhance integration with the landscape. Infill of existing hedgerows within the wider character area.

Receptor – PRoW - LON/90 Etherow – Goyt Valley Way & Tameside Trail

Nature of Effect During Construction:

Users on the PRoW would experience sequential views of the activity in the foreground associated with disruption and loss to important woodland blocks and field hedgerows, the installation of the low embankment and false cuttings. It could also include potential compounds and storage areas, new night time light sources, noise and movement of plant. This would occur in the foreground view. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features occupying a large proportion of the view, resulting in a negative effect.

Nature of Effect During Operation:

Users on the PRoW would experience sequential views of the Scheme and its associated traffic (partially visible above the false cutting). The Scheme would create a new noticeable

feature as it traverses the Etherow Valley floor landscape occupying a significant proportion of the open, wide angled view. It would result in the loss of a number of existing landscape elements including the pastoral agricultural land, patchy hedgerows, and hedgerow trees, and a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Green Bridge to sympathetically integrate the Scheme in views from the PRoW where it approaches and crosses the Scheme.

Receptor – PRoW - LON/92 & LON/93

Nature of Effect During Construction:

Users on the PRoW would experience sequential northerly foreground views of construction activity in the foreground associated with disruption and loss to important woodland blocks and field hedgerows, the installation of the low embankment and false cuttings. It could also include potential compounds and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features occupying a large proportion of the view, resulting in a negative effect.

Nature of Effect During Operation:

Users on the PRoW would experience sequential views of the Scheme in the foreground. The traffic would be mostly screened by the false cutting, although the new landform along with the loss of existing landscape elements including patchy hedgerows, and hedgerow trees would form a noticeable artificial linear feature as it traverses the Etherow Valley floor, occupying a significant proportion of the view, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Green Bridge to sympathetically integrate the Scheme in views from the PRoW where it approaches and crosses the Scheme.

Receptor – PRoW - LON/88 Carr House Lane

Nature of Effect During Construction:

Users on the PRoW would experience sequential southerly views of activity in the foreground associated with disruption and loss to important woodland blocks and field

hedgerows, the installation of the low embankment and false cuttings. It could also include potential compounds and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features occupying a large proportion of the view, resulting in a negative effect.

Nature of Effect During Operation:

Users on the PRoW would experience sequential views of the Scheme in the foreground. The traffic would be mostly screened by the false cutting, although the new landform along with the loss of existing landscape elements including patchy hedgerows, and hedgerow trees would form a noticeable artificial linear feature as it traverses the Etherow Valley floor, occupying a significant proportion of the view, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

The installation of a green bridge over Carr House Lane would help integrate the highway with the landscape and help reduce visibility of the Scheme from Carr Lane, as it underpasses the Scheme.

Receptor – PRoW - LON/87

Nature of Effect During Construction:

Users on the PRoW would experience sequential views of activities in the foreground associated with the Scheme on low embankment and associated false cuttings, the roundabout at Mottram Moor as well as disruption and loss of important landscape features including woodland blocks and field hedgerows. The view could also include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

Users on the PRoW would experience sequential views of the Scheme in the foreground. The traffic would be mostly screened by the false cutting, although the new landform along with the loss of existing landscape elements including patchy hedgerows, and hedgerow trees would form a noticeable artificial linear feature as it traverses the Etherow Valley floor, occupying a significant proportion of the view, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Adjacent to the roundabout at Mottram Moor, a faced stone wall with new hedgerow planting and new woodland block planting to the rear to integrate with the wider landscape.

Receptor – PRoW - LON/86

Nature of Effect During Construction:

Users on the PRoW would experience elevated sequential views of activity in the mid-ground associated with the Scheme on low embankment and associated false cuttings, the roundabout at Mottram Moor as well as disruption and loss of important landscape features including woodland blocks and field hedgerows. The view could also include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

Users on the PRoW would experience elevated sequential views of the Scheme which would create a noticeable feature as it cuts across the pasture moorland slopes of LCA 3: Mottram Moor Pasture and traverses the lower slopes and valley floor of LCA 4: Etherow Valley Pasture. The traffic and linear engineered earthworks) would be clearly visible features along with the loss of landscape elements including hedgerows and hedgerows trees and woodland blocks, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Adjacent to the roundabout at Mottram Moor, a faced stone wall with new hedgerow planting and new woodland block planting to the rear to integrate with the wider landscape.

Receptor – Residential Properties along the A57 Brookfield Road

Nature of Effect During Construction:

The occupiers would experience views from the front elevation ground and first storey windows of activity in the foreground associated with the new junction with the A57 and the installation of the bridge over the River Etherow and associated earthworks as well as removal of adjacent vegetation. This could also potentially include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers would experience views from the front elevation ground and first storey windows of the Scheme where it ties in with the A57 with the bridge the River Etherow, the approach earthworks and associated traffic, along with the loss of landscape elements bounding the A57 (hedgerows and hedgerows trees), resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

New hedgerow planting and new woodland block planting to integrate with the wider landscape and replace lost features.

Receptor – Tara Brook Farm

Nature of Effect During Construction:

The occupiers would experience southerly views from the front elevation first storey windows of activity in the foreground, associated with the installation of the Scheme earthworks and vegetation removal. The view could also potentially include compound and storage areas, new night time light sources, noise and movement of plant. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers would experience southerly views from the front elevation first storey windows of the Scheme and associated traffic on low embankment. The Scheme would be a clearly visible feature, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Infill of hedgerow planting and new woodland block planting within the wider landscape to integrate and replace lost features and reduce visibility from the receptor.

Receptor – Carr House Farm and Meadow View

Nature of Effect During Construction:

The occupiers would experience north westerly views from the first storey windows of activity in the foreground associated with the installation of the Scheme earthworks and vegetation removal. View associated with the highway installation. This could also potentially include temporary compound and storage areas, new night time light sources, noise and movement of plant, together with the new earthworks and removal of vegetation. It is considered these activities, albeit being short term in nature, would be noticeable intrusive features, resulting in a negative effect.

Nature of Effect During Operation:

The occupiers would experience north westerly views from the first storey windows of the Scheme on embankment. The traffic would mostly be screened by the 2.5m deep false cutting slopes. The re-location of Carr House Lane, together with loss of associated bounding vegetation and new overbridge, would be a noticeable feature, resulting in a negative effect.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

For the lifetime of the Scheme (permanent), with increased screening and integration as the mitigation establishes (15 years).

Additional Mitigation During Construction:

No additional mitigation is considered feasible at this stage.

Additional Mitigation During Operation:

Infill of hedgerow planting and new woodland block planting within the wider landscape to integrate and replace lost features and reduce visibility from the receptor.

9 PEOPLE AND COMMUNITIES

9.1 Existing Environmental Conditions

- 9.1.1 The study area varies according to the sub-topic, relating to the footprint of the Scheme and a 500m corridor either side of it. Study areas have been chosen based on a combination of the requirements of the [DMRB Volume 11, Section 3, Part 6, Part 8](#) and [Part 9](#) and professional judgement. Baseline data collated is described below and presented on Figure 9.1 at Appendix B.

Land Use

- 9.1.2 Land use includes private property and land (both commercial and residential), land used by the community, development land and agricultural land. Existing information for each of these categories is provided below.

Community Facilities

- 9.1.3 The settlements of Mottram in Longdendale, Hollingworth, Hattersley, Gamesley and Hadfield include a variety of social and community infrastructure, including education and healthcare facilities, community centres, places of worship, libraries and sporting facilities. Facilities that have been identified within 500m of the Scheme are shown on Figure 9.1 at Appendix B. No community facilities are within the red line boundary for the Scheme; the closest facilities to the red line boundary include Arundale Primary School, Hollingworth Primary School, Mottram Evangelical Church and the Awburn House Medical Practice.

Commercial and Private Assets

- 9.1.4 Buildings located within the red line boundary which may be subject to demolition as part of the Scheme are listed in Section 2.13 above.
- 9.1.5 Commercial assets identified within close proximity to the Scheme include the Tesco Supermarket, McDonald's restaurant and a Premier Inn Hotel in Mottram in Longdendale.
- 9.1.6 A number of commercial assets have been identified towards the east of the Scheme, including enterprises within Dinting Lodge Industrial Estate, Glossop Caravans and a BP Petrol Station.
- 9.1.7 The Mottram Agricultural Showground is located within the red line boundary to the north of the Scheme. The Mottram Show, held by the Mottram and District Agricultural Society, takes place annually every summer and attracts thousands of visitors every year for a whole range of classes for sheep, cattle, dogs and horticulture, plus other activities including horse competitions, trade stands, craft and vintage engine displays.
- 9.1.8 The Mottram Show has acquired a new larger showground, to which it will be relocating within the next few years. Whilst further discussions will be required with the organisers of the show, it is anticipated that the new location is unlikely to be affected by the Scheme. However, this will be subject to confirmation.

Access and Recreation

- 9.1.9 Public rights of way (PRoW) and bridleways may be severed by the Scheme or pass in close proximity to it. These include the Pennine Bridleway National Trail (which incorporates the Trans-Pennine National Cycle Route 62 along part of its

route).

9.1.10 Other PRoW in the vicinity of the Scheme include:

- PRoW LON/52/30 & LON/52/20 & LON/52/10 - runs from the A57 Hyde Road near the M67 Terminal Roundabout, in a north-easterly direction towards Old Mill Farm to the west of Mottram in Longdendale;
- PRoW LON/50/10 & LON/50/20 – runs from the A57 Hyde Road near the M67 Terminal Roundabout, in a north-westerly direction towards Edge Lane;
- PRoW LON/51/20 & LON/51/10 – runs from the A57 Hyde Road in a north-westerly direction towards Edge Lane in the north;
- PRoW LON/88/60 – runs in a north-south direction from the A57 Mottram Moor through Robin Hood Farm and links with the wider footpath network;
- PRoW LON/90/10 – runs in a south-west direction from Woolley Lane through Tara Brook Farm and links with the footpath wider network;
- PRoW LON/87/10 – towards the south of the Scheme, the PRoW runs in a north-east/south-west direction from the A57 Mottram Moor and links with PRoW LON/86/10 and runs in a westerly direction towards Market Street; and
- Bridleway LON/108/10 runs approximately 150m to the north of the Scheme, along Coach Road in a north-west/south-east direction from Mottram Old Hall towards the A57 Mottram Moor.

9.1.11 The Penning Bridleway National Trail is available to horse riders, cyclists and walkers and has two alternative sections of route in the vicinity of the Scheme – (a) passing between Broadbottom and Hollingworth and (b) passing between Gamesley and the west side of Hadfield.

9.1.12 Section (a), as detailed above, of the Pennine Bridleway National Trail (incorporating the Etherow Goyt Valley Way and Tameside Trail) crosses the A57(T) to A57 Link Road scheme approximately 700m to the south of the A57 Mottram Moor to meet Woolley Lane on the east of Hollingworth. This section of the National Trail is likely to be severed by the Scheme.

9.1.13 Section (b), as detailed above, of the Pennine Bridleway National Trail (incorporating the Trans-Pennine Trail National Cycle Route 62) crosses the A57 at a point inside the red line boundary with the potential for the route to be severed. The crossing point corresponds with the junction of the A57 Link Road and existing A57 at Woolley Moor.

Development Land

9.1.14 Consultation with Tameside Metropolitan Borough Council has concluded that there is no development land allocated in the vicinity of the Scheme.

9.1.15 However, the emerging [Greater Manchester Spatial Framework](#) (GMSF) includes a number of draft allocations for residential and employment land uses. A second draft of the plan is currently being developed, with a view to publication and further consultation in June 2018.

9.1.16 These allocations include land found to the north and south of the A57, with land to the north allocated for 70,000m² of B1 (c) and B2 employment floorspace, and

land to the south allocated for residential development. Whilst the GMSF is at a very early stage, it is felt important to recognise these draft allocations.

Agricultural Land

- 9.1.17 The study area is generally lowland, lying between 150m and 200m AOD. At these elevations it is unlikely that the prevailing climate limits agricultural use of the land. The distribution of soil types is shown in Figure 9.2 at Appendix B, with the distribution of land grades (based on the Agricultural Land Classification (ALC) system) shown in Figure 9.3 at Appendix B.
- 9.1.18 [The Provisional ALC maps](#) show that the Scheme comprises land mapped as 'Grade 4' or 'urban'. Grade 4 land is described as "Land with severe limitations which significantly restrict the range of crops and/or level of yields".
- 9.1.19 Natural England states that this mapping is not sufficiently accurate for use in the assessment of individual fields or development sites and should not be used other than for general guidance. The available soil type mapping shows that the Scheme comprises soils which have restricted permeability or high groundwater levels, along with low pH levels. These characteristics are likely to limit the associated grade of land, and thus whilst detailed mapping is not available it is unlikely that this land comprises best and most versatile land (i.e. land falling into Grade 1, 2 and 3a).
- 9.1.20 Land within the red line boundary appears to be predominantly under pasture with small areas of woodland. None of the land within the red line boundary is within an agri-environment or woodland grant scheme (as shown on Figure 9.4 at Appendix B).
- 9.1.21 Agricultural businesses and other land holdings within the study area that will be potentially affected by land take are listed below and shown on Figure 9.1 at Appendix B.
- Grange Farm – found immediately to the west of the Scheme;
 - Nettle Hall Farm – found immediately to the east of the Scheme, north of the A57;
 - Mottram Moor Farm – found immediately to the south of the A57;
 - Robin Hood Farm – found immediately to the south of the Scheme;
 - Tara Brook Farm – found immediately to the north of the Scheme; and
 - Home Farm – found immediately to the north of the Scheme, towards the eastern section.

Local Economy

- 9.1.22 The section presents the wider context within which the Scheme is located, using the local authority areas of High Peak Borough Council and Tameside Metropolitan Borough Council to present relevant socio-economic data.
- 9.1.23 The 2011 census shows that there were 310,216 people across the two authority areas.
- 9.1.24 According to the [Office for National Statistics](#) annual population survey, between July 2016 and June 2017, the unemployment rate was higher in Tameside (5.2%) than the East Midlands as a whole (4.7%), within which Tameside is found. The

employment rate in High Peak between July 2016 and June 2017 was 3.7%, which is lower than the North West as a whole (4.3%), within which High Peak is found.

9.1.25 Labour market data for each of the two local authority areas is summarised below:

9.1.26 **Tameside** – the [Office for National Statistics](#) annual population survey shows that between July 2016 and June 2017, the economic activity rate in Tameside was 74.9%, lower than the north-west region as a whole (76%). The main source of employment is the wholesale and retail sector, in addition to manufacturing and human health and social work activities.

9.1.27 **High Peak** – for the same period, the economic activity rate for the High Peak area was 78.7%, higher than the East Midlands region as a whole (77.4%). The main sources of employment include the manufacturing, wholesale and retail sectors.

9.2 Other baseline information to be obtained/surveys to be undertaken

9.2.1 Other baseline information to be obtained primarily relates to traffic data and non-motorised user counts. Results from the traffic model on peak traffic flow and speed will be used to inform the assessment of community severance and driver stress.

9.2.2 Surveys to ascertain usage of PRoW and bridleways will be undertaken to inform the DCO application. Methodologies for undertaking surveys will be subject to agreement with relevant local authorities, e.g. CCTV surveys.

9.2.3 Land owner/land manager interviews would be undertaken to understand the nature of the farm/forestry businesses such that an assessment of the impacts on farm viability can be undertaken. As none of the land affected by the Scheme is classified as best and most versatile, no ALC surveys are required.

9.3 Potential Effects and Mitigation Measures

9.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined in Table 9-1 below. Embedded mitigation measures can be found in Section 2.17.

9.3.2 It should be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Table 9-1: Potential effects and mitigation on People and Communities receptors

Receptor – Commercial and Private Assets
<p><i>Nature of Effect During Construction:</i></p> <p>A number of buildings would need to be demolished to construct the Scheme (listed in Section 2.13 above). The Scheme will pass directly through the grounds of Mottram Agricultural Showground. This may have an effect on the annual Mottram Show, in turn affecting local employment and expenditure; however, the Mottram Show has acquired a new, larger showground.</p> <p><i>Nature of Effect During Operation:</i></p> <p>As noted above, a number of properties will be demolished as part of the Scheme.</p>
<p><i>Duration of Effect During Construction:</i></p> <p>Permanent.</p>

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

The right to compensation and methods and procedures for assessing appropriate levels of such would be identified in relation to the National Compensation Code. Where necessary, consultation with landowners, occupiers and agents would continue to manage and reduce the impact on day-to-day activities, as far as practicably possible.

Additional Mitigation During Operation:

As noted above.

Receptor – Development Land

Nature of Effect During Construction:

Draft allocations which are contained within the GMSF are found within the red line boundary of the Scheme. Land to the east of the M67 roundabout, north of the A57 Hyde Road which has been allocated for 70,000m² of B1 and B2 employment floorspace could be affected by the Scheme.

Nature of Effect During Operation:

As noted above, there are draft allocations contained within the GMSF which are found adjacent to the Scheme, notably land to the east of the M67 roundabout, north of the A57 Hyde Road. Effects on this land during operation could be both negative and positive – whilst there may be loss of part of the allocated area as a result of the Scheme, positive effects may include improvements to connectivity and accessibility within the wider economic area.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

Where necessary, consultation with landowners and agents would be undertaken to manage potential impacts, as far as practicably possible.

Additional Mitigation During Operation:

As noted above.

Receptor – Agricultural Businesses

Nature of Effect During Construction:

Loss of land, disruption to business operations, viability impacted.

Nature of Effect During Operation:

As with the construction phase, effects during operation are likely to include potential impacts on viability as a result of the Scheme.

Duration of Effect During Construction:

Temporary and permanent.

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

Potential impacts on farm viability will be discussed with land owners/land managers with the potential for compensation agreements to be reached.

A Considerate Constructors Scheme would be put in place to minimise disruption to agricultural activities during the construction phase. For example, this would minimise access restrictions to land parcels remaining in agricultural productivity and limit disturbance to livestock.

Should animal bones be discovered which indicate a potential burial site, work would cease and the Animal Health Regional Office informed.

Additional Mitigation During Operation:

As noted above.

Receptor – Local Residents

Nature of Effect During Construction:

There may be a negative impact on people who live and work in the immediate area of the Scheme as a result of changes to amenity arising from construction activities –for example, a combination of dust arising from construction activities, changes in visual amenity and changes to noise levels. These effects are discussed individually in Chapters 5, 8 and 10 respectively.

Nature of Effect During Operation:

Changes to residential amenity as a result of a combination of factors arising from air quality, visual amenity and noise effects from the Scheme are discussed individually in Chapters 5, 8 and 10 respectively.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

Appropriate induction given to ensure the appointed contractor(s) act considerately in relation to local residents, particularly for any works that may be programmed to take place at night. Negative environmental effects from construction activities on residential amenity would be minimised or avoided through measures outlined in a CEMP. Such measures would include restrictions on the routes taken by construction traffic, and appropriate working practices. Further information on specific mitigation measures as they relate to air quality, visual amenity and noise, can be found in Chapters 5, 8 and 10 respectively.

Additional Mitigation During Operation:

As noted above, information on specific mitigation measures as they relate to air quality, visual amenity and noise can be found in Chapters 5, 8 and 10 respectively.

Receptor – Local Residents

Nature of Effect During Construction:

There may be a negative effect on community severance as a result of construction activities. This may be actual or perceived; this is an area for which further work will be undertaken as the Scheme is developed and relevant data is available.

Nature of Effect During Operation:

Again, the effect on community severance during Scheme operation may be both actual or perceived. The Scheme passes between communities along the northern edge of Mottram in Longdendale and those in the southern part of Roe Cross. Further work on the potential effects of community severance in this area will be undertaken as the Scheme is developed.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Perceived effects on community severance are likely to lessen over time.

Additional Mitigation During Construction:

A Traffic Management Plan (would be implemented in order to minimise delays during construction.

Additional Mitigation During Operation:

N/A

Receptor – Public Rights of Way

Nature of Effect During Construction:

There would be a negative effect on certain PRow and bridleways in the vicinity of the Scheme as a result of construction activities. Effects may include PRow and bridleways being temporarily closed for short periods of time, or the need for temporary diversions to be put in place.

Nature of Effect During Operation:

There would be both positive and negative effects on certain PRow and bridleways in the vicinity of the Scheme during operation. Positive effects may include the creation of new, accessible, footpath links across the road; negative effects may include lengthier journey times as a result of diversion routes created.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

In order to minimise disruption to footways by severance, temporary diversions would be put in place together with new gates and signs. This would be carried out in full consultation with the local highways authority and other interested stakeholders.

Additional Mitigation During Operation:

Mitigation measures would be carried out in consultation with the local highways authority and other interested stakeholders.

Receptor – Vehicle Travellers

Nature of Effect During Construction:

During construction, vehicle travellers may experience a negative effect in terms of views from the road, as a result of the presence of construction activities.

Nature of Effect During Operation:

During operation, vehicle travellers are likely to experience a negligible effect in terms of changes to the view from the road as a result of the Scheme.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

A CEMP would be implemented in order to minimise negative environmental effects of construction activities, including visual impacts.

Additional Mitigation During Operation:

N/A

Receptor – Vehicle Travellers

Nature of Effect During Construction:

During construction, it is expected that vehicle travellers could experience delays, either as a result of reduced speed limits through roadworks, the presence of construction traffic, increased congestion throughout the area or as a result of drivers re-routing.

Nature of Effect During Operation:

It is expected that during operation of the Scheme, there would be a positive effect on driver stress through reductions in congestion and improved accessibility between jobs and the labour market. Time and cost savings in terms of access to employment, goods and services would occur. Reduced levels of traffic may be anticipated throughout the study area.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

A Traffic Management Plan would be implemented in order to minimise delays during construction. Such measures could include temporary signage, which would reduce uncertainty and frustration.

Additional Mitigation During Operation:

N/A

Receptor – Local Economy and Employment

Nature of Effect During Construction:

Construction of the Scheme will bring a positive impact in terms of construction employment and associated expenditure in the local economy.

Nature of Effect During Operation:

During operation, it is anticipated that there would be local economic benefits as a result of the improvement in accessibility between jobs and the labour market.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

N/A

Additional Mitigation During Operation:

N/A

Receptor – Non-motorised users

Nature of Effect During Construction:

During construction, it is expected that non-motorised users could experience negative effects (both perceived and actual) as a result of the presence of construction traffic, increased congestion throughout the area, temporary closure or diversion of footways and cycleways, or as a result of drivers re-routing through more residential areas.

Nature of Effect During Operation:

Reduced levels of traffic may be anticipated throughout the study area, which should improve safety for NMUs using the adjacent footways and cycleways. Changes in air quality and noise levels around junctions would equally improve amenity levels for NMUs on these routes.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

Permanent.

Additional Mitigation During Construction:

A Traffic Management Plan would be implemented in order to minimise delays during construction, which would include measures to mitigate effects on non-motorised users. Measures could include temporary signage, and details of any temporary closures/diversions that may be necessary.

Additional Mitigation During Operation:

N/A

10 NOISE AND VIBRATION

10.1 Existing Environmental Conditions

10.1.1 Within the scope of this chapter information relating to the existing environmental conditions has been derived based upon commercial mapping information, aerial photography, site visits and baseline/ambient noise monitoring. Information acquired from these sources has been used to define the existing site conditions as outlined below.

10.1.2 The dominant source of noise in the area of the Scheme is concluded to be attributable to road traffic noise, primarily generated by vehicles traveling along the principle routes in the area including the B6174, A6018, A57 and A628.

10.1.3 There are existing residential receptors located towards the western end of the Scheme, in Hattersley; centrally where the Scheme passes Mottram and at the eastern end of the Scheme in Hollingworth. In addition, there are also isolated dwellings in the vicinity of the Scheme outside of the main settlements.

10.1.4 [DMRB HD 213/11](#) classifies 'other sensitive receptors' (non-residential receptors) as hospitals, schools, community facilities, designated areas (e.g. AONB, National Park, SAC, SPA, SSSI, scheduled monument), places of worship and public rights of way.

10.1.5 Across the study area (illustrated on Figure 10.1 at Appendix B), the following 'other sensitive receptors' have been identified:

- Balmoral Care Home;
- Arundale Primary School; and
- Longendale High School.

10.1.6 The location of the other sensitive receptors within the study area is presented on Figure 10.1 at Appendix B.

10.1.7 There are also four Noise Important Areas (NIAs) within close proximity to the Scheme which are likely to be within the final noise assessment calculation area. NIAs are locations in the England where the top 1% of the population that are affected by the highest noise levels are located according to the results of the strategic noise mapping undertaken by Defra under the terms of [The Environmental Noise \(England\) Regulations 2006](#). The locations of the four NIAs identified are presented in Figure 10.1 at Appendix B and are detailed as:

- Defra NIA ref: 1574, located along the M67;
- Defra NIA ref: 10992, located along the A57;
- Defra NIA ref: 10993, located along the A57; and
- Defra NIA ref: 1575, located along the A6018.

Noise Monitoring

10.1.8 In order to gain an understanding of the existing noise climate within the local area, attended noise surveys have been undertaken at six monitoring locations positioned along the Scheme.

10.1.9 These surveys were undertaken on 12 December 2017 and were carried out in accordance with BS 7445 1996 *'Description and measurement of environmental*

noise' (BS7445) following the shortened method measurement protocol contained within the [Calculation of Road Traffic Noise](#) (CRTN). This methodology is accepted for the quantification of road traffic noise in the UK and requires the measurement of data for three consecutive hours between the hours of 10:00 and 17:00 on a typical weekday.

10.1.10 The monitoring locations are presented in Figure 10.1 at Appendix B and are detailed as follows;

- NML 1 - Sound level meter set up at a height of 1.5m on the side of Old Hall Lane, approximately 3m from the nearest property. Distant road noise was audible.
- NML 2 - The sound level meter was set up at a height of 1.5m approximately 1.5 meters down Lodge Crescent. The nearest property was approximately 2.5m away. Road noise was dominant noise source.
- NML 3 - The sound level meter was set up at a height of 1.5m approximately 20m from the Four lanes/Stalybridge Road junction. The nearest property was approximately 1.5m away. Road noise was the dominant noise source.
- NML 4 - The sound level meter was set up at a height of 1.5m along Back Moor. The nearest property was approximately 10m away. Traffic building up and queueing along Back Moor resulted in considerably higher noise levels.
- NML 5 - The sound level meter was set up at a height of 1.5m about 5m down Carr House Lane. The nearest property was approximately 5m away. Road noise from traffic on Mottram Moor was the dominant noise source.
- ST-NML 6- The sound level meter was place at a height of 1.5m along the carriageway of Wooley Lane. The nearest property was approximately 2m away. The dominant noise source was traffic on Woolley Lane.

10.1.11 During the noise measurement survey the following meteorological conditions were noted, which are considered to be acceptable for the measurement of environmental noise;

- Winds speeds remained below 5m/s in a south westerly direction;
- Cloud cover was estimated to be approximately 10%;
- Temperature remained between 2°C and 6°C; and
- Ground conditions were noted to be dry with no precipitation falling during the site visit.

10.1.12 A summary of the monitored noise survey data is presented in Table 10-1.

Table 10-1: Summary noise baseline data

Noise Monitoring Location (Refer to Figure 10.1)	dB LA10, 3 hour	dB LAeq, 3 hour	dB LA90, 3 hour	dB LA10, 18 hour*
NML 1	53.7	52.9	45.3	52.7
NML 2	62.7	59.6	49.0	61.7
NML 3	57.3	54.3	45.2	56.3

Noise Monitoring Location (Refer to Figure 10.1)	dB LA10, 3 hour	dB LAeq, 3 hour	dB LA90, 3 hour	dB LA10, 18 hour*
NML 4	79.5	74.8	55.4	78.5
NML 5	66.5	64.6	60.8	65.5
NML 6	72.6	69.9	57.2	71.6
* dB LA10, 18-hour value estimated in accordance with CRTN by subtracting 1dB from the dB LA10 3-hour noise measurement				

10.1.13 At all monitoring locations subjective field notes conclude that road traffic noise forms a significant part of the existing noise climate. This can be seen from the small differences between the LAeq and LA10 parameters.

10.2 Other baseline information to be obtained/surveys to be undertaken

10.2.1 Additional baseline/ambient noise surveys will be undertaken within the scope of the ES, covering both the weekday and weekend periods to gain an understanding of the local diurnal noise variations, and night time noise levels at sensitive receptors within the study area.

10.2.2 The specifics of the survey locations and durations will be agreed with both High Peak District Council and Tameside Metropolitan Borough Council where appropriate prior to monitoring being undertaken.

10.2.3 In addition to the monitored baseline data, as part of the ES assessment the prediction of existing and future baseline road traffic noise contribution to the area in the absence of the Scheme will be undertaken. This will be predicted in accordance with the methodology of CRTN and is required as part of DMRB detailed assessment methodology.

10.3 Potential Effects and Mitigation Measures

10.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined below. Embedded mitigation measures can be found in Section 2.17.

10.3.2 The assessment has been based upon the currently available data relating to both the constructional and operational phases of the Scheme and design work undertaken to date. Therefore, it should be noted that assessment of potential effects is ongoing and is subject to change. Further detailed assessment will be provided within the ES.

Construction

10.3.3 The potential effects of the Scheme during construction and the example measures proposed to mitigate/control them are outlined in Table 10-2.

Table 10-2: Effects and mitigation on Sensitive Receptors – Construction

Receptor – Sensitive Receptors

Nature of Effect During Construction:

There is potential for short term adverse noise and vibration effects during the Scheme construction phase. It is anticipated that construction noise effects could occur due to the following aspects –

- Noise from the operation of construction plant;
- Noise from the construction of the Mottram Underpass; and
- Noise from HGV movements to and from the site, for example site deliveries and the removal of spoil.

It is anticipated that construction vibration effects could occur due to the following construction activities –

- Percussive piling activities; and
- Vibratory piling activities.

Rotary bored piling operations are considered to have inherently low vibration levels, even at close proximity and it is not anticipated that any potential effects from this type of piling activity would occur.

It is not anticipated that any significant construction works would be required to be undertaken during the night-time period, apart from discrete packages of work to tie in the new Scheme to the existing road network. These night time construction activities are expected to last no more than five nights at each new junction.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

However, through the entire construction phase, levels of construction noise and vibration will vary greatly as a result of the transient nature of the works. Impacts at any one specific receptor are likely to be evident for a limited period as the works progress.

Additional Mitigation During Construction:

Measures to minimise noise and vibration impacts from the construction phase would involve adopting Best Practicable Means' (BPM) (as outlined in Section 72 of the [Control of Pollution Act 1974](#)) and the recommendations of good practice presented in BS 5228-1:2009+A1:2014 Parts 1 and 2.

As part of the ES, a detailed predictive construction noise and vibration assessment will be undertaken, based on Scheme specific construction information and in accordance with BS5228: 2009+A1:2014 Parts 1 and 2. The assessment presented will consider appropriate construction noise and vibration limits, potential construction noise and vibration generation and specific mitigation measures where deemed necessary.

Possible mitigation measures will include, but not be limited to:

- Installing appropriate fencing around the construction areas likely to generate noise;
- Providing contact details for a site representative in the event that disturbance due to noise or vibration from the construction works occurs; ensuring that any complaints are dealt with pro-actively and that subsequent resolutions are communicated to the complainant;
- Keeping site access routes in good condition and well maintained with no potholes or other significant surface irregularities;

Receptor – Sensitive Receptors

- Turning off plant machinery when not in use;
- Maintaining all vehicles and mobile plant such that loose body fittings or exhausts do not rattle or vibrate;
- Using silenced equipment where possible, in particular silenced power generators and pumps;
- Using the most modern equipment available where possible and maintaining and operating equipment properly by trained staff;
- Locating static noisy plant, including generators, as far away from noise sensitive receptors as is feasible for the particular activity;
- Ensuring that the quietest plant and equipment, techniques and working practices available are selected and used; and
- No music or radios would be played on site.

These methods for mitigating construction noise and vibration would be implemented through a CEMP.

Operation

- 10.3.4 As part of the DMRB detailed level assessment it is necessary to consider road traffic noise changes as a result of the Scheme during both the long and short terms. The full scope of the detailed assessment will be presented in the ES.
- 10.3.5 Within the scope of this document the following comparisons of predicted road traffic noise are presented to consider the potential impacts of the Scheme.
- Opening Year Do Minimum against Opening Year Do Something; and
 - Opening Year Do Minimum against Future Assessment Year Do Something.
- 10.3.6 To allow these comparisons to be made, road traffic noise calculations have been undertaken in accordance with the CRTN prediction methodology. This allows the calculation of dB $L_{A10, 18\text{-hour}}$ values for road traffic noise contribution at identified sensitive receptors within the study area to be derived from supplied traffic data.
- 10.3.7 Calculations have been undertaken using the commercially available noise modelling software IMMI, which has been validated to follow the prediction procedures set out in CRTN. At this stage of the Scheme design a spatially coarse model has been produced which does not account for topography or vertical alignment. It is anticipated that the resultant road traffic noise levels and their impacts would be lower than presented within this PEIR once the effects of topography (bunds, cuttings) have been taken into account during the noise modeling process.
- 10.3.8 Traffic data used in the assessment contains the following data. Information has been provided for both the Opening Year and Future Assessment Year (15 years after opening) “Do Minimum” (without Scheme) and “Do Something” (with Scheme) scenarios on the basis of the following:
- 18-hour annual average weekday traffic (AAWT) flow;
 - 18-hour average speed (kph); and
 - Percentage HGV content of total 18-hour AAWT flow.

- 10.3.9 All new/altered road surfaces in the Opening Year and Future Assessment Year of the Scheme have been assumed to have a low noise surface/thin wearing course with a correction of -3.5dB being applied for links with a speed in excess of 75kph, and -1dB being applied for links with a speed below 75kph.
- 10.3.10 The information presented within Table 10-3 below is concluded from the road traffic noise change contour plot presented in Figure 10.2 at Appendix B. The change contours are presented at 4.0m above ground level as required by DMRB for situations where dwellings have a first floor.

Table 10-3: Short Term Operational Effects

Receptor – Sensitive Receptors

Nature of Effect During Operation:

Operational noise from the Scheme has the potential to impact upon receptors in the surrounding area. The nature of this effect will be dependent on the receptors location and its proximity to the new route and the existing road network.

DMRB defines a change in road traffic noise of 1dB $LA_{10, 18 \text{ hours}}$ in the short term as the smallest perceptible change. Therefore, within Figure 10.2 at Appendix B short term change contours are presented based upon this criteria with areas where there is a potential for perceptible changes in road traffic noise level to occur being identified.

Based upon the information presented in Figure 10.2 at Appendix B, areas that are predicted to experience perceptible road traffic noise increases in the Opening Year are:

- Along the new link road between the M67 roundabout and the western portal of the Mottram Underpass, including the link to the A6018. However, it is noted that these areas are sparsely populated and that the impact would be minimised as the road would be within a cutting along this section within the final design.
- Along the new link road between the eastern portal of the Mottram Underpass and the new A57 roundabout. However, it is noted again that these areas are sparsely populated and that the impact would be minimised as the road would be within a cutting along this section within the final design.
- Along the new link road between the new A57 roundabout and the western end of the Scheme where it meets the A57 and continuing along the A57 towards Glossop. It is noted that adjacent to the new link in this area is sparsely populated, however residential properties are identified along the existing A57 in this area which may experience a perceptible increase in road traffic noise as a result of the Scheme.
- At the western end of the Scheme along the A560 south of the M67 roundabout, through the residential area of Hattersley. Whilst this area is within the study area, the A560 is not an altered highway or part of the Scheme and the increases are due to changes in traffic flows as a result of the Scheme.

Based upon the information presented in Figure 10.3 at Appendix B, areas that are predicted to experience perceptible road traffic noise decreases in the Opening Year are:

- Along the majority of the bypassed A57 between the M67 roundabout (to the west), through the Hyde road/Stalybridge Road intersection at Mottram and to the new junction at the eastern end of the bypass.
- Reductions in road traffic noise are also evident on other roads in and around Mottram including Stalybridge Road, the A6018, Broadbottom Road and Ashworth Lane as a result of redistribution of traffic across the new link.

Receptor – Sensitive Receptors

In the Opening Year, the effects on the Defra identified NIAs are as follows:

- Defra NIA ref: 1574 – Potential for a perceptible adverse change in noise as a result of flow distribution along the M67, may require consideration for mitigation in the ES.
- Defra NIA ref: 1575 – No perceptible short-term change.
- Defra NIA ref: 10992 – Largely beneficial for the entire length of this area including the A57 and the A6018 sections. Potential for a perceptible adverse change in the vicinity of the new A57 roundabout, may require consideration for mitigation in the ES.
- Defra NIA ref: 10993 – Beneficial effects along the bypassed section of the area, with the potential for adverse effects in the un-bypassed sections of the area as a result of increased traffic flows.

As a result of the potential impacts of the Scheme relating to both sensitive receptors and NIAs, noise mitigation will need to be a feature of the design and considered in the ES.

Duration of Effect During Operation:

Short term impacts evident at the immediate point of opening to traffic and for the duration of the first year following opening.

Additional Mitigation During Operation:

The information presented within Figure 10.3 at Appendix B and discussed above is based upon a wholly unmitigated scenario with the exception of embedded low noise surfacing where specified within the design (refer to Section 2.17). Through the EIA process additional mitigation will be considered and incorporated where necessary and reported through the ES. In addition to the embedded low noise surfacing, other noise specific mitigation measures that will be considered within the ES will be environmental noise barriers. These barriers can be in the form of earth mounding or acoustic fencing of various types, or a combination of the two.

With regard to mitigation specific to noise, DMRB states the following, and this will require careful consideration and collaboration through the EIA process:

“The potential benefits of mitigation measures vary widely according to circumstances. For example, environmental barriers can provide reductions of 10 dB or more for well-screened locations relatively close to the source. But at further distances, and especially where the barrier provides only a small deflection of the transmitted sound waves, actual noise reductions may only be 1 or 2dB. Beyond 200-300m, the effects are often negligible as ground attenuation becomes the most significant factor.

Reducing the noise and vibration impact from a road scheme is just one of the factors to be considered in design, and conflicts can exist. Consideration should be given to cases where such conflict may exist, e.g. an acoustic barrier may introduce unacceptable visual intrusion or safety implications. In addition, any mitigation measure should perform to an acceptable level in traffic, road safety, economic and other environmental terms.”

As such mitigation measures cannot be considered for noise in isolation and will require to be concluded in conjunction with other topics through the EIA process.

- 10.3.11 The information presented within Table 10-4 below is concluded from the long-term road traffic noise change contour plot presented in Figure 10.3 at Appendix B. The change contours are presented at 4.0m above ground level as required by DMRB for situations where dwellings have a first floor.

Table 10-4: Long Term Operational Effects

Receptor - Sensitive Receptors

Nature of Effect During Operation:

Operational noise from the Scheme has the potential to impact upon receptors in the surrounding area. The nature of this effect will be dependent on the receptors' location and its proximity to the new route and the existing road network.

DMRB defines a change in road traffic noise of 3dB $L_{A10, 18 \text{ hours}}$ in the long term as the smallest perceptible change. Therefore, within Figure 10.3 at Appendix B, long term change contours are presented based upon this criteria with areas where there is a potential for perceptible changes in road traffic noise level to occur being identified.

Based upon the information presented in Figure 10.3 at Appendix B, areas that are predicted to experience perceptible road traffic noise increases in the Future Assessment Year are:

- Along the new link road between the M67 roundabout and the western portal of the Mottram Underpass, including the link to the A6018. However, it is noted that these areas are sparsely populated and that the impact would be minimised as the road would be within a cutting along this section within the final design.
- Along the new link road between the eastern portal of the Mottram Underpass and the new A57 roundabout. However, it is noted again that these areas are sparsely populated and that the impact would be minimised as the road would be within a cutting along this section within the final design.
- Along the new link road between the new A57 roundabout and the western end of the Scheme where it meets the A57. However, it is noted again that these areas are sparsely populated.

Based upon the information presented in Figure 10.3 at Appendix B, areas that are predicted to experience perceptible road traffic noise decreases in the Future Assessment Year are:

- Along the majority of the bypassed A57 between the M67 roundabout (to the west), through the Hyde road/Stalybridge Road intersection at Mottram and to the new roundabout on the A57.
- Along the A57 Woolley Lane between the Mottram Moor/Market Street/Woolley Lane junction to the north and the new bypass junction to the south.
- Reductions in road traffic noise are also evident on other roads in and around Mottram including the A6018 between Stalybridge Road and Mottram Moor and at the Hyde Road/Stalybridge Road intersection.

In the Opening Year the effects on the Defra identified NIAs are as follows:

- Defra NIA ref: 1574 – No perceptible long-term change.
- Defra NIA ref: 1575 – No perceptible long-term change.
- Defra NIA ref: 10992 – Largely beneficial for the entire length of this area including the A57 and the A6018 sections. Potential for a perceptible adverse change in the vicinity of the new A57 roundabout, may require consideration for mitigation in the ES.
- Defra NIA ref: 10993 – Largely no perceptible long-term change through this area aside from a potential for perceptible adverse change locally at the new junction with the bypass.

Receptor - Sensitive Receptors

As a result of the potential impacts of the Scheme relating to both sensitive receptors and NIAs, noise mitigation will need to be a feature of the design and considered in the ES.

Duration of Effect During Operation:

Longer term impacts evident for the lifetime of the Scheme following initial opening to traffic and based on worst case traffic flows within 15 years of opening.

Additional Mitigation During Operation:

The information presented within Figure 10.3 at Appendix B and discussed above is based upon a wholly unmitigated scenario with the exception of embedded low noise surfacing where specified within the design (refer to Section 2.17). Through the EIA process additional mitigation will be considered and incorporated where necessary and reported through the ES.

In addition to the embedded low noise surfacing, other noise specific mitigation measures that will be considered within the ES will be environmental noise barriers. These barriers can be in the form of earth mounding or acoustic fencing of various types, or a combination of the two.

With regard to mitigation specific to noise, DMRB states the following, and this will require careful consideration and collaboration through the EIA process:

“The potential benefits of mitigation measures vary widely according to circumstances. For example, environmental barriers can provide reductions of 10 dB or more for well-screened locations relatively close to the source. But at further distances, and especially where the barrier provides only a small deflection of the transmitted sound waves, actual noise reductions may only be 1 or 2dB. Beyond 200-300m, the effects are often negligible as ground attenuation becomes the most significant factor.

Reducing the noise and vibration impact from a road scheme is just one of the factors to be considered in design, and conflicts can exist. Consideration should be given to cases where such conflict may exist, e.g. an acoustic barrier may introduce unacceptable visual intrusion or safety implications. In addition, any mitigation measure should perform to an acceptable level in traffic, road safety, economic and other environmental terms.”

As such mitigation measures cannot be considered for noise in isolation and will require to be concluded in conjunction with other topics through the EIA process.

11 ROAD DRAINAGE AND THE WATER ENVIRONMENT

11.1 Existing Environmental Conditions

11.1.1 Baseline water environment data has been collated for an area extending 500m from of the red line boundary of the Scheme. The study area was chosen based on a combination of the requirements of the [DMRB Volume 11, Section 3, Part 10](#) and professional judgement.

11.1.2 Within the study area, the following surface water and groundwater features have been identified (refer to Figures 11.1 and 11.2 at Appendix B):

- River Etherow – an Environment Agency (EA) Main River that is monitored under the [Water Framework Directive](#) (WFD)². The river has a chemical quality status of ‘Good’, but is failing to meet its ecological target status. Its current ecological status is ‘Poor’, limited by biological quality elements (fish), but targeting ‘Moderate’ by 2027 (EA, 2017a). The River Etherow flows within a well-defined channel and flood defences, consisting of high ground, walls and embankments are located upstream (north) and downstream (south) of the proposed Scheme crossing. The [EA Flood Map for Planning](#) (EA, 2018a) indicates that areas local to the Scheme crossing are at high to medium risk of flooding should the Etherow overflow its banks and flood defences.
- Glossop Brook – an EA Main River that is monitored under the WFD and achieves a WFD chemical status of ‘Good’ and an ecological status of ‘Moderate’. The [EA Flood Map for Planning](#) indicates that there are narrow extents of land adjacent to the watercourse channel that are at medium to high risk of flooding.
- Hurtsclough Brook – an ordinary watercourse, which is re-designated as an EA Main River in the study area, but that is not monitored under the WFD. Its quality is inferred to be similar to that of monitored watercourses in the locality. The [EA Flood Map for Planning](#) indicates that flood risk from this source is low. However, high groundwater levels (at or close to the ground surface) and spring flows in the upper catchment can cause localised waterlogging/flooding.
- Field drains; ponds; sinks and Issues – ordinary watercourses/waterbodies that are not monitored under the WFD. These features generally flow south-eastwards towards the River Etherow. High groundwater throughout this part of the study area supports these features which are prone to causing waterlogged conditions, particularly following heavy rainfall during winter months.
- Manchester and East Cheshire Carboniferous Aquifer – bedrock aquifer underlying the entire study area, classified as achieving a WFD status of ‘Good’ for quantitative quality, meaning the level of groundwater in the

² The Water Framework Directive is a European Directive, adopted in 2000, that sets standards for rivers and lakes, aiming to achieve a ‘Good’ overall water quality for all waterbodies. The status of waterbodies is measured based on ecological factors, including biological community and quality; and chemical factors, including pollutants and other hazardous substances (European Commission, 2000).

aquifer meets the set criteria. Its chemical quality status is 'Poor', targeting 'Good' by 2027.

- Superficial aquifers – a mix of deposits are present classified as Secondary Undifferentiated, storing limited amounts of groundwater, and Secondary A; with potential to support water supplies at a local scale (Natural England, 2017). These aquifers are not monitored under the WFD.

11.1.3 There are no Groundwater Source Protection Zones located within the study area.

11.1.4 There is one large surface water abstraction within the study area, drawn from Hollingworth Brook, a tributary of the River Etherow, which is fed by the Arnfield Reservoir. The abstraction is managed by United Utilities and is used for potable, public water supply. The abstraction is located approximately 500m to the northeast (upstream) of the Scheme and is therefore unlikely to be directly affected (EA, 2017b).

11.2 Other baseline information to be obtained/surveys to be undertaken

11.2.1 To inform the next stages of our assessment the following surveys and quantitative analyses are proposed:

- Hydrological and hydraulic modelling of the River Etherow and its key tributaries (including the Glossop Brook and Hollingworth Brook). To date, the modelling scope and methodologies have been agreed with the EA. A bespoke topographical survey has been undertaken (December 2017), data from which will be used to develop a model of these watercourses and their floodplains. The findings of the modelling study will be reported in a Flood Risk Assessment that will define baseline flood risk and inform the design of any flood risk management measures that may be necessary.
- Scour assessment of the proposed River Etherow crossing, to determine requirements for scour protection, as required.
- Lead Local Flood Authorities and the EA would be consulted to agree surface water drainage concepts and treatment trains at road drainage outfalls. A quantitative appraisal of the effects of road drainage discharges on the quality of receiving waterbodies will be carried out using the Highways Agency Water Risk Assessment Tool ("HAWRAT"), the results of which will be used to inform the design of discharge treatment measures.
- Assessment of surface water and groundwater quality will be undertaken. The findings of which will be reported in a standalone WFD report.
- Three-dimensional numerical modelling assessment of groundwater in the Mottram area will be undertaken, the findings of which will be reported in a Hydrogeological Risk Assessment. A Water Features Survey, in addition to groundwater level monitoring at selected sites, will be undertaken (January – March 2018) to collect data to inform this assessment.

11.3 Potential Effects and Mitigation Measures

11.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined in Table 11-1 below. Embedded mitigation measures can be found in Section 2.17.

11.3.2 It should be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Table 11-1: Potential effects and mitigation on Road Drainage and the Water Environment receptors

Receptor – River Etherow, Glossop Brook, Hurstclough Brook and their floodplains, ponds and field drains
<p><i>Nature of Effect During Construction:</i> Negative effects on water quality of River Etherow, Glossop Brook and Hurstclough Brook, field drains and ponds due to receipt of construction work site run-off and potential for reduced flow conveyance capacity due to sedimentation.</p> <p><i>Nature of Effect During Operation:</i> Detriment to the current land drainage regime due to the addition of impermeable land cover and to the water quality of River Etherow, Glossop Brook and Hurstclough Brook and their tributaries due to receipt of highway run-off (routine run-off and accidental spillages).</p>
<p><i>Duration of Effect During Construction:</i> Throughout the construction phase (approximately 3 years).</p> <p><i>Duration of Effect During Operation:</i> The lifetime of the Scheme.</p>
<p><i>Additional Mitigation During Construction:</i> Effects would be avoided through implementation of best practice construction site drainage management and pollution prevention measures in line with Construction Industry Research Information Association (CIRIA) guidance (CIRIA, 2004).</p> <p><i>Additional Mitigation During Operation:</i> Where necessary, attenuation storage and treatment for highway drainage would be provided.</p>
Receptor – Bedrock and Superficial Aquifers
<p><i>Nature of Effect During Construction:</i> Locally reduced groundwater levels and altered groundwater flow paths where dewatering is necessary, particularly along the section of the Scheme in cut. Negative effects on groundwater quality due to receipt of construction work site run-off with pollution pathways opened via excavations and infiltration, particularly along the section of the Scheme in cut.</p> <p><i>Nature of Effect During Operation:</i> Long term changes in groundwater levels and flow paths due to the creation and long-term drainage of cuttings.</p>
<p><i>Duration of Effect During Construction:</i> Throughout the construction phase (approximately 3 years), but primarily during dewatering phase.</p> <p><i>Duration of Effect During Operation:</i> The lifetime of the Scheme.</p>
<p><i>Additional Mitigation During Construction:</i> Effects on groundwater levels and flows would be mitigated by carrying out dewatering operations in accordance with EA best practice guidelines for protection of groundwater</p>

resources^[1].

Effects on groundwater quality would be avoided through implementation of best practice construction site drainage management and pollution prevention measures in line with CIRIA guidance.

Additional Mitigation During Operation:

Effects on groundwater levels and flows would be avoided by implementing an appropriate drainage solution for the section of the Scheme that would be in cut.

^[1] Approach to Groundwater Protection (Environment Agency, 2017). Accessible online at <https://www.gov.uk/government/publications/groundwater-protection-position-statements>

12 GEOLOGY AND SOILS

12.1 Existing Environmental Conditions

Published Geology

- 12.1.1 The Preliminary Sources Study Report (PSSR) has been reviewed to obtain information on the geological setting of the site.
- 12.1.2 In preparing the PSSR, the British Geological Survey (BGS) 1:50,000 scale geological maps (Sheet 86 Glossop and Sheet 87 Barnsley) were reviewed.
- 12.1.3 The maps indicate that the superficial geology underlying the majority of the study area is the Devensian Till. In the eastern portion of the study area, Head deposits, Alluvium and a small area of River Terrace Deposits are indicated associated with the River Etherow. A description of the geological strata can be found in Table 12-1 below. Made Ground may be present in developed up areas associated with building works.
- 12.1.4 The bedrock geology, beneath the mantle of Till is folded and faulted and thus varies along the route and across the study area as shown on Figure 12.1 at Appendix B. From west to east the bedrock is mapped as:
- Hebden Formation (Mudstone and Siltstone)
 - Lower Kinderscout Grit (Sandstone)
 - Fletcher Bank Grit (Sandstone)
 - Marsden Formation (Mudstone and Siltstone)
 - Huddersfield White Rock (Sandstone)
 - Rossendale Formation (Mudstone and Siltstone)
 - Marsden Formation (Mudstone and Siltstone)
 - Huddersfield White Rock (Sandstone).
- 12.1.5 The above formations are part of the Millstone Grit Group or formations which are part of this group.
- 12.1.6 Description of the main geological units are provided in Table 12-1 below.

Table 12-1: Geological Descriptions

Geological Formation	Description (typical lithology and characteristic)
Till	Comprises gravel, sand and clay depending on upslope source and distance from source. Poorly sorted and poorly stratified glacial deposits later influenced by solifluction and/or hill wash and soil creep. Essentially comprises sand and gravel, locally with lenses of silt, clay or peat and organic material.
Alluvium	Soft to firm normally consolidated, compressible silty clay, but can contain layers of silt, sand, peat

Geological Formation	Description (typical lithology and characteristic)
	and basal gravel. A firmer desiccated surface zone may be present.
River Terrace Deposits	Sand and gravel, locally with lenses of silt, clay or peat.
Hebden Formation (Mudstone and Siltstone)	Fine- to very coarse-grained and pebbly, feldspathic sandstone interbedded with grey siltstone and mudstone, with subordinate marine black shales, thin coals and seatearths.
Marsden Formation (Mudstone and Siltstone)	Fine- to very coarse-grained and pebbly feldspathic sandstone, interbedded with grey siltstone and mudstone, and subordinate marine black shales, thin coals and seatearths.
Fletcher Bank Grit (Sandstone)	Sandstone and pebbly sandstone, coarse-grained with angular grains, with quartz and quartzite pebbles, massive and current-bedded, and subordinate beds of mudstone and coal.
Huddersfield White Rock (Sandstone)	Medium- to coarse-grained, massive to flaggy, cross-bedded, micaceous sandstone.
Rossendale Formation (Mudstone and Siltstone)	A fine- to very coarse-grained and pebbly, feldspathic sandstone, interbedded with grey siltstone and mudstone, and subordinate marine black shales, thin coals and seatearths. Typically, the formation comprises a lower mudstone-dominated succession including two prominent marine shales, the <i>Cancelloceras cancellatum</i> and <i>Cancelloceras cumbriense</i> marine bands, and an upper sandstone-dominated succession, including the Rough Rock and Rough Rock Flags.

12.1.7 Two fault lines are mapped to be crossing the Scheme. One positioned across the A57 east to the existing M67 roundabout at the western extent of the Scheme. The other fault crosses the location of the proposed Mottram Underpass running north west to south east with Marsden Formation on the south west side and Fletcher Bank Grit or Sandstone on the north east side.

12.1.8 Another fault is mapped crossing the most northern section of the study area but in a north east to south west direction. Within the study area other fault lines are mapped to the west and south of the Scheme.

Geodiversity

12.1.9 A review of the [JNCC Geological Conservation Review](http://www.jncc.gov.uk/) and MAGIC <http://www.magic.gov.uk/> website indicates that there are no recorded geodiversity heritage sites, Regionally Important Geology Sites (RIGS) or geological SSSIs within 1km of the Scheme.

Coal Mining and Mineral Deposits

- 12.1.10 The entire study area is within a coal mining affected area. Coal Authority reports indicate that there are two mine entries within, or within 20m of the boundary of the Scheme.
- 12.1.11 Details in the PSSR also include an extract from a Geotechnical report, which indicated that the risk of shallow coal mining is low, and the two mining entries shown relate to the same Longdendale aqueduct airshaft.
- 12.1.12 The extract states that the:

“Coal Authority Coal Mining Report Reference 00181061-04 (15 October 2004) indicates the presence of two shafts near the western end of the route, (at about Ch.180m). The northernmost of these two shafts (Mine Entry Ref: 398395-002) corresponds to the location of an air shaft on the United Utilities’ Longdendale Aqueduct Mottram Tunnel, described below. The second shaft (Mine Entry Ref: 398395-003) is shown about 27m south south-east of the first. Reference to the Coal Authority Mine Entry Data Sheets Reference 398395-002 and –003 indicate the sources of this information to be:

- *1/2500 OS 1st – 4th editions and 1:10,560 Geological Survey ¼ sheet (Mine Entry Reference 398395-002)*
- *1/2500 OS 1st edition (Mine Entry Reference 398395-003).*

Two shafts are shown at this location on the 1st Edition County Series topographic mapping published between 1872 and 1882, although subsequent revisions (from 1899 onwards) show only one shaft. Geological survey mapping carried out between 1925-1926, which is based on the 1911 revision of the County Series topographic map (IGS, 1926a), shows numerous abandoned coal mine shafts, but not at the site in question where a single ‘air shaft’ only is shown. The map does, however, show Coal Measures strata underlying this section of the route. The 1st Edition County Series topographic mapping apparently omits the easternmost of the four shafts on the United Utilities aqueduct, and it is possible that representation of a second shaft at Ch.180m is simply a cartographic error, corrected on later editions. No features are apparent on aerial photography corresponding with the position of the second shaft.

As discussed (in Section 5.2.3 and) above, it is concluded that the current 1:50,000 geological mapping (BGS, 1981) should take precedence over the old County Series mapping (BGS, 1926a). This is because the three ground investigations indicate that the 1981 map is more accurate. The probability of there being coal working beneath this section of the route is considered to be low, as the coal strata found in ground investigation No.3 (Fugro 2005) are too thin for mining extraction (0.01 to 0.2m thick, see section 5.2.3).”

- 12.1.13 From the Landmark Environmental Database, no mineral sites are indicated within the Scheme footprint. Within the study area the following are indicated:
- 13 BGS mineral sites between 200m and 780m north west of the Scheme;
 - Two mineral sites 300m and 810m southwest of the Scheme;
 - Three mineral sites 450m and 870m north of the Scheme; and

- Five mineral sites 600m and 750m east of the Scheme.

12.1.14 From the information from Landmark, there are no natural cavities recorded within the study area. One is indicated further to the west of the study area, which is described as a Gull/Fissure due to cambering within Millstone Grit Group. Given the nature of the geology, it is considered there may be currently unrecorded natural cavities present within the study area.

Hydrogeology and Hydrology

12.1.15 Hydrogeology and hydrology are detailed in Chapter 11. However, to give context on how these receptors and potential to provide migration pathways relate to contaminated land, brief details are provided below.

12.1.16 The Till superficial deposits are designated as Secondary (undifferentiated)³. This covers the majority of the study area surface geology. However, in areas associated with the Alluvium and Head deposits, the aquifer is designated as a Secondary A aquifer⁴.

12.1.17 The bedrock beneath superficial materials is designated as a Secondary A Aquifer.

12.1.18 The study area is not within a Groundwater Source Protection Zone. Registered groundwater abstractions (licensed) are not recorded within the study area.

12.1.19 The River Etherow is the main watercourse with the study area. This is located to the east and a new road crossing is proposed as part of the Scheme. Hurstclough Brook is located in the western part of the Scheme. There are a number other smaller existing field drains, ponds, areas of spring issues/sinks and unnamed streams indicated within the study area.

Historical Development/Potentially Contaminated Land Uses

12.1.20 The earliest maps (circa 1881) show the Scheme lies mainly within agricultural land with a number of farmsteads and established roads throughout the study area. The town of Mottram is shown to the south, Roe Cross to the north and Hollingworth to the east.

12.1.21 Noticeable features within the study area at this time include a quarry near Roe Cross (250m north) and Mottram Old Mill (Woollen) which is located adjacent to the M67 roundabout. To the north west (approximately 500m) is Harropedge Quarry and to the east (approximately 700m) lies the Manchester Sheffield & Lincolnshire Railway. Several mills and quarries are shown in the built-up areas within the study area.

12.1.22 In 1910, a small gas works is mapped adjacent to Woolley Lane on the south western edge of Hollingworth and a Bleach Works and associated tanks and Mersey Mills are located adjacent to River Etherow to the east. Light industry (Wadding Manufactory) are indicated to the north in Lower Roe Cross.

12.1.23 In 1950, additional industrial activities (Rhodes Mill (disused), Longdendale

³ **Secondary (undifferentiated)** Aquifer is a designation assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

⁴ **Secondary A** - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

(Works)) are shown to the east of the study area near Woolley Bridge near to the Bleach Works. A sewage works can be seen approximately 300m to the south of the Scheme in Longdendale.

- 12.1.24 By 1983 residential development in Mottram and Hollingworth has significantly increased. The industry to the north in Lower Roe Cross is no longer shown. A garage is located in the vicinity of the gas works which is no longer indicated.
- 12.1.25 Currently there are over 40 trade entries in the study area with the majority located to the east in the built-up area of Hollingworth and Hadfield. There is a small cluster of entries associated with Mottram to the north of the proposed Mottram Underpass. These entries relate to car dealerships, garage services and blind manufacturers.
- 12.1.26 There are six fuel stations within the study area. Four are indicated adjacent to the red line boundary of the Scheme.

Landfill sites

- 12.1.27 Table 12-2 details the landfill sites recorded within the study area.

Table 12-2: Recorded Landfill Sites

Landfill	Dates	Type of Waste	Distance from Red Line Boundary
Land adjacent to Woolley Lane Gas Works	Nov 1993 – Jan 1996	Inert	Within and adjacent to north eastern red line boundary
Carrhouse Road		No information provided	Within red line boundary
Disused Railway Line	Dec 1990 – Oct 1991	Inert	100m east of red line boundary
Melandra Road Waste Disposal Site	Dec 1977 – Dec 1981	Inert, Industrial, Commercial, Household and Liquid/Sludge	100m south east of red line boundary

- 12.1.28 The above landfill sites are within the 250m study area and therefore could potentially pose an impact to sensitive receptors. Historic site uses and landfill areas have a potential to release pollution. This potential impact would be assessed.

Unexploded Ordnance (UXO)

- 12.1.29 A preliminary desk study was undertaken by Zetica (UXO specialists) for the Scheme. This concluded that no readily available records of bombing or other significant military activity on the site have been found. It is considered that the site is likely to have a Low UXO hazard level.

12.2 Other baseline information to be obtained/surveys to be undertaken

- 12.2.1 A ground investigation would be undertaken to inform the Scheme design. The investigation would be designed to assess the presence or confirm absence of

chemical hazards (including ground gases) in areas identified as potentially contaminated land and to determine the ground and groundwater conditions. The ground conditions in the area of the fault indicated in the location of the proposed Mottram Underpass would be investigated.

- 12.2.2 A mineral resources/valuation report would be obtained from Mineral Valuation Office to assess the value of the mineral resources identified and the likelihood of future exploitation.
- 12.2.3 Consultations would be undertaken with relevant local planning authorities and Environment Agency to obtain additional baseline information along the Scheme.
- 12.2.4 An Outline CEMP and Materials Management Plan (MMP) would be submitted in support of the DCO application.

12.3 Potential Effects and Mitigation Measures

- 12.3.1 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are outlined in Table 12-3 below. Embedded mitigation measures can be found in Section 2.17.
- 12.3.2 It should be noted that within the Scheme a deep cutting is proposed which will expose the bedrock geology in that area. This could create the opportunity of beneficial learning resource (e.g. a resource which could be studied/used as a learning resource by geology students) during the operation lifetime of the Scheme, subject to cutting stability, operational safety and other required design factors.
- 12.3.3 It should further be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Table 12-3: Potential effects and mitigation on Geology and Soils receptors

Receptor – Geology in relation to contaminated land
<p><i>Nature of Effect During Construction:</i> Spread or mobilisation of pre-existing (historic land use) contamination and creation of new contamination during construction e.g. within the construction compound areas/general works.</p> <p><i>Nature of Effect During Operation:</i> No effect would be present during operation as there will be no significant soil movement after construction is completed.</p>
<p><i>Duration of Effect During Construction:</i> Throughout the construction phase (approximately 3 years).</p> <p><i>Duration of Effect During Operation:</i> N/A</p>
<p><i>Additional Mitigation During Construction:</i> Prior to the construction works, intrusive ground investigation would be undertaken to establish the locations of contaminated soils. This data would be used to inform a Conceptual Site Model. Applying CLR 11 source-pathway-receptor principles, a quantitative risk assessment would be undertaken. Where unacceptable risk was identified, some form of remedial action would be warranted within the Scheme design.</p>

In areas to be excavated or during topsoil stripping activities, unsuitable (contaminated) soils will be removed prior to the main works to ensure that they are not mixed, potentially rendering a larger volume of material requiring treatment.

During stripping/excavation/construction works, a watching brief protocol will be adopted with site workers remaining vigilant, so any visual or olfactory signs of contamination are noted and that any contaminated soil is kept separate from other materials. Any suspected contaminated material would be analysed to determine if it is suitable for re-use on site or requires disposal off-site to an appropriate soil recycling or disposal facility.

Prior to any construction compound areas being prepared, a baseline survey will be undertaken to determine the current land quality in these areas. This will highlight any localised contamination present above risk based suitable for use criteria. If appropriate, such areas will be remediated prior to, or as part of, the soil stripping/enabling works.

Within the construction site compounds, specific areas would be designated for the storage of chemicals, waste oils and fuel and refuelling activities. These areas will comply with Environment Agency guidance, for example, be bunded and placed on hardstanding to prevent downward migration of contaminants. Any transfer of fuel or other potentially contaminated liquids would only take place within a designated fuel transfer area. Drip trays would be provided to reduce the risk of spillages. These areas would be designed with appropriate drainage to ensure any spillages can be isolated.

An Emergency Response/Spill Response plan would be produced by the appointed contractor(s). Appropriate equipment (e.g. spill kits, absorption mats) would be made easily accessible on-site and personnel will be trained in using them. Clear protocols and communication channels would be provided to ensure that any spillages are dealt with immediately and adequately. This would prevent large areas of soil/geology potentially becoming contaminated and in turn protect surface water quality.

During the construction phase, localised contamination may occur within the compound areas through spillages/leakages of fuel and therefore a repeat baseline survey would be undertaken once the construction has finished and the compound dismantled to demonstrate the area has been maintained in, or returned to, its previous state. If contamination has occurred during the lifetime of the compounds, remediation would be undertaken to return the land to its previous land quality state.

Measures to prevent pollution incidents to receptors during the construction phase would be provided through a CEMP. This would be developed further by the appointed contractor(s) to ensure best practice is utilised and the receptors are protected. The appointed contractor(s) would prepare detailed method statements and appropriate controls to protect receptors. These would include best practice pollution prevention guidelines for activities such as excavation and dewatering, storage of fuels, chemicals and oils, vehicle washing, pollution control and emergency contingency.

Additional Mitigation During Operation:

N/A

Receptor – Human Health (Local Residents near to Scheme)

Nature of Effect During Construction:

Fugitive dust (potentially containing contaminants) could be generated by excavation/earth movements during construction of Scheme. Depending on weather conditions, this could be blown into nearby residential properties.

Nature of Effect During Operation:

No effect would be present during operation as there will be no significant soil movement which will create dust.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

N/A

Additional Mitigation During Construction:

Prior to the construction works, intrusive ground investigation would be undertaken to establish the locations of contaminated soils. During the construction of the Scheme, excavated soils will be appropriately stored to ensure that if dust is generated in dry weather periods, it is not directed towards properties. Other best practice measures such as damping down areas, vehicle wheel washing, covering stockpiles and lorries containing soils would be utilised to reduce the impacts from dust (refer to Chapter 5 for further detail).

Additional Mitigation During Operation:

N/A

Receptor – Human Health (Construction/Maintenance Workers/Site Users)

Nature of Effect During Construction:

Exposure to contaminated soils/groundwater during the construction of the Scheme.

Nature of Effect During Operation:

Exposure to contaminated soils.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

Prior to the construction works, intrusive ground investigation would be undertaken to establish the locations of contaminated soils. Appropriate working methods and Personal Protective Equipment (PPE) would be used and good site hygiene adopted by workers to reduce the exposure risk to contaminated materials.

Additional Mitigation During Operation:

The road itself will reduce the risk of road users being exposed to soils. The majority of the time, the users will be inside their cars. If they however need to be on the road side (e.g. breakdown), slight exposure could occur. Design of landscaped areas will thus ensure that unacceptably contaminated materials are not present at the surface. Information would be available in the Health & Safety file about quality of soils remaining and reused within the Scheme. Maintenance workers would wear appropriate PPE to reduce the risk where work was required within contaminated soils remaining (on a risk assessment basis) within the Scheme.

Receptor – Groundwater in relation to contaminated land

Nature of Effect During Construction:

Contaminants being pre-existing and/or mobilised during construction works and migrating into underlying groundwater and the wider water environment.

Nature of Effect During Operation:

No effect would be present during operation as there will be no significant soil movement after construction is completed.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

N/A

Additional Mitigation During Construction:

Prior to construction works, intrusive ground investigation would be undertaken to establish the locations of contaminated soils and existing groundwater quality in the area. A risk based approach in accordance with the principles of [CLR 11](#) and [The Environment Agency's Approach to Groundwater Protection](#) would be adopted.

To reduce the spread of contaminants, unacceptably contaminated soils within areas to be excavated may need to be treated or removed prior to commencement of construction. Materials may be treated so they can be reused within the Scheme or if this is not possible, materials will be disposed of at an appropriate waste facility.

Contaminated groundwater collected during the dewatering process will be treated or disposed of appropriately to reduce contamination of the wider water environment.

Additional Mitigation During Operation:

N/A

Receptor – Surface Water in relation to contaminated land

Nature of Effect During Construction:

Contaminants being mobilised during construction works and migrating into surface water and the wider water environment.

Nature of Effect During Operation:

No effect would be present during operation as there will be no significant soil movement after construction is completed.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

N/A

Additional Mitigation During Construction:

Excavated materials would be appropriately stored to ensure that water run-off from stockpiles does not enter surface water. If necessary stockpiles would be covered. Pollution prevention best practice protocols would be adopted to ensure contamination does not enter surface water.

Additional Mitigation During Operation:

N/A

Receptor – Geology

Nature of Effect During Construction:

A geological fault is present in the location of Mottram Underpass which could affect the design.

Nature of Effect During Operation:

A geological fault is present in the location of Mottram Underpass.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

Prior to the finalisation of the design of Mottram Underpass and construction works, intrusive ground investigation would be undertaken to establish the location of the geological fault. This will inform the design of Mottram Underpass.

Additional Mitigation During Operation:

No additional mitigation is considered feasible at this stage.

Receptor – Shallow Geology (Soils) and Water Environment (Surface & Groundwater)

Nature of Effect During Construction:

N/A

Nature of Effect During Operation:

Potential contamination from road spray and pollution incidents associated with road usage (e.g. fuel/oil spillages) and traffic accidents.

Duration of Effect During Construction:

N/A

Duration of Effect During Operation:

The lifetime of the Scheme.

Additional Mitigation During Construction:

N/A

Additional Mitigation During Operation:

Appropriate drainage systems would be designed to reduce the risk to receptors. If any incidence were to occur which had overwhelmed the systems, soils which had become significantly affected would be assessed and if necessary removed to reduce the risk of contamination migrating across a wider area and or entering controlled waters.

13 MATERIALS

13.1 Existing Environmental Conditions

Material Resources

- 13.1.1 Baseline data for material resources has been based on available material resources data for the UK, as material resources data is not available for the study area. Table 13-1 provides a breakdown of the annual UK demand of key material resources expected to be used by the Scheme. [The Mineral Products Association](#) identifies the annual UK demand of aggregates, pavement and concrete.

Table 13-1: Annual UK demand of key material resources

Material Resources	Quantities (tonnes)
Secondary Aggregates	225,000,000
Pavement	24,000,000
Concrete	81,000,000
Steel	10,400,000

Waste

- 13.1.2 [Eurostat data](#) has been reviewed to obtain information on the volume of construction, demolition and excavation (CD&E) waste produced in the UK during 2008, 2010, 2012 and 2014.

Table 13-2: CD&E waste arisings in the UK

Year	Quantities of CD&E waste (tonnes)
2008	100,999,493
2010	102,231,321
2012	108,838,022
2014	120,393,877

- 13.1.3 In Derbyshire County Council, the 'Assessment of Need for Waste Treatment and Disposal Capacity in Derbyshire, 2009/10-2029/30' report highlighted that the final datasets are based on estimates as reliable and consistent data is not available. The referenced dataset is from 2004/5 and the study concludes that CD&E waste arisings were around 2,761,694 tonnes. Of that total amount, approximately 587,280 tonnes was deposited in landfill sites and 45,921 tonnes deposited at exempt sites. The predicted growth in CD&E waste arisings for the following periods is as follows:
- 2019/20 – 3,080,833 tonnes per annum
 - 2029/30 – 3,080,833 tonnes per annum
- 13.1.4 There is very limited data on CD&E waste arisings for Lancashire as information is not collected routinely. The most recent information on CD&E arisings estimates 200,000 tonnes in 2006.
- 13.1.5 The Association of Greater Manchester Authorities undertook a [Waste Need](#)

[Assessment in 2007 and updated in 2010](#). CD&E waste arisings at 2008 were in the order of 1,299,421 tonnes, with 448,249 tonnes being landfilled and 851,172 tonnes being managed by transfer stations, material recycling facilities and treatment facilities.

13.1.6 A breakdown of specifically CD&E waste arisings from Derbyshire County Council is only available from 2004. For Lancashire the data is available from 2006 and for the Association of Greater Manchester Authorities the data is available from 2008.

13.1.7 Therefore, data from the [Survey of Arisings and Use of Alternatives to Primary Aggregates in England](#) (based on 2005 data) has been used to identify waste tonnages that have been received at various waste management facility types within the study area. Of this total:

- 34% entered licensed Landfill sites;
- 18% was sent for Treatment;
- 42% was sent to Transfer Stations (and the end fate cannot be tracked);
- 4% was reused on receiving sites using an Environmental Permit; and
- 2% was sent for metal recycling.

13.1.8 The capacity of waste infrastructure sites that could potentially receive CD&E waste arisings from the Scheme has been assessed using data gained from the Environment Agency Environmental Permitting Regulations database.

13.1.9 Table 13-3 details the landfill capacities from sites taking CD&E waste within the study area in 2015.

Table 13-3: Landfill that could potentially take CD&E waste in 2015

Areas	CD&E Waste Capacity (tonnes)
Derbyshire	10,655,808
Lancashire	12,947,595
Greater Manchester	10,190,180
Total	33,793,583

13.1.10 Table 13-4 details the annual waste infrastructure capacities from sites taking CD&E waste within the study area in 2016.

Table 13-4: Landfill that could potentially take CD&E waste in 2015

Areas	CD&E Waste Capacity (tonnes)
Derbyshire	324,394
Lancashire	1,028,086
Greater Manchester	486,210
Total	1,838,690

13.1.11 A non-exhaustive list of landfill sites and waste management facilities able to accept CD&E waste within 50km of the Scheme has been collated and presented in Table 13-5 and Table 13-6 (refer to Figure 13.1 at Appendix B for locations).

Table 13-5: Non-exhaustive list of landfill sites able to accept CD&E waste within 50km of the Scheme

Landfill Number	Landfill Name	Landfill Type	Capacity (tonnes) end 2015	Permit Reference	Landfill Postcode
1	Pilkington Quarry	Inert Landfill	1,300,000	400532	BL6 6RX
2	Morley Quarry Landfill	Inert Landfill	575,653	210126	M29 7EW
3	Harwood Quarry Landfill Site	Non-Hazardous Merchant Landfill	1,875,234	BV8741IL	BL2 4LT
4	Fletcher Bank Landfill Site	Non-Hazardous Restricted Landfill	1,600,000	GP3733FE	BL0 0DD
5	Arden Quarry Landfill	Non-Hazardous Merchant Landfill	2,357,312	BW1416IQ	SK22 1BY
6	Clayton Hall Landfill Site	Non-Hazardous Merchant Landfill	240,500	BV1364ID	PR6 7DT
7	Whinney Hill (Phase 2) Landfill Site	Non-Hazardous Merchant Landfill	4,326,634	BL9500IJ	BB5 5EN
8	Erin Landfill	Non-Hazardous Landfill With Stable Non-Reactive Hazardous Waste cell	6,457,220	BW0991IX	S44 5HS
9	Whitehead Landfill Site	Non-Hazardous Merchant Landfill	1,839,105	BW2277IM	M29 7JZ
10	Pilsworth South Landfill	Non-Hazardous Landfill with Stable Non-Reactive Hazardous Waste cell	5,652,603	BS7951IB	BL9 8QZ
11	William Lee Landfill Site	Non-Hazardous Merchant Landfill	600	NP3333LD	S18 2XU
12	Deerplay Landfill	Non-Hazardous Merchant Landfill	884,865	KP3734LL	BB11 3RL

Table 13-6: Non-exhaustive list of waste management facilities able to accept CD&E waste within 50km of the Scheme

Facility Number	Facility Name	Facility Type	Tonnes received in 2015	Permit Reference	Facility Postcode
1	Aggregate and Soil Recycling Facility	Inert Waste Transfer/Treatment	42,640	EB3301HD (403404)	M40 5AA
2	Beacon Park Golf and Country Club	Deposit of waste to land (recovery)	151,075	AB3633RE (103056)	WN8 7RU
3	Boden And Davies Ltd Transfer Station	Non- Hazardous Waste Transfer	49,250	MP3994CX (50263)	M29 7JZ
4	Frank O' Gara and Sons Ltd	Inert Waste Transfer/Treatment	27,944	VP3298CT (50075)	M44 5BA
5	Great Harwood Reclamation Centre Ltd	Material Recycling Facility	21,651	HP3597CQ (54272)	BB6 7UR
6	J O' Shea and Sons	Non-Hazardous Waste Transfer	25,200	AP3098CK (50093)	M6 6FL
7	J Ryan	Non- Hazardous Waste Transfer	34,814	WP3898CJ (50084)	M4 4JJ
8	Ruttle Plant Hire Ltd	Inert Waste Transfer	23,160	QP3591CD (54159)	PR7 1NH
9	Sandons Farm Landfill Site	Reclamation	59,200	AB3306LX (400544)	PR7 4DL
10	Sandons Farm Waste Recycling Facility	Physical Treatment	54,653	EB3806TM (400433)	PR7 4DL

13.2 Other baseline information to be obtained/surveys to be undertaken

- 13.2.1 If it is confirmed that a significant amount of secondary aggregates is required to facilitate the construction of the Scheme, the Derbyshire County Council Minerals Local Plan and Greater Manchester Minerals Plan would be reviewed. This would be used to ascertain if consistent baseline data for secondary aggregates could be obtained to form the basis of the quantitative assessment.
- 13.2.2 Landfill sites and waste management facilities presented in Table 13-5 and Table 13-6 respectively, and additional facilities, would be further reviewed as part of the future detailed assessment.

13.3 Potential Effects and Mitigation Measures

- 13.3.1 The potential effects of the Scheme during construction and the measures proposed to manage them are outlined in Table 13-7 below. Embedded mitigation measures can be found in Section 2.17.
- 13.3.2 It is anticipated that, during the lifetime of the Scheme, only a limited quantity of material resources would be required for maintenance and as a result negligible quantities of operational waste would be produced. Material resources and waste arisings during operation is therefore scoped out of further assessment.
- 13.3.3 It should be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Table 13-7: Potential effects and mitigation on Materials receptors

Receptor – Waste Management Infrastructure within reasonable proximity of the Scheme
<p><i>Nature of Effect During Construction:</i> Reduction or exhaustion of the waste management facilities' capacity to manage all waste streams arising from the Scheme and surrounding area.</p>
<p><i>Duration of Effect During Construction:</i> Throughout the construction phase (approximately 3 years).</p>
<p><i>Additional Mitigation During Construction:</i> Impacts would be controlled and managed during construction through the implementation of a CEMP, for example the appointed contractor(s) would be required to:</p> <ul style="list-style-type: none"> • Promote opportunities for the potential reusing and recycling of all material resources and waste; • Sort and segregate waste into different waste streams (where technically and economically feasible); and • Manage material use to maximise the environmental and Scheme's benefits from the use of surplus materials. <p>The CEMP would mandate several subsidiary management plans, which would form part of the suite of mitigation measures of particular relevance to materials and waste, for example the Site Waste Management Plan (SWMP).</p> <p>The SWMP will be a live document that will evolve into a SWMP following the granting of development consent to enable Highways England and the appointed contractor(s) to plan, implement, monitor and review waste minimisation and management on the Scheme.</p>

Excavated materials, such as soils, would be carefully stored in segregated piles for subsequent reuse on the Scheme. If the material is contaminated then it would be kept separate from clean material and sent for either treatment, recycling or recovery, where appropriate, or disposal at appropriately permitted facilities.

Receptor – Landfill Sites within reasonable proximity of the Scheme

Nature of Effect During Construction:

Reduction or exhaustion of the landfill sites' capacity to manage all waste streams arising from the Scheme surrounding area.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years) and during the life time of the Scheme.

Additional Mitigation During Construction:

Impacts would be controlled and managed during construction through the implementation of a CEMP, for example the appointed contractor(s) would be required to:

- Promote opportunities for the potential reusing and recycling of all material resources and waste;
- Sort and segregate waste into different waste streams (where technically and economically feasible); and
- Manage material use to maximise the environmental and Scheme's benefits from the use of surplus materials.

The CEMP would mandate several subsidiary management plans, which would form part of the suite of mitigation measures of particular relevance to materials and waste, for example the SWMP.

The SWMP will be a live document that will evolve into a SWMP following the granting of development consent to enable Highways England and the appointed contractor(s) to plan, implement, monitor and review waste minimisation and diversion from landfill on the Scheme.

A waste to landfill diversion target would be established for the Scheme.

As part of the SWMP, the appointed contractor(s) would have to monitor waste arisings and management practices. Auditing and measurement would enable more effective management of waste through the setting of performance targets for recycling and segregation and monitoring waste diverted from landfill.

As a minimum all vegetation waste would be diverted from landfill, unless identified as an invasive species and no other options are available. The greatest opportunity for the sustainable management of vegetation waste would be through recycling into compost.

Hazardous wastes, including any contaminated soil would be identified, removed and kept separate from other CD&E wastes in order to avoid contaminating 'clean' materials.

Any contamination identified may require soils to be treated onsite or taken offsite for treatment and/or disposal. Any hazardous waste arising from demolition activities would be taken offsite for disposal at a suitable facility.

Receptor – Highways network within reasonable proximity of the Scheme

Nature of Effect During Construction:

Capacity to accommodate, within the study area, increases in vehicle movements anticipated to be required to transport material resources to the Scheme and waste from the Scheme.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years).

Additional Mitigation During Construction:

- A Logistics Plan would be prepared prior to construction by the appointed contractor(s). The Logistics Management Team would be responsible for providing management, supervision and advice on all logistics activities on the Scheme. This includes coordination of all vehicle movements (the delivery of material resources to site and removal of waste and excavated material from site) in an efficient and safe manner to reduce impacts and congestions.
- A methodology to identify, order and book deliveries of equipment, plant and material resources would be outlined prior to construction. This will also include a site-specific driver's briefing that will be sent to the supplier/haulier explaining the approved routes, vehicle holding areas and contact numbers prior to delivery.
- A site-specific Traffic Management Risk Assessment would be undertaken by the appointed contractor(s) of each access and egress route. Logistics movements will be coordinated, planned and recorded in accordance with the Scheme's requirements.
- Opportunities for offsite manufacture, assembly, modularisation and designing out waste solution that could impact site logistics would be assessed at both the design and procurement stages, outlined in the Logistics Plan and implemented where possible.
- Where possible, no part loads will be allowed to be delivered to the Scheme. Hauliers will be encouraged to ensure that delivery vehicles are loaded to capacity. The need to consolidate is not anticipated but will be stipulated in the Logistics Plan and implemented where practicable.

14 CLIMATE

14.1 Existing Environmental Conditions

Climate Change Adaptation

- 14.1.1 There has been a significant human influence on the observed warming in annual Central England Temperature since 1950. Statistical results from extreme value analysis suggest that the UK daily maximum and minimum temperature extremes have increased by just over 1°C since the 1950s, and that heavy seasonal and annual rainfall events have also increased. Across England, land temperature in the decade 2005-2014 was 1°C warmer than 1961-1990.
- 14.1.2 There has been a small observed increase in annual mean rainfall in recent decades. Between 1961-1990 and 1981-2010, annual mean rainfall increased by 3.2%. However, this change is not statistically significant in the context of rainfall totals over the last century.
- 14.1.3 It is predicted that climate change will increase the frequency and severity of some types of extreme weather events in England. UKCP09 generally show that warmer, drier summers are more likely along with warmer, wetter winters. The projections for the North West in the 2020s under a high emissions scenario suggest a central estimate of:
- An increase in winter mean temperature of 1.2°C;
 - An increase in summer mean temperature of 1.5°C;
 - An increase in summer mean daily maximum temperature of 1.9°C;
 - An increase in summer mean daily minimum temperature of 1.4°C;
 - No change in annual mean precipitation;
 - A 4% increase in winter mean precipitation; and
 - A 5% decrease in summer mean precipitation.
- 14.1.4 By the 2050s, the high emission central estimate provides the following projection:
- An increase in winter mean temperature of 2.1°C;
 - An increase in summer mean temperature is of 3°C;
 - An increase in summer mean daily maximum temperature of 3.8°C;
 - An increase in summer mean daily minimum temperature of 2.9°C;
 - No change in annual mean precipitation;
 - A 13% increase in winter mean precipitation; and
 - A 18% decrease change in summer mean precipitation.
- 14.1.5 By the 2080s, the high emission central estimate provides the following projection:
- An increase in winter mean temperature of 3.1°C;
 - An increase in summer mean temperature of 4.7°C;
 - An increase in summer mean daily maximum temperature of 6°C;
 - An increase in summer mean daily minimum temperature of 4.6°C;

- A 1% increase in annual mean precipitation;
- A 26% increase in winter mean precipitation; and
- A 28% decrease change in summer mean precipitation.

Greenhouse Gas Emissions (GHG)

14.1.6 The total GHG emissions from transport in UK and North West are presented in Table 14-1 and Table 14-2 respectively. These figures are by source, which means that they include direct emissions and do not include emissions resulting from the production of the fuels used.

Table 14-1: Total GHG emissions from domestic transport in UK

Year	Tonnes of CO ₂ e
2010	120,100,000
2011	118,300,000
2012	117,700,000
2013	116,500,000
2014	117,800,000
2015	120,000,000

Table 14-2: Total GHG emissions from domestic transport in the North West

Year	Tonnes of CO ₂ e
2010	9,140,900
2011	8,971,400
2012	8,810,500
2013	8,651,700
2014	8,770,200
2015	8,878,400

14.2 Other baseline information to be obtained/surveys to be undertaken

14.2.1 Data from the traffic model would be required to inform the assessment of greenhouse gas emissions in accordance with the [Greenhouse Gases Sub Objective, TAG Unit A3](#).

14.2.2 A review of UKCP18 that will provide the latest information on our future climate and will build upon the current set of projections (UKCP09). The UKCP18 core set will be released in May 2018 and the data interface and support products will be released in November 2018.

14.3 Potential Effects and Mitigation Measures

- 14.3.1 It should be noted that assessment of potential effects is ongoing and is therefore subject to change. Further detailed assessment will be provided within the ES.

Climate Change Adaptation

- 14.3.2 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are proposed within the individual topics and outlined in Tables 14-3 and 14-4 below respectively. Embedded mitigation measures can be found in Section 2.17.

Table 14-3: Climate Change Adaptation - Potential Effects and Mitigation Measures during Construction

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
Hotter and drier/drought conditions	<ul style="list-style-type: none"> ▪ Air Quality, including atmosphere and people and communities; ▪ People and Communities, including open space and public rights of way (PRoW); and ▪ Materials, including non-hazardous waste landfill. 	<ul style="list-style-type: none"> ▪ An increased concentration of certain air pollutants; ▪ Stress for people; ▪ Exacerbate loss of grassland; ▪ Could lead to waste to desiccate instead of decomposing; and ▪ Increase consumption of beverages, leading to increased frequency of waste collection required. 	<ul style="list-style-type: none"> ▪ Facilitate access to training and employment opportunities along the Scheme for local residents. ▪ Further information on specific additional mitigation measures as they relate to air quality, people and communities, materials, road drainage and the water
Increase in frequency and intensity of heavy rainfall events/flooding	<ul style="list-style-type: none"> ▪ Air Quality, including atmosphere and people and communities; ▪ Cultural Heritage, including built Heritage; ▪ Biodiversity, including habitats and wildlife species; ▪ Landscape, including landscape character and visual receptors; 	<ul style="list-style-type: none"> ▪ An increased of concentration of certain air pollutants; ▪ Habitat loss; ▪ Loss of species in certain areas, because soils become water saturated and can no longer support existing species; ▪ A loss of soil; ▪ An increase in area of lower quality and marginal land; ▪ An increase on erosion. ▪ Change the watercourses; 	<ul style="list-style-type: none"> ▪ management are described in Chapters 5, 9, 11 and 13 of this

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
	<ul style="list-style-type: none"> ▪ People and Communities, including residential property; ▪ Road drainage and the water management, including surface water resources and flood risk and land drainage; ▪ Geology and Contaminated Land, including soils; and ▪ Materials, including non-hazardous waste landfill. 	<ul style="list-style-type: none"> ▪ Exacerbate isolation of properties; ▪ Increase flood risk, discharge volume and surface water run-off; and ▪ Could impact excavated soils and turn them into hazardous waste. 	<p>PEIR respectively.</p>
<p>Increased wind speed</p>	<ul style="list-style-type: none"> ▪ Air Quality, including atmosphere and people and communities; ▪ Cultural Heritage, including built heritage and grade II listed buildings; ▪ Biodiversity, including habitats and wildlife species; ▪ Landscape, including landscape character and visual receptors; 	<ul style="list-style-type: none"> ▪ Influence local pollutant levels; ▪ Wind-blown dusts; and ▪ A loss of soil. 	

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
	<ul style="list-style-type: none"> ▪ People and Communities; and ▪ Geology and Contaminated Land, including soils. 		
Hotter and wetter conditions	<ul style="list-style-type: none"> ▪ Cultural Heritage, including built heritage and grade II listed buildings; ▪ Landscape, including landscape character and visual receptors; ▪ People and Communities, including residential property, open space and PRow; and ▪ Materials, including non-hazardous waste landfill. 	<ul style="list-style-type: none"> ▪ An increase in growing season and increased rate of growth of vegetation; ▪ An increase in pests and diseases leading to loss of vegetation and defoliation making species more susceptible to external stress; and ▪ Affect decomposition and odour production. 	
Drier/drought conditions	<ul style="list-style-type: none"> ▪ Cultural Heritage, including built heritage; ▪ Biodiversity, including habitats and wildlife species; 	<ul style="list-style-type: none"> ▪ Exacerbate the risks of ground settlement; ▪ Low flows and decrease in water levels. This may lead to increased need for species to adapt and migrate; ▪ Loss of vegetation and defoliation and receptors could become more vulnerable to stress; 	

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
	<ul style="list-style-type: none"> ▪ Landscape, including landscape character and visual receptors; ▪ People and Communities, including residential property, open space and PRow; ▪ Road drainage and the water management, including: surface water and groundwater resources; and ▪ Geology and Contaminated Land, including soils. 	<ul style="list-style-type: none"> ▪ Wetlands to disappear and certain soil types may be less readily available; ▪ Loss of vegetation and defoliation, drought tolerant trees may become more prevalent and wetlands may disappear; ▪ Lower flows in water courses, reduction in groundwater levels, low river flows and reduced groundwater recharge and levels. This would reduce the availability of groundwater to support river baseflows and wetland habitats, licensed abstractions and private water supplies; ▪ Drier/drought conditions could lead to lower flows in watercourses with the potential for increased sediment deposition and less available dilution for pollutants, resulting in poorer water quality; and ▪ Affect the quality and capability of soils, increased risk of soil erosion. 	
Changes in humidity and increase in temperature	<ul style="list-style-type: none"> ▪ Noise and vibration, including residential properties and community facilities; ▪ Biodiversity, including habitats and wildlife species; and 	<ul style="list-style-type: none"> ▪ More people sleeping with windows open may alter propagation characteristics of sound through air; ▪ Could lead to greater number of people sleeping with windows open. This may alter propagation characteristics of sound through air; and 	

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
	<ul style="list-style-type: none"> ▪ People and Communities, including residential properties and people. 	<ul style="list-style-type: none"> ▪ Could lead to exceed thresholds for certain habitats and species. 	
<p>Increase in temperature and occurrence of heat waves</p>	<ul style="list-style-type: none"> ▪ People and Communities, including residential properties and people. 	<ul style="list-style-type: none"> ▪ Could lead to a negative effect on thermal comfort which may increase need to open windows increasing effect of noise; ▪ Enhance landfill gas production; and ▪ Cause an increase of volatility of organic compounds (VOC) causing unpleasant odours. 	
<p>Increase in frequency of extreme weather events</p>	<ul style="list-style-type: none"> ▪ People and Communities, including residential property, people, open space and PRow; and ▪ Materials, including non-hazardous waste landfill 	<ul style="list-style-type: none"> ▪ Could create stress for people; ▪ Impact quality and patterns of use of open spaces; and ▪ Lead to loss and reduction in quality of available waste and material resources. 	

Table 14-4: Climate Change Adaptation - Potential Effects and Mitigation Measures during Operation

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
Hotter and drier/drought conditions	<ul style="list-style-type: none"> ▪ Air Quality, including atmosphere and people and communities; ▪ People and Communities, including open space and PRow; and ▪ Materials, including non-hazardous waste landfill. 	<ul style="list-style-type: none"> ▪ Increase concentrations of certain air pollutants such as ozone; ▪ Affect the effectiveness of landscape planting; and ▪ Exacerbate loss of grassland. 	<ul style="list-style-type: none"> ▪ Significant ground-borne noise or vibration effects would be avoided or reduced through the design of the road; ▪ Provision of noise barriers to provide acoustic screening; ▪ Design of landscaped earthworks and planting to provide screening of the Scheme and help the infrastructure to blend into the existing landscape and reduce airborne noise;
Increase in frequency and intensity of heavy rainfall events/flooding	<ul style="list-style-type: none"> ▪ Air Quality, including atmosphere and people and communities; ▪ Landscape, including landscape character and visual receptors; and ▪ Road drainage and the water management, including surface water resources and flood risk and land drainage. 	<ul style="list-style-type: none"> ▪ Decrease concentration of air pollutants such as ozone; ▪ Impact excavated soils and turn them into hazardous waste; ▪ Triggering surface water and river flooding. Increase flood risk, discharge volume and surface water run-off; ▪ Loss of species in certain areas, because soils become water saturated and can no longer support existing species; and ▪ Lower flows in water courses and low river flows. 	<ul style="list-style-type: none"> ▪ Create a landscape mosaic including creation of grassland habitats along field boundaries and planted strips to enhance both wildlife and woodland connectivity; ▪ Advanced planted – effects in year one of operation may be further reduced by

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
Increased wind speed	<ul style="list-style-type: none"> ▪ Air Quality, including atmosphere, people and communities ▪ Cultural Heritage, including grade II listed buildings ▪ Biodiversity, including habitats and wildlife species ▪ Landscape, including landscape character and visual receptors 	<ul style="list-style-type: none"> ▪ Influence local pollutant levels; ▪ Impact on settings and landscape through potential tree losses; and ▪ Increase tree loss, habitat loss and/or fragmentation. 	<p>establishing planting in appropriate locations early in the construction programme, which will be considered during the detailed design stage. This would provide additional screening and greater integration of the Scheme into the landscape;</p> <ul style="list-style-type: none"> ▪ To reduce the impact of flood risk on plant/tree species the drainage profile of the soil could be increased;
Drier/drought conditions	<ul style="list-style-type: none"> ▪ Cultural Heritage, including built Heritage; ▪ Biodiversity, including habitats and wildlife species; ▪ Landscape, including landscape character and visual receptors; ▪ People and Communities, including residential property, open space and PRow; and ▪ Road drainage and the water management, 	<ul style="list-style-type: none"> ▪ Exacerbate the risks of ground settlement; ▪ Low flows and decrease in water levels, habitat loss and/or fragmentation; ▪ Loss of vegetation and defoliation and receptors could become more vulnerable to stress; ▪ Drought tolerant trees that may become more prevalent; ▪ Wetlands to disappear and certain soil types may be less readily available; 	<ul style="list-style-type: none"> ▪ Operational drainage design incorporating resilience to climate change in terms of both treatment and attenuation prior to discharge into the receiving water environment; ▪ Specific incident response protocols enacted to help contain any spillages that do occur within the drainage systems;

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
	<p>including groundwater resources.</p>	<ul style="list-style-type: none"> ▪ Loss of vegetation and defoliation, drought tolerant trees may become more prevalent and wetlands may disappear; and ▪ Lower flows in water courses, reduction in groundwater levels, low river flows and reduced groundwater recharge and levels. This would reduce the availability of groundwater to support river baseflows and wetland habitats, licensed abstractions and private water supplies. 	<ul style="list-style-type: none"> ▪ Effects on groundwater levels and flows mitigated by implementing an appropriate drainage solution for the section of the Scheme that would be in cut; ▪ Operational design of the Scheme informed by the findings and recommendations of a Flood Risk Assessment; ▪ The current 20% uplift in attenuation capacity would be supported by a test providing for a 40% uplift in line with the EA guidance. Where uplift is considered necessary then the Scheme would be designed to cope with the increase in rainfall;
<p>Hotter and wetter conditions</p>	<ul style="list-style-type: none"> ▪ Cultural Heritage, including Grade II listed buildings; ▪ Landscape, including landscape character and visual receptors; and ▪ People and Communities, including residential property, open space and PRow. 	<ul style="list-style-type: none"> ▪ Increase in growing season and increased rate of growth of vegetation; ▪ Increase in pests and diseases leading to loss of vegetation and defoliation making species more susceptible to external stress; ▪ Could lead to increase in air conditioning use; and ▪ Longer growing season and an increased rate of growth of vegetation. 	<ul style="list-style-type: none"> ▪ Regular maintenance of water course crossings and drainage infrastructure; ▪ Planting suitable species for future climate conditions;

Risk to Construction Design	Potential Topic Areas/Receptors that could be Affected	Potential Effect	Additional Mitigation
Changes in humidity and increase in temperature	<ul style="list-style-type: none"> ▪ Biodiversity, including habitats and wildlife species. ▪ Noise and Vibration, including residential properties and community facilities; and ▪ People and Communities, including residential property, open space and PRow. 	<ul style="list-style-type: none"> ▪ Greater number of people sleeping with windows open, may alter propagation characteristics of sound through air; and ▪ Could lead to exceed thresholds for certain habitats and species. 	<ul style="list-style-type: none"> ▪ Identification of suitable locations for advance planting, to reduce impacts on the setting of assets; ▪ Provide green bridges and underpasses to enhance landscape connectivity and maintain species; and ▪ Specific measures would be incorporated with regard to incident response, communication with the emergency services and the Environment Agency and to help contain any spillages that do occur within the drainage systems.
Increase in frequency of extreme weather events	<ul style="list-style-type: none"> ▪ People and Communities, including residential property, open space and PRow. 	<ul style="list-style-type: none"> ▪ Create stress for people; and ▪ Impact quality and patterns of use of open spaces. 	
Increase in temperature and occurrence of heat waves	<ul style="list-style-type: none"> ▪ People and Communities, including residential property. 	<ul style="list-style-type: none"> ▪ Lead to a negative effect on thermal comfort which may increase need to open windows increasing effect of noise. 	

Greenhouse Gas Emissions

- 14.3.3 The potential effects of the Scheme during construction and operation and the measures proposed to manage them are proposed within the individual topics and outlined in Table 14-5 below. Embedded mitigation measures can be found in Section 2.17.
- 14.3.4 Carbon Management is one of five key themes established in the [Highways England Sustainable Development Strategy](#). This describes the Scheme's approach to carbon management as being to 'play our part in reducing UK carbon emissions'.
- 14.3.5 While international standards and guidance documents exist for compiling GHG Inventories, there are currently no accepted criteria for assessing GHG emissions impacts and for quantifying the GHG emissions during operation. In the absence of such guidance, the assessment would be undertaken for the ES (when data would become available) using professional judgement and utilising WebTAG and carbon sequestration from tree planting data.

Table 14-5: Potential Effects and Mitigation on Air Quality, People and Communities and Biodiversity Receptors in Relation to Greenhouse Gas Emissions

Receptor – Air Quality, People and Communities and Biodiversity

Nature of Effect During Construction:

In order to construct the Scheme, a large amount of natural resources (i.e. raw materials and energy) would be required, which would contribute towards GHG emissions and therefore climate change.

The construction phase of the Scheme would also have the potential to increase GHG emissions due to:

- Emissions from construction plant onsite;
- Emissions from water consumption; and
- Exhaust emissions from construction phase road traffic.

It is estimated that additional vehicle movements and emissions, within the study area, associated with the construction of the Scheme would be a very small percentage of the total emissions within the study area.

Nature of Effect During Operation:

As a result of the operation of the Scheme, GHG emissions would mainly result from vehicular movements with other emissions, e.g. due to maintenance - likely to be minimal.

Duration of Effect During Construction:

Throughout the construction phase (approximately 3 years) and during the life time of the Scheme.

Duration of Effect During Operation:

Lifetime of the Scheme.

Additional Mitigation During Construction:

Key mitigation measures which should be implemented are:

- Water use during construction would be minimised and the reuse would be encouraged. Any water abstraction required for construction would be coordinated with the needs of local community; and
- Work closely with suppliers to reduce GHG emissions from network related construction activities, including the reduction of fuel, energy and raw material consumption and all waste generation.

Additional Mitigation During Operation:

Key mitigation measures which should be implemented are:

- Work closely with suppliers to reduce GHG emissions from network related activities, including the reduction of fuel, energy and raw material consumption and all waste generation.

15 ASSESSMENT OF CUMULATIVE EFFECTS

15.1 Methodology

15.1.1 Two types of cumulative effects would be considered for the ES:

- Intra-scheme effects – The combined action of a number of different environmental topic specific effects upon a single resource/receptor; and
- Inter-scheme effects – The combined action of a number of different projects, in combination with the project being assessed, on a single resource/receptor.

Intra-Scheme Cumulative Effects

15.1.2 Intra-scheme effects would be presented for receptors which could be affected by more than one ES topic. Where a receptor has been identified as only experiencing one effect or where only one topic has identified effects on that receptor, there is no potential for intra-scheme effects to occur.

15.1.3 Intra-scheme cumulative effects would therefore only be identified where more than one ES chapter has identified a residual effect on an individual or group of receptors.

15.1.4 An assessment of intra-Scheme effects on human health will be considered referencing the 'Air Quality', 'Noise and Vibration', 'Road Drainage and the Water Environment' and the 'People and Communities' assessments.

Inter-Scheme Cumulative Effects

15.1.5 Inter-scheme effects arising from the Scheme in combination with 'other development' schemes during the construction and operational phases would be assessed. PINS [Advice Note 17: Cumulative Effects Assessment](#) sets out an assessment process involving 4 'stages'. These 4 'stages' are outlined below.

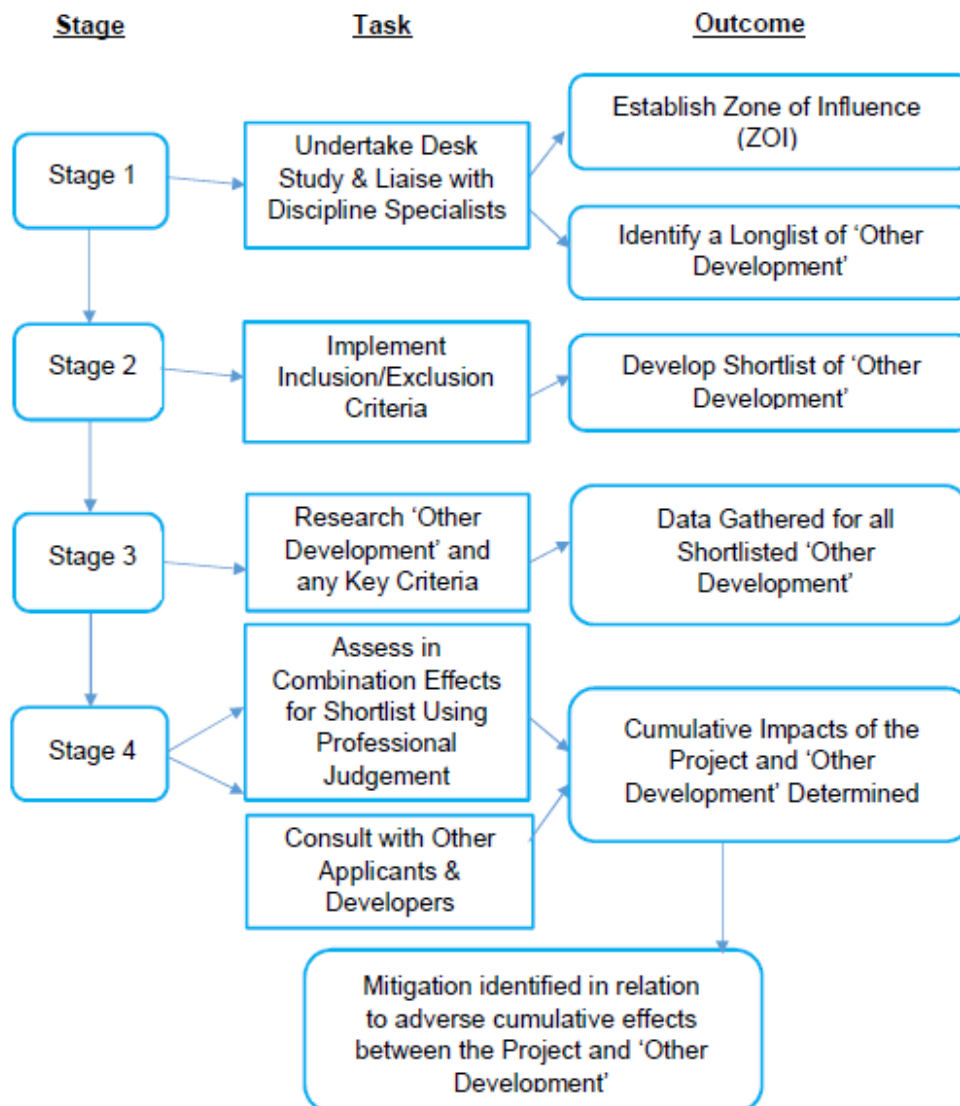
15.1.6 Stage 1 of the process involves establishing an appropriate 'Zone of Influence' (ZOI) to help identify 'other development' relevant to the assessment. Through liaison with technical specialists for each individual ES topic, ZOIs have been established using professional judgement (see Table 16-1). A 1km ZOI addresses localised cumulative effects from topic areas, while a larger ZOI addresses the potential for cumulative effects associated with air quality and noise and vibration.

15.1.7 The ES will set out the assessment methodology, recognising the requirements of the [NN NPS](#) and advice on development of threshold criteria in PINS Advice Note 17, giving particular regard to the size and spatial influence of developments on the Scheme.

Table 16-1: The Established ZOIs for Environmental Topics

Environmental Topic	Zone of Influence
Air Quality	Dependent on the traffic study area
Cultural Heritage	1km
Landscape	1km
Biodiversity	2km
Geology and Soils	1km

Environmental Topic	Zone of Influence
Noise and Vibration	Dependent on the traffic study area
People and Communities	500m
Road Drainage and the Water Environment	500m
Climate	Dependent on the traffic study area
Health	As per 'Air Quality', 'Noise and Vibration', 'Road Drainage and the Water Environment' and 'People and Communities'.



15.2 Assessment of Intra-Scheme Effects

- 15.2.1 The in-combination assessment undertaken at the previous assessment stage indicated a potential for cumulative impacts on residual effects for humans (residential) receptors for noise, air quality and visual landscape.
- 15.2.2 The study area for the in-combination effects is defined by the study areas of each of the individual environmental topic assessments, which are discussed in the relevant topic chapters.
- 15.2.3 The receptors considered in this assessment are sub-divided into six groups:
- Humans (residential receptors);
 - Ecological features;
 - Built heritage features;
 - Water bodies;
 - All travellers; and
 - Community assets and businesses.
- 15.2.4 The potential effects acting upon these receptors are changes in noise, air quality, visual intrusion, water quality, traffic and land take.
- 15.2.5 The assessment will consider significant adverse residual effects, after mitigation has been taken into account. Assessing the significance of in-combination effects is necessarily a qualitative process, based on professional judgment. The significance of the in-combination effects will be determined using the criteria taken from [DMRB HA 205/08](#), considering the following factors:
- Which receptors/resources are affected?
 - How will the activity(-ies) affect the condition of the receptor/resource?
 - What are the probabilities of such effects occurring?
 - What ability does the receptor/resource have to absorb further effects before change becomes irreversible?

15.3 Assessment of Inter-Scheme Effects

- 15.3.1 Following the establishment of the ZOIs for each topic, a desk study was undertaken to search for 'other development'. This used the furthest ZOI as the maximum extent of the study area in which the 'other development' was searched for to create a 'long list'. A review of this list would be undertaken for the ES.
- 15.3.2 A tiered approach was applied to consider the level of certainty of 'other development' being carried out that falls within the ZOI.
- 15.3.3 The tiers assigned were as follows:
- Tier 1 (a): Under construction;
 - Tier 1 (b): permitted application(s), whether under the [Planning Act 2008](#) or other regimes, but not yet implemented;
 - Tier 1 (c): submitted application(s) whether under the [Planning Act 2008](#) or other regimes but not yet determined;

- Tier 2: schemes on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted;
- Tier 3 (a): scheme on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted;
- Tier 3 (b): identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals would be limited; and
- Tier 3 (c): identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

15.3.4 It was then deemed appropriate to apply threshold criteria to exclude or include 'other development' from the 'long list' to develop a 'short list'.

15.3.5 This was undertaken to keep the assessment proportionate and focused so that 'other development' is only taken through to further assessment stages if it has potential to give rise to significant cumulative effects by overlaps in temporal scope; and due to the scale and nature of the 'other development'.

15.3.6 A process of shortlisting was then undertaken regarding planning applications, relevant development plans and other relevant sources, to identify which developments within the ZOIs fall within the 'other developments' that are relevant to the assessment of potential cumulative effects.

15.3.7 The resulting list is presented in Table 16-2 below. These 'other developments' are also mapped on Figure 16.1 at Appendix B. This list and map reflects the temporal scope and scale and nature of the 'other development', in line with Stage 2 of PINS Advice Note 17.

Table 16-2: Cumulative Developments

Figure Ref	Local Authority	Application Reference	Type of Development	Development Details	Development Status	Timescales	Approx. Distance from the Scheme	Tier
Nationally Significant Infrastructure Projects								
N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A
Submitted Applications (pending decision)								
N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A
Approved Applications (not under construction)								
1	High Peak Borough Council	HPK/2015/069 2	Residential	Proposed Outline Planning Permission with some Matters Reserved for Residential Development for up to 113 Dwellings.	Approved	Unknown	1.8km south east	1
2	High Peak Borough Council	HPK/2014/006 7	Residential	Proposed laying out of access from Graphite Way & erection of up to 44no dwellings with Trans-Pennine trail improvements, community open spaces, garages, gardens & landscaping.	Approved 15/05/14	Unknown	430m north east	1

Figure Ref	Local Authority	Application Reference	Type of Development	Development Details	Development Status	Timescales	Approx. Distance from the Scheme	Tier
Under Construction								
N/A	N/A	N/A	None	N/A	N/A	N/A	N/A	N/A
Local Development Plan Housing Allocations								
3	Tameside Metropolitan Borough	Mottram M67	Employment	Strategic site at the eastern end of the M67 between Hattersley and Mottram. Suitable for employment led development for research, light and general industrial purposes and distribution. Provides 35ha of employment land.	Unknown	Unknown	0km from Scheme. Encompasses existing M67 near the Roundabout at Grange Farm.	3

- 15.3.8 More detailed information would be gathered for the ES on the 'other developments'. Following this, the assessment would be undertaken (Stage 4) in accordance with PINS Advice Note 17. Throughout the assessment process, the 'other development' identified would be reviewed periodically to ensure that the most up to date information is used at key points during the evolution of the ES. This includes reviewing the status of 'other development' and any new applications which may be registered within the ZOI.

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GLOSSARY

Term	Meaning
Abstraction	Removal of water for public supply or irrigation.
Aerial Photograph (AP)	Photograph taken using a plane or satellite which can be used to reveal archaeological or other features within a landscape and aid in assessment.
Agricultural Land Classification (ALC)	A relative measure of agricultural land quality in England and Wales. In practice, the ALC grades are defined by reference to the land's physical characteristics. The most productive and flexible land falls into Grades 1 & 2 and Subgrade, 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. The remainder is very poor-quality land in Grade 5, which mostly occurs in the uplands.
Aquifer	An underground rock formation containing water, often used as a water source.
Archaeological Remains	Are the artefacts or physical evidence of past human activity which have been recovered or discovered as part of archaeological investigation.
Asset (Heritage)	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).
Attenuation	Reduction. The term used in drainage design to indicate a reduction in the rate of flow or flooding risk, for example, by means of a pond to hold back water.
Biodiversity	Biological diversity: The variety of life forms in a given area, includes all species of plants and animals, their genetic variation and the complex ecosystems of which they are part.
British Geological Survey (BGS)	The British Geological Survey (BGS) is a partly publicly funded body which aims to advance geoscientific knowledge of the United Kingdom landmass and its continental shelf by means of systematic

Term	Meaning
	surveying, monitoring and research.
Character (Heritage)	Is formed by elements of a heritage asset or landscape which contribute to its importance or value. Character can also refer to the overall appearance of a place or structure as perceived by those who visit and enjoy it – alteration to this appearance has the potential to detract from enjoyment of a heritage asset.
Conservation Area	An area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance.
Construction Environmental Management Plan (CEMP)	The purpose of a construction environmental management plan is to outline how a construction project will avoid, minimise or mitigate effects on the environment and surrounding area. Construction environmental management plans often detail the implementation of measures in accordance with environmental commitments outlined in; an Environmental Statement, an environmental policy or environmental plan, requirements of planning conditions, Section 106 agreements or other legislative requirements. They are 'live' documents that are reviewed and updated at regular intervals throughout the project life cycle.
Contaminated Land Reports (CLR)	Technical guidance on the management of contaminated land including how to investigate, assess and manage the risks.
Contaminated Land: Application in Real Environments (CL:AIRE)	CL:AIRE is an independent, not-for-profit organisation established to stimulate the regeneration of contaminated land in the UK by raising awareness of and confidence in practical, sustainable remediation technologies.
Cumulative impact	The combined residual impact of a proposed scheme over the entirety of the scheme, as opposed to residual impact for individual sections of the scheme; also the combined impact with other schemes.
Cutting	A section of road where the surrounding land is at a higher level and the ground has been dug away to put in the road.
Decibel (dB) A-weighted (A)	Measurement of noise on a logarithmic scale. The range of audible sound pressures is approximately 0 dB to 140 dB. A-weighting refers to the method of

Term	Meaning
	subtracting an appropriate correction from the dB figure, to relate better to the loudness of sound heard.
Design Year	In the case of this Scheme, 15 years after assumed opening.
Designated Asset	A heritage asset which is protected under legislation such as the Ancient Monuments Act 1979 or the Planning Act 1990. These are nationally important assets which are protected under law.
Desk-based Assessment (DBA)	A document produced to assess the overall heritage resources of a defined area. These are primarily performed without the aid of archaeological investigations through use of HERs and archive materials.
Direct Impacts	Direct impacts are those that arise as straightforward consequences of the Scheme. For archaeological remains and historic structures, this can mean physical damage to, or physical improvement of, the fabric of the asset, but it can also mean impacts on the setting of cultural heritage assets. For an historic building, for instance, an increase in noise and pollution as a result of the Scheme would constitute a direct impact. (DMRB 2007).
Do Minimum	Future situation assuming no scheme is provided, but that maintenance is on-going.
Do Something	Future situation with the scheme provided.
Earthworks	The process of excavating or increasing level of soil.
Earthworks (Heritage)	An artificial bank of soil. These can be the result of agricultural activity, settlement expansion or design, management of the natural environment, or defence.
Enclosed Fields	Land which has been walled or fenced as part of the 'Inclosure Acts', most commonly in the 16th and 17th centuries. These were a series of Acts of Parliament that empowered enclosure of open fields and common land in England and Wales, creating legal property rights to land that was previously held in common.
Environment Agency (EA)	The government agency responsible for environmental protection.
Fabric (Historic)	The material substance of which places are formed, including geology, archaeological deposits, structures and buildings, and flora.

Term	Meaning
	Fabric can also refer to the materials of which a building is constructed.
Feature (Heritage)	Can be an element of a historic asset or landscape which contributes to its overall heritage value or importance. This can also refer to archaeological components of a site, monument, or landscape which are often below ground or appear as earthworks. These can include ditches, pits, agricultural workings such as ridge and furrow, trackways, and building remains.
Floodplain	Area of land prone to flooding and protected against development. The indicative floodplain is the flood risk area based on a 1 in 100 year storm.
Geophysical survey	Technology such as fluxgate gradiometer (for magnetometry) and resistance meter (for resistivity) are scanned over the ground surface and pick up interferences in either the earth's magnetic field (magnetometry) or the effect demonstrated on the passing of energy into the ground (resistivity). The interference or anomalies can be manmade or natural in origin. Their interpretation can give indications into the archaeological potential for a site. If the ground is not susceptible to these anomalies i.e. the machine cannot detect the difference between archaeological features and background geology, the results may indicate no archaeology present when in fact there are archaeological features, but they just cannot be distinguished from the background geology.
Geotechnical or Geoarchaeological Monitoring/Assessment	The observation of interventions made for geotechnical purposes to look for deposits or material of an archaeological nature. This can also comprise sampling or observation of materials removed from boreholes or test pits to assess the archaeological potential or deposits to reveal information about past environments or societies.
Grade	In reference to designated assets: Many are classified to aid in assessing the level of protection they require based on their importance to the heritage or the county or an area. Assets are designated at Grades I (Highest), II* (High), II (Medium).
Greenhouse Gas	A gas that helps contribute towards global

Term	Meaning
	warming by trapping heat given off from the earth's surface. Under the UN's Kyoto Protocol, the 6 greenhouse gases are carbon dioxide, methane, nitrous oxide, perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride.
Groundwater Protection (GP)	Technical Guidance on Environment Agency Principles and Practices for groundwater.
HAWRAT	Water Risk Assessment Tool.
Heritage at Risk	The Register is an annual Historic England publication which identifies the most important heritage assets at risk of damage or loss.
Heritage Potential ('potential')	The potential for places, structures, or landscapes to hold information regarding previously unknown archaeological or historic knowledge which would enhance the understanding of a place and its development.
Historic England	The Historic Buildings and Monuments Commission for England', more commonly known as Historic England, established in 1984 by the National Heritage Act 1983. Historic England is the Government's adviser on the historic environment in England.
Historic Environment Record (HER)	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
Historic Hedgerows	Hedgerows which are deemed to be 'important' under the Hedgerow Regulations (1997). These may be either more than 30 years old, part of parish or other ancient boundaries, or forms part of an identified archaeological asset.
Historic Landscape	The historic landscape is a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features.
Impact Risk Zone (IRZ)	Geographical Information System (GIS) tool developed by Natural England to make a rapid initial assessment of the potential risks

Term	Meaning
	posed by development proposals to: SSSIs, SACs, SPAs and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.
Indirect Impacts	An indirect or secondary impact is an impact arising from the scheme via a complex route, where the connection between the scheme and the impact is complicated, unpredictable or remote. For instance, an impact on historic landscape character could arise from a scheme that severs an agricultural holding, leading to changes in farming viability and thence to changes in historic land-use patterns in areas away from the scheme. Hydrological changes affecting important palaeoenvironmental deposits a distance away from a scheme as a result of the effects of a highway scheme on local land drainage could be an indirect impact on archaeological remains. The fact that an impact is 'indirect' does not necessarily mean it is less damaging than a 'direct' effect. For instance, dewatering peat and the consequent degradation of valuable environmental evidence is considered to be one of the most significant sources of cultural heritage loss in the UK today. The important point is that the impact of the scheme should be fully considered, regardless of the mechanism through which it operates. (DMRB 2007).
Investigation (Intrusive/Non-intrusive)	A type of field research by which archaeologists search for archaeological sites/remains and collect information about the location, distribution and organization of past human cultures across a large area. These can take the form of remote sensing such as geophysics or walkover survey (non-intrusive); or trial trenching or boreholes/test pits (intrusive). Investigations form a key element of pre-application assessment and post-application mitigation.
LiDAR	LiDAR (light detection and ranging), also known as Airborne Laser Altimetry, is used to produce accurate horizontal and vertical evaluation measurements. This data has

Term	Meaning
	considerable potential for archaeological investigation such as mapping sites with raised earthworks and understanding the site within the wider area.
Listed Building	Building or structure listed by the Secretary of State as being of 'special architectural or historic interest'.
Listed Building (LB)	Building or structure listed by the Secretary of State as being of 'special architectural or historic interest'.
Loss of Fabric	The deterioration or destruction of the fabric of a place or structure which is detrimental to the heritage value of the asset.
Non-designated Asset	A heritage asset which is recorded by the local planning authority on the Historic Environment Record. These assets are protected by the NPPF and can be deemed of equal value to designated assets thus earning equivalent protection.
Opening Year	In the case of this Scheme, assumed to be 2023.
Period	An allocated amount of time which is generally accepted to denote the boundary between one type of society and another. These are generally defined by notable changes in technology or major political or historical events. The boundaries of periods can be movable depending on accepted understanding at the time of writing.
Personal Protection Equipment (PPE)	Equipment that will protect the user against health or safety risks at work.
Phase 1 Habitat Survey	Recognised standard methodology for collating information on the habitat structure of a particular site.
Potential Effects	Refers to the change which can occur to heritage assets because of a development or scheme of works. Effects can cover changes to setting, fabric, or character of an asset which may affect its heritage value or importance.
Preliminary Sources Study Report (PSSR)	Technical report on geology and ground conditions.
Preservation by Record	The capture of information which describes the physical configuration, condition and use of monuments, groups of buildings and sites, at points in time.
Receptor	Environmental feature that has the potential to be adversely or beneficially affected by

Term	Meaning
	an impact of the proposed scheme, e.g., local residents, wildlife and water bodies.
Regionally Important Geological Sites (RIGS)	Locally designated sites of local, national and regional importance for geodiversity (geology and geomorphology).
Registered Battlefield	A site included on the Register of Battlefields in England, maintained by Historic England. Registered battlefields are designated heritage assets and subject to the planning policies within the NPPF.
Registered Park and Garden	A site included on the Register of Historic Parks and Gardens in England. Registered parks and gardens are designated heritage assets and subject to the planning policies within the NPPF.
Remediation	Clean up or other methods used to remove or contain hazardous materials from site.
Residual impact	Effects on the environment that occur after mitigation of potential impacts has been implemented.
Scheduled Monument (SM)	'Scheduled monument' means any monument which is for the time being included in the schedule [compiled and maintained by the Secretary of State for Culture, Media, and Sport]. This is a designated asset which is protected by the 1979 Act.
Scope	The specifications of a piece of work as set in discussion with stakeholders and statutory consultees. Scope may vary following agreement with these parties and the client.
Setting (Historic)	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
Site of Special Scientific Interest (SSSI)	A conservation designation denoting a protected area in the United Kingdom.
Source Protection Zone (SPZ)	Area of groundwater protected by the Environment Agency.
Stakeholder	An organisation or individual with a particular interest in the project.
Stakeholder	An organisation or individual with a particular interest in the project.

Term	Meaning
Statutory consultees	Individuals or groups which are contacted and requested to provide information or comment on a scheme, legally recognised under statute.
Statutory consultees	Individuals or groups which are contacted and requested to provide information or comment on a scheme, legally recognised under statute.
Study Area	The spatial area within which environmental effects are assessed i.e. extending a distance from the project footprint in which significant environmental effects could occur (this may vary between the topic areas).
Targeted Surveys (Heritage)	Surveys or intrusive investigations which are designed to provide more information about previously identified areas of archaeological interest or archaeological features. Often these use observations from the walkover survey, information obtained through LiDAR or AP analysis, or the results of geophysical survey.
Time Depth	Evidence of the development and history of a landscape which is still discernible within the modern landscape. This can comprise: field boundaries, structures, industry or commerce, woodland, and transportation networks or trackways.
Trial trenching	Trial trenching an archaeological investigation also known as an archaeological evaluation. The trenches vary in length but are usually placed over cropmarks or geophysical anomalies. The trenches are to test to see the amount, date and complexity of the archaeological features in a particular area. The trial trench results can inform as to whether further archaeological investigation is needed.
UXO	Risk from Unexploded Ordnance.
Value (Heritage)	An aspect of worth or importance, here attached by people to qualities of places. This worth can be assessed on several key criteria set out by Historic England.
Walkover Survey	A survey undertaken on foot to assess the heritage potential or an area, assets within and set area, the settings of assets with potential to be impacted by a proposal and identify previously unknown heritage. Usually this would be field by field and would be constrained by a previously

Term	Meaning
	established study area.
Water Framework Directive	The Water Framework Directive (2000/60/EC) (WFD) is a wide-ranging piece of European environmental legislation for the protection of water resources that is being transposed into UK Law.
World Heritage Site	A site on a list of properties maintained by the World Heritage Committee of UNESCO and called the World Heritage List "forming part of the cultural heritage and natural heritage...which it considers as having outstanding universal value in terms of such criteria as it shall have established".
Zone of Theoretical Visibility (ZTV)	<p>A Zone of Theoretical Visibility (ZTV), also known as a Zone of Visual Influence (ZVI), is a computer-generated tool to identify the likely (or theoretical) extent of visibility of a development. The elevation (or a set of elevations) of the development is tested against a 3D terrain model.</p> <p>The terrain model is usually, but not always, a bare-earth model; that is, it does not feature buildings, vegetation or other boundaries which may have a significant effect on the visibility of a development. This is the principal reason it is known as a Zone of Theoretical Visibility.</p> <p>Neither does the ZTV, of itself, take account of the effects of distance in reducing the significance of a development. It might be considered, therefore, that it is of limited use, but it does have particular benefits which, if used carefully, aid the landscape and visual impact assessment process.</p>

APPENDIX A – LANDSCAPE, TOWNSCAPE AND VISUAL RECEPTORS

Receptor	Type	Nature of Receptor (Sensitivity)
Harrop Edge Zone		
Located in the north-western extent of the study area, from the urban edge of Hattersley to the A6108 at Spout Green, located north of the A57		
Landscape Receptor		
Landscape Character Area (LCA) 1: Harrop Edge Valley Pasture	Landscape	High
Townscape Receptor		
Townscape Character Area (TCA) 1: South Stalybridge	Townscape	Moderate
Visual Amenity Receptor		
Public Right of Way (PRoW) - HYD/52	Recreational	High
PRoW - HYD/46	Recreational	High
PRoW - HYD/51	Recreational	High
PRoW - HYD/49	Recreational	High
PRoW - HYD/50	Recreational	High
PRoW - LON/104	Recreational	High
PRoW - LON/49	Recreational	High
PRoW - LON/48	Recreational	High
PRoW - LON/47	Recreational	High
PRoW - LON/46 including Edge Lane	Recreational	High
PRoW - LON/50	Recreational	High
PRoW - LON/51	Recreational	High
PRoW - LON/52	Recreational	High
PRoW - LON/41	Recreational	High
PRoW - DUK/1	Recreational	High

Receptor	Type	Nature of Receptor (Sensitivity)
A6018 Roe Cross Road & PRow - LON/40	Travel	Low
Close Farm	Residential	High
Higher Matley Farm	Residential	High
Cheetham Fold Farm	Residential	High
Ham Fold Farm	Residential	High
Miniature Castle Farm	Residential	High
Grange Farm & Farmstead on Edge Lane	Residential	High
Cluster of residential properties on Harrop Edge Road	Residential	High
Cluster of residential properties on Edge Lane	Residential	High
Residential Properties on Four Lanes, Ash Close, Meadowcroft, and Littlefields	Residential	High
Residential Properties on Elm Close, Oak Close, Lowry Close, Rushycroft, and the Croft	Residential	High
Residential Properties along the A57 Hyde Road	Residential	High
A57 Hyde Road	Travel	Low
Stalybridge Road	Travel	Low
Mottram Moor Zone		
An area located in the north-eastern extent of the study area, north of the A57, from the A6108 at Spout Green to the A628 at Hollingsworth, including the urban area of Hough Green		
Landscape Receptor		
LCA 2: Hollingsworth Hall Moorland Slopes	Landscape	High
LCA 3: Mottram Moor Pasture	Landscape	High
LCA 7: Swallows Valley with Woodland	Landscape	Moderate

Receptor	Type	Nature of Receptor (Sensitivity)
Townscape Receptor		
TCA 3: Mottram Spout Green	Townscape	Moderate
TCA 5: Mottram Moor	Townscape	Moderate
TCA 6: Wedneshough Green	Townscape	High
TCA 7: Hollingsworth	Townscape	Moderate
Visual Amenity Receptor		
PRoW - LON/38	Recreational	High
PRoW - LON/39	Recreational	High
Residential Properties and PRoW - LON/35 along Old Hall Lane	Residential/Recreational	High
PRoW - LON/108 Coach Road	Recreational	High
PRoW - LON/109	Recreational	High
PRoW - LON/28	Recreational	High
PRoW - LON/18	Recreational	High
PRoW - LON/17	Recreational	High
PRoW - LON/19	Recreational	High
PRoW - LON/16	Recreational	High
PRoW - LON/20	Recreational	High
PRoW - LON/24	Recreational	High
PRoW - LON/4	Recreational	High
PRoW - LON/23	Recreational	High
Back Moor	Travel	Low
A57 Mottram Moor	Travel	Low
Residential Properties along Roe Cross Road	Residential	High
Residential Properties along Old Road	Residential	High

Receptor	Type	Nature of Receptor (Sensitivity)
Residential Properties along Roe Cross Green	Residential	High
Residential Properties along Lodge Court	Residential	High
Residential Properties along Shaw Street	Residential	High
Residential Properties along the A57 Mottram Moor	Residential	High
Residential Properties along Hall Drive, Hall Close, and Tollemache Road	Residential	High
Residential Properties along and Toller mache Close	Residential	High
Mottram Old Hall	Residential	High
Residential Properties along Dewsnap Lane and Rabbit Lane	Residential	High
Lumb Farm	Residential	High
Hardtimes Farm	Residential	High
Landslow Farm	Residential	High
Thornccliffe Farm	Residential	High
Thornccliffe Hall	Residential	High
Longendale High School	Education	Moderate
Nettle Hall and Residential Properties along Coach Road	Residential	High
Residential Properties along Hollinhey Terrace and War Memorial	Residential	High
Residential Properties along Spring Street and Cannon Street	Residential	High
Residential Properties in Hollingworth	Residential	High

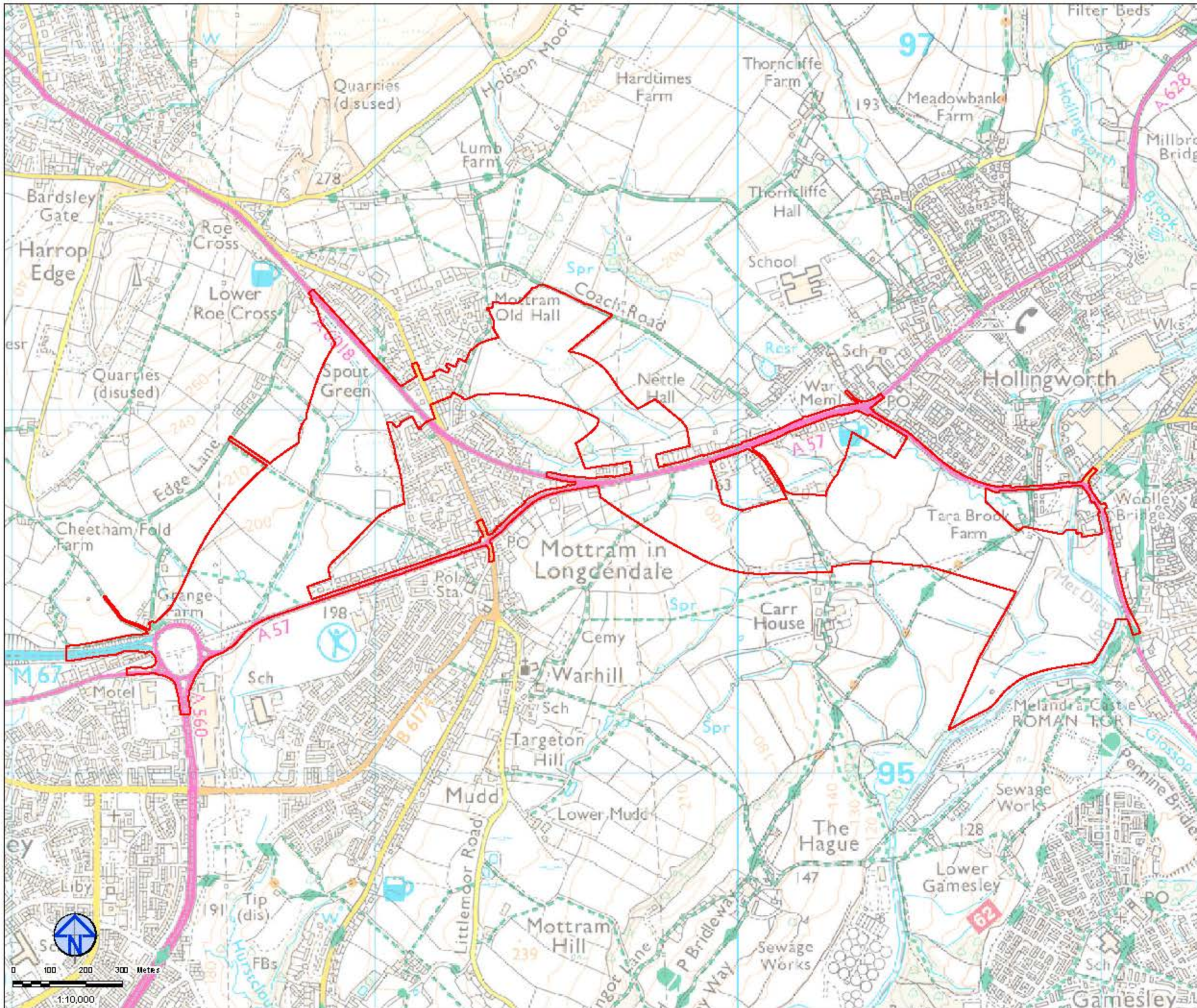
Receptor	Type	Nature of Receptor (Sensitivity)
Etherow Valley Zone		
Located in the south and eastern extent of the study area, south of the A628 at Hollingsworth to the eastern edge of Hattersley south of the A57 including the Etherow Valley, and urban areas of Gamersley, and Hadfield		
Landscape Receptor		
LCA 2: Hollingworth Hall Moorland Slopes	Landscape	High
LCA 5: Etherow Valley Floor with Woodland	Landscape	High
LCA 6: Brookfield Valley Floor	Landscape	Moderate
Townscape Receptor		
TCA 4: Old Mottram	Townscape	High
TCA 8: Gamesley	Townscape	Moderate
TCA 9: Brookfield Industrial Valley	Townscape	Low
TCA 10: Hadfield	Townscape	Moderate
TCA 11: Etherow Industrial Valley Floor	Townscape	Low
Visual Amenity Receptor		
PRoW - LON/29	Recreational	High
PRoW - LON/32	Recreational	High
PRoW - LON/105	Recreational	High
PRoW - LON/90 Etherow – Goyt Valley Way, & Tameside Trail	Recreational	High
PRoW - LON/91	Recreational	High
PRoW - LON/92 & LON/93	Recreational	High
PRoW - LON/88 Carr House Lane	Recreational	High
PRoW - HP12/83	Recreational	High
PRoW - HP12/144	Recreational	High
PRoW - HP12/177	Recreational	High

Receptor	Type	Nature of Receptor (Sensitivity)
PRoW - HP12/180	Recreational	High
PRoW - HP12/81	Recreational	High
PRoW - HP12/179	Recreational	High
PRoW - HP12/70	Recreational	High
PRoW - HP12/176	Recreational	High
PRoW - HP12/72	Recreational	High
PRoW - HP12/71	Recreational	High
PRoW - HP12/73	Recreational	High
PRoW - HP12/162	Recreational	High
PRoW - HP12/175 Pennine Bridleway	Recreational	High
PRoW - LON/89	Recreational	High
PRoW - LON/97	Recreational	High
PRoW - LON/98	Recreational	High
PRoW - LON/94	Recreational	High
PRoW - LON/87	Recreational	High
PRoW - LON/86	Recreational	High
PRoW - LON/94	Recreational	High
PRoW - LON/99	Recreational	High
PRoW - LON/100	Recreational	High
PRoW - LON/85	Recreational	High
National Cycle Network Route 68 – Trans Pennine Trail	Recreational	High
Residential Properties along Woolley Lane	Residential	High
Residential Properties along Booth Street, Church Road, Taylor Street, Claylands Close, Earnshaw Street, Lord Street,	Residential	High

Receptor	Type	Nature of Receptor (Sensitivity)
Cross Street Wooley Close, and Taylor Street		
Residential Properties along the A57 Brookfield Road	Residential	High
Residential Properties along Potter Road	Residential	High
Residential Properties in Woolley Bridge	Residential	High
Residential Properties in Hadfield	Residential	High
Brookfield Industrial Estate	Work Place	Low
Melandra Castle	Residential	High
Residential Properties in Gamesley	Residential	High
Tara Brook Farm	Residential	High
Carr House Farm and Meadow View	Residential	High
Residential Properties along Carr House Lane	Residential	High
Residential Properties along Pingot Lane, Hague Road, including The Hague	Residential	High
Residential Properties along Littlemoor Road, and Broadbottom Road	Residential	High
Cluster of Residential Properties at Warhill, Targeton Hill & Mudd including Mottram C of E Primary School	Residential & Education	High
St Michaels and All Angels Church and Graveyard at Warhill	Institutional building/asset	High
Residential Properties along Market Street, and Mottram Moor.	Residential	High
Hattersley and Mottram Zone		
Located in the south and western extent of the study area, south of the A57, including the urban areas of Hattersley, and Mottram in Longendale		
Townscape Receptor		
TCA 2: West Mottram and Hattersley	Townscape	Low

Receptor	Type	Nature of Receptor (Sensitivity)
Visual Amenity Receptor		
Hurst Clough Local Nature Reserve	Recreational	Moderate
PRoW - LON/63	Recreational	High
PRoW - LON/64	Recreational	High
Residential Properties along John Kennedy Road, Lowry Grove, Arundale Grove, Arundale Close, Manley Grove, and John Kennedy Garden	Residential	High
Residential Properties along Mottram Road, and Melyncourt Drive	Residential	High
Arundale Community Primary School	Education	Moderate
Recreation Ground adjacent to the A57, John Kennedy Road	Residential	High
Premier Inn Manchester Hyde at Dawlish Close	Visitor Accommodation	Moderate
Residential Properties at Dawlish Close, and Colbourne Grove	Residential	High
Setting of Peak District National Park	Landscape	High

APPENDIX B – SUPPORTING FIGURES

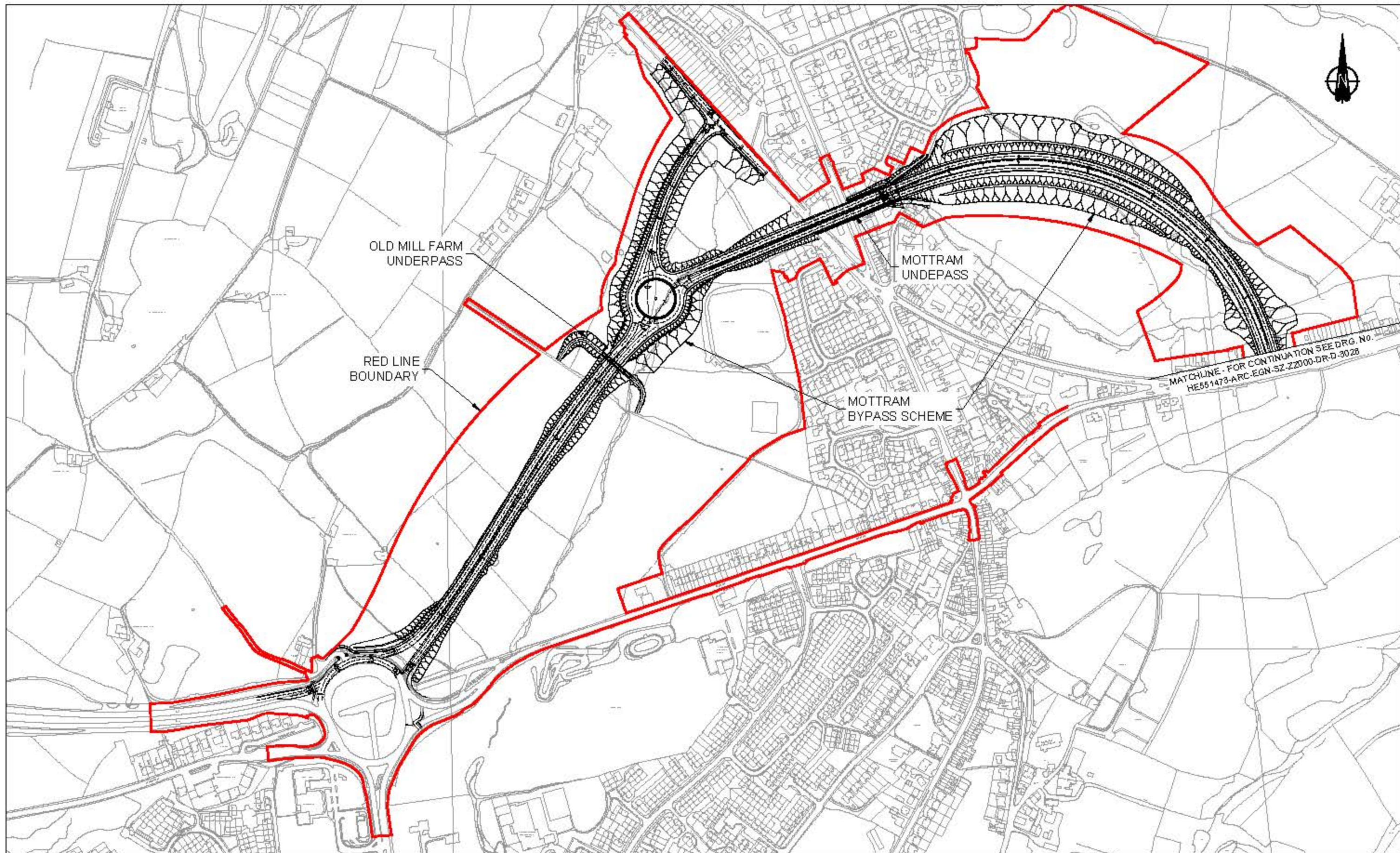


Legend

Red Line Boundary

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Height Datum	NEWLYN	Checked: E WOODROW
Projection	O.S.	Approved: Z CARTWRIGHT
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Client		
Project		
Project Name	TRANS-PENNINE UPGRADE PROGRAMME	
Title	FIGURE 2.1 RED LINE BOUNDARY	
Drawing No.	HE 551473-ARC-EGN-SZ_ZZ000_DR-LE-3026	





PO1	11/01/18	DRAFT	RM	EW	ZC
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NOTES:
KEYPLAN

Sheet 1

Client

DELIVERING THROUGH
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Suitability Description:

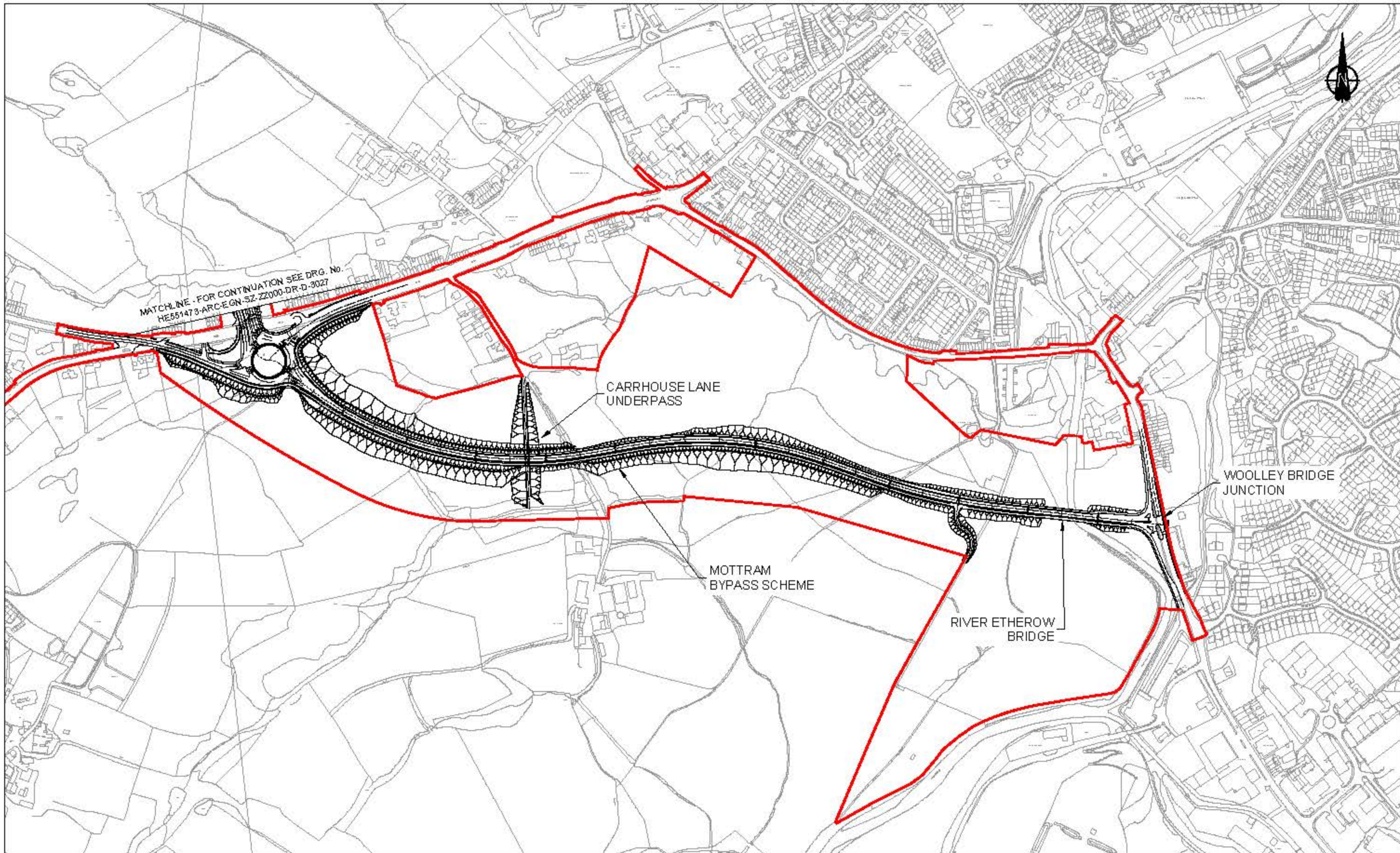
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Drawn	E.MOONSHAW	11/JAN/18	SJ*
Checked	Z.CARTWRIGHT	11/JAN/16	SJ*
Approved			
Scale:	1:8000	Datum:	ADD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	

Project
**TRANS-PENNINE
UPGRADE PROGRAMME**

Title
**FIGURE 2.2
SCHEME OVERVIEW
SHEET 1 OF 2**

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Revision: P01



MATCHLINE - FOR CONTINUATION SEE DRG. No.
HE551473-ARC-EGN-SZ-ZZ000-DR-D-3027

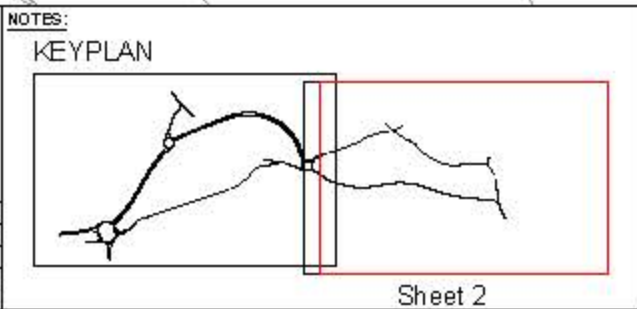
CARRHOUSE LANE
UNDERPASS

MOTTRAM
BYPASS SCHEME

RIVER ETHEROW
BRIDGE

WOOLLEY BRIDGE
JUNCTION

PO1	11/01/18	DRAFT	RM	EW	ZC
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**FIGURE 2.2
SCHEME OVERVIEW
SHEET 2 OF 2**

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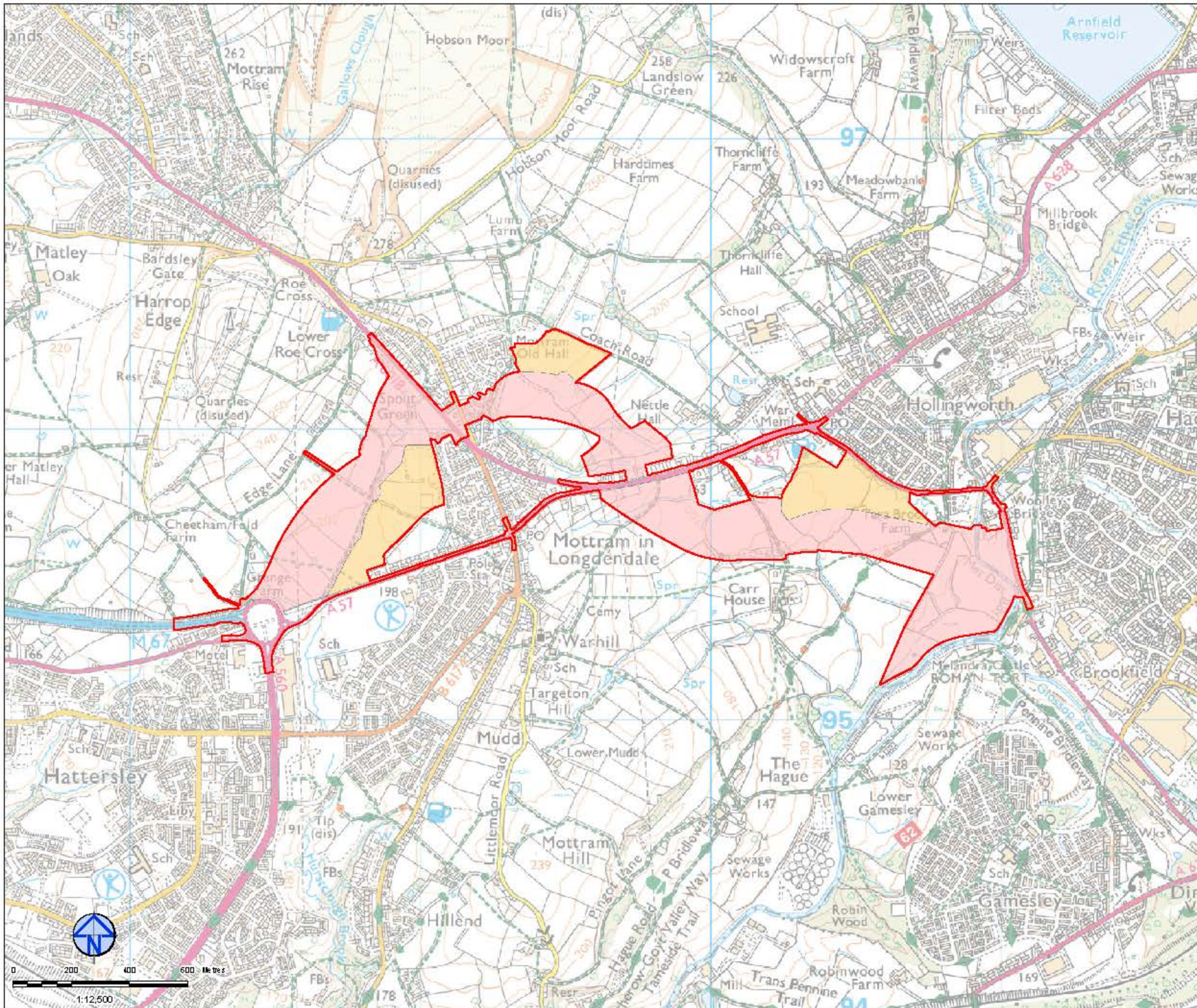
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Revision: P01

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Approved	Z.CARTWRIGHT	11/JAN/18	SH/AA
Scale	1:8000	Datum	ADD
Original Size	A3	Grid	OS
Suitability Code	S2	Project Number	



- Legend**
- Red Line Boundary
 - Temporary Land Take (181a)
 - Permanent Land Take (21a)

Issue	01	Draft	21/01/18
Issue		Description	Date
Status	For Information		
Scale	1:12,500	Current Issue	Signature
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Height Datum	NEWLYN	Checked	EMWOODROW
Protection	O.S	Approved	D HOARE
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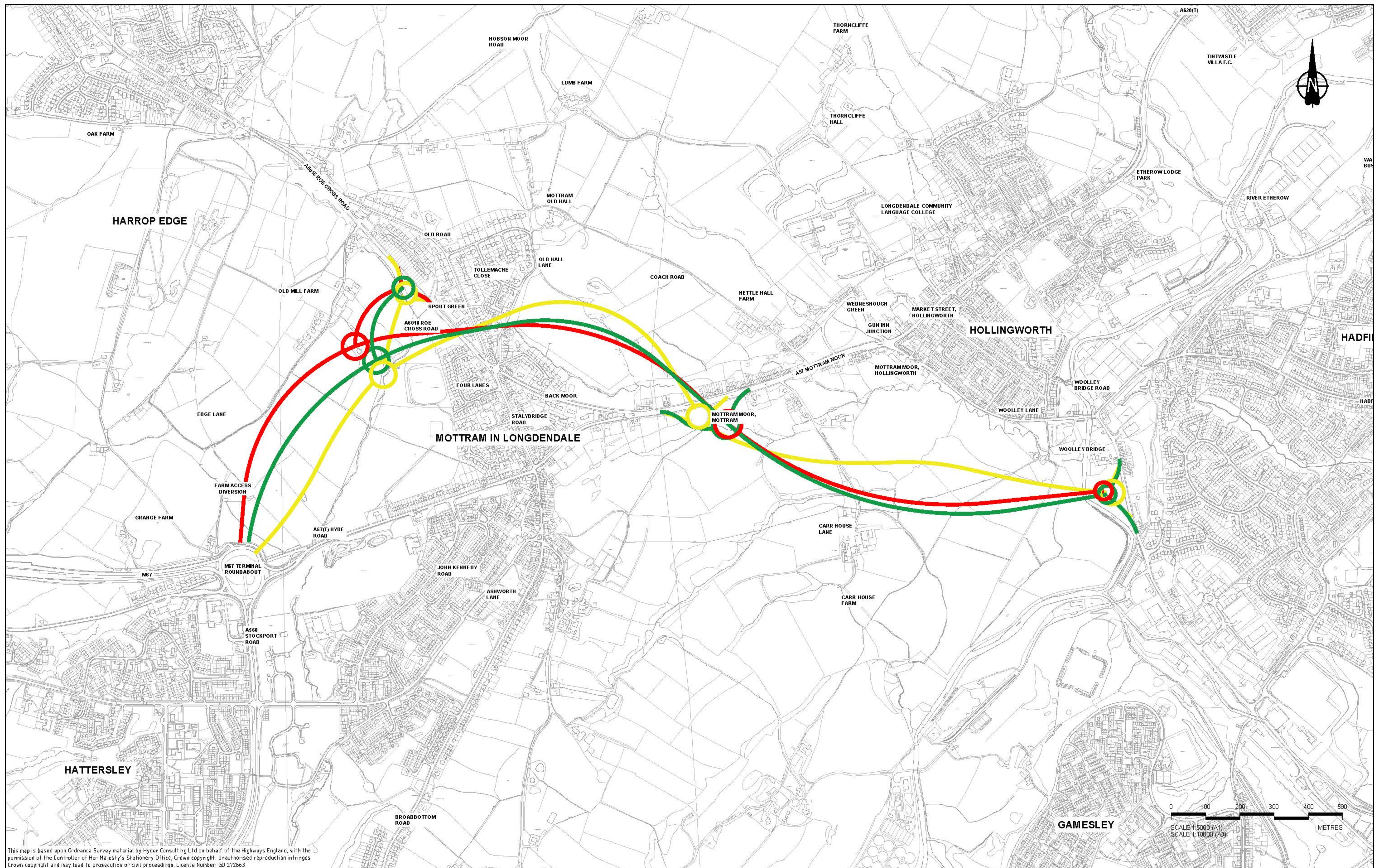


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 2.3 PERMANENT AND TEMPORARY LAND TAKE

Drawing No. HE551473-ARC-GEN-SZ_ZZ000-DR-Z-3016





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POI	S2	20181018	ISSUED FOR INFORMATION	NC	CBM	NW
Rev	Status	Rev. Date	Purpose of revision	Drawn	Chk B	Apprv B

KEY:	
	OPTION 0
	OPTION 3
	OPTION 4

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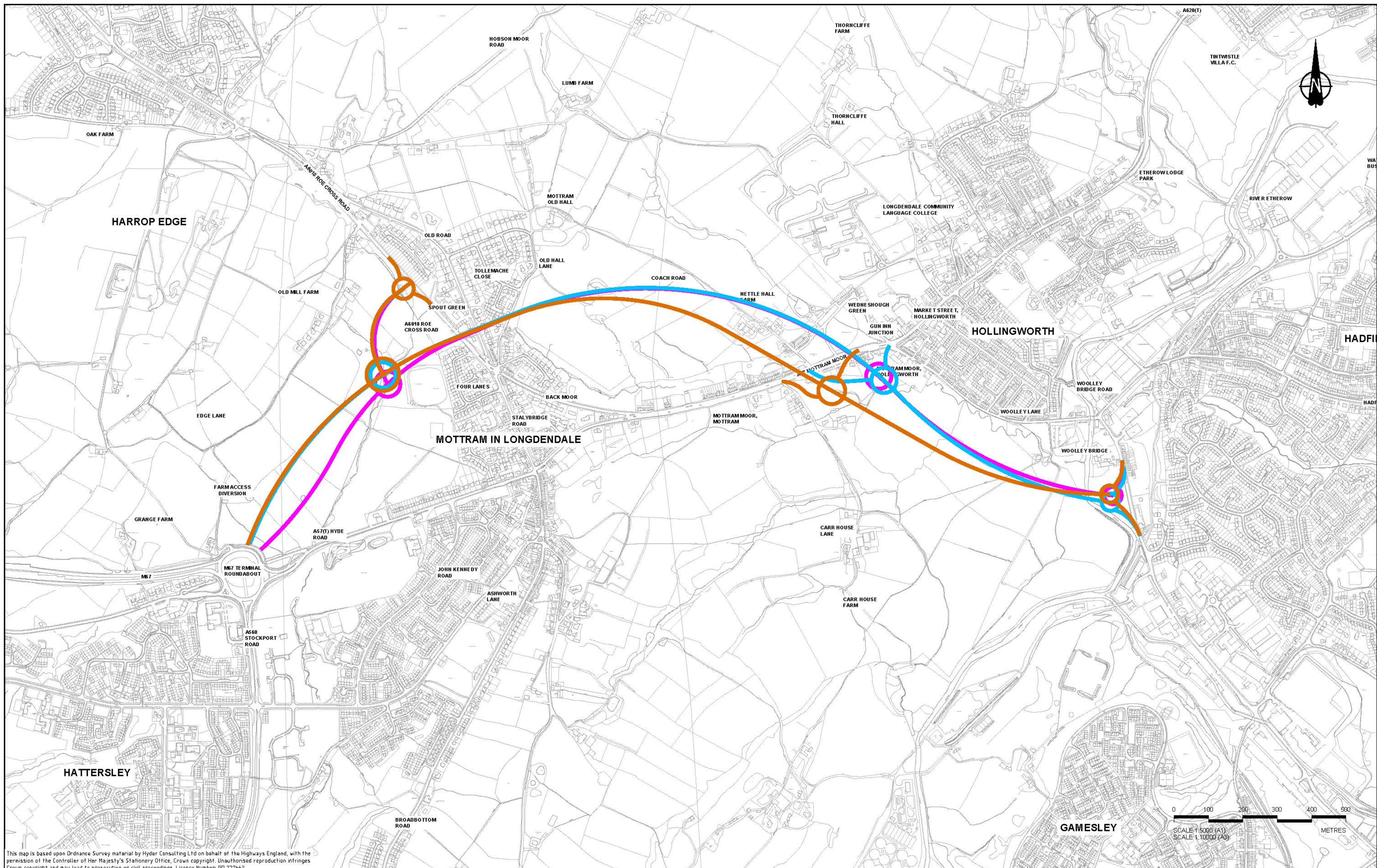
Client

Project: TRANS-PENNINE UPGRADE PROGRAMME

Drawing title: FIGURE 3.1 ASSESSMENT OF ALTERNATIVES: OPTION 0, 3 & 4

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Scale	1 : 5000	Date	26/10/2018
Drawn By	N. CLEMENTS		
Checked By	C. BURGHAM-MALIN		
Approved By	N. WESTWOOD		
Original Size	A1		

Drawing number	HA	PIN	Originator	Volume	Location	Type	Role	Number
HE551473-ARC-GEN-SZ_ZZ000-DR-Z-3012								



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KEY	
	OPTION 1
	OPTION 2
	OPTION 5

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Project

**TRANS-PENNINE
UPGRADE PROGRAMME**

Drawing title

**FIGURE 3.2
ASSESSMENT OF ALTERNATIVES:
OPTION 1, 2 & 5**

Status	S2	Revision	F01
Scale	1 : 5000	Date	26/12/2018
Drawn By	N. CLEMENTS		
Checked By	C. BURGHAM-MALIN		
Approved By	N. WESTWOOD		
Drawing number	HA_PIN Originator Volume Location Type Role Number	Original Size	A1
HE551473-ARC-GEN-SZ_ZZ000-DR-Z-3013			



Rev	Status	Rev. Date	Purpose of revision	Drawn	Check	Approved
PO1	S2	2018/01/18	ISSUED FOR INFORMATION	NC	CBM	NW

- Blue Route
- Brown Route
- Red Route

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Project **TRANS-PENNINE UPGRADE PROGRAMME**

Drawing title **FIGURE 3.3 ASSESSMENT OF ALTERNATIVES: BROWN ROUTE, BLUE ROUTE AND RED ROUTE**

Status	S2	Revision	P01
Scale	1 : 5000	Date	26/01/2018
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Checked By	C. BURGHAM-MALIN		
Approved By	N. WESTWOOD		
Drawing number	HA	PIN Originator Volume Location Type Role Number	Original Size
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Rev	Status	Rev. Date	Purpose of revision	Drawn	Check	Approved
PO1	S2	2018/02/19	ISSUED FOR INFORMATION	NC	CBM	NW

Client



Project

**TRANS-PENNINE
UPGRADE PROGRAMME**

Drawing title

**FIGURE 3.4
MHT - DFT LOW COST OPTION 1
WITH A57 Link (GLOSSOP SPUR)
GENERAL ARRANGEMENT**

Client

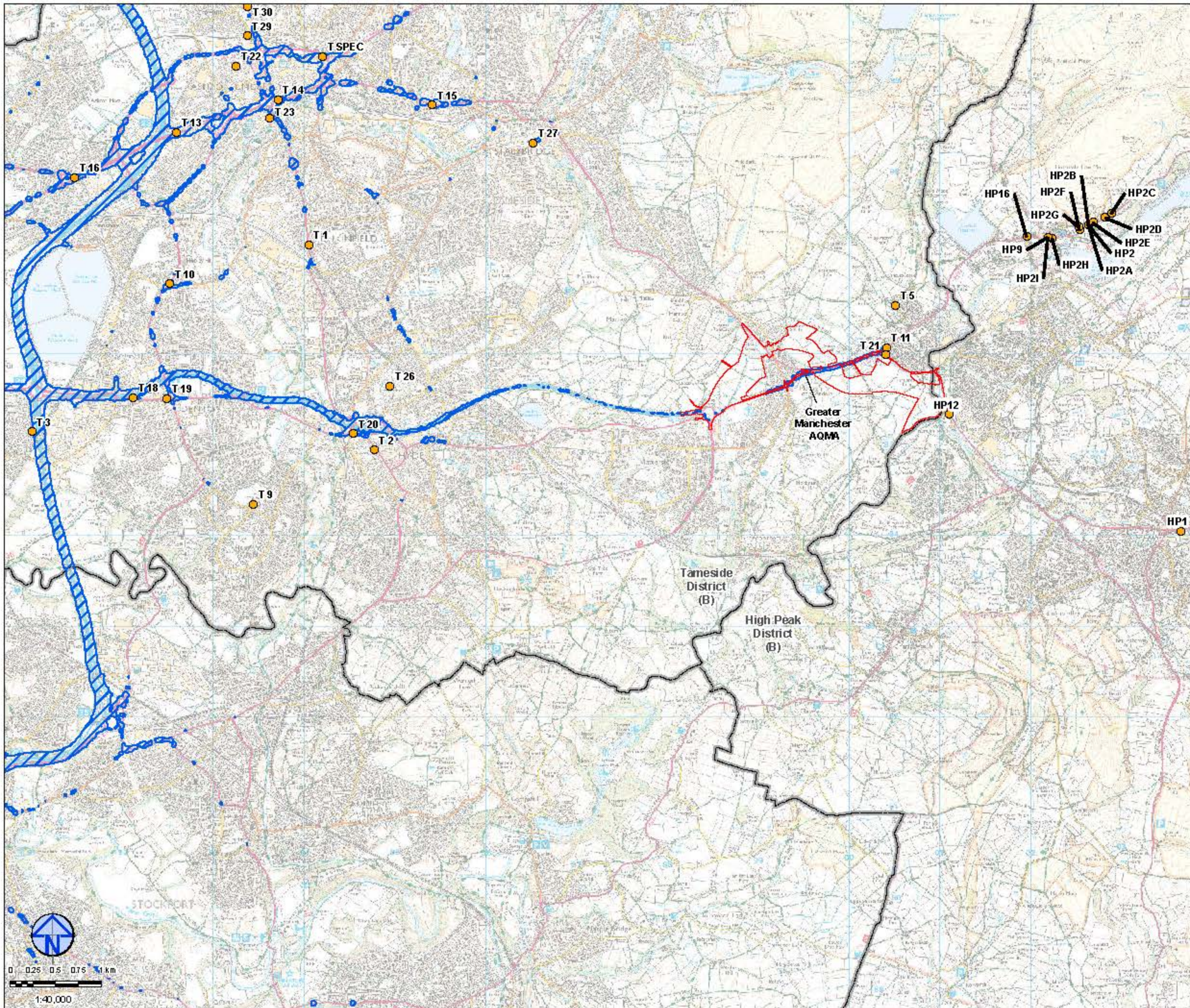


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Checked By	C. BURGHAM-MALIN		
Approved By	N. WESTWOOD		
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Checked By	C. BURGHAM-MALIN		
Approved By	N. WESTWOOD		
Drawing number	HA	PIN Originator Volume Location Type Role Number	Original Size
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Legend

- Red Line Boundary
- Monitoring Location
- Air Quality Management Area
- District Boundary

Issue	01 Draft	Date	21/01/18
Status	For Information		
Scale	1:40,000	Current Issue	Signature
Original Size	A3	Drawn	R MILLMAN
Height Datum	NEWLYN	Checked	SNAYLOR
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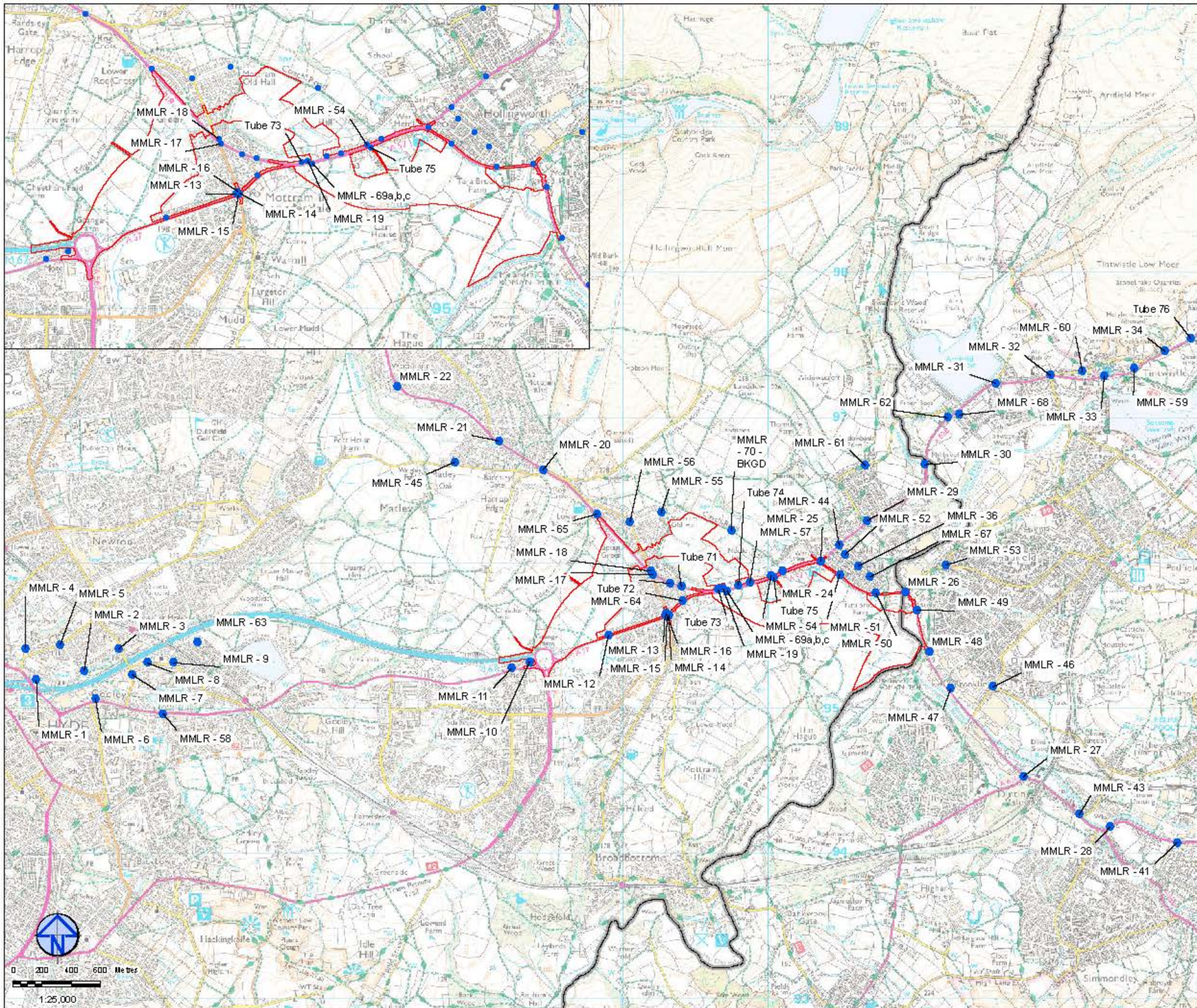
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Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 5.1 AIR QUALITY MANAGEMENT AREA AND LOCAL AUTHORITY MONITORING LOCATIONS

Drawing No. HE551473-ARC-EAQ-SZ_ZZ000_DR-LA-3001



Legend

- Red Line Boundary
- Highways England Monitoring Tube Location
- District Boundary

01	Draft	02/02/18
Issue	Description	Date
Status		
For Information		
Scale	1:25,000	Current Issue Signature
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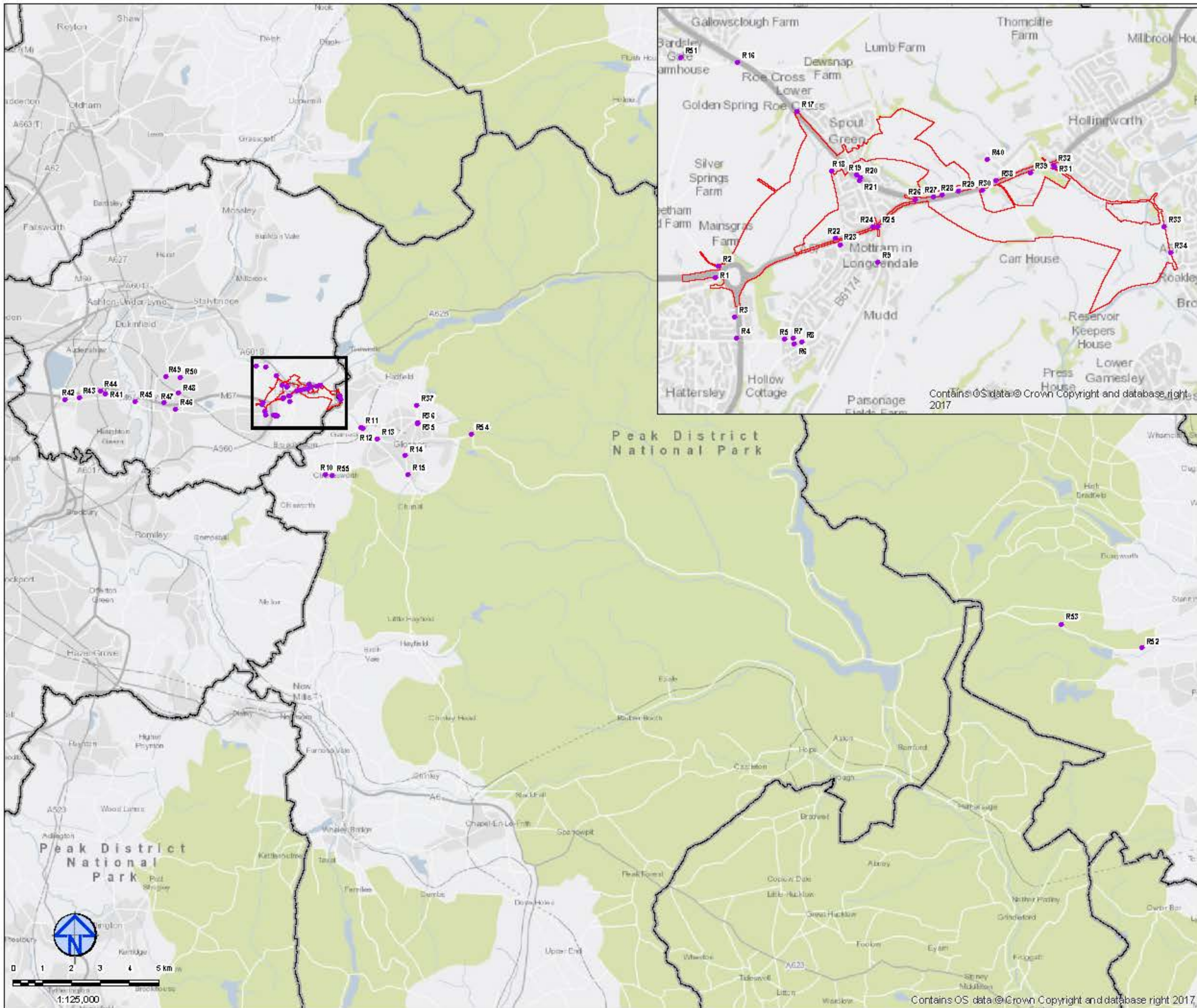


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 5.2 HIGHWAYS ENGLAND AIR QUALITY MONITORING TUBE LOCATIONS

Drawing No. HE551473-ARC-EAQ-SZ_ZZ000_DR-LA-3002





Legend

- Red Line Boundary
- Sensitive Receptor Location
- District Boundary

Issue	Description	Date
01	Draft	21/01/18
For Information		
Scale	1:125,000	Current Issue Signature
Original Size	A3	Drawn R MILLMAN
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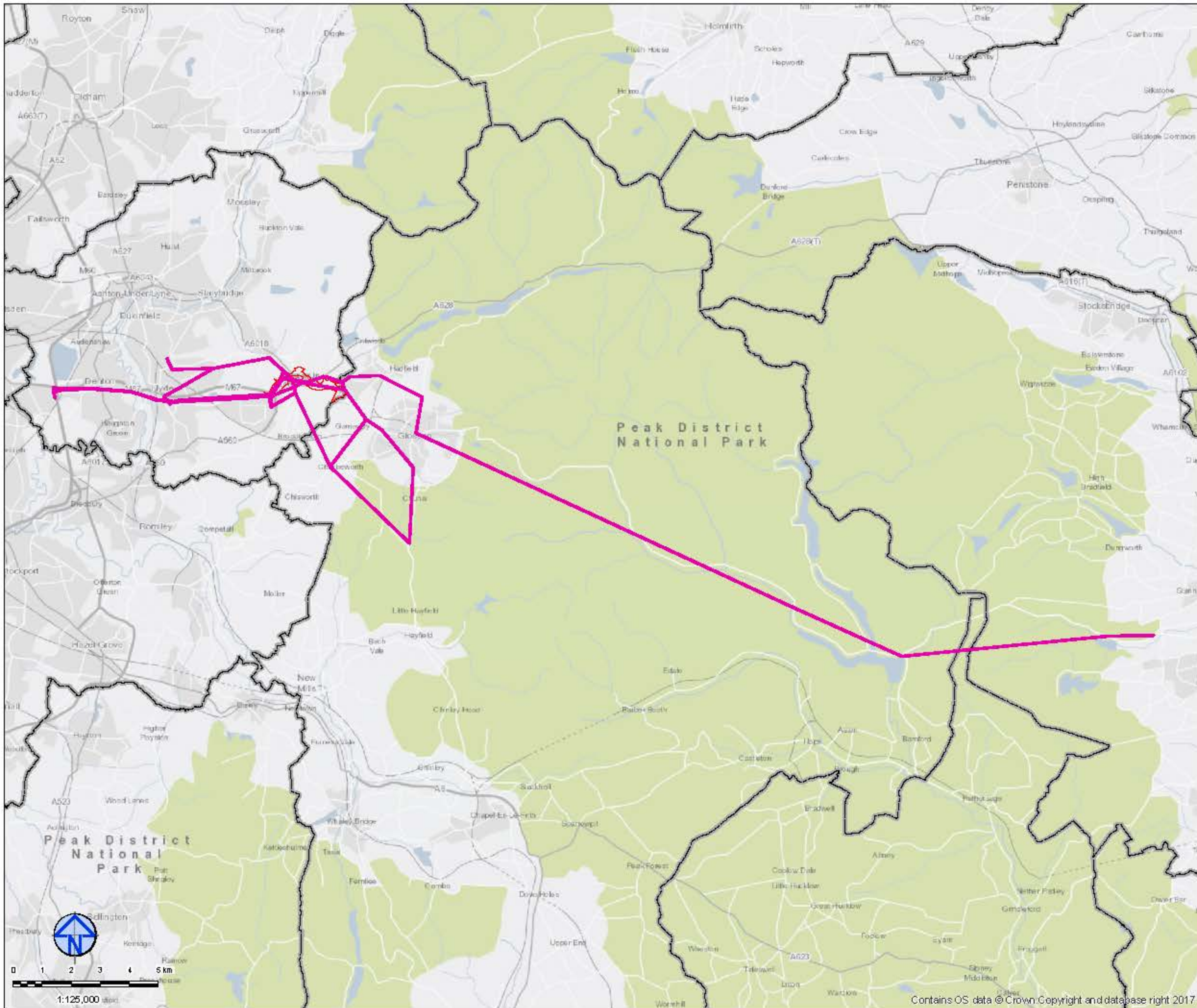
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Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 5.3 AIR QUALITY SENSITIVE RECEPTOR LOCATIONS

Drawing No. HE551473-ARC-EAQ-SZ_ZZ000_DR-LA-3003



Legend

- Red Line Boundary
- Air Quality Affected Road Network
- District Boundary

Issue	01 Draft	Date	21/01/18
Status	For Information		
Scale	1:125,000	Current Issue	Signature
Original Size	A3	Drawn	R MILLMAN
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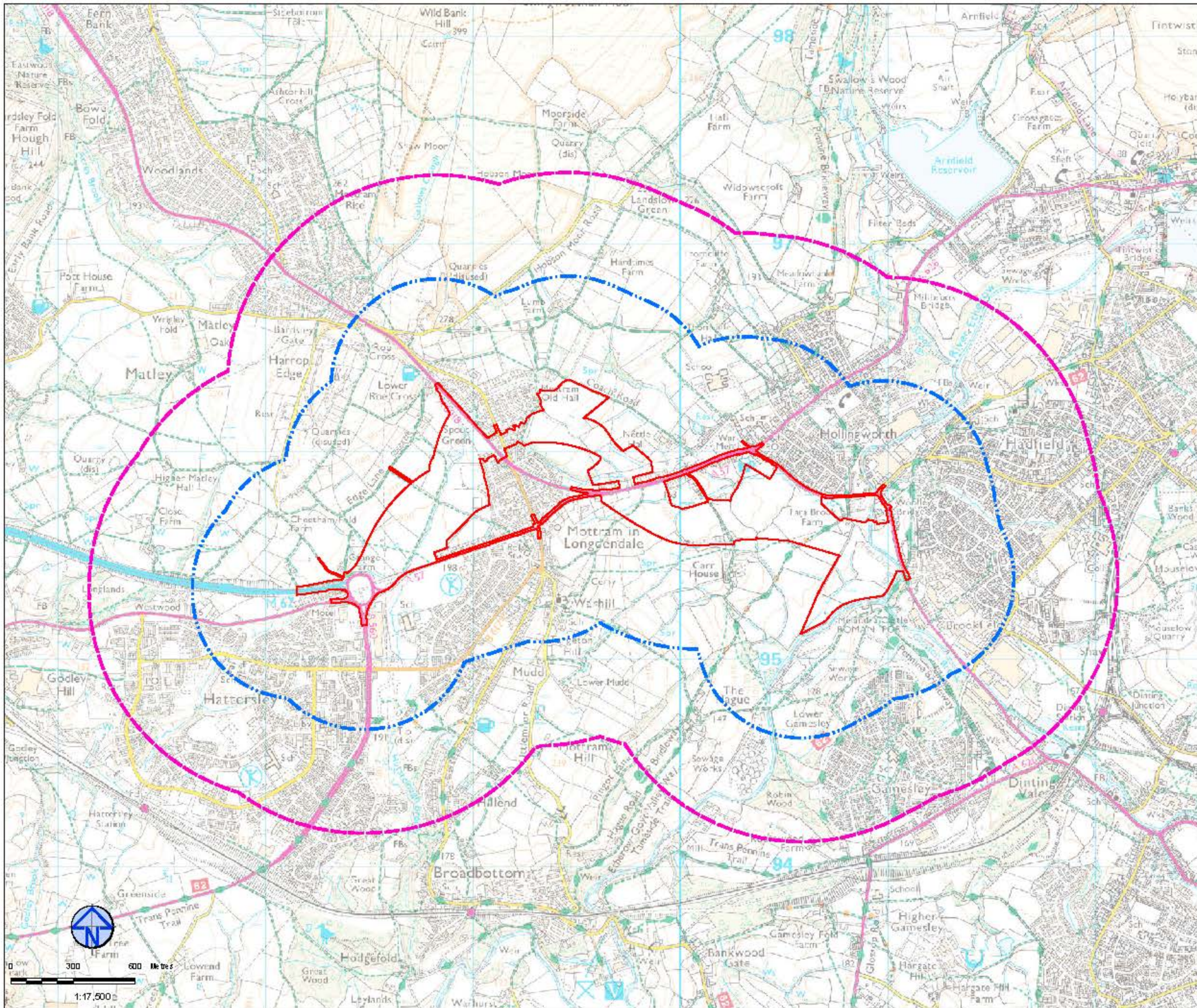


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 5.4 AIR QUALITY AFFECTED ROAD NETWORK

Drawing No. HE551473-ARC-EAQ-SZ_ZZ000_DR-LA-3004

Scale: 1:125,000
 0 1 2 3 4 5 km



Legend

- Red Line Boundary
- 500m Study Area
- 1km Study Area

Issue	01	DRIFT	24/01/18
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Date			
Status	For Information		
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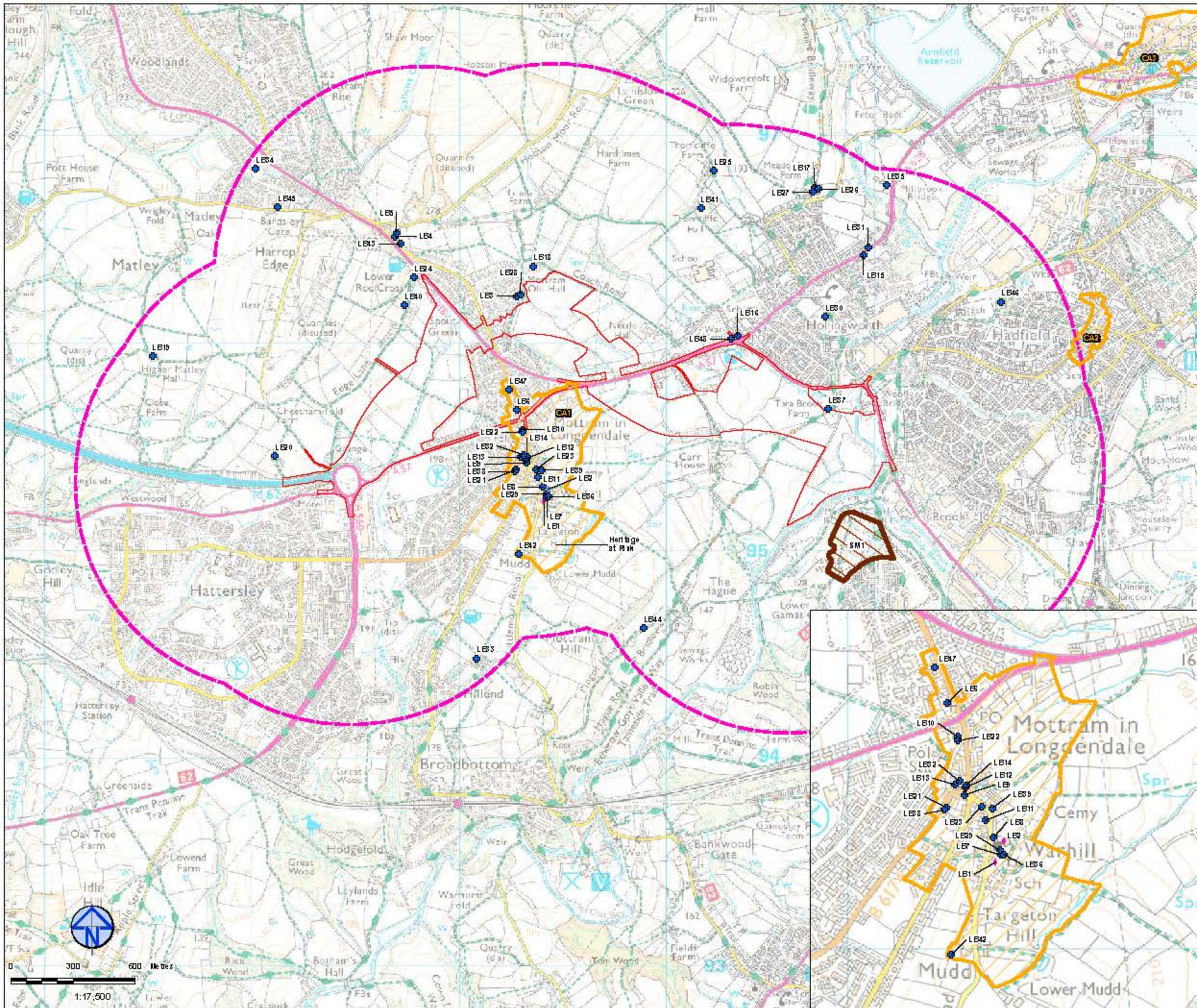
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Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 6.1 CULTURAL HERITAGE STUDY AREA

Drawing No. HE 551473-ARC-EHR-SZ_ZZ000_DR-LH-3001



- Legend**
- Red Line Boundary
 - 1km Study Area
 - ◆ Grade II* Listed Building
 - Grade II Listed Building
 - Conservation Area
 - Scheduled Monument
 - Heritage at Risk

01	DRAFT	21/01/18
Issue	Description	Date
Status	For Information	
Scale	1:17,500	Current Issue Signature
Original Size	A3	Drawn: AHANSON
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Project

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UPGRADE PROGRAMME

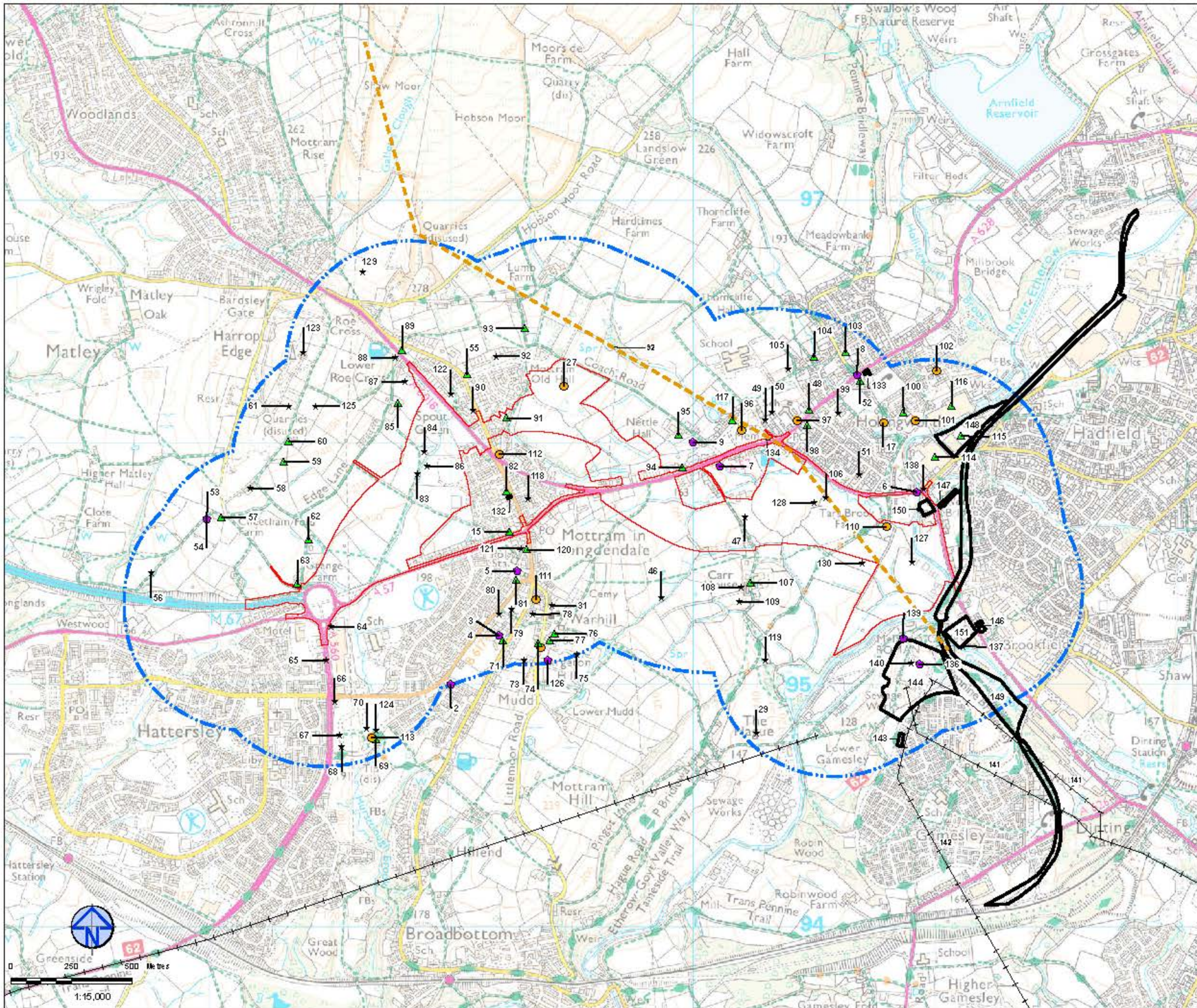
Title

FIGURE 6.2
DESIGNATED HERITAGE ASSETS

Drawing No.

HE55 1473-ARC-EHR-SZ_ZZ000_DR-LH-3002





- Legend**
- Site Boundary
 - 500m Study Area
 - ▲ Building
 - ★ Find Spot
 - ★ Monument
 - Place
 - Monument Lines
 - ADS Monument Line (Roman Road)
 - Monument Polygons

01	DRAW 1	24/01/18
Issue	Description	Date
Status: For Information		
Scale	1:15,000	Current Issue: Signal Line 2
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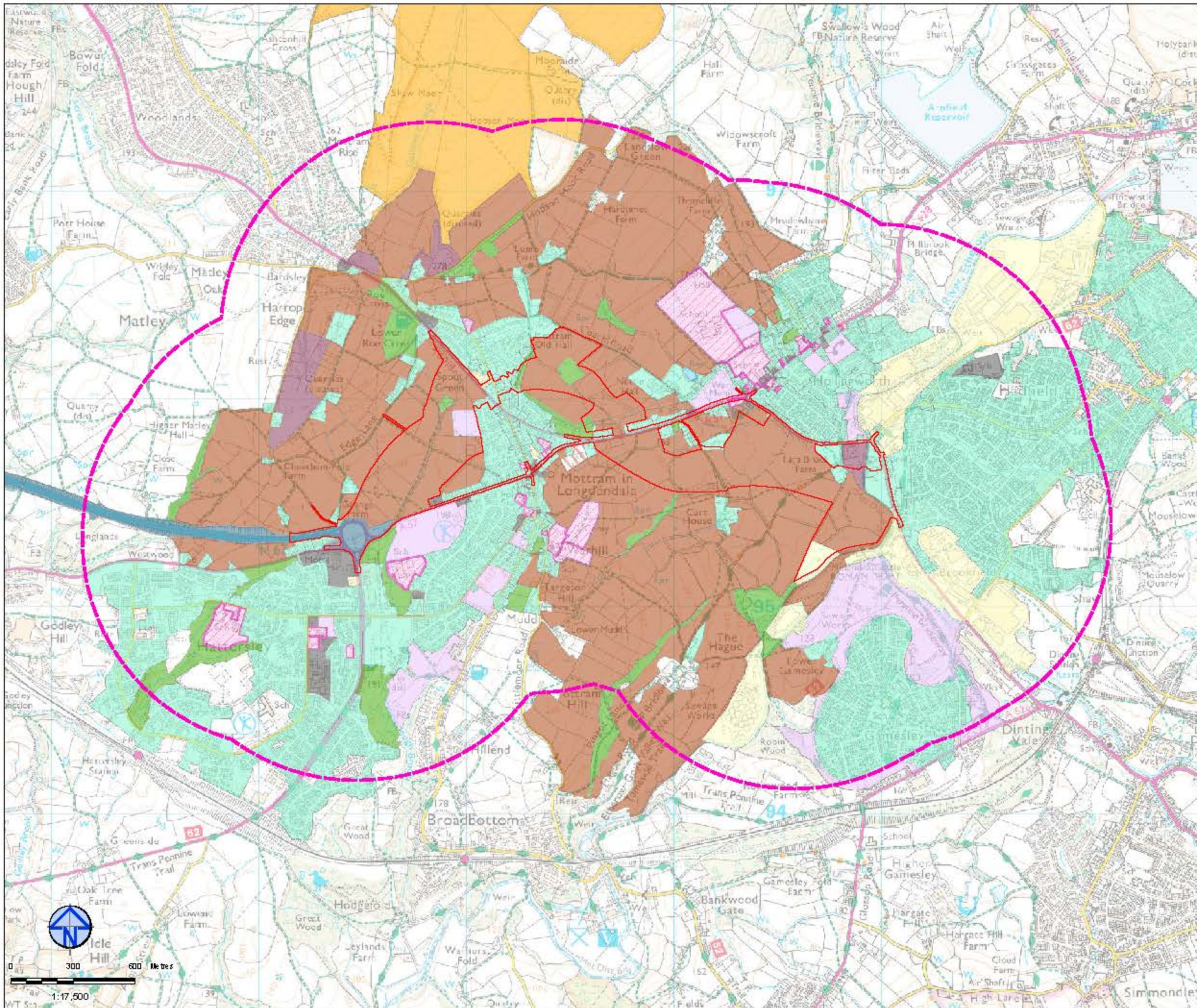
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Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 6.3: NON-DESIGNATED HERITAGE ASSETS

Drawing No.: HE55 1473-ARC-EHR-SZ_ZZ000_DR-LH-3003



- Legend**
- Red Line Boundary
 - 1km Study Area
- Historic Landscape Characterisation Data**
- Civic and Commercial
 - Communications
 - Fields and Enclosed Land
 - Extractive
 - Horticulture
 - Industrial
 - Institutional
 - Ornamental, Parkland and Recreational
 - Settlement
 - Unenclosed Land
 - Water Bodies
 - Woodland

01	DRAFT	21/01/18
Issue	Description	Date
Status	For Information	
Scale	1:17,500	Current Issue Signature
Original Size	A3	Drawn: AHANSON
Height Datum	NEWLYN	Checked: EPLINETT
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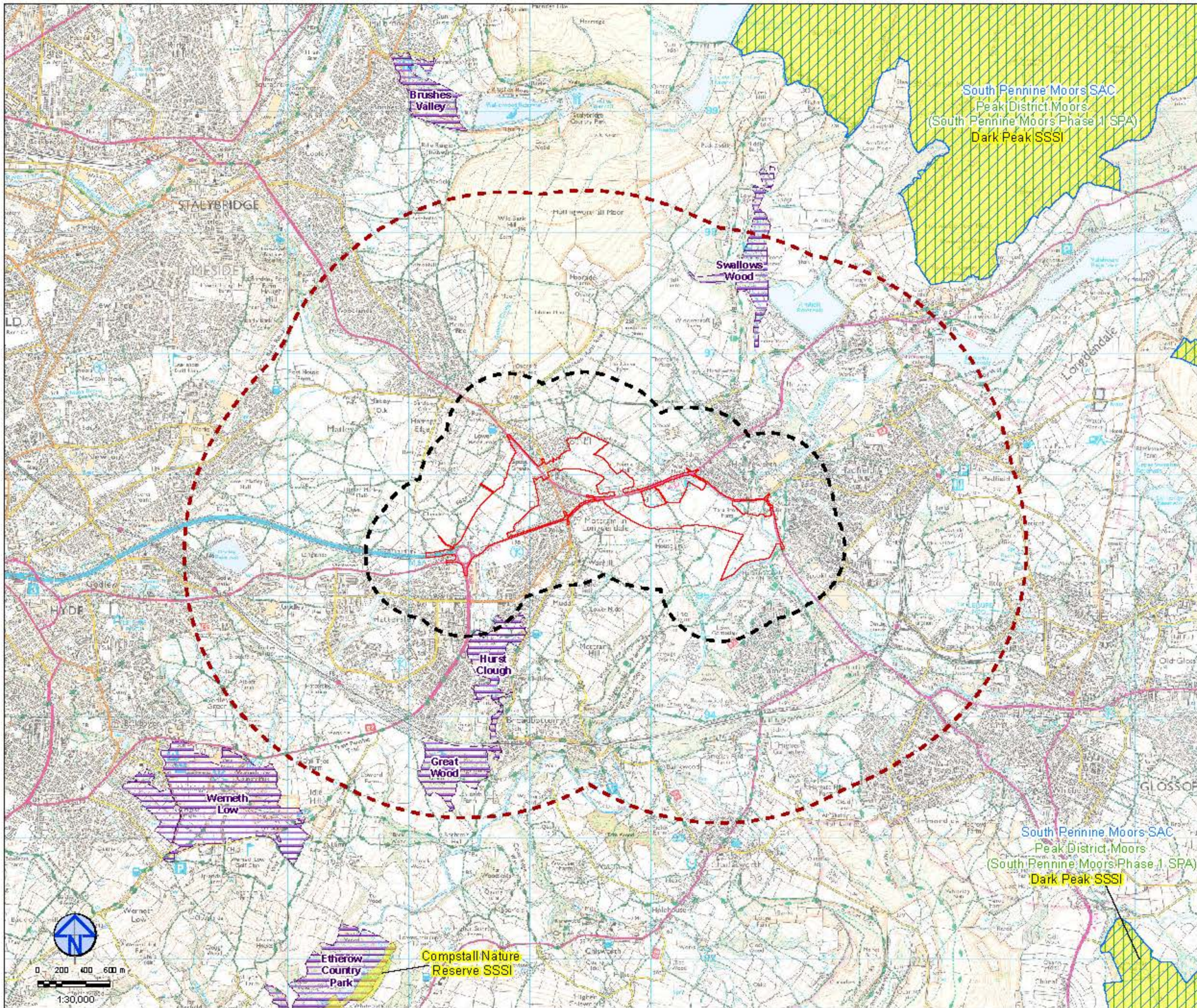
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Project TRANS-PENNINE UPGRADE PROGRAMME

Title FIGURE 6.4 HISTORIC LANDSCAPE CHARACTERISATION DATA

Drawing No. HE551473-ARC-EHR-SZ_ZZ000_DR-LH-3005



- Legend**
- Red Line Boundary
 - 500m Study Area
 - 2km Study Area
 - Special Area of Conservation
 - Special Protection Area
 - Site of Special Scientific Interest
 - Local Nature Reserve

Issue	Description	Date
01	Draft	21/01/18
For Information		
Scale	1:30,000	Current Issue Signature
Original Size	A3	Drawn R MILLMAN
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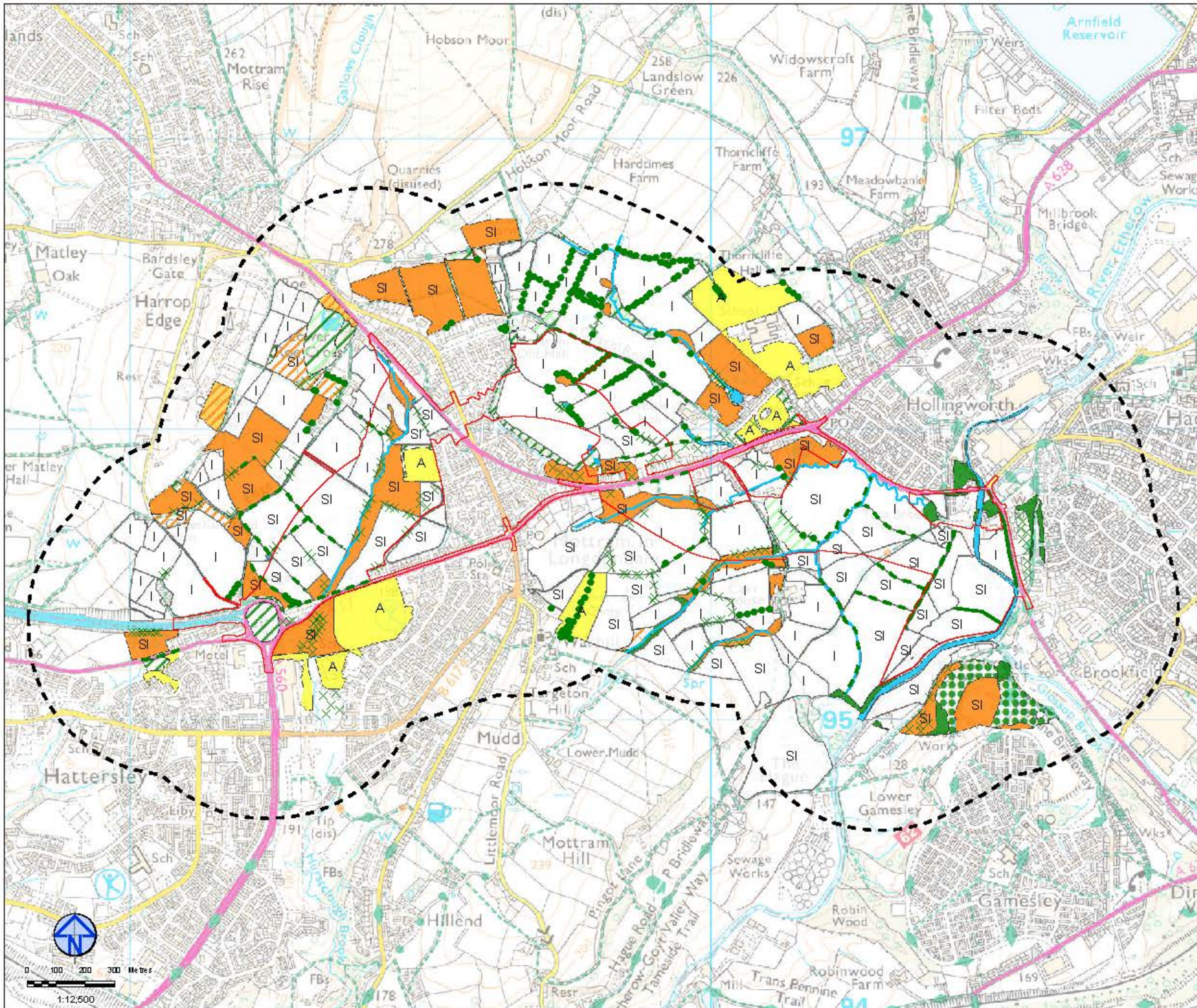


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 7.1 STATUTORY DESIGNATED SITES FOR NATURE CONSERVATION

Drawing No. HE 551473-ARC-EBD-SZ_ZZ000_DR-LE-3001





- Legend**
- Red Line Boundary
 - 500m Study Area
 - Broad-Leaved Tree
 - × Scattered Scrub
 - Water
 - Species-Poor Intact Hedge
 - - - Species-Poor Defunct Hedge
 - - - Dry Ditch
 - Broad-Leaved Semi-Natural Woodland
 - Broad-Leaved Plantation
 - Coniferous Plantation
 - Mixed Plantation
 - Dense Scrub
 - Broad-Leaved Scattered Trees
 - Unimproved Acid Grassland
 - Semi-Improved Acid Grassland
 - Unimproved Neutral Grassland
 - Semi-Improved Neutral Grassland
 - Improved Grassland
 - Poor Semi-Improved Grassland
 - Tall Riparian
 - Dry Heath/Acid Grassland Mosaic
 - Water
 - Arable Grassland

SI	Draft		21/01/18
Issue	Description		Date
Status			
For Information			
Scale	1:12,500	Current Issue Signature	
Original Size	A3	Drawn	R MILLMAN
Height Datum	NEWLYN	Checked	N JAMESON
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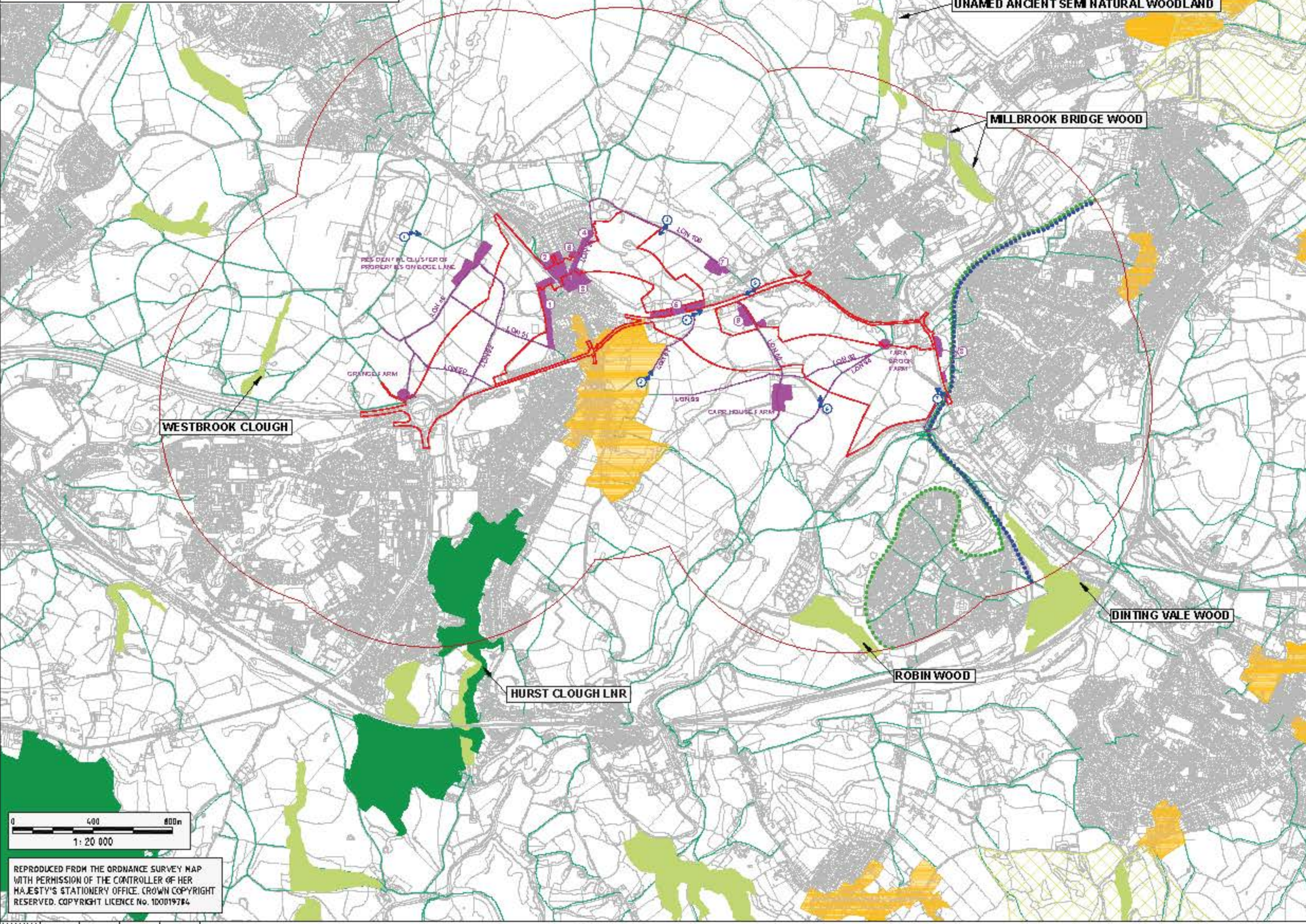
Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 7.2 PHASE 1 HABITAT SURVEY PLAN

Drawing No.: HE 551473-ARC-EBD-SZ_ZZ000_DR-LE-3002

Visual Receptors

1. Residential properties on Four Lanes, Ash Close, Meadowcroft and Littlefields
2. Residential properties along Old Road
3. Residential properties along Lodge Court
4. Residential properties along Old Hall Lane
5. Residential properties along the A57 Mottram Moor
6. Residential properties along Tolesmache Close
7. Nettle Hall and residential properties along Coach Road
8. Residential properties along Brookfield Road (A57)
9. Residential properties along Carr House Lane



Legend:

- RED LINE BOUNDARY
- STUDY AREA (1KM)
- LOCAL NATURE RESERVE
- PUBLIC RIGHT OF WAY (RtW)
- NATIONAL CYCLE ROUTE 62 - TRANS PENNINE TRAIL
- NATIONAL TRAIL
- CONSERVATION AREA
- ANCIENT WOODLAND
- PEAK DISTRICT NATIONAL PARK
- ⊙ PHOTO VIEW LOCATIONS
- VISUAL RECEPTORS WITH POTENTIAL SIGNIFICANT EFFECTS

Rev	Date	Description	Drawn	Check	Approv
P1	10.01.18	FIRST ISSUE	AC	RK	CH

Client HIGHWAYS ENGLAND
PROJECT: MOTTRAM MOOR LINK ROAD AND A57(T) TO A57 LINK ROAD

Site *Area* *Permitted*

Client
Highways England
15th Floor
25 Abchurch Lane
London EC4A 3DF
Tel: 020 3446 6000
www.gov.uk

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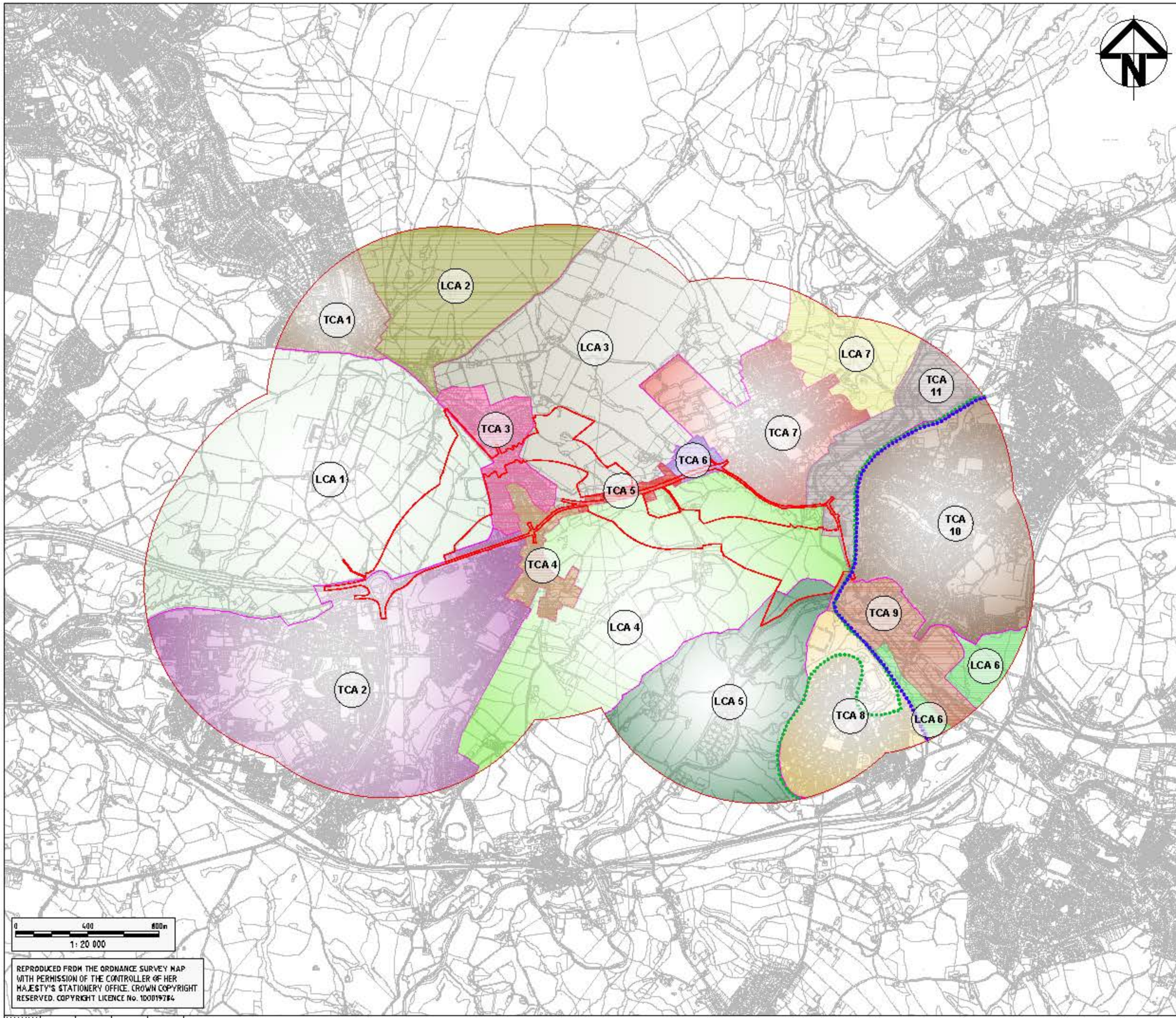
Registered office: Arcadis House, 34 York Way, London N1 9AE
Coordinating office: 5th Floor 40-41 Paradise Street, Brixwood Park, Warrington, WA3 6GA, Tel: 44 (0) 1925 200700
www.arcadis.com

TITLE: FIGURE 8.1 VISUAL RECEPTORS, LANDSCAPE DESIGNATIONS AND PHOTO VIEW LOCATIONS

Designed	A.CHESTER	Drawn	J.NORMAN	Checked	R.KITCH	Approved	D.HOARE
Scale:	1:20 000	Date:	10 JAN 18	Grid:	OS	Project Number:	UA008848
Original Size:	A3	Suitability Code:	S2	Suitability Description:	FOR INFORMATION		

Drawing Number: HE551473-ARC-ELS-SZ-ZZ000-DR-L-3021
Revision: P1

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- LEGEND**
- RED LINE BOUNDARY
 - STUDY AREA (1 KM)
 - NATIONAL CYCLE ROUTE 62 - TRANS PENNINE TRAIL
 - NATIONAL TRAIL PENNINE BRIDLEWAY
 - SCHEME LEVEL CHARACTER AREAS
 - TOWNSCAPE CHARACTER AREAS
 - TCA 1 - SOUTH STALYBRIDGE
 - TCA 2 - WEST MOTTRAM AND HATTERSLEY
 - TCA 3 - MOTTRAM POLT GREEN
 - TCA 4 - OLD MOTTRAM
 - TCA 5 - MOTTRAM MOOR
 - TCA 6 - WEDNESHOUGH GREEN
 - TCA 7 - HOLLINGSWORTH
 - TCA 8 - GAINERSLEY
 - TCA 9 - BROOKFIELD INDUSTRIAL ESTATE
 - TCA 10 - HADFIELD
 - TCA 11 - ETHEROW INDUSTRIAL VALLEY FLOOR
 - LANDSCAPE CHARACTER AREAS
 - LCA 1 - HARPUR EDGE VALLEY PASTURE
 - LCA 2 - HOLLINGSWORTH HALL MOORLAND SLOPE
 - LCA 3 - MOTTRAM MOOR PASTURE
 - LCA 4 - ETHEROW VALLEY PASTURE
 - LCA 5 - ETHEROW VALLEY FLOOR WITH WOODLAND
 - LCA 6 - BROOKFIELD VALLEY FLOOR

PI	10.01.18	FIRST ISSUE	AC	RK	CH
Rev	Date	Description	Drawn	Check	Approv

Client HIGHWAYS ENGLAND
 PROJECT: MOTTRAM MOOR LINK ROAD AND A57(T) TO A57 LINK ROAD

Site *Map Reference*

Client
 Highways England
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 15000000000
 15000000000
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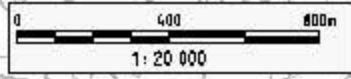
TITLE: FIGURE 8.2 SCHEME LEVEL CHARACTER AREAS

Designed	A. CHESTER	10 JAN 18	Signoff
Drawn	J. NORMAN	10 JAN 18	Signoff
Checked	R. KITCH	10 JAN 18	Signoff
Approved	D. HOARE	10 JAN 18	Signoff
Scale:	1:20 000	Datum:	ADD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	UA008848

Suitability Description: **FOR INFORMATION**

Drawing Number: HE551473-ARC-ELS-SZ-ZZ000-DR-L-3022

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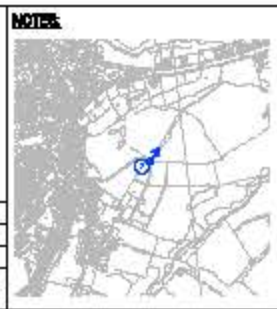
PHOTO VIEW 2; 90 DEGREES VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD ,VIEW PROW NEAR ST MICHAELS AND ALL ANGELS CHURCH

← 90 DEGREES VIEW →



PHOTO VIEW 2; FULL PANORAMIC VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD ,VIEW PROW NEAR ST MICHAELS AND ALL ANGELS CHURCH

Rev	Date	Description	Design	Check	Approve
P1	10/01/19	FIRST ISSUE	AC	RK	DH



Client

HIGHWAYS ENGLAND

Client Name: **Highways England**
 Project Name: **Mottram Moor Link Road**
 Date: **10/01/2019**
 File: **HE561473-ARC-ELS-S2-ZZ000-DR-L-3024**
 Site: **Highways England**
 www.highways.gov.uk

Reliability Check/Rev

Designed	ALCHESTER	By	10 JAN 19	Rev	1
Drawn	JNORMAN	On	10 JAN 19	Rev	1
Checked	RKITCH	By	10 JAN 19	Rev	1
Approved	DJOHARE	On	10 JAN 19	Rev	1
Status:	NTS	Drawn:	ADD		
Original Date:	A3	QMS:	OS		
Reliability Code:	S2	Project Number:	UA008846		

PROJECT: MOTTRAM MOOR LINK ROAD AND A57(T) TO A57 LINK ROAD

TITLE: FIGURE 8.3 REPRESENTATIVE PHOTO VIEW 2 SHEET 2 OF 7

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 Westfield, MK9 0GA
 Tel: +44 (0)1908 633000

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Drawing Number: **HE561473-ARC-ELS-S2-ZZ000-DR-L-3024** **Revision:** **P1**



PHOTO VIEW 3; 90 DEGREES VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD, THE BYPASS (MOTTRAM), VIEW FROM THE A6018 MOTTRAM ROAD, LOOKING SOUTH WEST

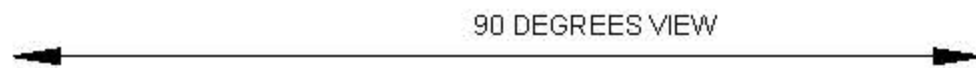
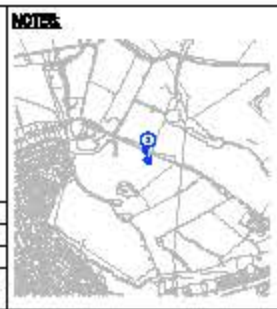


PHOTO VIEW 3; FULL PANORAMIC VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD, THE BYPASS (MOTTRAM), VIEW FROM THE A6018 MOTTRAM ROAD, LOOKING SOUTH WEST

Rev	Date	Description	Design	Check	Approve
P1	10/01/19	FIRST ISSUE	AC	RK	DH



Client
HIGHWAYS ENGLAND
 Mottram Moor Link Road
 01206 222222
 01206 222222
 www.highways.gov.uk

Reliability Checksheet			
Designed	A.CHESTER	10 JAN 19	Sign
Drawn	J.NORMAN	10 JAN 19	Sign
Checked	R.KITCH	10 JAN 19	Sign
Approved	D.HOARE	10 JAN 19	Sign
Status:	NTS	Drawn:	ADD
Original Date:	A3	QMS:	OS
Reliability Code:	S2	Project Number:	UA008846

PROJECT:
 MOTTRAM MOOR LINK ROAD AND A57(T) TO A57 LINK ROAD
TITLE:
 FIGURE 8.3 REPRESENTATIVE PHOTO VIEW 3 SHEET 3 OF 7

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Drawing Number: HE561473-ARC-ELS-S2-ZZ000-DR-L-3025
 Revision: P1



PHOTO VIEW 4; 90 DEGREES VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD, VIEW FROM A57, LOOKING NORTH EAST

90 DEGREES VIEW



PHOTO VIEW 4; FULL PANORAMIC VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD, VIEW FROM A57, LOOKING NORTH EAST




			NOTES 			Client  HIGHWAYS ENGLAND <small>Highways England Planning and Design Mottram Moor Link Road 11th Floor 111 Abchurch Lane London EC4N 3DF Tel: 020 300 6700 www.highways.gov.uk</small>		Reliability Controller <table border="1"> <tr> <td>Designed</td> <td>A.CHESTER</td> <td>By</td> <td>10 JAN 18</td> <td>By</td> <td></td> </tr> <tr> <td>Drawn</td> <td>J.NORMAN</td> <td>Date</td> <td>10 JAN 18</td> <td>By</td> <td></td> </tr> <tr> <td>Checked</td> <td>R.KITCH</td> <td>By</td> <td>10 JAN 18</td> <td>By</td> <td></td> </tr> <tr> <td>Approved</td> <td>D.HOARE</td> <td>By</td> <td>10 JAN 18</td> <td>By</td> <td></td> </tr> <tr> <td>Issue:</td> <td>NTS</td> <td>Date:</td> <td>ADD</td> <td></td> <td></td> </tr> <tr> <td>Original Date:</td> <td>A3</td> <td>QMS</td> <td>OS</td> <td></td> <td></td> </tr> <tr> <td>Reliability Code:</td> <td>S2</td> <td>Project Number:</td> <td>UA008846</td> <td></td> <td></td> </tr> </table>		Designed	A.CHESTER	By	10 JAN 18	By		Drawn	J.NORMAN	Date	10 JAN 18	By		Checked	R.KITCH	By	10 JAN 18	By		Approved	D.HOARE	By	10 JAN 18	By		Issue:	NTS	Date:	ADD			Original Date:	A3	QMS	OS			Reliability Code:	S2	Project Number:	UA008846			PROJECT: MOTTRAM MOOR LINK ROAD AND A57(T) TO A57 LINK ROAD TITLE: FIGURE 8.3 REPRESENTATIVE PHOTO VIEW 4 SHEET 4 OF 7		 <small>Regional office: Mottram Moor 22 Colton Place London NW9 5LN Tel: 020 8996 2222 www.arcadis.com</small> <small>Overarching office: 4th Floor 401 Finsbury Street London EC2A 3DU Tel: 020 7766 2300</small>	
Designed	A.CHESTER	By	10 JAN 18	By																																																			
Drawn	J.NORMAN	Date	10 JAN 18	By																																																			
Checked	R.KITCH	By	10 JAN 18	By																																																			
Approved	D.HOARE	By	10 JAN 18	By																																																			
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P1	10/01/18	FIRST ISSUE	AC	RK	DH					Drawing Number: HE561473-ARC-ELS-S2-ZZ000-DR-L-3026		Revision: P1																																											
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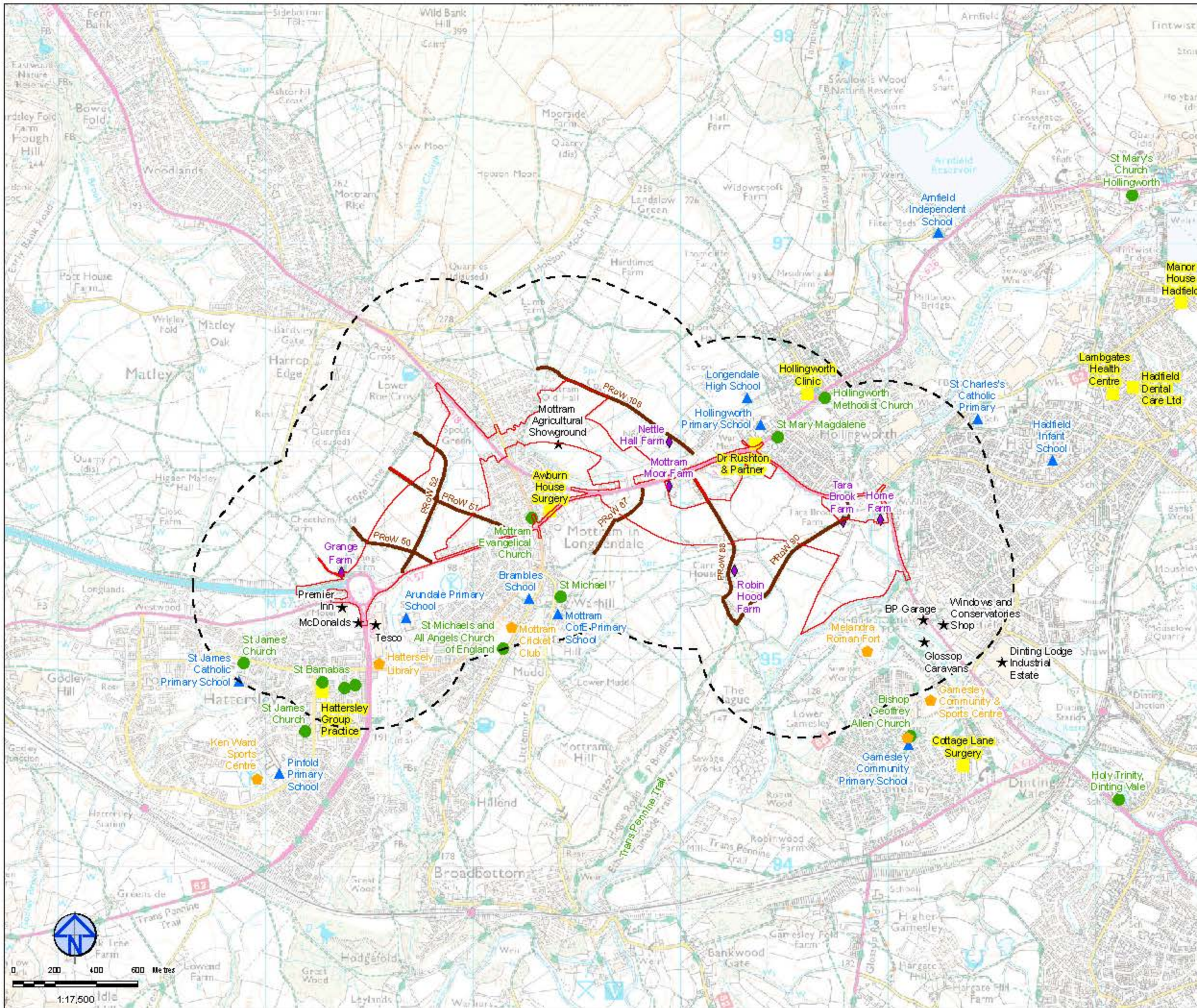
PHOTO VIEW 6; 90 DEGREES VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD, VIEW FROM LOCAL PROWL NEAR CARRHOUSE, LOOKING NORTH EAST

90 DEGREES VIEW



PHOTO VIEW 6; FULL PANORAMIC VIEW - MOTTRAM MOOR LINK ROAD AND A57 (T) TO A57 LINK ROAD, VIEW FROM LOCAL PROWL NEAR CARRHOUSE, LOOKING NORTH EAST

			NOTES 			Client HIGHWAYS ENGLAND <small>Highways England Planning and Design 100 Victoria Road London E16 1JH Tel: +44 (0)20 8916 6000 Fax: +44 (0)20 8916 6001 www.highways.gov.uk</small>		Reliability Classification Designed: A.CHESTER 10 JAN 18 Report Drawn: J.NORMAN 10 JAN 18 Report Checked: R.KITCH 10 JAN 18 Report Approved: D.HOARE 13 JAN 18 Report Status: NTS Date: ADO Original Date: A3 Date: OS Reliability Code: S2 Project Number: UA008846		PROJECT: MOTTRAM MOOR LINK ROAD AND A57(T) TO A57 LINK ROAD TITLE: FIGURE 8.3 REPRESENTATIVE PHOTO VIEW 6 SHEET 6 OF 7		 ARCADIS <small>Building & Construction for roads and rail assets</small> Regional office: 22 Colindale Avenue London NW9 1EQ Overarching office: 4th Floor 401 Finsbury Street London EC2A 3DF Tel: +44 (0)20 7066 0000 www.arcadis.com	
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Rev	Date	Description	Drawn	Check	Approve								



- Legend**
- Red Line Boundary
 - 500m Study Area
 - Public Right of Way
- Community Facilities**
- ▲ School
 - Health Centre
 - Church
 - ★ Commercial Asset
 - ◆ Farm Business
 - Other

01	Drawn	24/11/18
Issue	Description	Date
For Information		
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Original Size	A3	Drawn R MILLMAN
Height Datum	NEWLYN	Checked APOWELL
Protection	O.S.	Approved D HOARE
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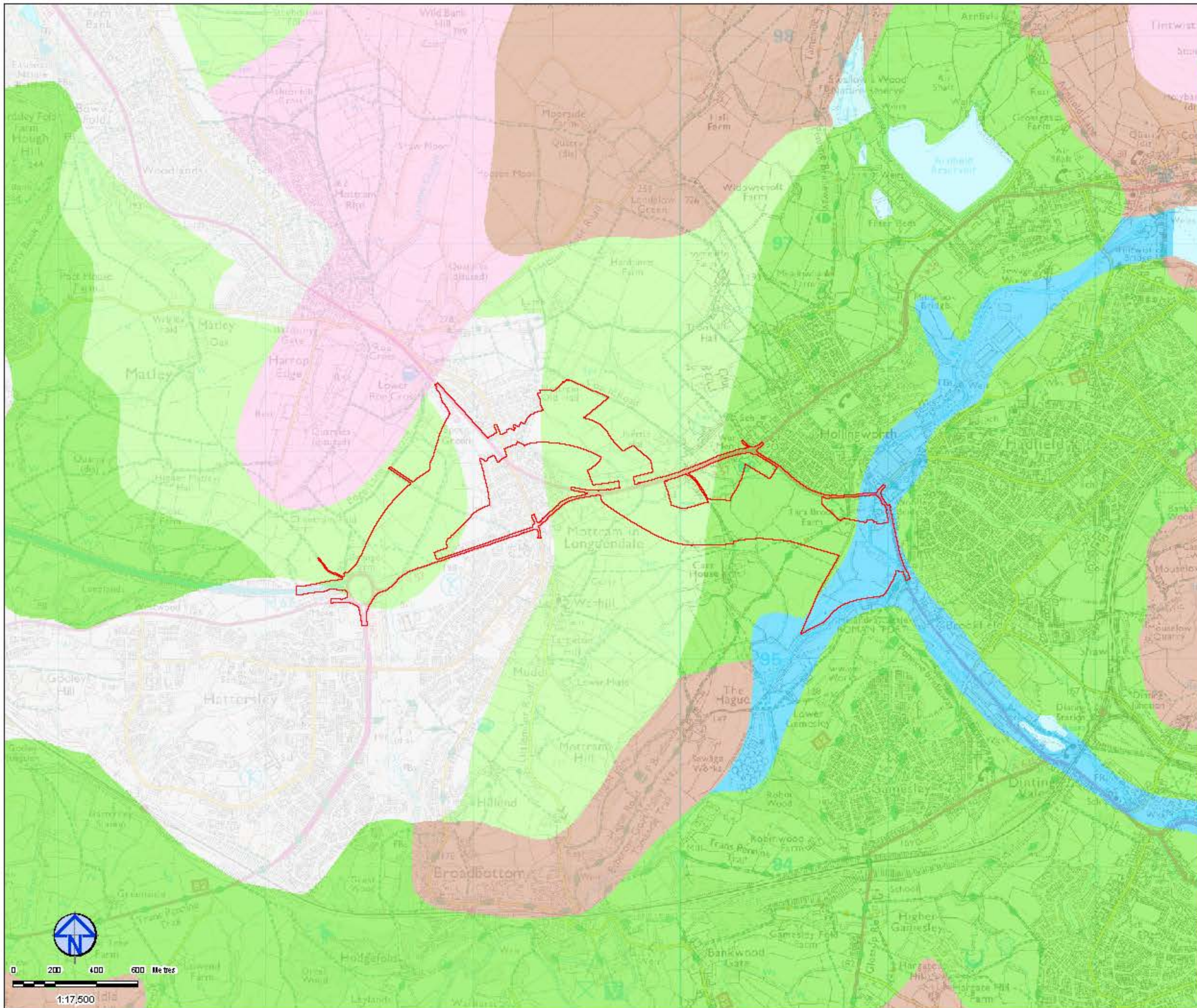


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 9.1 COMMUNITY FACILITIES AND COMMERCIAL ASSETS

Drawing No. HE 551473-ARC-EGN-SZ_ZZ000_DR-LE-3024





- Legend**
- Red Line Boundary
 - Loamy and clayey floodplain soils with naturally high groundwater
 - Very acid loamy upland soils with a wet peaty surface
 - Slowly permeable seasonally wet loamy and clayey soils
 - Freely draining slightly acid bany soils
 - Slowly permeable wet to very acid upland soils with a peaty surface
 - Unclassified / Urban
 - Water

01	Draft	12/11/18
Issue	Description	Date
Status: For Information		
Scale	1:17,500	Current Issue Signature
Original Size	A3	Drawn: R MILLMAN
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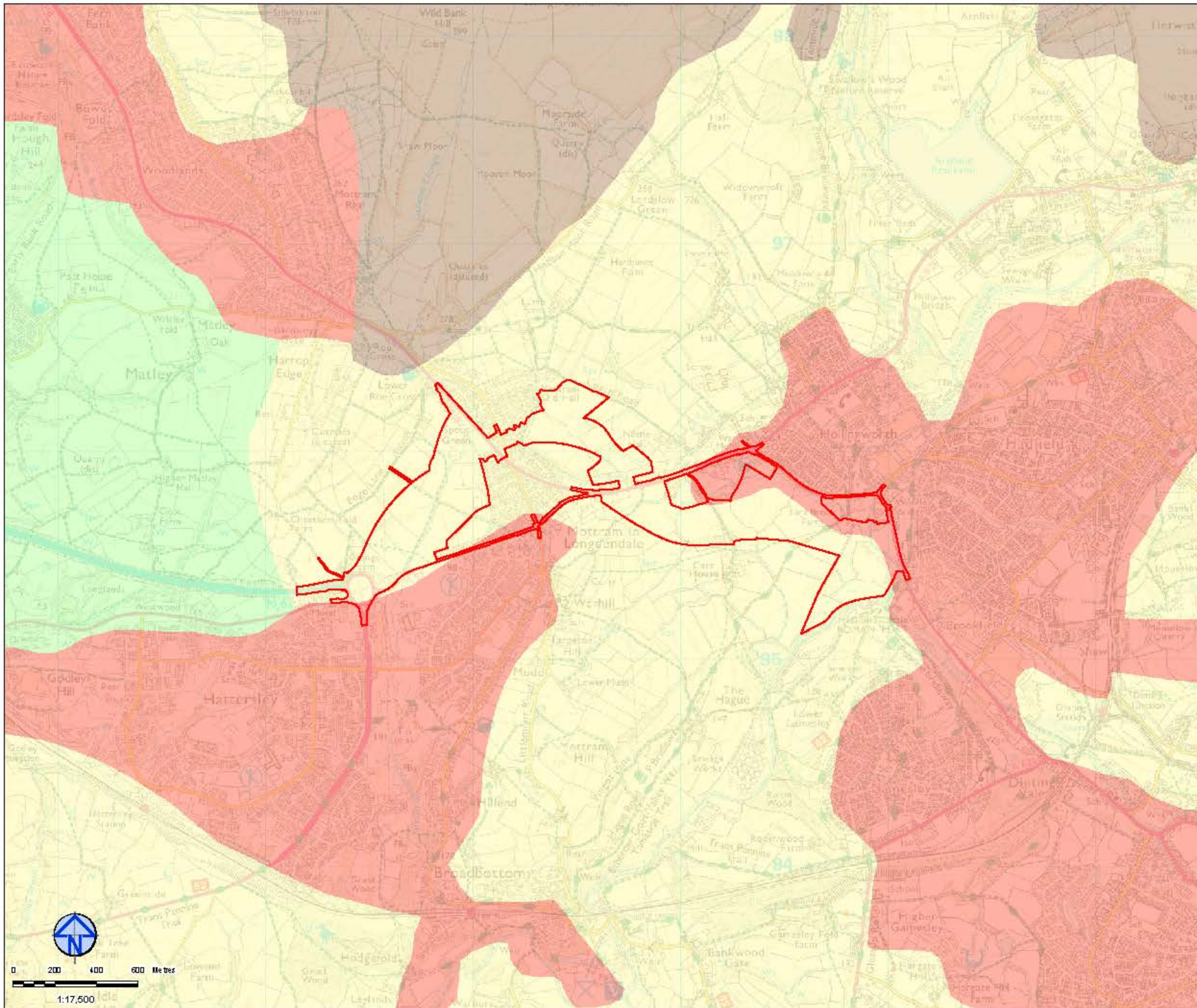


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 9.2 SOILSCAPE

Drawing No.: HE 551473-ARC-EGN-SZ_ZZ000_DR-LE-3021





Legend

- Red Line Boundary
- Grade 3
- Grade 4
- Grade 5
- Uba

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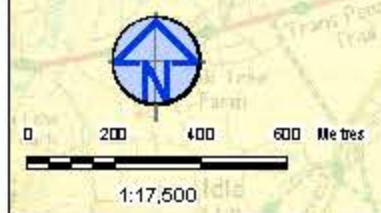
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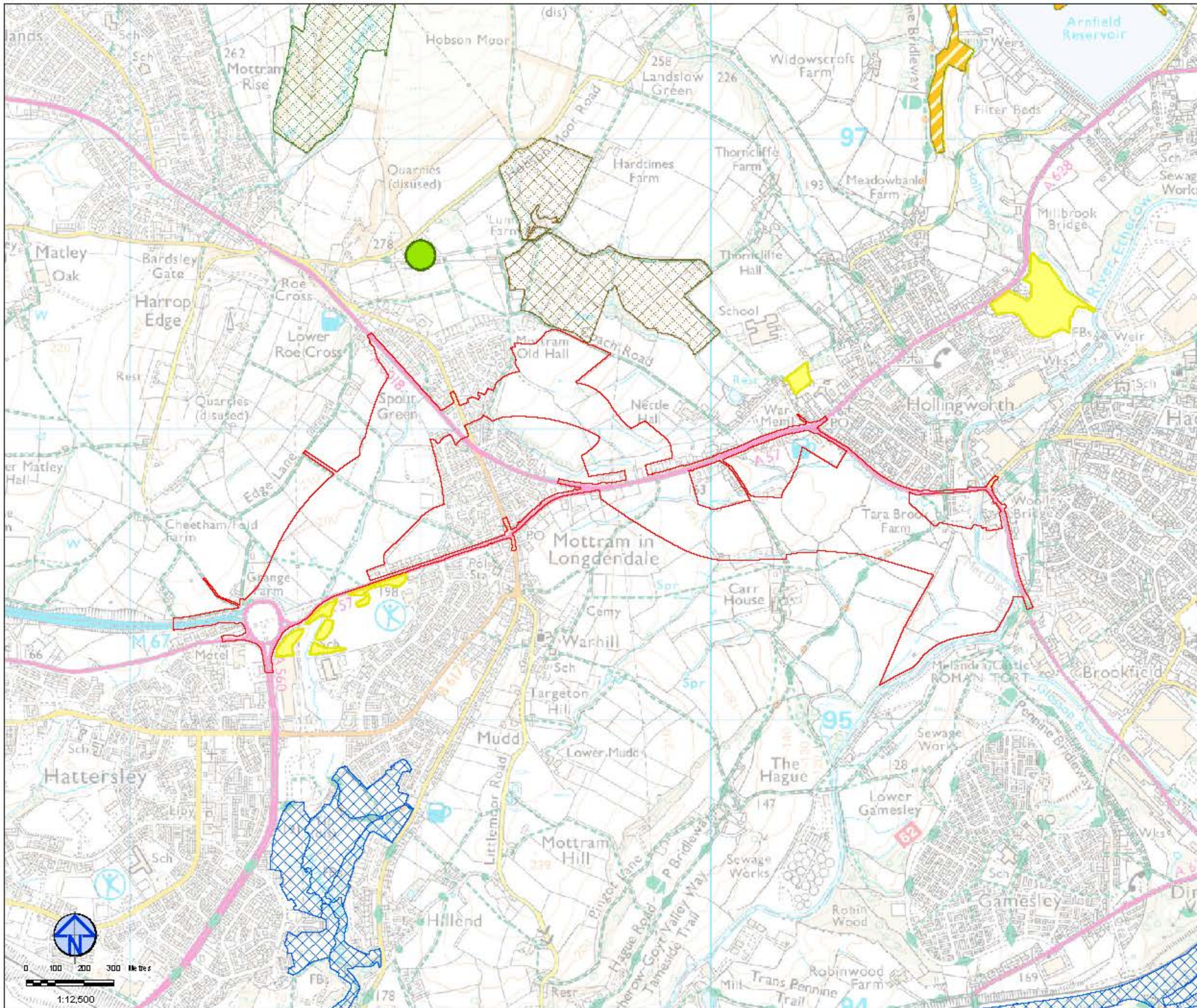


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 9.3 PROVISIONAL AGRICULTURAL LAND CLASSIFICATION MAPPING

Drawing No. HE 551473-ARC-EGN-SZ_ZZ000_DR-LE-3022





- Legend**
- Red Line Boundary
 - Entry Level Woodland Grant Scheme
 - Felling Licence Applications England
 - Woodland Grant Scheme 1
 - Woodland Grant Scheme 3
 - Entry Level Stewardship
 - Entry Level plus Higher Level Stewardship

Issue	01 Draft	Date	12/11/18
For Information			
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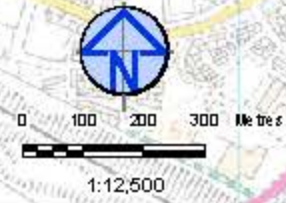
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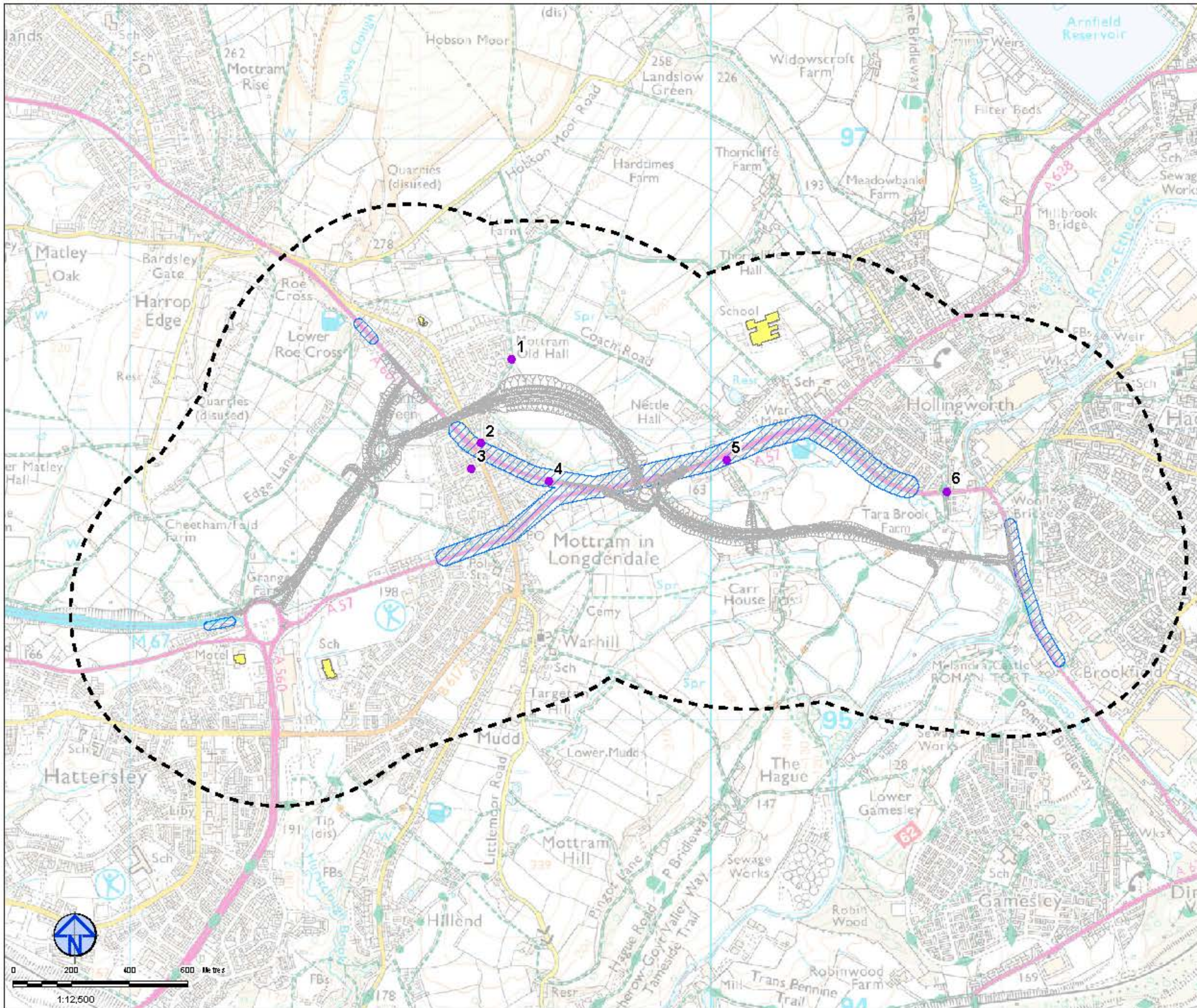


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 9.4 ENVIRONMENTAL STEWARDSHIP AND FORESTRY AND WOODLAND GRANT SCHEMES

Drawing No. HE551473-ARC-EGN-SZ_ZZ000_DR-LE-3023





Legend

- Noise monitoring location
- 600m Study Area
- Other sensitive receptor
- Noise Importance Areas

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Issue		Description	Date
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Scale	1:12,500	Current Issue	Signature
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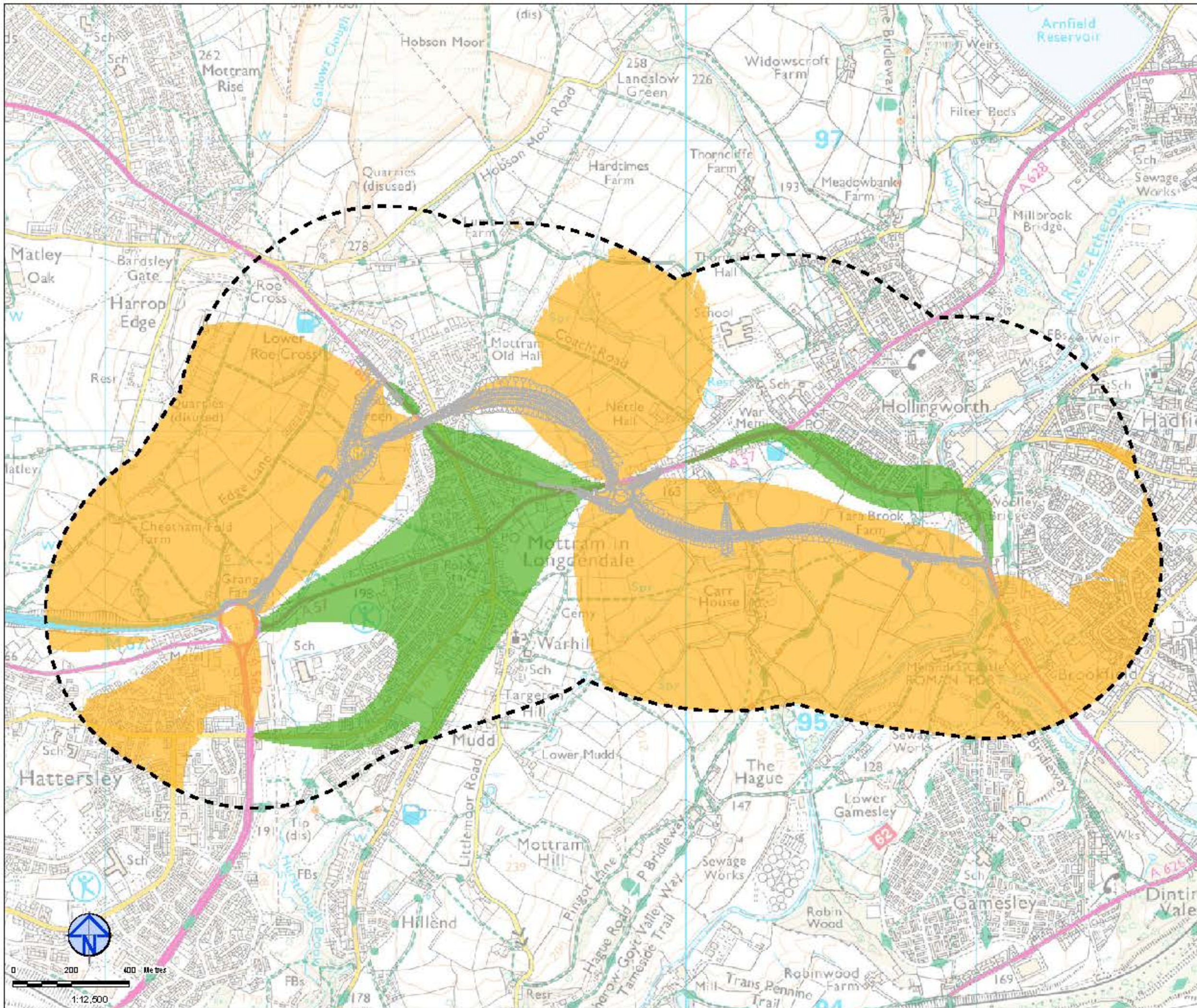


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 10.1 NOISE SENSITIVE RECEPTOR AND MONITORING LOCATION PLAN

Drawing No. HE551473-ARC-ENV-SZ_ZZ000_DR-LA-3001





Legend

- 600m Study Area
- dB LA10 18-hour**
 - <math>< -1</math>
 - 1 - 1
 - > 1

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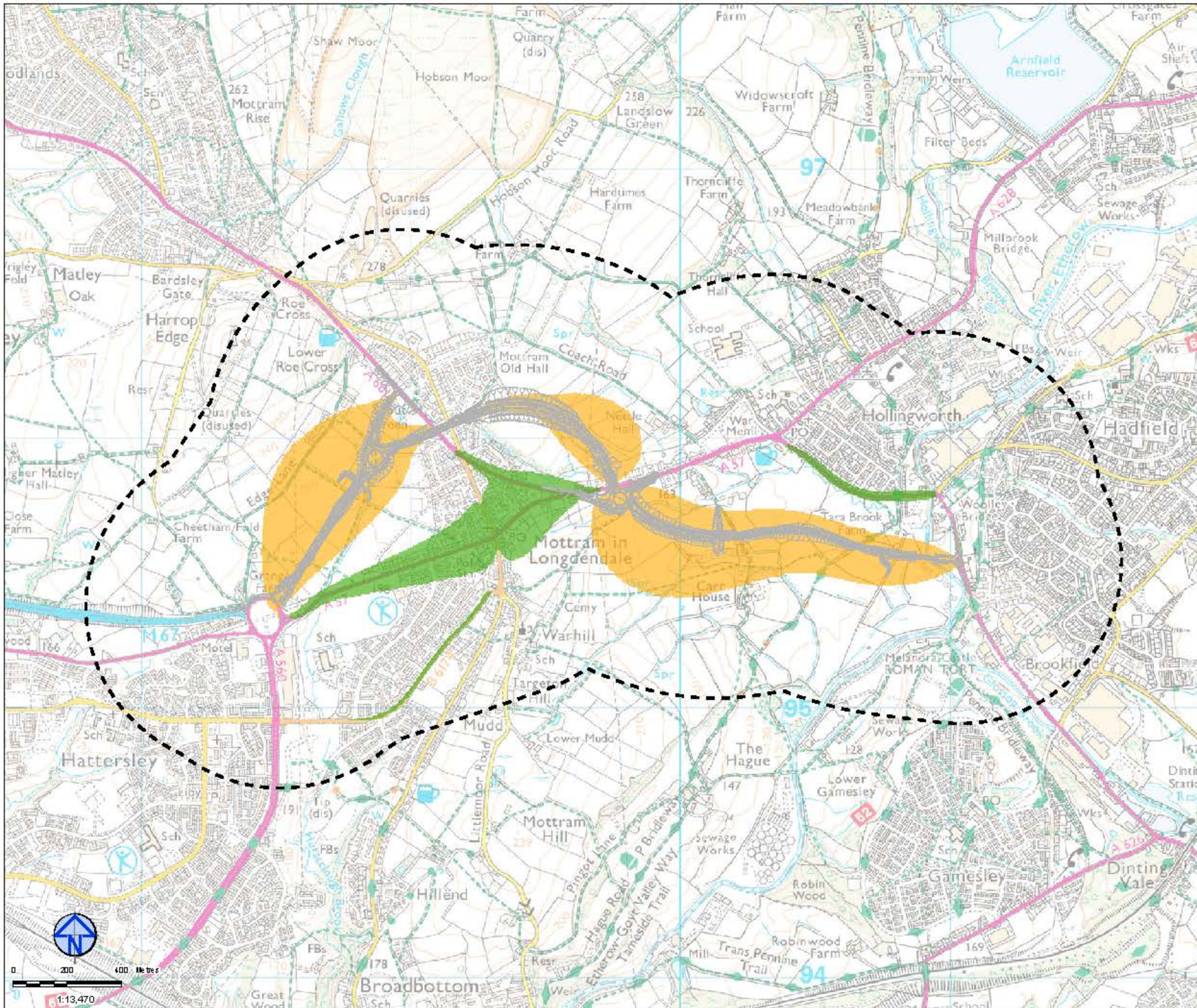


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 10.2 SHORT-TERM CHANGE CONTOURS

Drawing No. HE551473-ARC-ENV-SZ_ZZ000_DR-LA-3002





Legend

- 600m Study Area
- dB LA10 18-hour
- <math>< -3</math>
- -3 - $+3$
- > +3

Issue	01	Draft	21/01/18
Issue		Description	Date
Status	For Information		
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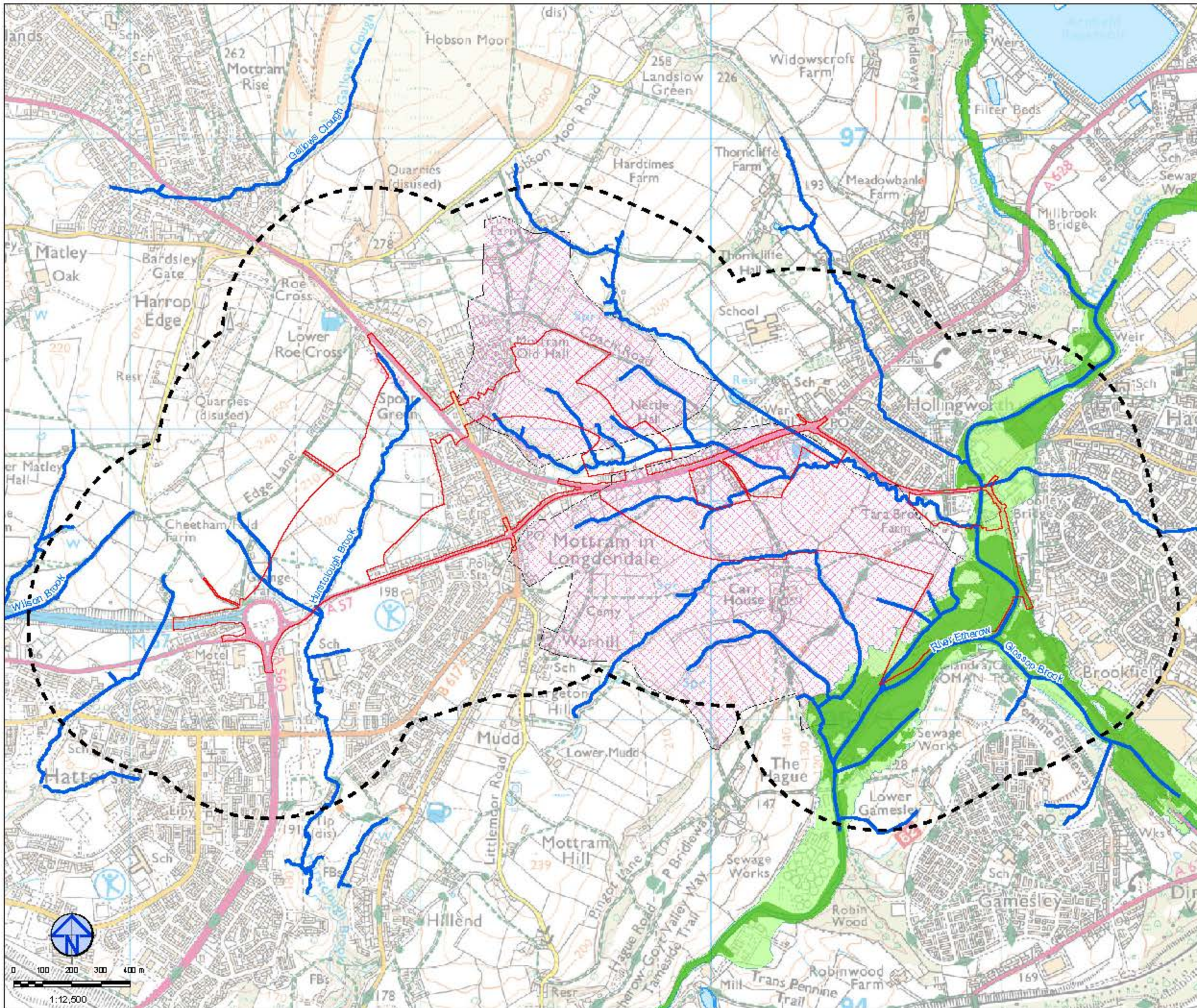


Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 10.3 NOISE FUTURE YEAR CHANGE CONTOUR

Drawing No. HE551473-ARC-ENV-SZ_ZZ000_DR-LA-3003





- Legend**
- Red Line Boundary
 - 500m Study Area
 - River network
 - Floodzone 3
 - Floodzone 2
 - Surface Waterbody
 - Sites and Issues

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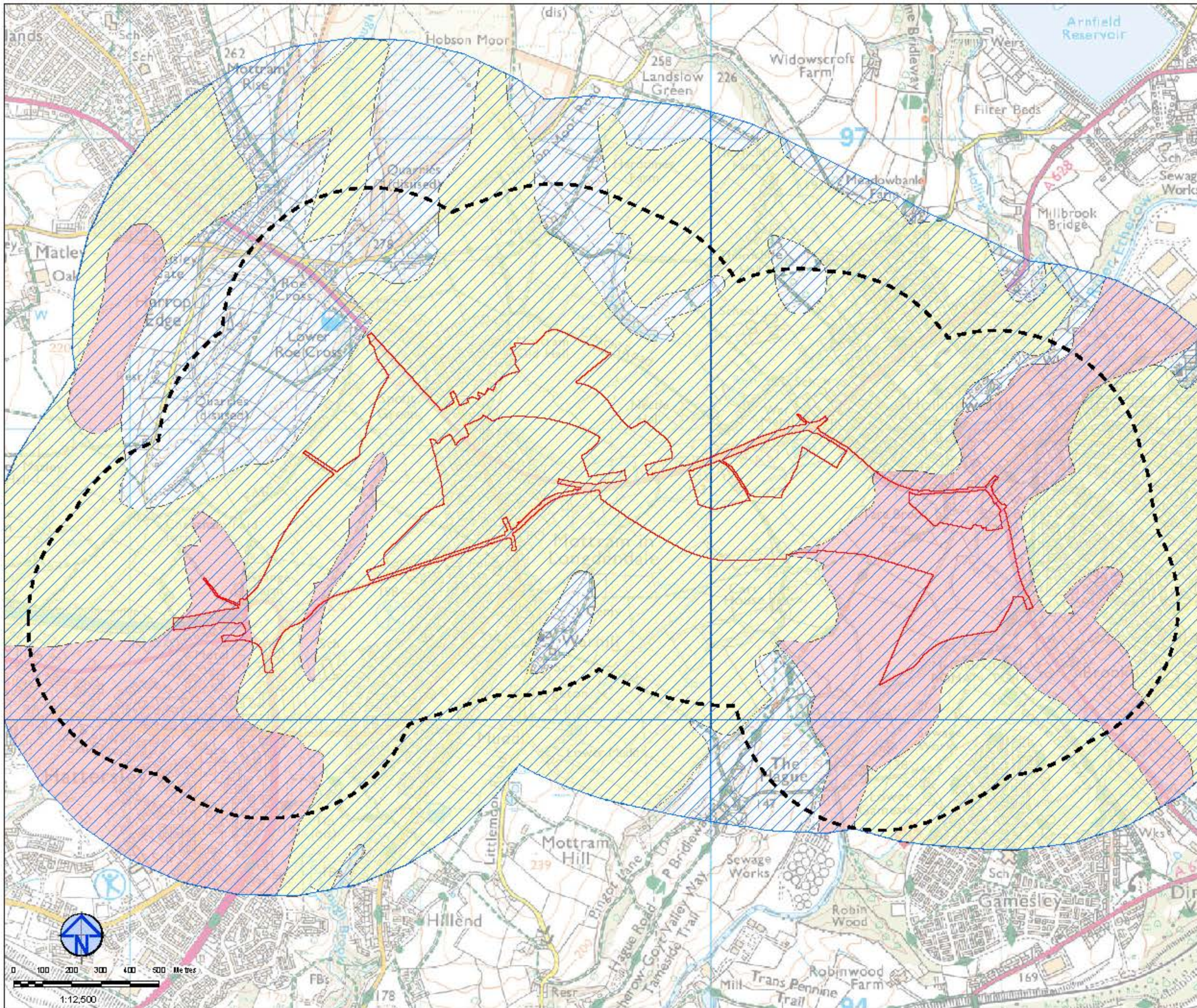
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Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 11.1 SURFACE WATER RECEPTORS

Drawing No. HE551473-ARC-EWE-SZ_ZZ000_DR-LE-3001



- Legend**
- Red Line Boundary
 - 500m Study Area
 - Superficial Aquifer
 - Secondary A
 - Secondary Undifferentiated
 - Bedrock Aquifer
 - Secondary A

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Issue	Description	Date
Status	For Information	
Scale	1:12,500	Current Issue Signature
Original Size	A3	Drawn R MILLMAN
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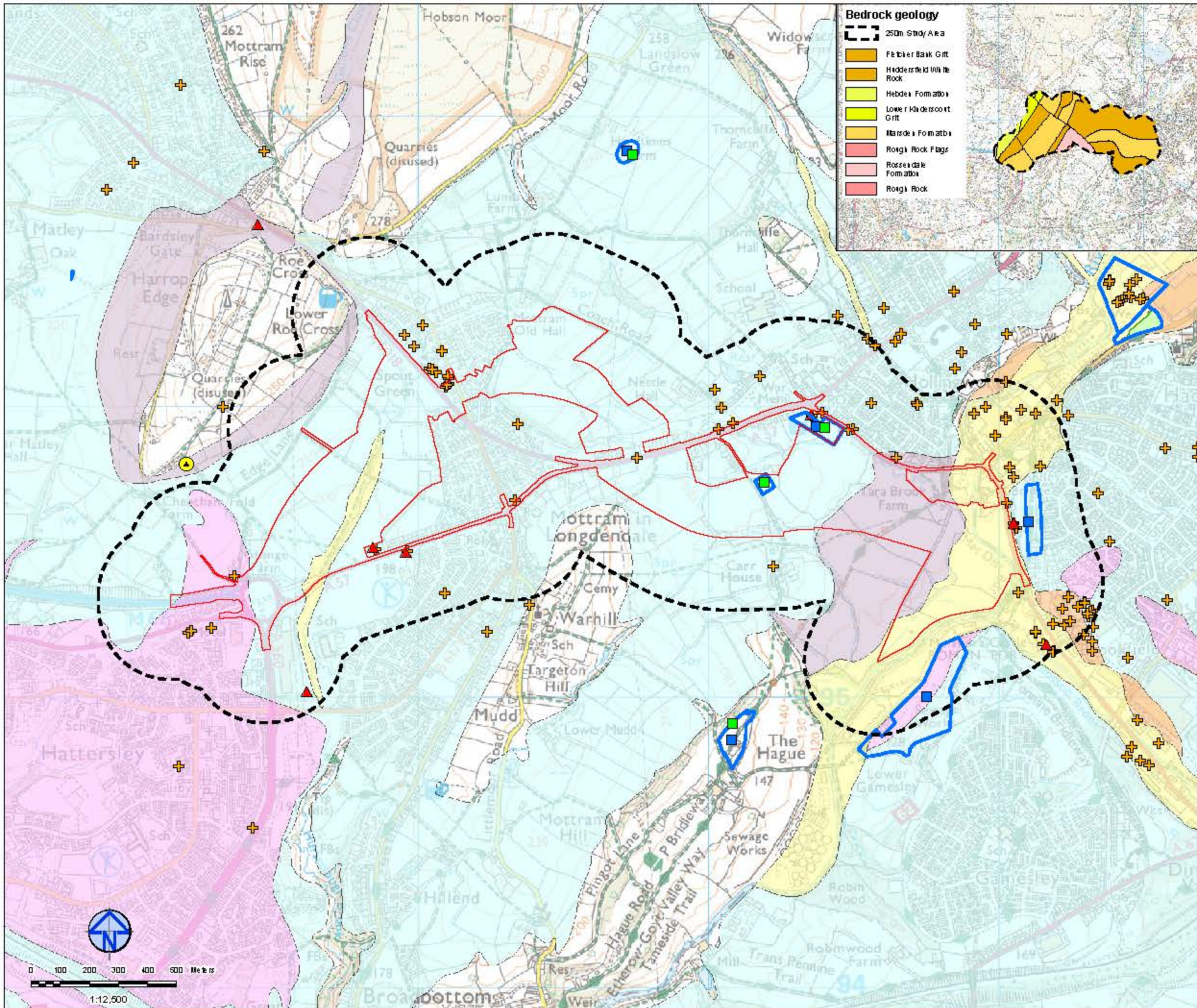
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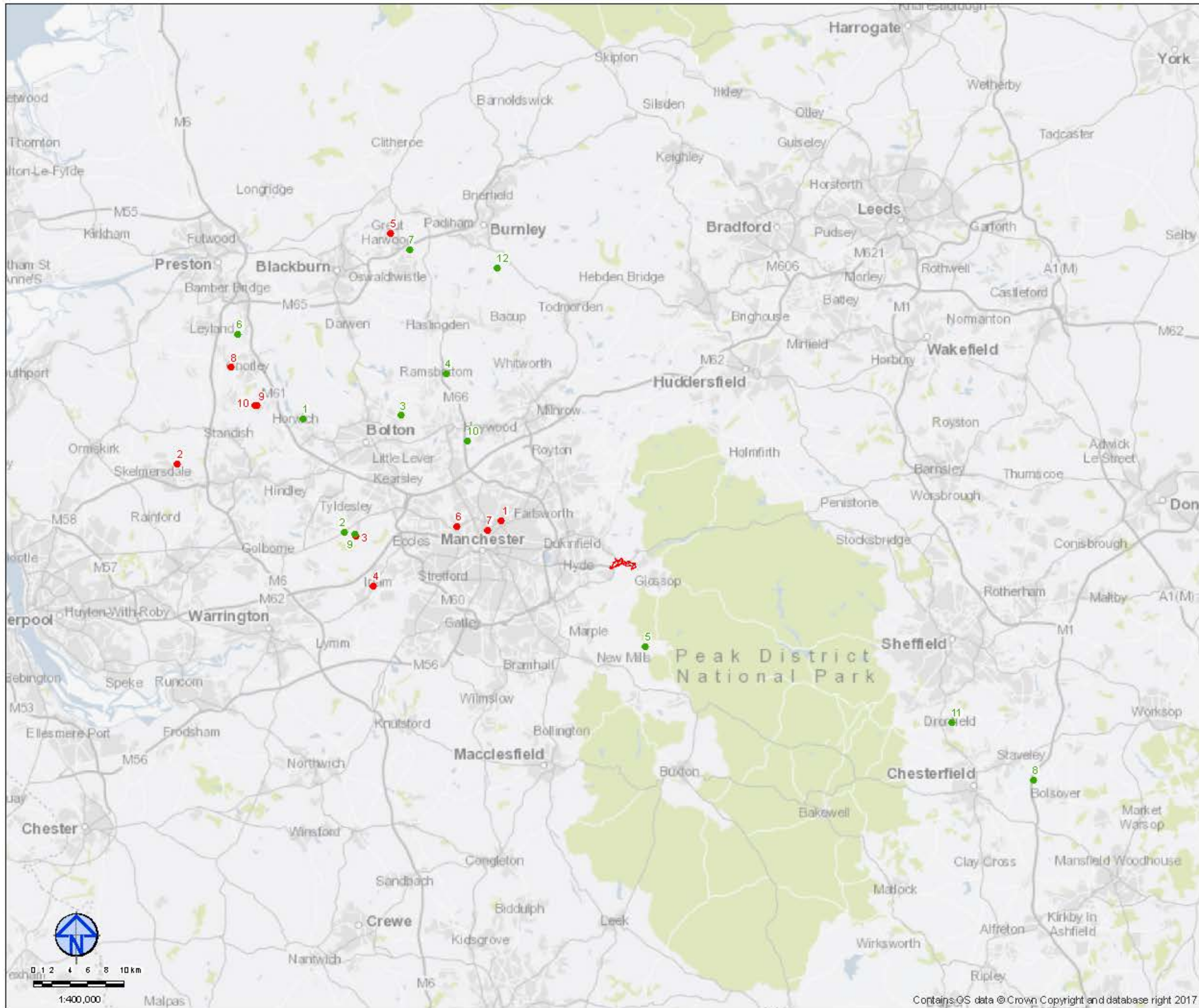
Title: FIGURE 11.2 GROUNDWATER RECEPTORS

Drawing No. HE551473-ARC-EWE-SZ_ZZ000_DR-LE-3002



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Status: For Information		
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Client		
Project		
Project Name	TRANS-PENNINE UPGRADE PROGRAMME	
Title	FIGURE 12.1 ENVIRONMENTAL FEATURES ASSOCIATED WITH GEOLOGY AND SOILS	
Drawing No.	HE551473-ARC-EGT-SZ_ZZ000_DR-LE-3001	

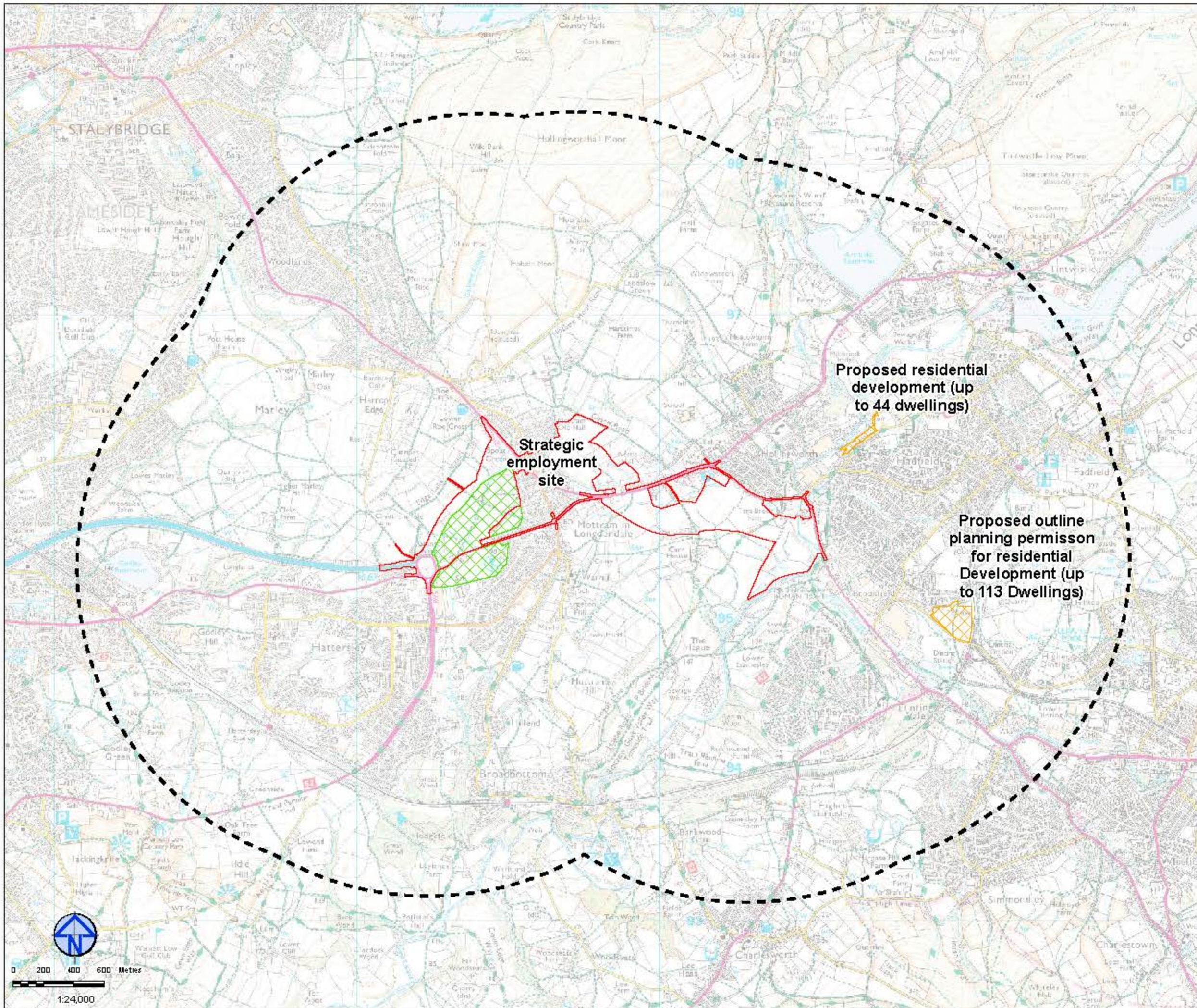


Legend

- Red Line Boundary
- Landfill Site
- Waste Management Facility

Issue	Date	
01 Draft	21/01/18	
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Client		
ARCADIS <small>Design & Consultancy for roads, rail, built assets</small>		
Project		
TRANS-PENNINE UPGRADE PROGRAMME		
Title		
FIGURE 13.1 WASTE MANAGEMENT FACILITIES AND LANDFILL SITES		
Drawing No.		
HE551473-ARC-EGN-SZ_ZZ000_DR-LE-3029		

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Legend

- Red Line Boundary
- 2km Study Area
- Approved Residential Application
- LDP Employment Allocation

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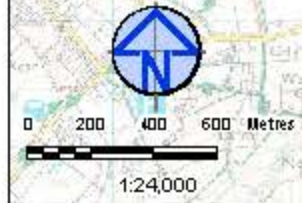
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Project: TRANS-PENNINE UPGRADE PROGRAMME

Title: FIGURE 16.1 DEVELOPMENT SITES

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