

M60/M62/M66 Simister Island Interchange

TR010064

ENVIRONMENTAL STATEMENT CHAPTER 12 POPULATION AND HUMAN HEALTH

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

VOLUME 6.1

April 2024

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms and
Procedure) Regulations 2009**

**M60/M62/M66 Simister Island Interchange
Development Consent Order 202[]**

**ENVIRONMENTAL STATEMENT
CHAPTER 12 POPULATION AND HUMAN HEALTH**

Regulation Reference	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010064
Application Document Reference	TR010064/APP/6.1
Author	M60/M62/M66 Simister Island Interchange Costain Jacobs Partnership Project Team & National Highways

Version	Date	Status of Version
P01	April 2024	DCO APPLICATION ISSUE

CONTENTS

12	Population and human health	1
A.	Introduction	1
12.1	Topic introduction.....	1
12.2	Competent expert evidence	2
12.3	Legislative and policy framework	2
B.	Land use and accessibility	12
12.4	Assessment methodology.....	12
12.5	Assessment assumptions and limitations	24
12.6	Study area.....	25
12.7	Baseline conditions	25
12.8	Potential impacts.....	39
12.9	Design, mitigation and enhancement measures	40
12.10	Assessment of likely significant effects	43
12.11	Monitoring	62
C.	Human health.....	63
12.12	Human health assessment methodology	63
12.13	Assessment assumptions and limitations	78
12.14	Study area.....	79
12.15	Baseline conditions	79
12.16	Potential impacts.....	92
12.17	Design, mitigation and enhancement measures	94
12.18	Assessment of likely significant effects	97
12.19	Monitoring	116
D.	Summary.....	118
12.20	Land use and accessibility	118
12.21	Human health.....	119
	Acronyms and initialisms	120
	Glossary.....	122
	References	126

LIST OF PLATES

Plate 12.1	Pathways from transport policy to health outcomes (source: Joffe and Mindell, 2002).....	64
Plate 12.2	Determinants of health and wellbeing in our neighbourhoods (Source: Barton and Grant, 2006).....	65
Plate 12.3	General health by ward.....	80

LIST OF TABLES

Table 12.1	Legislation relevant to the population and human health assessment	3
Table 12.2	NPS NN requirements for population and human health	5

Table 12.3 Draft NPS NN requirements for population and human health	7
Table 12.4 Other national, regional and local policy relevant to population and human health	9
Table 12.5 Scope of assessment for land use and accessibility	12
Table 12.6 Scoping Opinion feedback on land use and accessibility.....	12
Table 12.7 Statutory consultation feedback on preliminary land use and accessibility assessment.....	13
Table 12.8 Land use and accessibility – environmental value (sensitivity) and descriptions	16
Table 12.9 Land use and accessibility – magnitude of impact and typical descriptions	21
Table 12.10 Baseline private property and housing	26
Table 12.11 Housing and employment allocations and applications within the land use and accessibility study area	27
Table 12.12 Community land and assets within or immediately adjacent to the Order Limits	28
Table 12.13 Development land and business which abut the Order Limits	30
Table 12.14 Agricultural landholdings within land use and accessibility study area.....	31
Table 12.15 PRow and other pedestrian and cycle routes in study area	34
Table 12.16 Assessment of likely significant effects during construction on private property and housing	44
Table 12.17 Assessment of likely significant effects during construction on community land and assets	46
Table 12.18 Assessment of likely significant effects during construction on development land and business.....	48
Table 12.19 Assessment of likely significant effects during construction on agricultural landholdings.....	50
Table 12.20 Assessment of likely significant effects during construction on WCH routes	54
Table 12.21 Assessment of likely significant effects during operation on WCH.....	60
Table 12.22 Scope of assessment for human health.....	66
Table 12.23 Scoping Opinion feedback on human health	67
Table 12.24 Statutory consultation feedback on preliminary human health assessment... ..	70
Table 12.25 Sensitivity criteria for human health	75
Table 12.26 Magnitude criteria for human health.....	75
Table 12.27 Significance criteria for human health	76
Table 12.28 Significance matrix.....	77
Table 12.29 Health profile of local communities (ward level data)	80
Table 12.30 Mental health indicators for Bury.....	83
Table 12.31 Collision summary.....	89
Table 12.32 Sensitivity of relevant population groups.....	91
Table 12.33 Air quality impacts in Besses ward for 2029 Opening year	109
Table 12.34 Air quality impacts in Holyrood ward for 2029 Opening year	110
Table 12.35 Air quality impacts in St Mary’s ward for 2029 Opening year	112

Table 12.36 Quantitative noise results.....	113
Table 12.37 Monetised health outcomes due to noise.....	113
Table 12.38 Distribution of health effects by ward	115
Table 12.39 Monitoring criteria	116
Table 12.40 Summary of residual significant effects for land use and accessibility	118
Table 12.41 Summary of residual significant effects for human health.....	119

12 Population and human health

A. Introduction

12.1 Topic introduction

12.1.1 This chapter presents the information required by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 to be provided in the Environmental Statement for the M60/M62/M66 Simister Island Interchange (the 'Scheme') in respect of population and human health.

12.1.2 This chapter provides an assessment of the interrelated aspects of population and human health in accordance with the Design Manual for Roads and Bridges (DMRB) LA 112 Population and Human Health (Highways England, 2020a). The chapter is split in to four parts, structured as follows:

- Part A: Introduction – This part contains Sections 12.1 to 12.3 which set out the general topic introduction, competent expert evidence and legislative and policy framework for the population and human health aspect.
- Part B: Land use and accessibility – This part contains Sections 12.4 to 12.11 and presents the methodology, baseline conditions, potential impacts, mitigation, assessment of likely significant effects and monitoring proposals in relation to the 'land use and accessibility' aspect. The land use and accessibility assessment addresses the matters of: private property and housing; community land and assets; development land and businesses; agricultural landholdings; and access for walkers, cyclists and horse riders (WCH).
- Part C: Human health – This part contains Sections 12.12 to 12.19 and presents the methodology, baseline conditions, potential impacts, mitigation, assessment of likely significant effects and monitoring proposals in relation to the 'human health' aspect. The human health assessment addresses potential effects on population health linked to impacts on several determinants of health. Further details of the scope of assessment are set out in Section 12.12 of this chapter.
- Part D: Summary – This part contains Sections 12.20 and 12.21. It provides a summary of the significant residual effects identified in the population and human health assessment.

12.1.3 This chapter is supported by the following Environmental Statement Figures (TR010064/APP/6.2):

- Figure 12.1: Population and Human Health Context
- Figure 12.2: Agricultural Landholdings
- Figure 12.3: Key Population and Human Health Impacts

12.1.4 This chapter is supported by the following Environmental Statement Appendices (TR010064/APP/6.3):

- Appendix 12.1: Detailed Private Property and Housing Assessment
- Appendix 12.2: Human Health Literature Review and Evidence

12.2 Competent expert evidence

12.2.1 The assessment has been undertaken and reported by a team of competent population and human health specialists. The competent expert responsible for the assessment is a Senior Associate Director, Chartered Environmentalist (CEnv), Full member of the Institute of Environmental Management and Assessment (IEMA) (MIEMA), and associate of the Faculty of Public Health, who has a Bachelor of Arts (BA) Honours degree in Geography, a Master of Science (MSc) postgraduate degree in Environmental Management, and a Master of Public Health (MPH) degree.

12.2.2 The competent expert has over 20 years' experience of in undertaking population and human health-related assessments for major infrastructure and linear schemes, including highways.

12.3 Legislative and policy framework

Legislation

12.3.1 The population and human health assessment has had regard for the legislation set out in Table 12.1.

Table 12.1 Legislation relevant to the population and human health assessment

Legislation	Relevance to the Scheme	How this legislation is addressed in the assessment
Commons Act 2006	This Act provides for the registration of common land and of town or village greens. The presence of common land and town or village greens has been a consideration of this assessment in terms of community assets (in the land use and accessibility assessment) and access to green space (a wider determinant of human health).	There are no areas of common land or town or village greens within the study area.
Countryside and Rights of Way Act 2000	This Act regulates all public rights of way (PRoW). Part II of the Act contains provisions designed to reform and improve rights of way in England and Wales. It requires local highway authorities to publish a Rights of Way Improvements Plan, which should be reviewed every 10 years. The Act requires the highway authorities to have regard to the needs of disabled people when undertaking improvements. There is provision in the Act for occupiers of any land to temporarily divert a footpath or bridleway which passes over that land where works are likely to cause danger to users of the right of way	The assessment has taken account of the relevant Rights of Way Improvement Plans for the study area in assessing the significance of effects on walkers and horse riders and in proposing alternative diversion routes for PRoW which cross land occupied by the Scheme on a temporary or permanent basis.
Air Quality (England) Regulations 2000, Air Quality (England) (Amendment) Regulations 2002, and Air Quality Standards (England) Regulations 2010	Set Air Quality Objectives (AQOs) and limit values for nitrogen oxides (NO _x), nitrogen dioxide (NO ₂) and PM ₁₀ .	The consideration of significance in the health assessment takes account of AQOs, limit values and targets to inform what is considered an acceptable level of health protection.

Legislation	Relevance to the Scheme	How this legislation is addressed in the assessment
Health and Social Care Act 2012 (as amended by the Health and Care Act 2022)	Part 1 Section 12 sets out responsibilities for local authorities to take such steps as it considers appropriate for improving the health of people in its area. It requires these responsibilities to be overseen by an appointed Director of Public Health.	The Director of Public Health for Bury was consulted regarding the assessment of health effects for the Scheme, presence of vulnerable groups within the study area and priorities for improving health within Bury.
Health and Safety at Work etc. Act 1974	This act is the primary piece of legislation covering occupational health and safety in Great Britain, while the Construction (Design and Management) Regulations 2015 aim to improve health and safety in the construction industry specifically.	It is considered that these pieces of legislation are embedded requirements for managing construction-related health and safety risks relating to the Scheme and, therefore, construction-related health and safety has not been considered further in this assessment.

Policy

National Policy Statement for National Networks

- 12.3.2 The National Policy Statement for National Networks (NPS NN) (Department for Transport (DfT), 2014) sets out the Government's policies relating to the development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. The Secretary of State uses the NPS NN as the primary basis for making decisions on Development Consent Order (DCO) applications.
- 12.3.3 Table 12.2 summarises the policy requirements from the NPS NN relating to the applicant's assessment and mitigation requirements for population and human health and how these requirements have been addressed in the assessment. See also the NPS NN Accordance Tables (TR010064/APP/7.2) for an assessment of the Scheme's compliance with the NPS NN.

Table 12.2 NPS NN requirements for population and human health

Paragraph reference	Applicant's assessment / mitigation requirement	How this requirement is addressed in the assessment
4.81	<i>'As described in the relevant sections of this NPS, where the proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant adverse health impacts.'</i>	Sections 12.12 – 12.19 set out the Applicant's assessment of likely significant effects on human health.
4.82	<i>'The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health.'</i>	Section 12.17 sets out mitigation to avoid or reduce adverse health effects identified as resulting from the construction and operation of the Scheme. Section 12.18 considers the cumulative impacts on the health of local communities.
5.165	<i>'The applicant should identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan. The assessment should be proportionate.'</i>	Sections 12.4 – 12.11 set out the Applicant's assessment of likely significant effects on land use, which includes identification of the existing and proposed land uses near the Scheme as described in Section 12.7 (baseline conditions).
5.166	<i>'Existing open space, sports and recreational buildings and land should not be developed unless the land is surplus to requirements or the loss would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location. Applicants considering proposals which would involve developing such land should have regard to any local authority's assessment of need for such types of land and buildings.'</i>	The Scheme would not result in any permanent loss of open space or recreational uses (or land classed as Special Category Land (see Section 6.10 of the Case for the Scheme (TR010064/APP/7.1) for further details). Temporary possession of an area of approximately 0.3 hectares (ha) on the southern boundary of Unsworth Academy playing fields would be required to facilitate drainage improvement works. This land would not be required on a permanent basis. See Section 12.16 for further details.

Paragraph reference	Applicant's assessment / mitigation requirement	How this requirement is addressed in the assessment
5.184	<p><i>'Public rights of way, National Trails and other rights of access to land (e.g., open access land) are important recreational facilities for walkers, cyclists and equestrians. Applicants are expected to take appropriate mitigation measures to address adverse effects on coastal access, National Trails, other public rights of way and open access land and, where appropriate, to consider what opportunities there may be to improve access. In considering revisions to an existing right of way consideration needs to be given to the use, character, attractiveness, and convenience of the right of way. The Secretary of State should consider whether the mitigation measures put forward by an applicant are acceptable and whether requirements in respect of these measures might be attached to any grant of development consent.'</i></p>	<p>Section 12.17 identifies effects on PRoW as a result of the Scheme. Mitigation measures have been identified to avoid or reduce adverse impacts as far as practicable and they are described in Section 12.17.</p>
5.206	<p><i>'For road and rail developments, if a development is subject to EIA and is likely to have significant environmental impacts arising from impacts on transport networks, the applicant's environmental statement should describe those impacts and mitigating commitments'</i></p>	<p>Residual significant effects on land use and accessibility receptors are described in Section 12.10, with the mitigation measures identified to avoid or reduce these effects set out in Section 12.9.</p> <p>Residual significant effects on human health are described in Section 12.18, with the mitigation measures identified to avoid or reduce these effects set out in Section 12.18.</p>

Draft National Policy Statement for National Networks

12.3.4 The Government has published a draft of the NPS NN in March 2023 (DfT, 2023). The consultation closed in June 2023 and the draft NPS NN has not yet been designated. However, it is potentially capable of being an important and relevant consideration in the decision-making process. The Environmental Statement continues to reference the 2014 NPS NN though, as it remains the relevant Government policy. Notwithstanding that position, Table 12.3 summarises the policy requirements from the draft NPS NN relating to the applicant's assessment and mitigation requirements for population and human health and how these have been addressed in the assessment. See also the Draft NPS NN Accordance Tables (TR010064/APP/7.3) for an assessment of the Scheme's compliance with the draft NPS NN.

Table 12.3 Draft NPS NN requirements for population and human health

Paragraph reference	Applicant's assessment / mitigation requirement	How this requirement is addressed in the assessment
4.71	<p><i>'As described in the relevant sections of this NPS, where the proposed project has an effect on human beings, the applicant should assess these effects, identifying any potential adverse health impacts, and identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. Enhancement opportunities should be identified by promoting local improvements for active travel and horse riders driven by the principles of good design to create safe and attractive routes to encourage health and wellbeing; this includes potential impacts on vulnerable groups within society, i.e. those groups within society which may be differentially impacted by a development compared to wider society as a whole.'</i></p>	<p>This chapter provides an assessment of effects on human beings, including the identification of potential adverse health impacts and sets out mitigation measures. The assessment identifies vulnerable groups where relevant.</p> <p>The aims of the Scheme relate to reducing peak congestion; delivering journey time reliability and improving safety on this section of the motorway network. Therefore, the Applicant considers that proposals for new pedestrian, cyclist and equestrian infrastructure are not relevant to the remit for the Scheme.</p>
5.235	<p><i>'Where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts.'</i></p>	<p>Socio-economic impacts have been addressed in Sections 12.16 and 12.18 as appropriate.</p>
5.236	<p><i>'This assessment should consider all relevant socio-economic impacts, which may include:</i></p> <ul style="list-style-type: none"> <i>• the creation of jobs and training opportunities</i> <i>• the value of increased connectivity on productivity and access to jobs, services and housing</i> <i>• the provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities. Applicants should engage with local businesses and the local community at the pre-construction phase to understand opportunities for businesses and the community throughout construction, such as employment or educational programmes</i> 	<p>Socio-economic impacts have been addressed in Sections 12.16 and 12.18 where relevant. Cumulative effects are addressed in Chapter 15: Assessment of Cumulative Effects of this Environmental Statement (TR010064/APP/6.1).</p>

Paragraph reference	Applicant's assessment / mitigation requirement	How this requirement is addressed in the assessment
	<ul style="list-style-type: none"> • any indirect beneficial impacts for the region hosting the infrastructure, particularly in relation to use of local support services and supply chains • effects on tourism • cumulative effects - if development consent were to be granted to for a number of projects within a region and these were developed in a similar timeframe, there could be some short-term negative effects, for example a potential shortage of construction workers to meet the needs of other industries and major projects within the region.' 	
5.237	'Applicants should describe the existing socio-economic conditions in the areas surrounding the proposed development and should also refer to how the development's socio-economic impacts correlate with local planning policies.'	Existing socio-economic conditions have been addressed in Section 12.15 to inform the human health assessment.
5.239	'The Secretary of State should consider whether mitigation measures are necessary to mitigate any adverse socio-economic impacts of the development. For example, high quality design can improve the visual and environmental experience for visitors and the local community alike.'	As set out in paragraph 12.16.12 of this chapter, there is potential for the landscaping design (as set out in the Environmental Masterplan (Figure 2.3 of the Environmental Statement Figures (TR010064/APP/6.2))) to improve the quality of environment in the medium to long term, once planting becomes established. Socio-economic commitments are set out in Section 12.17 of this chapter.
5.240	'This could include the potential for jobs to be created in the area as a result of a major scheme, the impact on local businesses and the supply chain, and potentially require the provision of additional local services. This is more relevant to Strategic Rail Freight Interchanges than road or rail schemes.'	

Other relevant policy

12.3.5 In addition to the NPS NN, other relevant policies have been considered as part of the population and human health assessment. Table 12.4 sets out other policy relevant to this aspect and how the assessment has considered/addressed these policies.

Table 12.4 Other national, regional and local policy relevant to population and human health

Plan / Policy document	Key requirements and objectives	How this has been considered/addressed in the assessment
National		
Healthy Lives, Healthy People: Our Strategy for Public Health in England (HM Government, 2011)	The focus of this coalition Government white paper was to support people to live healthier lives for longer and to reduce health inequalities. It provides a response to the Marmot Review (Fair Society, Healthy Lives) (Marmot, 2010) which had highlighted the relevance of wider (social) determinants of health and how people living in the poorest areas will, on average, die seven years earlier than people living in richer areas and spend up to 17 more years living with poor health.	Wider determinants of health have been included as part of the scope of the human health assessment. The assessment considers health inequalities.
Noise Policy Statement for England (NPSE) (Department for Environment, Food and Rural Affairs (Defra), 2010)	Defines the concept of a significant observed adverse level to inform what is meant by 'significant adverse' effect in noise policy terms.	The consideration of significance in the health assessment takes account of policy on what is considered an acceptable level of health protection.
Regional and Local		
Places for Everyone. Joint Development Plan Document – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan, Publication Stage (Greater Manchester Combined Authority (GMCA), 2021)	<p>Objectives and policies most relevant to this aspect are summarised below.</p> <ul style="list-style-type: none"> • Promote the health and wellbeing of communities (objective 10) • Protect existing green urban space and deliver new high quality green urban spaces (policy JP-6) • New development is required to maximise positive contributions to health and wellbeing and support health lifestyles through the use of active design principles (Policy JP-P 6) • Protect and enhance a network of high-quality sports and recreation facilities (policy JP-P 7) 	<p>The assessment of land use and accessibility has considered the value of green spaces, sports and recreation facilities and cycling and walking infrastructure.</p> <p>The assessment of effects on human health has considered potential impacts on the health and wellbeing of communities and impacts on opportunities to support healthy lifestyles.</p>

Plan / Policy document	Key requirements and objectives	How this has been considered/addressed in the assessment
	<ul style="list-style-type: none"> • Ensure development and transport investment considers the needs of all people and those modes which make most efficient and sustainable use of road space (Policy JP-C 1) • Improvements to the highway network are part of a multimodal strategy to increase cycling and walking and transport for all (policy JP-C 4) • Help deliver a high proportion of journeys made by walking and cycling by creating safe, attractive, and integrated walking infrastructure and increasing the capacity and quality of walking and cycling infrastructure 	
<p>Bury Joint Strategic Needs Assessment (JSNA) (Bury Metropolitan Borough Council, 2022)</p>	<p>The JSNA:</p> <ul style="list-style-type: none"> • Provides a shared understanding of the needs of Bury’s local communities for health and care. • Looks at the health of the population focusing on behavioural risk factors including smoking, diet and exercise. • Helps to identify commissioning priorities to improve health and wellbeing priorities and reduce health inequalities. • Examines wider determinants of health such as income, education and housing that are now recognised to have a greater influence on health than health care, behaviours or genetics. • Provides evidence on the effectiveness of various health and care interventions • Documents current provision of services and identifies gaps in health and care services to highlight unmet needs 	<p>The JSNA was being updated whilst the assessment was being undertaken. Information from the Bury Directory on wider determinants of health has informed the understanding of the health baseline and priorities for Bury.</p>
<p>“Let’s Do It!” Bury 2030 Strategy (Bury Metropolitan Borough Council, 2021)</p>	<p>Sets a delivery plan for the next ten years. It includes the following outcome measures of relevance to this chapter:</p> <ol style="list-style-type: none"> 1. Improved quality of life... 	<p>The assessment has considered these priorities in determining the significance of effect the Scheme has on relevant health determinants.</p>

Plan / Policy document	Key requirements and objectives	How this has been considered/addressed in the assessment
	4. Increased adult skill levels and employability 5. Inclusive economic growth...	
Bury Unitary Development Plan 1997 (Bury Metropolitan Borough Council, 1997)	Policies most relevant to this aspect are: <ul style="list-style-type: none"> • Retain and protect the amenity of valuable urban open areas (policies OL3 and OL4) • Prevent severance of viable farm holdings, and avoid detrimental impacts on agricultural land (policies OL4/1 and OL4/3) • Prevent the loss of sports and recreation facilities, and improve existing facilities (policies RT1/1, RT1/2, RT2/1, RT3/1 and RT3/2) • Maintain and improve the Public Right of Way (PRoW) network and cycleways (policies RT3/3). 	An assessment of effects on open areas, farm holdings, sports and recreation facilities and routes used by WCH (including the PRoW network and cycle routes) is presented in this chapter. Where potential adverse effects are identified, then mitigation has been developed to avoid or minimise the severity of these impacts.

B. Land use and accessibility

12.4 Assessment methodology

Assessment scope

12.4.1 Table 12.5 sets out the scope of the land use and accessibility assessment.

Table 12.5 Scope of assessment for land use and accessibility

Matter	Scoped in – construction	Scoped in – operation
Private property and housing	✓	✓
Community land and assets	✓	✓
Development land and business	✓	✓
Agricultural landholdings	✓	✓
WCH	✓	✓

Scoping Opinion

12.4.2 Table 12.6 summarises the key requirements from the Planning Inspectorate’s Scoping Opinion (TR010064/APP/6.7) as relevant to the scope of the land use and accessibility assessment, and identifies any matters scoped out of the assessment as agreed with the Planning Inspectorate and other stakeholders.

Table 12.6 Scoping Opinion feedback on land use and accessibility

Stakeholder	Comment	Response
Planning Inspectorate	<i>ID 4.8.4 – ‘Whilst there is potential for disruption to public transport services, the Applicant considers that these may reroute and the overall provision would remain unchanged by the Proposed Development and ultimately have limited effects on human health. Whilst there is no specific details of potential rerouting of coach and bus services (and there are 4 tram stops are located within the study area), the Inspectorate agrees that effects in terms of population and human health from rerouting and disruption to public transport are unlikely to be significant given the nature, location and objectives of the scheme.’</i>	Disruption of public transport services has been scoped out of the assessment.

Statutory consultation

12.4.3 Table 12.7 summarises key feedback from Transport for Greater Manchester (TfGM) and Transport for the North during the statutory consultation. All comments raised during the statutory consultation, as well as the Applicant's responses, are included in Annex Q of the Consultation Report Annexes (TR010064/APP/5.2).

Table 12.7 Statutory consultation feedback on preliminary land use and accessibility assessment

Stakeholder	Comment	Response
TfGM	<i>'GMTS [Greater Manchester's transport strategy] 2040 also states: "Where we upgrade highways, we will include improvements for pedestrians, bus users and people who cycle". In the case of the Simister project, there are opportunities to improve and create safe walking and cycling connections across the motorway, reduce the severance effect of the road, connect communities with each other and with community facilities.'</i>	The objectives of the Scheme relate to reducing peak congestion; delivering journey time reliability and improving safety on this section of the motorway network rather than wider transport objectives.
	<i>'A facility that we would recommend is protected and significantly enhanced as part of the scheme is the permissive path at Haweswater Aqueduct underpass. Passing through land owned by National Highways, it could be a key connection between the schools to the south of the Motorway and the residential areas within its local catchment area to the north... With the Haweswater Aqueduct underpassn the revised schemes, providing for a hard shoulder, it is imperative that National Highways bring this path up to national LTN 1/20 design guidance, consistent with local guidance set out in the future GM Streets for All Design Guide.'</i>	The Applicant has ensured that the permissive route which runs through Haweswater Aqueduct underpass is not adversely affected by the Scheme on a permanent basis by limiting highway widening to carriageway level only. The Applicant considers the enhancement of Haweswater Aqueduct underpass outside the scope of the Scheme's objectives, which relate to reducing peak congestion; delivering journey time reliability and improving safety on this section of the motorway network.

Stakeholder	Comment	Response
	<p><i>'It is essential that the works are fully coordinated with the Local Highways Authorities and TfGM to ensure disruption to travellers – both using and crossing the motorway, and the local community are minimised. A particular concern is the potential loss of walking and cycling connections during the works and potential impact of displaced traffic upon the operation of the local road network and bus services. In case of the latter, it is of note that regular local bus services do travel through Simister Island, as well as on both parallel and crossing routes.'</i></p>	<p>Measures to reduce disruption to travellers, including users of walking and cycling routes and bus users, are set out in the Outline Traffic Management Plan (TR010064/APP/7.5). Construction related impacts on walking and cycling routes are assessed in Section 12.9, and whilst mitigation has been identified to limit the severity of effects on WCH, the overall effect is assessed as significant due to the need for temporary closure of several key routes for safety reasons.</p>
<p>Transport for the North</p>	<p><i>'We welcome National Highways proposals to improve facilities for active travel, however, believe this should be delivered within the scope of the Simister Island Interchange rather than considered for funding via the designated funds. This includes improvements to improve the Haweswater Aqueduct underpass, bringing it up to the standard of a cycleway and footpath, and connecting it to the local cycle network, and Old Hall Lane footbridge, south of the junction.'</i></p>	<p>The Applicant considers the enhancement of Haweswater Aqueduct underpass and works to Old Hall Lane footbridge to be outside the scope of the Scheme's objectives, which relate to reducing peak congestion; delivering journey time reliability and improving safety on this section of the motorway network.</p>

General approach

- 12.4.4 The approach to the assessment follows DMRB LA 112. Effects are assessed for the construction phase and the first year of operation.
- 12.4.5 The focus of this assessment is on identifying whether the existing function of the land use or access would be changed by the physical impact of the Scheme. Refer to Section 12.5 of this chapter for information on assumptions and limitations.

Baseline and evaluation of resources

- 12.4.6 The process of assessment has involved identifying the baseline land use and accessibility resources that could potentially be physically affected by the Scheme, or where the direct access to those assets would be physically affected.
- 12.4.7 Each land use and accessibility asset has been assigned a value, guided by the criteria set out in Table 12.8, which is derived from DMRB LA 112. Interpretation notes have been added against some criteria to explain how the DMRB LA 112 criteria have been interpreted for this assessment.

Assessment criteria

Value (sensitivity) of receptors

- 12.4.8 Value (sensitivity) has been assigned to land use and accessibility resources according to the criteria outlined in Table 12.8 (derived from DMRB LA 112, Table 3.11).

Table 12.8 Land use and accessibility – environmental value (sensitivity) and descriptions

Value (sensitivity)	Typical descriptors
Very high	<p><u>Private property and housing</u></p> <p>1) existing private property or land allocated for housing located in a local authority area where the number of households are expected to increase by >25% by 2041 (Office for National Statistics (ONS) data); and/or</p> <p>2) existing housing and land allocated for housing (e.g., strategic housing sites) covering >5ha and/or >150 houses.</p> <p>Interpretation notes: 2043 ONS projections have been used as ONS projections have been updated since DMRB LA 112 was published.</p>
	<p><u>Community land and assets</u></p> <p>Community land and assets where there is a combination of the following:</p> <p>1) complete severance between communities and their land/assets, with little/no accessibility provision;</p> <p>2) alternatives are only available outside the local planning authority area;</p> <p>3) the level of use is very frequent (daily); and</p> <p>4) the land and assets are used by the majority (>=50%) of the community.</p>
	<p><u>Development land and businesses</u></p> <p>Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering >5ha.</p>
	<p><u>Agricultural landholdings</u></p> <p>1) areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and</p> <p>2) access between land and key agricultural infrastructure is required on a frequent basis (daily).</p> <p>Interpretation notes: For the purposes of this assessment, this has been interpreted to mean agricultural holdings which are dependent on very regular access between fields and agricultural infrastructure throughout the year, for example dairy farms.</p>

Value (sensitivity)	Typical descriptors
	<p><u>WCH</u></p> <ol style="list-style-type: none"> 1) national trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient walker, cyclist, and horse rider route. Little or no potential for substitution. 2) routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs. 3) rights of way for walkers, cyclists, and horse riders crossing roads at grade with >16,000 vehicles per day.
High	<p><u>Private property and housing</u></p> <ol style="list-style-type: none"> 1) private property or land allocated for housing located in a local planning authority area where the number of households are expected to increase by 16–25% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g., strategic housing sites) covering >1–5ha and/or >30–150 houses. <p>Interpretation notes: 2043 ONS projections have been used as ONS projections have been updated since DMRB LA 112 was published.</p> <p><u>Community land and assets</u></p> <ol style="list-style-type: none"> 1) there is substantial severance between community and assets, with limited accessibility provision; 2) alternative facilities are only available in the wider local planning authority area; 3) the level of use is frequent (weekly); and 4) the land and assets are used by the majority ($\geq 50\%$) of the community. <p>Interpretation note: Point 2 has been interpreted to mean locations where alternatives are available only by travel to other settlements/areas.</p> <p><u>Development land and businesses</u></p> <p>Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering >1–5ha.</p>

Value (sensitivity)	Typical descriptors
	<p><u>Agricultural landholdings</u></p> <ol style="list-style-type: none"> 1) areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a frequent basis (weekly). <p>Interpretation notes: For the purposes of this assessment, these criteria are being interpreted as farm holdings dependent on access to extensive land to maintain high productivity, for example extensive arable farms.</p> <p><u>WCH</u></p> <ol style="list-style-type: none"> 1) regional trails and routes (e.g., promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution; and/or 2) rights of way for walkers, cyclists, and horse riders crossing roads at grade with >8,000–16,000 vehicles per day.
Medium	<p><u>Private property and housing</u></p> <ol style="list-style-type: none"> 1) houses or land allocated for housing located in a local authority area where the number of households are expected to increase by >6–15% by 2041 (ONS data); and/or 2) existing housing and land allocated for housing (e.g., strategic housing sites) covering <1ha and/or <30 houses. <p>Interpretation notes: 2043 ONS projections have been used as ONS projections have been updated since DMRB LA 112 was published.</p> <p><u>Community land and assets</u></p> <ol style="list-style-type: none"> 1) there is severance between communities and their land/assets but with existing accessibility provision; 2) limited alternative facilities are available at a local level within adjacent communities; 3) the level of use is reasonably frequent (monthly); and 4) the land and assets are used by the majority (>=50%) of the community. <p><u>Development land and businesses</u></p> <p>Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering <1ha.</p>

Value (sensitivity)	Typical descriptors
	<p><u>Agricultural landholdings</u></p> <ol style="list-style-type: none"> 1) areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly). <p><u>WCH</u></p> <ol style="list-style-type: none"> 1) PRoW and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys; and/or 2) rights of way for walkers, cyclists, and horse riders crossing roads at grade with >4,000–8,000 vehicles per day.
Low	<p><u>Private property and housing</u></p> <p>Proposed housing development on unallocated sites providing housing with planning permission or in the planning process.</p> <p><u>Community land and assets</u></p> <ol style="list-style-type: none"> 1) limited existing severance between community and assets, with existing full Equality Act 2010 compliant accessibility provision; 2) alternative facilities are available at a local level within the wider community; 3) the level of use is infrequent (monthly or less frequent); and 4) the land and assets are used by the minority (<=50%) of the community. <p><u>Development land and businesses</u></p> <p>Proposed development on unallocated sites providing housing with planning permission or in the planning process.</p> <p><u>Agricultural landholdings</u></p> <ol style="list-style-type: none"> 1) areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and 2) access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent). <p><u>WCH</u></p> <ol style="list-style-type: none"> 1) routes which have fallen into disuse through past severance, or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes; and/or 2) rights of way for WCH crossing roads at grade with <4,000 vehicles per day.

Value (sensitivity)	Typical descriptors
Negligible	<u>Private property and housing</u> N/A
	<u>Community land and assets</u> 1) no or limited severance or accessibility issues; 2) alternative facilities are available within the same community; 3) the level of use is very infrequent (a few occasions yearly); and 4) the land and assets are used by the minority (<=50%) of the community.
	<u>Development land and businesses</u> N/A
	<u>Agricultural landholdings</u> Areas of land which are infrequently used on a non-commercial basis.
	<u>WCH</u> N/A

Magnitude of impact (change)

- 12.4.9 The magnitude of impact (change) on receptors has been assessed according to the criteria outlined in Table 12.9 (derived from DMRB LA 112, Table 3.12).
- 12.4.10 The assessment has considered whether the integrity or function of the asset would be lost or compromised, or whether impacts would be noticeable but not result in any change to the viability of that land use or accessibility asset.

Table 12.9 Land use and accessibility – magnitude of impact and typical descriptions

Magnitude	Typical descriptors
Major	<p><u>Private property and housing, community land and assets, development land and businesses, and agricultural landholdings:</u></p> <ul style="list-style-type: none"> 1) Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. e.g., direct acquisition and demolition of buildings and direct development of land to accommodate highway assets. 2) Introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. <p><u>WCH*:</u> >500m increase (adverse) or decrease (beneficial) in walking, cycling and horse-riding journey length.</p>
Moderate	<p><u>Private property and housing, community land and assets, development land and businesses, and agricultural landholdings:</u></p> <ul style="list-style-type: none"> 1) Partial loss of or damage to key characteristics, features or elements, e.g. partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings. 2) Introduction (adverse) or removal (beneficial) of severe severance with limited or moderate accessibility provision. <p><u>WCH*:</u> >250m–500m increase (adverse) or decrease (beneficial) in walking, cycling and horse-riding journey length.</p>
Minor	<p><u>Private property and housing, community land and assets, development land and businesses, and agricultural landholdings:</u></p> <ul style="list-style-type: none"> 1) A discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g. amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings. 2) Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. <p><u>WCH*:</u> >50m–250m increase (adverse) or decrease (beneficial) in walking, cycling and horse-riding journey length.</p>

Magnitude	Typical descriptors
Negligible	<p><u>Private property and housing, community land and assets, development land and businesses, and agricultural landholdings:</u></p> <ol style="list-style-type: none"> 1) Very minor loss or detrimental alteration to one or more characteristics, features or elements, e.g. acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings. 2) Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. <p><u>WCH*:</u> <50m increase (adverse) or decrease (beneficial) in walking, cycling and horse-riding journey length.</p>
No change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

*Note: The assessment of impacts on WCH has also considered changes in the availability, quality and standard of provision for WCH as well as severance and accessibility provision. For example, where a cycle track would be widened to meet a more modern standard, or where past severance of a PRoW would be removed, this is regarded as beneficial. A narrative is provided in the assessment to support the judgement of magnitude assessed.

Significance of effect

- 12.4.11 Chapter 4: Environmental Assessment Methodology of this Environmental Statement (TR010064/APP/6.1) sets out the general approach to assessing the significance of effects and follows DMRB LA 104 Environmental Assessment and Monitoring (Highways England, 2020b), and relates to whether or not effects are considered material in the decision-making process.
- 12.4.12 Paragraphs 3.13 and 3.14 of DMRB LA 112 state that *‘The significance of effect shall be derived by combining the assigned value (sensitivity) of receptors with the magnitude of change arising from a project, in accordance with LA 104’* and that the *‘significance of effect shall be determined for each element of the land and accessibility sub topic (e.g. private property and housing, development land and businesses etc.) affected by a project’*.
- 12.4.13 This requirement of DMRB LA 112 has been interpreted by the competent expert to mean that, although there may be a major impact on a particular land use and accessibility asset, which would be greatly significant to the owners/users of that asset, this does not imply significance at a decision-making level, as there may be sufficient alternative resource to serve overall community needs. To do this, the magnitude criteria in Table 12.9 have been used to guide the decision as to:
- Whether the characteristics of each land use and accessibility resource for each assessed community has been lost, partially lost or damaged, discernibly changed or altered in some minor way
 - Severance has been introduced or removed, and whether accessibility has been adequately provided for in the design or mitigation

- Whether the viability of walking, cycling and horse-riding routes for the community overall would be compromised or improved through changes in distance, quality or accessibility

12.4.14 After considering the overall magnitude of the identified impacts on the integrity of each community's overall land use and accessibility matter, together with the value of the various affected assets, the judgement of likely significant effects on land use and accessibility has then been assessed using the significance matrix provided in Table 4.7 of Chapter 4: Environmental Assessment Methodology of this Environmental Statement (TR010064/APP/6.1), which is derived from DMRB LA 104. The interpretation of the assessment criteria to assign an overall level of significance has involved a degree of professional judgement as to whether an effect is likely to be material in the decision-making process and hence significant in terms of DMRB LA 104. In the case of this land use and accessibility assessment, the judgement has considered whether:

- Several resources are affected to the extent that effects are noticeable at a community level (rather than individual level)
- The function of a land use and accessibility resource, such as factors required to support a population (for example services, employment, recreation, local economy, community cohesion), are likely to be lost, severely degraded or greatly enhanced

Timescales

12.4.15 Land use and accessibility effects are reported for the construction phase and for the first year of operation.

12.4.16 The following terms are used to describe the duration of impacts:

- Transient impacts are those that would typically last up to two days, such as disruption caused in the case of a weekend road closure
- Short-term impacts are those lasting up to six months
- Medium-term impacts are those lasting six months to five years
- Long-term impacts are those lasting more than five years.

12.4.17 Temporary impacts are those which would not be permanent, such as land take during the construction phase that would be returned to the landowner on completion of the works. It should be noted that, in some cases, impacts described as temporary could last for several months or even the duration of the construction phase.

12.5 Assessment assumptions and limitations

- 12.5.1 This assessment has been undertaken on the Scheme design (as shown on Figure 2.2: Scheme Design of the Environmental Statement Figures (TR010064/APP/6.2)) assuming a reasonable worst-case basis afforded by the limits of deviation (see Section 2.5 of Chapter 2: The Scheme of this Environmental Statement (TR010064/APP/6.1)). While the limits of deviation (as shown on the Works Plans (TR010064/APP/2.2)) could result in the Scheme being closer to some receptors or resources, it is not considered this would result in a greater level of significance than provided in this assessment.
- 12.5.2 The assessment addresses only the direct impacts and effects of the Scheme on land use in relation to land take, severance and changes to accessibility. The assessment does not draw conclusions on the viability of any individual businesses, including farm businesses, that may be affected by changes in land or access from the Scheme. Such matters would relate to the relevant margins that support the businesses and any impacts on business viability would require direct negotiation between the interested parties and their representatives. Instead, the assessment presents effects in relation to whether the current land use can feasibly be maintained in light of impacts such as land take or alterations to access.
- 12.5.3 The right to compensation for affected landowners, together with the methods and procedures for ascertaining the appropriate levels of any compensation due, is decided in relation to the compensation code, which is outside of the scope of this Environmental Impact Assessment process. Information on the status of the Applicant's negotiations with other parties' interests is set out in the Statement of Reasons (TR010064/APP/4.1).
- 12.5.4 All measurements are approximate and do not reflect details of final negotiations relating to land acquisition.
- 12.5.5 Any impacts on individual properties do not necessarily constitute a significant community effect. The assessment considers significance in terms of the effect on the land use resource as a whole i.e. on each of the five elements (private property and housing, community land and assets, development land and business, agricultural land holdings and WCH) rather than each individual land use and accessibility asset.
- 12.5.6 The use of the Strava (2022) Global Heatmap to inform cycling and running activity in the area has the limitation that it is likely to be a selective group of cyclists and runners who use the app. The app is likely used more by very keen and more competitive cyclists and runners and may not reflect the activities of occasional cyclists and runners, family rides with younger children or short regular commutes. Nevertheless, the app is widely used and provides an indication of routes regularly used and routes which tend to be avoided. Other sources of data have also been used to support the assessment including the Outdoor Recreation Valuation tool (ORVal) (Day and Smith, 2018), which provides usage data for some recreational assets, and Ordnance Survey mapping to indicate proximity of receptors that would likely access the resource.

12.6 Study area

- 12.6.1 The study area for land use and accessibility includes the Order Limits together with a buffer of approximately 100m. The study area is indicated on Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2). The buffer has been reduced from the 500m buffer used in the Preliminary Environmental Information Report (PEIR) (Annex L of the Consultation Report Annexes (TR010064/APP/5.2)) on the basis that no effects were predicted on land use or accessibility assets beyond this distance.
- 12.6.2 The human health study area (see Section 12.14) has been used for wider context as to the extent of communities potentially affected by changes to land use and accessibility, and in terms of the likely origins and destinations of people using the PRoW and routes which cross the Order Limits.

12.7 Baseline conditions

Baseline sources

- 12.7.1 The land use and accessibility baseline has been informed by the following information sources:
- Ordnance Survey (OS) mapping
 - Aerial photography
 - Land registry data
 - Bury Metropolitan Borough Council website (including documents to support the emerging Local Plan)
 - Greater Manchester Open Data Infrastructure Map (GMODIN)
 - ONS datasets
 - Information from site surveys undertaken by the wider environmental assessment team such as by the landscape and visual impact assessment specialists
 - Responses to land use questionnaires which were issued to agricultural landholders during spring 2023

Baseline information

Private property and housing

- 12.7.2 The 'private property and housing' element in DMRB LA 112 is defined as '*land, buildings and infrastructure for the purpose of residential use.*'
- 12.7.3 The Scheme is within Bury, Greater Manchester, while the study area extends across the local authority boundary into Manchester District. Bury and Manchester are anticipated to see a 12.8% and 12.6% increase in the number of households respectively between mid-2018 and mid-2043 based on ONS projections (ONS, 2020).

12.7.4 The relevant wards which coincide with the study area are Besses, St Mary’s, Holyrood, Unsworth, Pilkington Park and Higher Blackley. However, there is no residential land use in Pilkington Park or Higher Blackley wards which have potential to be directly affected by the Scheme. The land surrounding the north and south of the Scheme between M60 J17 and M60 J18 is predominantly residential (see Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2)). Land use to the east of the M66 and east of the M60 south of Simister is more open (farmland and a golf course). Several streets and houses in the study area are immediately adjacent to the Order Limits. These are listed in Table 12.10.

Table 12.10 Baseline private property and housing

Wards	Population of ward*	Residential streets within or immediately adjacent to Order Limits	Value/sensitivity
Besses	11,077	<ul style="list-style-type: none"> • Balmoral Avenue • Prestfield Road (southernmost extent only) • Kensington Street • Glendevon Place • Conisborough Place • Marston Close • Mode Hill Lane • Hardman’s Road (southernmost extent only) • North Circle • Derwent Close • Duddon Close • Derwent Avenue • Leven Walk • Heybrook Walk • Heybrook Close • Brathay Close • Rothay Close 	Very high (on the basis that covers more than 5ha)
Higher Blackley	15,569	(None)	N/A (no residential property in study area)
Holyrood	11,199	<ul style="list-style-type: none"> • Barnard Avenue • Kenilworth Avenue • Warwick Avenue • Warwick Close • Hollymount off Simister Lane 	Very high (on the basis that residential land covers more than 5ha)
Pilkington Park	9,884	(None)	N/A (no residential property in study area)

Wards	Population of ward*	Residential streets within or immediately adjacent to Order Limits	Value/sensitivity
St Mary's	11,279	<ul style="list-style-type: none"> Cross Avenue Stanley Avenue North 	Very high on the basis that residential land covers more than 5ha)
Unsworth	11,034	<ul style="list-style-type: none"> Castle Road (one group of rural properties) St Georges Road (edge of estate) 	Very high (on account of extensive housing allocation, see Table 12.11)

*Source: ONS (2023) Census 2021, TS001 - Number of usual residents in households and communal establishments

12.7.5 Much of the more open land is covered by allocations under the planning strategy 'Places for Everyone' (a strategy put forward by the councils of Bolton, Bury, Manchester City, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan). Reference to the Scheme was made in the Places for Everyone Plan, stating, '*Works to improve the capacity of Simister Island (the junction of the M62, M60 and M66 motorways) are already planned, but additional investment in the motorway network will be required to support the scale of development proposed within the North-East Growth Corridor*' (GMCA, 2021). The emerging Places for Everyone Plan may become an adopted plan during the period that this application for development consent is being examined and/or determined (see Section 6.5 of the Case for the Scheme (TR010064/APP/7.1) for further details).

12.7.6 Relevant allocations and planning applications in the study area are set out in Table 12.11.

Table 12.11 Housing and employment allocations and applications within the land use and accessibility study area

Allocation/Application	Number of units	Notes	Value/sensitivity
85 Bury Old Road, Whitefield, Manchester, M45 7AY (planning application reference 63003)	11 apartments, 562 sqm employment (25 full time employees)	Planning application approved for housing and office space to Bury Metropolitan Borough Council. Application site abuts Order Limits.	Very high (on basis it is within a wider residential area of over 5ha)
Heywood / Pilsworth Northern Gateway (JPA1.1)	1,200,000 sqm employment, 1,200 homes	Mixed use allocation in Places for Everyone Submission Plan (GMCA, August 2021). This allocation coincides with the Order Limits at the north-east side of J18.	Very high (on basis of the large scale of this allocation)

12.7.7 A further allocation in the Places for Everyone Plan (GMCA, 2021) is Simister and Bowlee (Northern Gateway) (JPA1.2) which has an allocation for 1,550 homes. This is outside of the study area but within 500m of the Order Limits. Although it is not likely to be directly impacted on by the Scheme, it is of relevance to the future land use and accessibility baseline in terms of use of PRoW and other land use assets (see below).

Community land and assets

12.7.8 Community land and assets include land, buildings and infrastructure which provide a service or resource to a community, for example open spaces, village greens, village halls, healthcare, and education facilities.

12.7.9 Areas of community land identified within or immediately adjacent to the Order Limits are set out in Table 12.12. These are indicated on Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2).

Table 12.12 Community land and assets within or immediately adjacent to the Order Limits

Community asset	Location	Description / baseline issues	Value/ sensitivity
Our Lady of Grace Roman Catholic Primary School	School grounds are within 25m of Order Limits, south-east of M60 J17.	Primary school is somewhat shielded from the Scheme by housing along Highfield Road and Cross Avenue. Its main access is from Highfield Road with a further pedestrian access from Willow Road. The school has 348 pupils aged 3–11 years (with capacity for 445) (Gov.uk, 2022). It has been assigned very high value on the basis it is used by children (vulnerable group) on a daily basis.	Very high
Eden Gardens Allotment	Abuts Order Limits on north side of M60 in Whitefield.	Accessed from Derwent Avenue, Whitefield. It has an estimated 1,620 visits per year (Day, B. H., and G. Smith (2018)). Likely to serve as an important local community hub and resource.	Medium
Plot of land south of Marston Close (part of agricultural landholding NW2 – see Table 12.14)	Order Limits bisect this plot of land on north side of M60 in Whitefield.	A path to the rear of properties on Marston Close bounds the north-west edge of this plot of land which is part of agricultural landholding NW2 understood to be owned by National Highways. Aerial imagery indicates it may be used informally by local residents, possibly as a place of informal play for children, and by dogwalkers. It has been valued as negligible on the basis it has no formal community status and other areas of green space are available locally.	Negligible

Community asset	Location	Description / baseline issues	Value/ sensitivity
Prestwich Heys Football Club	Located south of the M60 (immediately adjacent to the Order Limits)	Accessed via Sandgate Road. The football club has an estimated 110,360 visits per year (Day, B. H., and G. Smith (2018)). It has been assigned high value on the basis of its regular use and status as a semi-professional club.	High
Parrenthorn High School	School grounds abut the Order Limits to the south-west of M60 J18.	Accessed via Heywood Road/Simister Lane which crosses the M66 via a bridge. The school has 897 pupils aged 11–16 years (and has capacity for 1050) (Gov.uk, 2022). It has been assigned very high value on the basis it is used by children (vulnerable group) on a daily basis.	Very high
St Margaret's Church of England Primary School	School grounds within 10m of the Order Limits to the south-west of M60 J18.	Accessed via Heywood Road/Simister Lane which crosses the M66 via a bridge. The school has 238 pupils aged 4–11 years (and has capacity for 247) (Gov.uk, 2022). It has been assigned very high value on the basis it is used by children (vulnerable group) on a daily basis.	Very high
Unsworth Cricket and Tennis Club	Located between Pole Lane, Unsworth and the M66. The cricket grounds abut the Order Limits.	Access from Pole Lane. Likely to be used by the community for venue hire as well as by members of the cricket and tennis club. It has been assigned high value on the basis of its regular use.	High
Unsworth Academy	Main school campus is immediately adjacent to M66 within 40m of Order Limits (but with playing fields within the Order Limits – see below).	Accessed via Parr Lane, Unsworth. The school has 910 pupils aged 11–16 years (and has capacity for 935) (Gov.uk, 2022). It has been assigned very high value on the basis it is used by children (vulnerable group) on a daily basis.	Very high
Unsworth Academy school playing fields	Located east of M66 and south of Griffie Lane. Within the Order Limits.	These playing fields are accessed from the school via an underpass under the M66. Part of the playing fields are within the Order Limits. They have been assigned very high value on the basis it is used by children (vulnerable group) on a daily basis.	Very high
Pike Fold Golf Club	Located east of the M66. Within the Order Limits.	Golf club serving members, likely to serve a sizeable minority of residents in study area. Five other golf courses are within an approximate 2km radius and therefore this asset is assigned low sensitivity.	Low

Community asset	Location	Description / baseline issues	Value/sensitivity
Simister Allotments	Located in Simister approximately 35m west of Order Limits which follow private lane and public footpath 50PRE south of Lower Drouhts Farm and M62.	Approximately 0.5ha of allotment gardens. Likely to serve as an important local community hub and resource.	Medium
Simister Green Playground	Located in Simister approximately 45m south of the Order Limits, south of the M62	Small children's playground. Likely to serve younger children in the local neighbourhood. Assigned high value on the basis that no alternative play facilities have been identified serving young children (vulnerable group) within reach of community.	High

Development land and business

- 12.7.10 DMRB LA 112 defines development land as *'land identified in national or local plans, policies or strategies for development... and land subject to planning permission'*. Business land is defined as *'land and buildings for the purpose of commercial/industrial enterprise'*.
- 12.7.11 As noted in Table 12.11, the two allocations within the study area are for mixed use development and therefore include employment use.
- 12.7.12 Given the urban nature of area there are several businesses near the study area including various shops, services, leisure and hospitality venues. However, very few businesses have been identified within the land use and accessibility study area as the majority of land is residential or agricultural. Table 12.13 provides a summary of business land which abut the Order Limits. These are indicated on Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2).

Table 12.13 Development land and business which abut the Order Limits

Community	Commercial and industrial properties within the land use and accessibility study area	Value/sensitivity
Whitefield / Besses	There is a commercial warehouse within 10m of the Order Limits on Hardman's Road on the north-east side of J17. HH Smith & Sons construction company is located on Bury Old Road immediately north-west of the bridge over the M60. The Frigate Public House is located on Thatch Leach Lane. These properties have all been valued as medium sensitivity on the basis they are less than 1ha in area.	Medium
Prestwich / Kirkhams	On the A665 'Bury Old Road' there is an Esso garage and a number of shops and fast-food outlets immediately south-east of the Order Limits close to Bury Old Road bridge. These properties have all been valued as medium sensitivity on the basis they are less than 1ha in area.	Medium

Agricultural landholdings

- 12.7.13 DMRB LA 112 defines agricultural landholdings as *'land and associated infrastructure for the purpose of agricultural production, for example arable farming and dairy farming'*.
- 12.7.14 Agricultural land use is located in the study area around M60 J18. The understanding of baseline agricultural use has been informed by responses to agricultural landowner questionnaires, information from the Applicant's land agents, and aerial imagery. Table 12.14 sets out the agricultural landholdings identified within the study area. These are indicated on Figure 12.2: Agricultural Landholdings of the Environmental Statement Figures (TR010064/APP/6.2).

Table 12.14 Agricultural landholdings within land use and accessibility study area

Agricultural landholding reference	Location and description	Value/sensitivity
SE1	South-east of M60 J18. Four fields associated with Heywood Farm. Aerial imagery suggests the land is used for permanent pasture and grazing. Total area is approximately 2ha. It is judged to be of medium sensitivity for agricultural use.	Medium
SW1	South-west of M60 J18. Five large fields north and south of Simister Lane. It is understood they are associated with Mellowdew Farm, Simister and therefore access to these fields is likely to be via the Simister Lane bridge over the M60. These are used for mixed farming (pasture and arable). Approximately 22.67ha, involving parts of three fields and two entire fields, is within the Order Limits. It is judged this land is of high sensitivity for agricultural land use.	High
SW2	South-west of M60 J18. Field to rear of 10 Simister Lane. Small field abuts M60 highway boundary. Currently used for grazing horses. The land parcel is 1.05ha in total. This land is partially dependent on proximity to stables and therefore judged to be of medium sensitivity.	Medium
NW1	North-west of M60 J18 (south-west of Cowl Gate Farm). Land is assumed to be used for grazing horses (under short-term tenancies). Entire field (11.93ha) is within Order Limits. This land is partially dependent on proximity to stables and therefore judged to be of medium sensitivity.	Medium
NW2	Land owned by National Highways. It is understood to be used for grazing horses under no formal agreement. Entire field (3.2ha) is within Order Limits. It is assumed this land is not used for commercial agricultural production, and since there is no formal arrangement it is judged to be negligible sensitivity for agricultural land use.	Negligible

Agricultural landholding reference	Location and description	Value/sensitivity
NW3	Land at Cowl Gate Farm, north-west of M60 J18. Cowl Gate Farm and its associated field to the north (2.95ha) is outside of (but surrounded by) the Order Limits, however its access route (Pole Lane and Mode Hill Lane) is within the Order Limits. The land is used for grazing horses. It is assumed this land is occasionally used for commercial agricultural production, is partially dependent on spatial relationship to property and therefore judged to be medium sensitivity.	Medium
NE1	Land north-east of M60 J18, north of Egypt Lane. A small plot (1.67ha) of land currently not used and overgrown. The entire plot is within the Order Limits. This land is allocated for mixed use (housing and employment) under the Places for Everyone plan (Heywood and Pilsworth) (see Table 12.11). This land is not used for commercial agricultural production and is judged to be negligible sensitivity for agricultural land use.	Negligible
NE2	Land north-east of M60 J18, north and south of Egypt Lane. Agricultural fields belonging to Unsworth Moss Farm, Simon Lane. The land is used for mixed agriculture (cattle grazing and arable). Some 16ha (three fields) are within the Order Limits (substantial further land is outside of Order Limits). This land was allocated for mixed use (housing and employment) under the Places for Everyone plan (Heywood and Pilsworth) (see Table 12.11). It is judged this land is of high sensitivity for agricultural land use.	High
NE3	North-east of M60 J18. Information from landowners indicates this land is used for grazing horses. While these fields (2.65ha) are outside of the Order Limits, their access (Egypt Lane) is within the Order Limits. This land was allocated for mixed use (housing and employment) under the Places for Everyone plan (Heywood and Pilsworth) (see Table 12.11). It is judged this land is of high sensitivity on the basis that regular access to stables and fields is required to maintain function of equestrian enterprise.	High
NE4	North-east quadrant of M60 J18, to the east of Unsworth Academy school playing fields and west of Castle Brook. Field (5.21ha) is on the south side of Griffie Lane. Field is used for cattle grazing and permanent pasture. Approximately 2.4ha of the field is within Order Limits. This land was allocated for mixed use (housing and employment) under the Places for Everyone plan (Heywood and Pilsworth) (see Table 12.11). It is judged this land is of high sensitivity for agricultural land use.	High

WCH

- 12.7.15 Walkers and cyclists can be considered as two types – those who walk or cycle as part of an active travel journey (e.g., as part of a regular commute or to access services); and those who are walking or cycling for recreational purposes. The first type will typically be more interested in an efficient, convenient route, while the second type would be more interested in the recreational amenity of the route. Equestrian activity is dominated by recreational horse-riding and therefore horse riders are assumed to be recreational unless there is clear evidence otherwise.
- 12.7.16 Pedestrians, cyclists, and horse riders are prohibited from using the motorways themselves, including the M60, M62 and M66. These motorways act as a barrier for these groups in many locations.
- 12.7.17 The routes used by walkers, cyclist and in some instances, horse riders which are in the study area are described in Table 12.15 and shown on Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2). These include PRow, roads, lanes and cycle paths.

Table 12.15 PRow and other pedestrian and cycle routes in study area

PRow / route	Location	Description / baseline issues	Value/ sensitivity
Bury New Road	Crosses within 50m of the Order Limits at M60 J17	Bury New Road (A56) runs north to south across the Scheme between Besses o' th' Barn and Prestwich. The road and junction are largely a dual carriageway with footways on either side. Bury New Road crosses the M60 via J17. This is likely used as a key crossing point between communities north and south of the M60 for walkers and cyclists but is not a convenient route for them. They either need to negotiate an indirect route via a subway system and Prestwich Footbridge, or in the case of cyclists, negotiate intimidating traffic conditions (slip-roads and multiple lanes of traffic) on the gyratory itself. Due to high local population likely to use the route, this is valued as very high.	Very high
Local cycle route near M60 J17 Whitefield Interchange	Off road cycle route parallel to Bury New Road south of M60 J17	A TfGM Cycle Network route segregated from pedestrians follows a route parallel to south-bound side of Bury New Road south of M60 J17 as far as junction with Valley Lane Road where it crosses to continue adjacent to north-bound side of Bury Road. It is within 50m of Order Limits at its closest point near M60 J17. Due to high local population likely to use the route, this is valued as very high.	Very high
Bury Old Road	Crosses the Scheme to the north-east of M60 J17	Bury Old Road (A665) runs north-west to south-east across the Scheme between Besses o' th' Barn and Prestwich. It crosses over the M60 and under the tram line, with pavements on both sides for pedestrians. It offers a more direct crossing point for walkers and cyclists than M60 J17. Due to high local population likely to use the route, this is valued as very high.	Very high

PRoW / route	Location	Description / baseline issues	Value/ sensitivity
Sandgate Road / Footpath 18WHI	Crosses over the M60 on Sandgate Road, between Besses o' th' Barn and Kirkhams.	Public footpath that crosses over the M60 on Sandgate Road. Sandgate Road has pavements on either side of the road. Generally, this connects the residential areas either side of the M60 and is therefore an important community route. It may also be used as a school route for children living north of the M60 who go to Parrenthorn High school. There is also a number of recreational routes and footpaths that can be accessed via this crossing. North of the crossing, it connects to Footpath 12WHI which, if followed, leads to Unsworth as well as crossing the M66 at Hills Lane. This joins to Footpath 9WHI which runs in a south-easterly direction within the Order Limits. These routes feed into longer recreational routes to the north, east and south of the Scheme. To the south of the Sandgate Road crossing, this connects to routes to Heaton Park and Heaton Park Reservoir. Due to high local population likely to use the route, this is valued as very high.	Very high
Permissive path via Haweswater Aqueduct underpass	Heybrook Close to Parrenthorn Rd	Permissive path that connects Derwent Avenue and Heybrook Close to Parrenthorn Road via an underpass under the M60. The underpass exists to provide maintenance access to the Haweswater Aqueduct, a strategic water pipeline. However the permissive path is also used by pedestrians and connects the communities in the north to the facilities in the south, including schools and leisure and sporting facilities. The route appears well used and offers a more direct route for schoolchildren than Sandgate Road, but can get very muddy, has no lighting provision and has evidence of attracting anti-social behaviour. Public feedback during statutory consultation has suggested that this is viewed as an important route for schoolchildren despite the conditions (see the Consultation Report (TR010064/APP/5.1) and Annex Q of the Consultation Report Annexes (TR010064/APP/5.2) for further details). Therefore, it has been assigned a very high value.	Very high
Footpath 28bPRE and 29bPRE	Within and south of Simister, abuts Order Limits on southbound side of M60.	Footpath 28bPRE links from Simister Lane following a south-south-east direction before connecting with 29bPRE at Heywood Farm from which it follows a north-east direction back to Simister Lane at Mellarliue Farm. These public footpaths have been severed from their counterparts (28aPRE and 29aPRE) by the original construction of the M60. Access for walkers across the M60 is now facilitated through connection to Nutt Lane/Old Hall Lane and via Old Hall Lane footbridge. Assigned medium value as it is likely to be regularly used for recreation.	Medium

PRoW / route	Location	Description / baseline issues	Value/ sensitivity
Footpaths 28aPRE and 29aPRE	South of the M60 and east of Prestwich. Coincide with Order Limits adjacent to northbound side of M60.	Footpaths that form a loop to the north of bridleway 27aPRE and no longer provide any meaningful recreational or active travel use due to historic severance from footpaths 28bPRE and 29bPRE. Walkers are more likely to continue along bridleway 27aPRE than use these footpaths. There is little evidence of use on the ground. Assigned low value due to its lack of use and meaningful route.	Low
Bridleway 27aPRE	South of the M60 on Bridle Road. Abuts Order Limits close to northbound side of M60.	Bridleway follows the course of Bridle Lane. Footpaths 28aPRE and 29aPRE link with this bridleway. The bridleway leads to Old Hall Lane footbridge over the M60 some 218m south-east of Order Limits. The footbridge has steps and is not suitable for equestrian use, which limits the value of 27aPRE as a route for horse riders. Connectivity across the M60 can be achieved for cyclists via a bridge across M60 J19 (also called Old Hall Lane) some 680m south-east of Old Hall Lane footbridge. Assigned medium value as it is likely to be regularly used for recreation.	Medium
Simister Lane	Simister, south of the M60 J18	Simister Lane runs south-west to north-east across the M60, south of the M60 J18. This could be used by residents in Simister and Kirkhams to cross between communities as well as to access recreational routes within the local area.	High
Footpath 46WHI	Crosses the M62 close to Egypt's Farm and Lower Droughts Farm. Coincides with Order Limits.	Public footpath starting at Simister Lane, that runs north to cross the M62 on an overbridge. This connects to a large number of routes to the north, east and south. Directly it connects to Footpath 50PRE and Footpath 9WHI. Assigned medium value as it is likely to be used for recreational journeys.	Medium
Footpath 50PRE	Links with Footpath 46WHI at Lower Droughts Farm. Coincides with Order Limits.	Unnamed road that provides access from Simister Lane to Lower Droughts Farm. It also links to Simister Allotments. Assigned medium value as it is likely to be regularly used for recreation.	Medium

PRoW / route	Location	Description / baseline issues	Value/ sensitivity
Footpath 9WHI	North-east of the M60 J18. Coincides with Order Limits to north-east of J18 Simister Island.	This PRoW runs along Egypt Lane before heading north parallel to the M66 and south of Pike Fold Golf Course to join Hills Lane, Unsworth. Likely to be used for recreational journeys. Assigned medium value as it is likely to be regularly used for recreation.	Medium
Footpath 7WHI	Crosses the M66 at Unsworth Academy. Coincides with Order Limits.	Public footpath that crosses under the M66 at Unsworth Academy, which also allows access for school pupils to the school playing fields. Assigned very high value as it provides direct access for schoolchildren between school and playing field.	Very high
Castle Road / Restricted byway 85BUR	Crosses the M66 at Castle Road where it coincides with Order Limits.	Restricted byway that crosses over the M66 on Castle Road, which has pavements for some of its route. This connects directly to Footpaths 89BUR and 87BUR as well as bridleway 79BUR. Generally, this crossing connects residential areas in Unsworth to recreational routes to the north and east of the Scheme. A TfGM Cycle Network route also follows Castle Road which loops northwards to Aviation Road which could be followed by all types of cyclists. It is assigned high value as it may provide an important connection between Heywood and Unsworth.	High
Footpath 89BUR	Coincides with Order Limits to east of Unsworth (east of M66)	Connects 85BUR to 6WHI. Path No.85 to county borough Boundary Path starts from path No.85 by the motorway and continues along Griffie Lane to cross Castle Brook near the county borough boundary approximately 319m to the west of Brick House. Assigned medium value as it is likely to be regularly used for recreation.	Medium
Footpath 12WHI	North-west of Simister Island, along Mode Hill Lane. Coincides with Order Limits.	Public footpath that follows one lane track down Mode Hill Lane. Connects to Unsworth Pole via Pole Lane Mode Hill Lane and Oak Lane to Oak Bank Estate. Footpath is metalled and used by the public and by farm traffic. Assigned medium value as it is likely to be regularly used for recreation.	Medium
Footpath 84BUR	Within 30m of Order Limits (west of M66)	79BUR to Hollins Lane. Path starts from 79BUR and runs southwards alongside the motorway. The path then turns south westwards along the eastern boundary of woodland to emerge on Hollins Lane between No.124 Hollins Lane and Unsworth North Methodist Church. Assigned medium value as it is likely to be regularly used for recreation.	Medium

- 12.7.18 Within the wider context there are numerous more PRoW which serve as access to green spaces and recreational walking, as well as providing routes within some of the more built-up areas of the surrounding area.
- 12.7.19 National Cycle Network (NCN) Route 6 is outside of the study area of the Scheme. However, it is likely to be a destination for cyclists crossing the study area. The NCN passes through Prestwich Forest Park and passes over the M60 via a foot/cycle bridge to the west of the Scheme. There are further TfGM Cycle Network links on Bury New Road, between Thatch Beach Lane and Albert Road near Whitefield Community Primary School and Ribble Road near two further primary schools in Whitefield, as well as along Heywood Road, Prestwich linking St Margaret's Church of England Primary School and Parrenthorn High School with Simister and Castle Road and Aviation Road in Unsworth (see Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2)). There are also a variety of mountain bike trails within Prestwich Forest Park and along the River Irwell. These routes also provide access to open space to the north (see Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2)).
- 12.7.20 As noted in the agricultural landholdings section above, some of the land is used for grazing horses and there are stables attached to some of the farms in the wider area. There is therefore potential for horse riders to be using the lanes and bridleways in the study area.

Future baseline

- 12.7.21 The future baseline will likely be characterised by continued population growth within and around the study area (see also paragraph 12.7.3 of this chapter) as more of the residential development allocations get built out. As indicated by allocations in the Places for Everyone Plan (GMCA, 2021) there is clear intent for housing growth in the area, which would likely impact on existing agricultural land use in the future. The likely population growth anticipated for the Heywood / Pilsforth Northern Gateway (JPA1.1) and Simister and Bowlee (Northern Gateway) (JPA1.2) allocations would also mean a likely increase in walkers and cyclists using the local PRoW network, particularly at points where PRoW cross the M60 south of J18 and the M66 north of M60 J18.
- 12.7.22 Increasing fuel prices and rate of inflation mean that some people may depend more on public transport, walking and cycling. Similarly local and national level policy aimed at encouraging modal shift towards active travel and public transport may increase dependency on these modes in the mid- to longer term.

Value (sensitivity) of receptors

- 12.7.23 All land use and accessibility receptors within the baseline have been assigned a value based on criteria in DMRB LA 112 and using professional judgement in interpreting those criteria. The values are set out in Tables 12.8 to 12.15 against the relevant land use and accessibility assets identified within the study area.

- 12.7.24 The very high value land use and assets in the study area include the existing housing and large housing allocations, the schools, and some of the routes which cross the motorways since they are used by schoolchildren or are key points at which people can cross between communities.

12.8 Potential impacts

Construction

Private property and housing

- 12.8.1 There is potential for temporary and permanent loss of land from residential properties and land allocated for housing due to the close proximity of the Scheme to residential land. There is also potential for disruption to access for residential properties.

Development land and business

- 12.8.2 There is potential for temporary and permanent loss of business land and employment land from areas allocated for mixed use development. Note that potential impacts on Pike Fold Golf Course are considered under 'Community land and assets' as the impacts on this facility as a business are the same as described for the facility as a community resource.

Community land and assets

- 12.8.3 There is potential for temporary and permanent loss of community land, including from one golf course, facilities used by Prestwich Heys Football Club, Unsworth Academy sports pitches and St Margaret's Church of England Primary School. In addition, construction of the Scheme could cause temporary or permanent disruption of access to community facilities where PRow would have to be temporarily closed or diverted or where routes across the motorways would be affected.

Agricultural landholdings

- 12.8.4 There is potential for permanent and temporary loss of agricultural land from the construction footprint of the Scheme. There is also potential to disrupt access between landholdings due to use of some of the local lanes by construction vehicles and the presence of construction compounds.

WCH

- 12.8.5 Construction of the Scheme would require the diversion and temporary closures of PRow throughout the study area, with associated impacts on local outdoor recreation and access.

Operation

Private property and housing

- 12.8.6 No additional impacts over and above those described in paragraph 12.8.1.

Development land and business

- 12.8.7 No additional impacts over and above those described in paragraph 12.8.2.

Community land and assets

- 12.8.8 There could be changes in the access or amenity of community assets such as areas of greenspace where permanent PRow diversions are required (see paragraph 12.8.3).

Agricultural landholdings

- 12.8.9 No additional impacts over and above those described in paragraph 12.8.4.

WCH

- 12.8.10 There is potential for beneficial impacts on access for WCH should the Scheme address locations of poor accessibility and past severance of PRow.
- 12.8.11 PRow temporarily severed by the Scheme during construction would be reinstated and so there is no potential for new operational severance to occur. However, the existing PRow may be permanently changed as a result of potential diversions, closures and replacement routes.

12.9 Design, mitigation and enhancement measures

Embedded mitigation

- 12.9.1 The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the scheme design. This is referred to as embedded (or design) mitigation. Chapter 3: Assessment of Alternatives of this Environmental Statement (TR010064/APP/6.1) details the design alternatives that have been considered, including the environmental factors which have influenced the decision-making.
- 12.9.2 Mitigation is included in the Register of Environmental Actions and Commitments (REAC) contained within the First Iteration Environmental Management Plan (EMP) (TR010064/APP/6.5). The First Iteration EMP would be developed into a Second Iteration EMP to be implemented during construction and secured by Requirement 4 of the draft DCO (TR010064/APP/3.1).
- 12.9.3 The design of the Scheme, including construction activities, seeks to limit land take from current and proposed residential and employment land uses, community land and assets and agricultural landholdings as far as practicable.
- 12.9.4 The type and quality of new or reprovisioned surfacing, crossing and access points for PRow and other routes used by WCH will be suitable for the intended use and context (i.e., whether rural or urban, or whether there is likely cyclist, wheelchair, or horse rider use), and in accordance with relevant design and accessibility guidance. Key design considerations include DMRB GG 142 Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) standard (Highways England, 2019) and the Equality Act 2010 (see commitment PHH1 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)).

12.9.5 Embedded landscape design mitigation measures as set out in Section 7.9 of Chapter 7: Landscape and Visual of this Environmental Statement (TR010064/APP/6.1).

Essential mitigation

12.9.6 Essential mitigation measures to reduce and if possible offset likely significant adverse environmental effects for this aspect include the following commitments in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5):

- Commitment PHH2 – Where practicable, construction activities will be planned and managed to avoid conflict with access and use of Prestwich Heys Football Club, for example during football match fixtures, as informed through liaison with Prestwich Heys Football Club and Bury Metropolitan Borough Council.
- Commitment PHH3 – Works at Unsworth Academy school playing fields will be undertaken outside of school hours and times of sports use wherever practicable, as informed through liaison with Unsworth Academy. Areas of works will be fenced off to ensure safety of schoolchildren and other users of the facilities.
- Commitment PHH4 – Works near PRoW will be fenced off to ensure safety.
- Commitment PHH5 – Access to private properties, businesses, community land and agricultural landholdings will be maintained throughout construction where practicable. For residential properties, businesses, development land, community assets and agricultural landholdings where access will be directly affected during construction, an appropriate alternative temporary or permanent access will be provided where practicable.
- Commitment PHH6 – To protect agricultural assets, the Principal Contractor will prepare method statements for i) biosecurity (if required), ii) protection of agricultural land, and iii) soil management, prior to construction. The method statements will make reference to the controls set out in the First Iteration EMP (TR010064/APP/6.5) and any subsequent detail set out in the Second Iteration EMP. The Principal Contractor will follow the agreed method statements during construction. An Outline Soils Management Plan has been prepared (Appendix F of the First Iteration EMP (TR010064/APP/6.5)).
- Commitment PHH7 – So far as practicable, works will be planned to avoid temporary closure of the permissive path through Haweswater Aqueduct underpass during school term times, and consideration will be given to busy periods around school opening and closing times.
- Commitment PHH8 – Access and egress for construction plant and vehicles at the point of access from Sandgate Road will be managed.

- Commitment PHH9 – Access along public footpath 7WHI will be maintained at all times for access to Unsworth Academy playing fields and for users of the public footpath. Use of controlled temporary crossing will be used to facilitate safe access for schoolchildren, staff and members of the public using the route.
- Commitment PHH10 – Access along public footpaths 46WHI and 50PRE will be maintained for public use throughout construction as far as safe and practicable.
- Commitment PHH11 – Access along public footpaths 12WHI, 85BUR, 84BUR and 89BUR will be maintained for public use as far as possible throughout construction. Where this is not safe and practicable a diversion route will be provided.
- Commitment PHH12 – All temporary diversions of PRow and other routes used by walkers, cyclists and/or horse riders will be clearly signed and suitable for all potential users of the existing provision (for example, where closure of a bridleway is required, the diversion route provided will be suitable for WCH). Essential diversions for health and safety requirements are identified in the Outline Traffic Management Plan (TR010064/APP/7.5).
- Commitment PHH13 – All land subject to temporary possession will be restored to the original surveyed condition at the time of entry (unless otherwise agreed with the landowner) in accordance with the provisions of Article 30 of the draft DCO (TR010064/APP/3.1) (subject to the exceptions in that Article).
- Commitment PHH14 – A record of condition of land to be temporarily used for the Scheme will be undertaken pre-construction to provide a baseline against which appropriate reinstatement will be measured.
- Commitment PHH15 – Traffic management measures as documented in the Outline Traffic Management Plan (TR010064/APP/7.5) (which will be developed into a Traffic Management Plan prior to construction (Requirement 10 of the draft DCO (TR010064/APP/3.1))), will be implemented to ensure safe access along roads within the site where necessary. The construction works will be phased such that disruption to access is reduced, with full road closures restricted to nights and weekends wherever practicable and feasible.
- Commitment PHH16 – Liaison with Pike Fold Golf Club will be undertaken during detailed design and pre-construction stages to limit impacts on the amenity of the golf course during construction as far as practicable.
- Commitment PHH17 – A Community Liaison Manager will be appointed in the pre-construction phase to oversee communication with residents, schools, landowners and other interested parties regarding construction activities, programme, and alterations to access routes and to respond to concerns and queries which may arise.

- 12.9.7 The Principal Contractor will inform the public of the nature, timing and duration of particular construction activities, for example, by newsletters, letter drops and liaison with the relevant planning authority. A Communication Plan (that includes community engagement) will be developed before work commences on site (commitment G3 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)).

12.10 Assessment of likely significant effects

- 12.10.1 The tables in this section summarise the likely significant residual effects of the Scheme on land use and accessibility during construction and operation. All effects have been assessed based on the application of professional judgement to the DMRB LA 112 and DMRB LA 104 significance criteria.
- 12.10.2 Where effects have been identified, these would be reduced where practicable by implementing the mitigation measures outlined in Section 12.9 and by ensuring that the construction of the Scheme responds to the national regulatory or policy standards and local policy requirements relevant to this aspect. The residual effects detailed in this section assume the implementation of this mitigation.
- 12.10.3 Effects on land use and accessibility receptors are shown on Figure 12.3: Key Population and Human Health Impacts of the Environmental Statement Figures (TR010064/APP/6.2).

Construction

Private property and housing

- 12.10.4 Effects on housing have been predicted as **not significant**. The nature of impacts on housing relates to relatively small areas of land take (mostly temporary) and potential disruption to some residential streets for construction access.
- 12.10.5 A summary of the overall effects on residential land use is set out in Table 12.16. Further details on the impacts at individual locations are set out in Appendix 12.1: Detailed Private Property and Housing Assessment of the Environmental Statement Appendices (TR010064/APP/6.3).

Table 12.16 Assessment of likely significant effects during construction on private property and housing

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Existing housing	Very high	<ul style="list-style-type: none"> • Temporary land take involving strips of land to the rear of approximately 28 properties. Land take is from areas to rear of properties' garden boundaries. This land is on the highway side of the properties' boundary fences and thought to be owned by National Highways but not currently shown as such on Land Registry plans. Further temporary land take would be from five car parking spaces. The longest impact would be for 23 properties where space is required to construct a retaining wall over a period of approximately 60 weeks • Potential intermittent disruption to access for approximately 157 properties due to temporary possession of streets to allow for utility diversions for an estimated period of four to 12 weeks 	<ul style="list-style-type: none"> • Commitment PHH13 – All land subject to temporary possession will be restored to the original surveyed condition at the time of entry (unless otherwise agreed with the landowner). • Commitment PHH17 – Community Liaison Manager will oversee liaison with affected residents regarding timing of construction works. • Commitment PHH5 – Access to private properties will be maintained throughout construction where practicable. For residential properties where access will be directly affected during construction, an appropriate alternative temporary or permanent access will be provided where practicable. <p>Note that the principles of the compensation code will apply.</p>	Negligible adverse – there would be discernible changes to features of some properties, but residential function would be retained	Slight adverse (temporary)

Receptor	Value/sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Land allocated for housing	Very high	Heywood / Pilsworth Northern Gateway (JPA1.1). Acquisition of a very small (less than 2%) proportion of the site, mostly required on a permanent basis. This is not likely to compromise use of the site for development and improving capacity of the motorway network is required to support scale of development (GMCA, 2021).	<ul style="list-style-type: none"> Commitment PHH13 – All land subject to temporary possession will be restored to the original surveyed condition at the time of entry (unless otherwise agreed with the landowner). 	Negligible adverse – the marginal loss of land would likely be incorporated into the developing proposals for the allocation	Slight adverse (temporary)

Community land and assets

- 12.10.6 Effects on community land and assets have been predicted as **not significant** overall. Embedded mitigation has avoided impacts on several of the community assets identified in the baseline.
- 12.10.7 Affected community land and assets are set out in Table 12.17 along with the assessment.

Table 12.17 Assessment of likely significant effects during construction on community land and assets

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Prestwich Heys Football Club	High	Temporary access required across approximately 50% of land associated with football club which is currently used by club for car parking and storage. A maintenance vehicle layby would be constructed within the car park to allow for the parking of maintenance vehicles. There is potential for intermittent disruption to access for the club for a period of six to 12 weeks. There would be no impact on the sports pitch. Permanent right of access would be in place which would not affect normal use.	<ul style="list-style-type: none"> Commitment PHH2 – Where practicable, construction activities will be planned and managed to avoid conflict with access and use of Prestwich Heys Football Club, for example during football match fixtures, as informed through liaison with Prestwich Heys Football Club and Bury Metropolitan Borough Council. Commitment PHH5 – Access to the Football Club will be maintained throughout construction where practicable. 	Negligible adverse	Slight adverse (temporary)
Unsworth Academy school playing fields	Very high	Approximately 6% (0.3ha) of playing fields area to be used to allow for drainage works. Permanent right of access would be in place. The land take would be in the form of one strip of land along the southern boundary of the field. No physical impact is anticipated on the marked pitches themselves and therefore the sports function of the playing fields would be generally maintained. There is potential for intermittent disruption sports use of the pitches, depending on the timing of the works and health and safety constraints.	<ul style="list-style-type: none"> Commitment PHH3 – Works at Unsworth Academy school playing fields will be undertaken outside of school hours and times of sports use wherever practicable, as informed through liaison with Unsworth Academy. Areas of works will be fenced off to ensure safety of schoolchildren and other users of the facilities. 	Negligible adverse	Slight adverse (temporary)

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Pike Fold Golf Club	Low	Permanent land take (circa 1.4ha or 2.5% of the total area of the facility). Land take largely restricted to boundaries of golf course however it would impinge on a functional area (tee boxes) in the south-west corner of the golf course which would require a change to operating conditions but overall viability of land use is anticipated to be retained.	<ul style="list-style-type: none"> Commitment PHH5 – Access to the Golf Club will be maintained throughout construction where practicable. Commitment PHH16 – Liaison with Pike Fold Golf Club will be undertaken during detailed design and pre-construction stages to limit impacts on the amenity of the golf course during construction as far as practicable. Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. 	Minor adverse	Slight adverse (permanent)
Simister Allotments	Medium	No direct impact on land use. Part of private road used to access the allotments is within Order Limits for construction access so there is potential for intermittent disruption to access. However this is not likely to impact on the function of the allotments themselves.	<ul style="list-style-type: none"> Commitment PHH5 – Access to allotments will be maintained throughout construction where practicable. Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. 	Negligible adverse	Neutral

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
St Margaret's Church of England Primary School	Very high	No physical impact is likely on the school grounds. However, construction activities would be close (<30m) to the playing field so there is potential for noise, dust and other activities to disrupt sports use.	<ul style="list-style-type: none"> Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. 	Negligible adverse	Slight adverse (temporary)

Development land and business

12.10.8 Effects on development land and business have been assessed as **not significant**. The majority of commercial and industrial properties identified in the baseline (Table 12.13) would not be affected. Development land and business properties that would be affected are set out in Table 12.18 which includes a description of the impacts and assessment of the effects.

Table 12.18 Assessment of likely significant effects during construction on development land and business

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Heywood / Pilsworth Northern Gateway (JPA1.1).	Very high	Heywood / Pilsworth Northern Gateway (JPA1.1). Acquisition of a very small (less than 2%) proportion of the site, mostly required on a permanent basis. This is not likely to compromise use of the site for development and improving capacity of the motorway network is required to support scale of development (GMCA, 2021).	<ul style="list-style-type: none"> Commitment PHH13 – All land subject to temporary possession will be restored to the original surveyed condition at the time of entry (unless otherwise agreed with the landowner). 	Negligible adverse – the marginal loss of land would likely be incorporated into the developing proposals for the allocation	Slight adverse (permanent)

Receptor	Value/sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Frigate Public House	Medium	Permanent right of access acquired over approximately 28% of car park area (not required for construction access). It is not thought that this land is part of the functional beer garden area as it is beyond a fence line and appears to be unused. There would be a potential requirement to change operating conditions for car parking, but this is not anticipated to affect the viability of the land use for business.	<ul style="list-style-type: none"> Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. The principles of the compensation code will apply.	Minor adverse	Slight adverse (permanent)

Agricultural landholdings

- 12.10.9 Effects on agricultural landholdings have been assessed as **significant**. Moderate adverse impacts due to land take during the construction phase have been identified for landholdings SW1, NW1, NE2 and NE4. Two of these landholdings are used for arable agriculture and pasture, and two landholdings used for grazing livestock. For one arable agricultural landholding (SW1) (high value) the land take would be permanent. Taking into account the temporary and permanent impacts, the overall significance of effect on the agricultural resource has been determined as **moderate adverse (significant)**. As noted in Section 12.7 of this chapter, much of this land is allocated for mixed use (housing and employment) under the Places for Everyone plan (GMCA, 2021) and is likely to be built on in the future baseline. However the Places for Everyone Plan (GMCA, 2021) had not been adopted at the time of assessment and so the assessment compares the impact of the Scheme on the current baseline, whereby agricultural land availability is relatively limited in the study area.
- 12.10.10 A summary of the assessment for each of the affected agricultural landholdings is set out in Table 12.19. No impacts are predicted on landholdings SW2 or NW3 and therefore they have not been included in Table 12.19.

Table 12.19 Assessment of likely significant effects during construction on agricultural landholdings

Receptor	Size* and land use	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of effect
SE1	2ha, permanent pasture / grazing	Medium	Permanent land take of approximately 0.08ha (approximately 4%) from south-westernmost boundaries of two fields. This would not cause severance of any land and is unlikely to have a discernible impact on function of landholding.	<ul style="list-style-type: none"> Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. Liaison with landowners, tenants, and their agents which are affected by the Scheme has been ongoing. <p>The principles of the compensation code will apply.</p>	Negligible adverse	Neutral (permanent)
SW1	22.67ha, mixed (arable / pasture)	High	Land take of approximately 7.76ha (approximately 34%) to accommodate temporary access, construction compounds and materials storage areas for construction, drainage ponds, and permanent ecological mitigation areas. Permanent land take (5.49ha) involves parts of two fields and one complete field. Remaining parts of fields could continue to be farmed once temporary land take restored.	<ul style="list-style-type: none"> Commitment PHH13 – All land subject to temporary possession will be restored to the original surveyed condition at the time of entry (unless otherwise agreed with the landowner). Approximately 2.26ha will be restored post-construction, meaning a total of 5.49ha (approximately 24%) permanent land take. Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. Liaison with landowners, tenants, and their agents which are affected by the Scheme has been ongoing. <p>The principles of the compensation code will apply.</p>	<p>Moderate adverse (temporary)</p> <p>Minor adverse (permanent)</p>	<p>Moderate adverse (temporary)</p> <p>Slight adverse (permanent)</p>

Receptor	Size* and land use	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of effect
NW1	11.93ha, grazing (horses)	Medium	Land take of approximately 8.61ha (one entire large field, approximately 72% of landholding) to accommodate temporary material storage areas, construction compound, haul route, drainage works, maintenance access and construction of embankments for the Northern Loop. Permanent land take would be approximately 2.09ha (approximately 17.5%).	<ul style="list-style-type: none"> Commitment PHH13 – All land subject to temporary possession will be restored to the original surveyed condition at the time of entry (unless otherwise agreed with the landowner). Approximately 6.52ha will be restored post-construction, meaning permanent land take would be approximately 2.09ha (17.5%). Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. Liaison with landowners, tenants, and their agents which are affected by the Scheme has been ongoing. <p>The principles of the compensation code will apply.</p>	<p>Moderate adverse (temporary)</p> <p>Minor adverse (permanent)</p>	<p>Moderate adverse (temporary)</p> <p>Slight adverse (permanent)</p>
NW2	3.20ha, grazing (horses)	Negligible	Land take of entire 3.20ha plot.	<ul style="list-style-type: none"> None (land owned by National Highways). 	Major adverse (permanent)	Slight adverse (permanent)

Receptor	Size* and land use	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of effect
NE1	1.67ha, not farmed / overgrown	Negligible	Permanent acquisition of entire plot (1.67ha) for construction of Northern Loop, motorway widening, landscaping and a PRow diversion.	<ul style="list-style-type: none"> Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. Liaison with landowners, tenants, and their agents which are affected by the Scheme has been ongoing. <p>The principles of the compensation code will apply.</p>	Major adverse (permanent)	Slight adverse (permanent)
NE2	30.49ha, mixed (pasture / arable)	High	Permanent land take of approximately 10.96ha (approximately 36% of landholding) comprising two entire fields for construction of the Northern Loop (including drainage), landscaping and environmental mitigation, and a PRow diversion.	<ul style="list-style-type: none"> Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. Liaison with landowners, tenants, and their agents which are affected by the Scheme has been ongoing. <p>The principles of the compensation code will apply.</p>	Moderate adverse (permanent)	Moderate adverse (permanent)
NE3	2.65ha, grazing (horses)	High	No land take predicted. Potential for severance of access to stables where Egypt Lane to be acquired for construction and maintenance access.	<ul style="list-style-type: none"> Commitment PHH5 – Arrangements will be made to enable access to stables at all times. 	Minor adverse (temporary)	Slight adverse (temporary)

Receptor	Size* and land use	Value/sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of effect
NE4	5.21ha, permanent pasture / grazing (cattle)	High	<p>Land take of 2.40ha from one field (approximately 46% of landholding) would be required to accommodate drainage and materials storage. It is unclear whether the south-eastern portion of the field would be accessible during construction, therefore it is assumed that temporary severance of the field would occur during construction.</p> <p>Permanent land take would involve approximately 1.44ha (approximately 27.6% of the landholding).</p>	<ul style="list-style-type: none"> Commitment PHH17 – Community Liaison Manager will oversee liaison with affected parties regarding timing of construction works. Liaison with landowners, tenants, and their agents which are affected by the Scheme has been ongoing. Commitment PHH13 – All land subject to temporary possession will be restored to the original surveyed condition at the time of entry (unless otherwise agreed with the landowner). Approximately 1ha will be restored post-construction, which will reverse any severance of field, meaning permanent land take would be approximately 1.44ha (27.6%). <p>The principles of the compensation code will apply.</p>	<p>Moderate adverse (temporary)</p> <p>Minor adverse (permanent)</p>	<p>Moderate adverse (temporary)</p> <p>Slight adverse (permanent)</p>

*Estimated size of landholding within study area. Landowners may own further land beyond the scope of landownership searches for the Scheme.

WCH

12.10.11 Effects on WCH during construction have been assessed as **significant**. The significantly affected routes would be:

- Permissive path via Haweswater Aqueduct underpass (**very large adverse effect**)
- Footpath 9WHI (**moderate adverse effect**)
- Footpath 84BUR (**moderate adverse effect**)

12.10.12 A significant adverse effect has been identified for the Haweswater Aqueduct underpass permissive path since it would require a substantial diversion (1.7km) and affects a school route. Footpath 84BUR would involve a substantial diversion which is likely to affect recreational journeys, while footpath 9WHI would be closed during the construction phase, again affecting recreational journeys.

12.10.13 Table 12.20 sets out the predicted effects on the WCH routes likely to be affected by the Scheme. Unaffected routes identified in the baseline have not been included in Table 12.20.

Table 12.20 Assessment of likely significant effects during construction on WCH routes

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Permissive path via Haweswater Aqueduct underpass	Very high	Temporary closure of the permissive path would be required for six to eight weeks to allow for the widening of the highway around Haweswater Aqueduct underpass and works to the underpass structure. Diversion via Sandgate Road is some 1.7 km longer which adds considerable distance for some schoolchildren north of the M60 who are in the catchment for Parrenthorn High School.	<ul style="list-style-type: none"> • Commitment PHH7 – So far as practicable, works will be planned to avoid temporary closure of the permissive path during school term times, and consideration will be given to busy periods around school opening and closing times. Note that since this mitigation is uncertain it has not been accounted for in the assessment of magnitude and significance. 	Major adverse	Very large adverse (temporary)

Receptor	Value/sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
			<ul style="list-style-type: none"> Commitment PHH12 – Essential diversions for health and safety requirements are identified in the Outline Traffic Management Plan (TR010064/APP/7.5). All temporary diversions of PRoW and other routes used by walkers, cyclists and/or horse riders will be clearly signed and suitable for all potential users of the existing provision (for example, where closure of a bridleway is required, the diversion route provided will be suitable for WCH). 		
Bridleway 27aPRE	Medium	No direct impact. Potential loss of amenity for the affected stretch which passes close to construction areas, however access would be retained.	<ul style="list-style-type: none"> Commitment PHH4 – Works near PRoW will be fenced off to ensure safety. 	Negligible adverse	Slight adverse (temporary)
Footpaths 28aPRE and 29aPRE	Low	Permanent closure due to the construction and maintenance of Pond 5. A diversion route would be put in place linking to bridleway 27aPRE. Since most journeys would be via bridleway 27aPRE, no increase or decrease in journey distance is considered likely.	<ul style="list-style-type: none"> Commitment PHH12 – All temporary diversions of PRoW and other routes used by walkers, cyclists and/or horse riders will be well-signed and suitable for all potential users of the existing provision. 	Negligible adverse	Neutral
Footpath 28bPRE and 29bPRE	Medium	No direct impact. Potential loss of amenity for the affected stretch which passes close to construction areas, however access would be retained.	<ul style="list-style-type: none"> Commitment PHH4 – Works near PRoW will be fenced off to ensure safety. 	Negligible adverse	Slight adverse (temporary)

Receptor	Value/sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Footpath 46WHI	Medium	Egypt Lane would be used for construction plant access during the enabling works phase, and therefore there may be occasional disruption in access or reduction in amenity of these routes during the construction period. It is assumed access would be retained.	<ul style="list-style-type: none"> Commitment PHH10 – Access along footpath 46WHI will be maintained for public use throughout construction as far as safe and practicable. 	Minor adverse	Slight adverse (temporary)
Footpath 50PRE	Medium	Egypt Lane would be used for construction plant access during the enabling works phase, and therefore there may be occasional disruption in access or reduction in amenity of these routes during the construction period. It is assumed access would be retained.	<ul style="list-style-type: none"> Commitment PHH10 – Access along footpath 50PRE will be maintained for public use throughout construction as far as safe and practicable. 	Minor adverse	Slight adverse (temporary)
Footpath 9WHI	Medium	The public footpath would need to be closed during construction over a duration of approximately 36 to 42 months until a replacement route has been provided.	<ul style="list-style-type: none"> None identified. 	Major adverse	Moderate adverse (temporary)
Footpath 7WHI	Very high	Construction vehicles would be required to cross the path due to works to construct Pond 2. This would last for approximately four to twelve weeks.	<ul style="list-style-type: none"> Commitment PHH9 – Access along footpath 7WHI will be maintained at all times for access to Unsworth Academy playing fields and for users of the public footpath. Use of controlled temporary crossing will be used to facilitate safe access for schoolchildren, staff and members of the public using the route. 	Negligible adverse	Slight adverse (temporary)

Receptor	Value/sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Castle Road / Restricted byway 85BUR	High	The junction with Griffie Lane would be used as construction access for Pond 2. Therefore, there may be occasional transient disruption in access or reduction in amenity of these routes during the construction period. It is assumed access would be retained.	<ul style="list-style-type: none"> Commitment PHH11 – Access along footpath 85BUR will be maintained for public use so far as possible throughout construction. Where this is not safe and practicable a diversion route will be provided. 	Minor adverse	Slight adverse (temporary)
Footpath 89BUR	Medium	Approximately 270m of Griffie Lane would be used as construction access for Pond 2. Therefore, there may be occasional transient disruption in access or reduction in amenity of these routes during the construction period. It is assumed access would be retained.	<ul style="list-style-type: none"> Commitment PHH11 – Access along footpath 89BUR will be maintained for public use so far as possible throughout construction. Where this is not safe and practicable a diversion route will be provided. 	Minor adverse	Slight adverse (temporary)
Footpath 12WHI	Medium	Pole Lane would be used for construction plant access during the enabling works phase and for access by construction worker cars and other small good vehicles during the main construction works, leading to a small degree of disruption in access and reduction in amenity of this these route during this period of time. It is assumed access would be retained, and the effects on amenity would not be sufficient to dissuade use.	<ul style="list-style-type: none"> Commitment PHH11 – Access along footpath 12WHI will be maintained for public use so far as possible throughout construction. Where this is not safe and practicable a diversion route will be provided. 	Minor adverse	Slight adverse (temporary)

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Footpath 84BUR	Medium	<p>The PRoW may be required to be closed for approximately two to four weeks during piling works for a new gantry.</p> <p>A diversion route via The Hags would be provided. The diversion would increase the journey length between Hollins Lane and Aviation Road by 1,178m.</p>	<ul style="list-style-type: none"> • Commitment PHH11 – Access along footpath 84BUR will be maintained for public use so far as possible throughout construction. Where this is not safe and practicable a diversion route will be provided. • Commitment PHH12 – All temporary diversions of PRoW and other routes used by WCH will be clearly signed and suitable for all potential users of the existing provision. 	Major adverse	Moderate adverse (temporary)

Operation

Private property and housing

- 12.10.14 No effects over and above those identified at the construction stage (Table 12.16) have been identified for private property and housing, and no operational significance is ascribed.

Community land and assets

- 12.10.15 No effects over and above those identified at the construction stage (Table 12.17) have been identified for community land and assets. Table 12.17 also reports permanent land take from Pike Fold Golf Course. It is anticipated that the golf club would have adapted its course to manage this loss of land and so no operational effect is predicted in the post-construction period.

Development land and business

- 12.10.16 No operational impacts on development land and business over and above those identified in Table 12.18 as commencing at the construction stage have been identified.

Agricultural landholdings

- 12.10.17 Permanent loss of land from agricultural landholdings would occur as a result of the construction phase and therefore no effects on land take or severance over and above that reported for the construction stage (Table 12.19) would occur.
- 12.10.18 Overall, approximately 24.92ha of agricultural land in the study area would be permanently lost. Approximately 3.2ha of this land is already owned by National Highways, therefore the permanent land take of agricultural land not owned by National Highways would be approximately 21.72ha. Approximately 9.96ha of land (approximately 40% of the total agricultural land take during construction) would be restored to agricultural use post-construction. No operational impacts on restored or remaining land are anticipated from the Scheme. It should be noted that much of the agricultural land to the north-east of M60 J18 is allocated for mixed use development under the Heywood / Pilsworth Northern Gateway (JPA1.1) allocation in Places for Everyone (GMCA, 2021) and therefore the time period over which agricultural production would continue in this area is uncertain.

WCH

- 12.10.19 Effects on WCH during operation have been assessed as **not significant**. The operational effects on footpaths are set out in Table 12.21. The Scheme includes a modest enhancement for recreational walkers through the inclusion of a replacement route for footpaths 28aPRE and 29aPRE through an area of ecological mitigation. The Scheme would not cause any new severance of existing routes for WCH.

Table 12.21 Assessment of likely significant effects during operation on WCH

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Footpaths 28aPRE and 29aPRE	Low	A replacement route would be provided which would loop through an environmental mitigation area. This would provide an enhanced connection to nature (see also Section 12.18 of this chapter). Since the footpaths do not provide a meaningful route in the baseline, it is not considered the additional length of the new route would result in increased journeys or should be judged as negative, as people could use the more direct bridleway 27aPRE as they currently do in the baseline. On this basis the impact is judged to be beneficial.	Commitment PHH1 – The type and quality of new or reprovisioned surfacing, crossing and access points for PRow and other routes used by WCH will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance.	Negligible beneficial	Neutral

Receptor	Value/ sensitivity	Description of potential impact	Summary of mitigation in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)	Magnitude of impact	Significance of residual effect
Footpath 9WHI	Medium	Approximately 300m of footpath along Egypt Lane would be stopped up due to the construction of the Northern Loop north-east of M60 J18. The footpath would be realigned from Egypt Lane around the outside of the Northern Loop. The new loop structure would be on an embankment and the public footpath would be at the foot of the embankment. The public footpath would then transition to the top of an embankment between the realigned slip road and Pike Fold Golf Course before tying back into the existing alignment south of Hills Lane.	Commitment PHH1 – The type and quality of new or reprovisioned surfacing, crossing and access points for PRow and other routes used by WCH will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance.	Negligible beneficial (no discernible change in distance is anticipated for walkers between Egypt Lane and Hills Lane).	Neutral
Footpath 7WHI	Very high	Pond 2 would be created at the low point in the field next to the school playing field, requiring a section of the public footpath to be realigned around the north of the pond.	Commitment PHH1 – The type and quality of new or reprovisioned surfacing, crossing and access points for PRow and other routes used by WCH will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance.	Negligible adverse (change in distance is anticipated to be marginal for walkers)	Slight adverse

12.11 Monitoring

- 12.11.1 No specific monitoring measures are proposed for land use and accessibility. Refer to Section 12.19 for monitoring proposals for human health.

C. Human health

12.12 Human health assessment methodology

Assessment scope

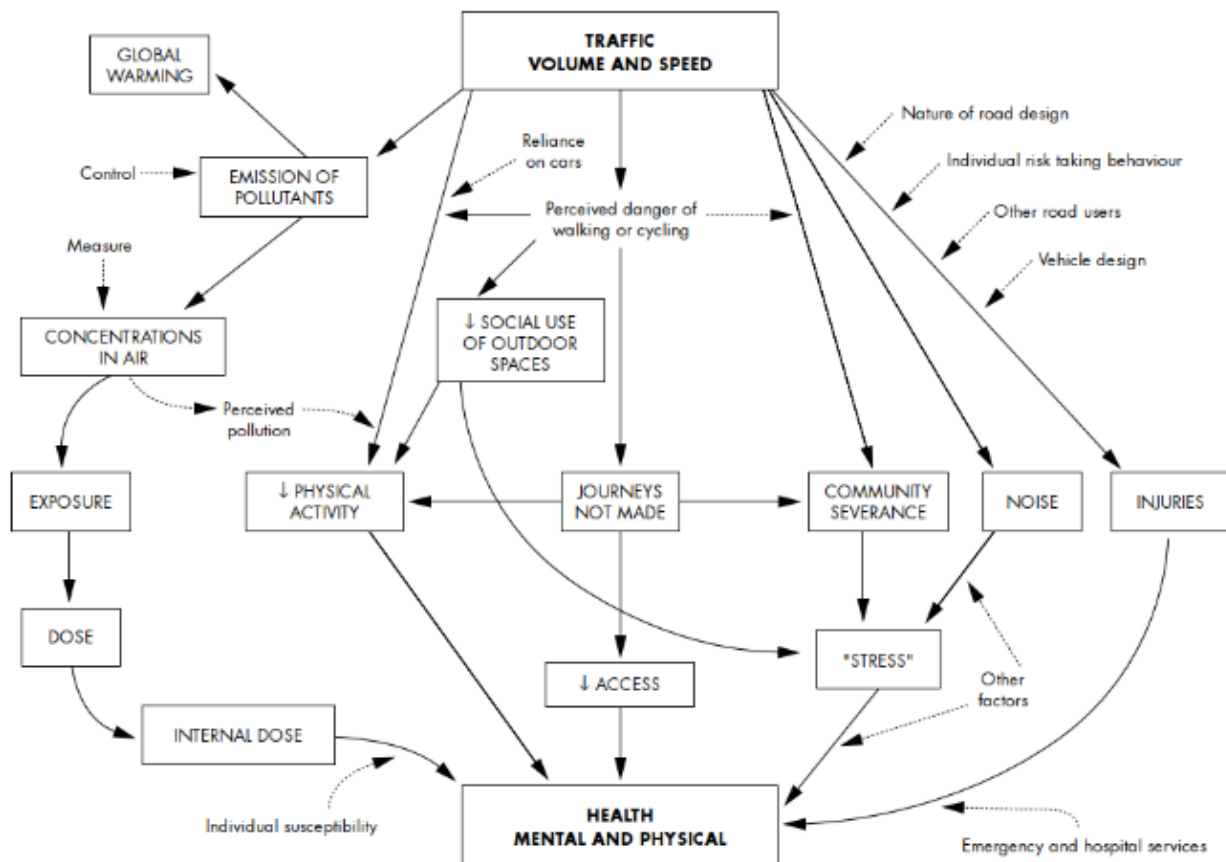
Definitions of health and mental health

- 12.12.1 The human health assessment adopts the World Health Organisation (WHO) definition of health which is *'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'* (WHO, 1948).
- 12.12.2 The WHO describes mental health as *'a state of wellbeing in which an individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community.'* (WHO, 2018).
- 12.12.3 This assessment applies that definition and uses the terms mental health and mental wellbeing interchangeably. Mental wellbeing is taken to include emotional, social and psychological wellbeing. Mental illness refers to clinically identifiable illness or conditions that affect cognitive functioning.

Pathways to health outcomes

- 12.12.4 Highway schemes can affect human health in direct and indirect ways. Plate 12.1 provides an illustration of some of the pathways through which a completed highway scheme, with its associated traffic, can have unintended adverse impacts on physical and mental health. Highway schemes can also have beneficial impacts on human health by providing opportunities for people to access a range of services, employment, education and leisure opportunities.

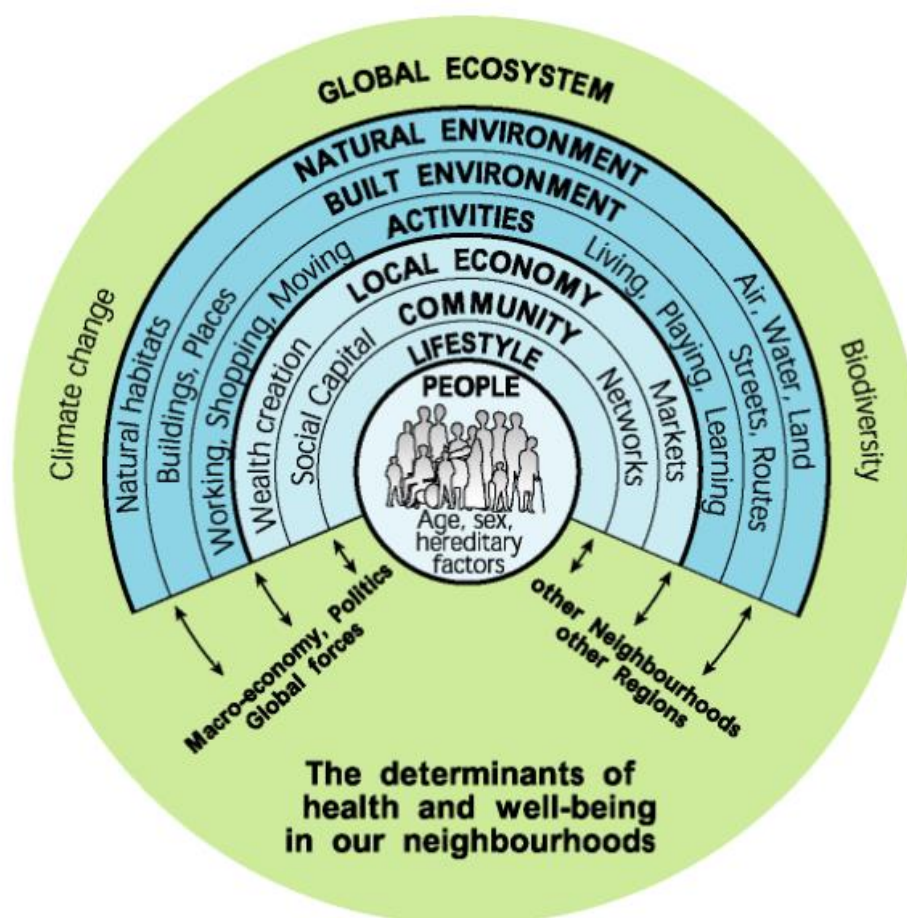
Plate 12.1 Pathways from transport policy to health outcomes (source: Joffe and Mindell, 2002)



Wider determinants of health

12.12.5 Health is determined by a complex interaction between individual characteristics, lifestyle, and the physical, social, and economic environment. These ‘wider determinants of health’ can have a greater influence than medical healthcare for ensuring a healthy population (WHO, 2017). Plate 12.2 provides a conceptual illustration of wider determinants of health.

Plate 12.2 Determinants of health and wellbeing in our neighbourhoods (Source: Barton and Grant, 2006)



Health inequalities

- 12.12.6 A related issue, of key importance to public health, is the issue of health inequalities. The Marmot Review 'Fair Society, Healthy Lives' (Marmot, 2010) highlighted how there is a social gradient of health, whereby inequalities in health outcomes are reflected in the social gradient on wider determinants such as educational attainment, employment, income, and quality of neighbourhood. Understanding the wider determinants of health is seen as an important means of tackling health inequalities and improving population health as a whole.
- 12.12.7 This assessment therefore considers how the Scheme is likely to have impacts on wider determinants of health and how those impacts are associated with effects on health outcomes. It does this by taking account of the findings from other environmental aspect assessments within this Environmental Statement (TR010064/APP/6.1), as well as considering impacts on determinants relating to access, traffic and transport, socio-economic conditions, and land use. The next sub-section of this chapter provides further detail on the scope of matters covered within this assessment.

Wider determinants of health scoped into assessment

- 12.12.8 Table 12.22 sets out the scope of the human health assessment.

Table 12.22 Scope of assessment for human health

Health determinant	Scoped in	
	Construction	Operation
Access to the natural environment and outdoor recreation – this includes the ability of communities to access green/open space.	✓	✓
Accessibility for walking and cycling – this includes potential impacts on active travel.	✓	✓
Connections to employment, services, facilities and leisure – this includes changes in the outline spatial characteristics of the transport network, including the surrounding road network, public transport routes and changes in access by car and public transport.	✓	✓
Community severance – this includes the degree of severance or separation between communities and facilities.	✓	✓
Employment opportunities including training opportunities – this includes opportunities to address this social determinant of health and potentially address health inequalities.	✓	x
Quality of urban and natural environments – this addresses changes in environmental conditions relevant to human health including air quality, noise, sources of pollution and landscape amenity.	✓	✓

Scoping Opinion

12.12.9 Table 12.23 summarises the key requirements from the Planning Inspectorate’s Scoping Opinion (TR010064/APP/6.7) as relevant to the scope of the human health assessment, and identifies any matters scoped out of the assessment as agreed with the Planning Inspectorate and other stakeholders. This table also explains any changes to the assessment methodology as a result of this engagement.

Table 12.23 Scoping Opinion feedback on human health

Stakeholder	Comment	Response
Planning Inspectorate	<p><u>ID 4.8.1</u> – <i>‘It is unclear whether [Connections to employment, services, facilities and leisure during construction] is proposed to be scoped in or out of the ES assessment as Table 13.7 states that it will be scoped in for construction and operation but the scoping summary in Table 13.8 proposes to scope it out during construction. As the construction phase has potential to disrupt connectivity through traffic management and alterations of public rights of way, the Inspectorate considers that this matter should be scoped into assessment. Where the Applicant proposes to scope a matter out, sufficient evidence and reasoning must be provided.’</i></p>	<p>This determinant has been scoped into assessment for construction and is assessed in Section 12.18 of this chapter.</p>
	<p><u>ID 4.8.2</u> – <i>‘Community severance is defined as a “longer-term issue” and therefore, as the construction phase is temporary in duration (3 years) and phased, construction impacts would not constitute a long-term change. Therefore, this matter is proposed to be scoped out of the assessment during construction but will be addressed in terms of operational effects. Accessibility is scoped in as a different impact.’</i> <i>‘Based on the information provided, and in particular the statements at paragraphs 13.6.4 and 13.6.5 that severance during construction has the potential to be significant, the Inspectorate does not agree that this matter can be scoped out at this stage and should be considered alongside longer-term severance during operation’</i></p>	<p>This determinant has been scoped into assessment for both construction and operation and is assessed in Section 12.18 of this chapter.</p>
	<p><u>ID 4.8.3</u> – <i>‘No clear explanation is provided as to why employment opportunities during operation are scoped out of the assessment, however, due to the nature of the Proposed Development, the Inspectorate is content to scope this matter out.’</i></p>	<p>Section 12.16 provides an explanation of why there would be no likely significant effects on employment opportunities during operation.</p>

Stakeholder	Comment	Response
	<p><u>ID 4.8.4</u> – ‘<i>Whilst there is potential for disruption to public transport services, the Applicant considers that these may reroute and the overall provision would remain unchanged by the Proposed Development and ultimately have limited effects on human health. Whilst there is no specific details of potential rerouting of coach and bus services (and there are 4 tram stops are located within the study area), the Inspectorate agrees that effects in terms of population and human health from rerouting and disruption to public transport is are unlikely to be significant given the nature, location and objectives of the scheme.</i>’</p>	<p>Disruption of public transport services has been scoped out of the assessment.</p>
	<p><u>ID 4.8.5</u> – ‘<i>For the reasons given in table 13.7 of the Scoping Report, the Inspectorate agrees [the remaining wider determinants of health scoped out of assessment in the Scoping Report] can be scoped out during construction and operation in terms of the Proposed Development’s potential effects to population and human health.</i>’</p>	<p>The wider determinants referred to have been scoped out of the assessment.</p>
	<p><u>ID 4.8.6</u> – ‘<i>Scoping Report paragraph 13.3.31 states that those values shaded in Table 13.5 are ‘significantly worse’ than the national average (also displayed in the Table). However, there is no explanation or set threshold provided to determine what above the national average is considered ‘significantly worse’.</i></p> <p><i>Should these figures be used to inform the baseline of the assessment in the ES, there should be an explanation as to how these figures have been separated from others as ‘significantly worse’ than the national average and how this influences the assessment of significant effects under the EIA Regulations.’</i></p>	<p>The calculation of significance for health indicator data has been undertaken by OHID and the table replicates that data. An explanation of how significance has been determined is provided in the table notes for Tables 12.29 and 12.30.</p>
	<p><u>ID 4.8.7</u> – ‘<i>Scoping Report paragraph 13.7.13 states that no judgement of significance will be made for human health impacts. Regulation 14(2)(b) of The Environmental Impact Assessment (EIA) Regulations 2017 states that the environmental statement must include a description of the likely significant effects of the Proposed Development. Section 5(d) of Schedule 4 of the EIA Regulations states that information for inclusion in environmental statements includes a description of the likely significant effects of the Proposed Development on the risks to human health.</i></p> <p><i>Therefore, the ES should describe the methodology for determining the significance of effects and report the significance of effects on human health.’</i></p>	<p>This chapter now includes significance criteria for the human health assessment based on guidance from IEMA (Pyper et al., 2022). These criteria are set out in Tables 12.25 – 12.28.</p>

Stakeholder	Comment	Response
Public Health England (PHE)	<i>‘Potential for impacts on human health from sources of water contamination and electric and magnetic fields should be clarified.’</i>	No impacts on human health associated with water contamination or electric and magnetic fields are anticipated.
	<ul style="list-style-type: none"> • Support for design development reduces public exposure to air quality pollutants, addresses inequalities of exposure and maximises opportunities for physical activity. • Identification of wider determinants of health that the assessment should address, and of vulnerable groups that should be considered. • Suggested guidance to follow for assessment of health impacts associated with noise, which involves quantification approaches. 	<ul style="list-style-type: none"> • Opportunities to contribute towards improved health outcomes will continue to be explored as the design development progresses. • The Director of Public Health (DPH) was contacted by email on 6 March 2023, 11 May 2023 and 24 May 2023 for information on vulnerable groups and health priorities for the area. A contact for follow up was provided by the DPH on 26 May 2023. Microsoft Teams meetings were held with the DPH’s delegate on 5 July 2023 and 12 July 2023 where information to inform the assessment was shared. • This chapter now includes quantification of health outcomes associated with noise.

Statutory consultation

12.12.10 Table 12.24 summarises key feedback from the United Kingdom Health Security Agency (UKHSA) and Office for Health Improvement and Disparities (OHID) during the statutory consultation. All comments raised during the statutory consultation, as well as the Applicant’s responses, are included in Annex Q of the Consultation Report Annexes (TR010064/APP/5.2).

Table 12.24 Statutory consultation feedback on preliminary human health assessment

Stakeholder	Comment	Response
UKHSA	<p>Comments were made in relation to the noise and vibration assessment in the PEIR, rather than the population and human health assessment. Comments related to the use of the observable adverse effects levels (LOAELs and SOAELs), concerns over the scale of impact from construction noise and recommendations to include greater consideration of the strengthening body of evidence that road traffic noise is associated with adverse health effects, including annoyance, sleep disturbance, and cardiovascular and metabolic health outcomes and to quantify health outcomes associated with noise.</p> <p>Recommendations were made that effective communication between contractor and communities would be key to giving communities a meaningful say.</p>	<p>While the assessment in Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1) applies DMRB LA 111 (Highways England, 2020c) and the observable adverse effects levels from the NPSE, this human health assessment has based the judgement of significance on health effects on the quantified noise results which relate to effect sizes and dose-response relationships developed from recent scientific literature.</p> <p>Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3) provides a review of scientific literature on noise effects on health outcomes.</p> <p>This chapter now includes quantification of health outcomes associated with noise.</p> <p>A mitigation measure for a Community Liaison Manager and a monitoring strategy for recording how community concerns have been addressed are included as commitments PHH17 and PHH20, respectively, in the REAC contained within the First Iteration EMP (TR010064/APP/6.5) (see Section 12.17 of this chapter for further details).</p>
OHID	<p><i>'The IEMA guidance has been developed to be the national guidance for assessing significance in population and human health and so should be adopted and utilised for the purposes of the Environmental Statement (ES).'</i></p>	<p>This chapter now includes significance criteria for the human health assessment based on guidance from IEMA (Pyper <i>et al.</i>, 2022). These criteria are set out in Tables 12.25 – 12.28 of this chapter.</p>

Stakeholder	Comment	Response
	<p><i>'The baseline health data should include sufficient data to consider mental health and wellbeing, including suicides. Additionally, the local DPH and Police should be contacted to inform an assessment of risk from the scheme, including scheme design, such as bridge structures. National Highways have previously created Suicide Prevent Strategy Reports, which should also be generated and included within the Environmental Statement for this scheme if required. Supporting assessments, alongside any proposed additional mitigation measures should be agreed with OHID and the local DPH.</i></p> <p><i>The applicant should refer to the vulnerable groups identified by the Wales Health Impact Assessment Support Unit to inform assessments of any possible differential impacts. In addition to health data this should encompass deprivation, demographics and other socio-economic factors from local data sources or the review of local publications such as the JSNA.'</i></p>	<p>Baseline mental health data has now been included in Section 12.15 of this chapter, in relation to vulnerable groups identified using the checklist from the Welsh Health Impact Assessment Support Unit (WHIASU).</p> <p>Reference has been made to the JSNA (Bury Metropolitan Borough Council Health and Wellbeing Board, 2023), the Bury Directory (Bury Metropolitan Borough Council, 2022) and "Let's Do It!" Bury Strategy 2030 (Bury Metropolitan Borough Council, 2021) to provide further baseline information.</p> <p>The DPH was contacted by email on 6 March 2023, 11 May 2023 and 24 May 2023 for information on vulnerable groups and health priorities for the area. A contact for follow up was provided by the DPH on 26 May 2023. Microsoft Teams meetings were held with the DPH's delegate on 5 July 2023 and 12 July 2023 where information to inform the assessment was shared.</p>
	<p><i>'The overall risk to WCH and impact on active travel should be considered on a case-by-case basis, taking into account the number and type of users and the effect that the temporary traffic management system will have on their journey and safety.'</i></p>	<p>Potential construction traffic impacts have been substantially reduced by the revised design for the Scheme since the statutory consultation. Main construction routes would be directly from the motorways and therefore the risk to WCH would be limited.</p> <p>Consideration to the impact of temporary traffic diversions has been included in the assessment.</p>

General approach

Standards and guidance

- 12.12.11 The approach to the assessment on human health applies the standard DMRB LA 112 and is supported by the following further guidance:
- HIA in Spatial Planning (PHE, 2020)
 - Human health: Ensuring a high level of protection (International Association for Impact Assessment (IAIA) and European Public Health Association (EUPHA), 2020)
 - IEMA Guide to Determining Significance for Human Health in Environmental Impact Assessment (Pyper *et al.*, 2022) (hereafter referred to as the 'IEMA Guidelines')

Developing community health profiles

- 12.12.12 The assessment relates to population health, which is concerned with the health outcomes of groups of people. The assessment has considered communities within the study area, as well as potential vulnerable groups using guidance from the WHIASU, which was recommended for use by UKHSA in its statutory consultation response (see Table 12.24 of this chapter for further details).
- 12.12.13 In accordance with DMRB LA 112, the health profiles of communities have been established through the inclusion of the following data which are available at ward level:
- Percentage of community with increased susceptibility to health issues (vulnerable members, e.g., ages below 16 and over 65)
 - Percentage of community with pre-existing health issues (e.g., respiratory disease/chronic obstructive pulmonary disease (COPD))
 - Deaths from respiratory diseases
 - Percentage of community with long-term illness or disability
 - Life expectancy
 - Income deprivation
- 12.12.14 Data on coronary heart diseases have also been obtained due to the associations between these outcomes and relevant risk factors linked to transport, for example physical activity levels (see Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)). Data on mental health indicators have been obtained to help understand the general mental health condition of the communities. Mental health indicator datasets were only available at district and clinical commissioning group levels.
- 12.12.15 The health profile of communities has therefore been built up from a consideration of indicators of physical health, socio-economic status and mental health and wellbeing.

Impact identification

- 12.12.16 A source-pathway-receptor approach has been undertaken to inform whether there are plausible links between impacts on health determinants and potential health outcomes within the local communities. This has involved the following broad process:
- Identifying how the Scheme would potentially impact on a health determinant
 - Understanding the pathways between potential impacts and physical, mental, and social health outcomes
 - Considering the likelihood that communities (potential receptors) would be exposed to those pathways, taking into account the effectiveness of essential mitigation.
- 12.12.17 The understanding of pathways between potential impacts and health outcomes has been informed by scientific literature including systematic reviews with meta-analyses where available. Systematic reviews provide a summary of all the literature available on a particular topic which meets pre-defined eligibility criteria. These are more helpful as an evidence base as they synthesise the available research and help to reduce the overall level of bias which may influence an individual research paper. The health evidence base is set out in Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3).

Indicators of public concern and wellbeing

- 12.12.18 Public feedback obtained during the statutory consultation (see the Consultation Report (TR010064/APP/5.1) for further details) has been reviewed to identify issues of local concern of relevance to the health determinants within the scope of this assessment. This has been used to help inform the baseline, sensitivity towards certain issues, as well as potential impacts on quality of life.

Quantification of health impacts associated with noise

- 12.12.19 DMRB LA 112 states that '*a qualitative assessment of human health shall be undertaken, with evidence provided to support conclusions*'. The quantification of health outcomes related to noise was therefore not included in the proposed scope of assessment for population and human health, as set out in the Environmental Scoping Report (TR010064/APP/6.6).
- 12.12.20 In its Scoping Opinion consultation response (see Table 12.23 of this chapter for further details), PHE recommended the quantification of health outcomes related to noise using the methodology agreed by the Interdepartmental Group on Costs and Benefits - Noise subgroup [IGCB(N)] and more recent systematic reviews.
- 12.12.21 While quantification of health outcomes is not a requirement of DMRB LA 112, quantification (monetisation) of health outcomes has been undertaken to inform the Case for the Scheme (TR010064/APP/7.1). This process follows the approach set out in Transport Analysis Guidance (TAG) Unit A3 (DfT, 2022).

- 12.12.22 The approach set out in TAG Unit A3 is based on that developed by the IGCB(N). A TAG Noise Workbook is included which contains the dose-response functions for each impact pathway (e.g. road transport noise, railway noise or aviation noise). These functions describe, at different noise levels, the percentage of the population affected (for sleep disturbance and annoyance/amenity) or the increased risk of adverse health outcomes. The functions are based on a number of assumptions, for example, that an average household size is 2.3 persons.
- 12.12.23 The TAG Noise Workbook provides a monetised output for each health outcome considered. This is based on the number of Disability-Adjusted Life Years (DALYs) lost or gained under each impact pathway, and monetised at a value of £60,000 per DALY. The output is calculated for 15 years after the Scheme opening and includes some discounting factors in line with the Green Book discount rate set by HM Treasury.
- 12.12.24 The outputs of the TAG Noise Workbook have been drawn on to inform this chapter on the basis that this work was being undertaken as part of the wider project, and therefore provides consistency.
- 12.12.25 The TAG Noise Workbook provides outputs for several health outcomes, however, for this Environmental Statement (TR010064/APP/6.1), only the monetised effects for the following health outcomes are reported, on the basis that these are health outcomes for which the evidence base for associated effects is currently strongest:
- Amenity (this is equivalent to ‘annoyance’ as applied in the WHO Environmental Noise Guidelines (2018))
 - Sleep disturbance
 - Acute myocardial infarction (AMI) – this is the clinical term for ‘heart attack’ and can be an outcome of ischaemic heart disease (IHD)
- 12.12.26 Recent systematic reviews supporting evidence of association between noise and annoyance, sleep disturbance and IHD are set out in Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3).

Assessment criteria

Sensitivity of receptors

- 12.12.27 The sensitivity of communities is described as either ‘high’, ‘medium’ or ‘low’ as required by paragraph 3.3.1 of DMRB LA 112. The judgement of the level of sensitivity has applied the criteria set out in Table 12.25 which have been adapted from the IEMA Guidelines (Pyper *et al.*, 2022).

Table 12.25 Sensitivity criteria for human health

Sensitivity level	Indicative criteria*
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the Scheme); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependents; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.

*Judgement based on most relevant criteria, it is likely in any given analysis that some criteria will span categories.

Adapted from Pyper *et al.* (2022).

Magnitude of impact (change) and significance of effect

12.12.28 Health outcomes are reported as positive, neutral, negative or uncertain as required by DMRB LA 112 (Table 3.32, p21). DMRB LA 112 does not currently provide significance criteria for human health assessment. Therefore, magnitude and sensitivity criteria from the IEMA Guidelines (Pyper *et al.*, 2022) have been adapted to align with terminology applied in DMRB LA 104. The health outcomes are reported with a supporting narrative setting out the judgement as to how the scale and significance of health effect have been determined. The magnitude and significance criteria used to support this judgement are set out in Tables 12.26 and Table 12.27 respectively. The judgement of significance category to be applied has been guided by the matrix in Table 12.28.

Table 12.26 Magnitude criteria for human health

Magnitude level	Indicative criteria*
Major	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Moderate	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; substantial minority of population affected; gradual reversal; small service quality implications.

Magnitude level	Indicative criteria*
Minor	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implications.

*Judgement based on most relevant criteria, it is likely in any given analysis that some criteria will span categories. Adapted from Pyper *et al.* (2022).

Table 12.27 Significance criteria for human health

Significance level	Indicative criteria*
Large (significant)	<p>Significant for public health because (select as appropriate):</p> <ul style="list-style-type: none"> • Changes, due to the Scheme, have substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views. • Change, due to the Scheme, could result in a regulatory threshold or statutory standard being crossed (if applicable). • There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that would result from the Scheme and changes to health outcomes. • In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or population group affected by the Scheme
Moderate (significant)	<p>Significant for public health because (select as appropriate):</p> <ul style="list-style-type: none"> • Changes, due to the Scheme, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views. • Change, due to the Scheme, could result in a regulatory threshold or statutory standard being approached (if applicable). • There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from the Scheme and changes to health outcomes. • In addition, health priorities for the relevant study area are of general relevance to the determinant of health or population group affected by the Scheme
Slight (not significant)	<p>Not significant for public health because (select as appropriate):</p> <ul style="list-style-type: none"> • Changes, due to the Scheme, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including

Significance level	Indicative criteria*
	<p>as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders.</p> <ul style="list-style-type: none"> • Change, due to the Scheme, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). • There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive relationship between changes that would result from the Scheme and changes to health outcomes. • In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the Scheme.
Negligible (not significant)	<p>Not significant for public health because (select as appropriate):</p> <ul style="list-style-type: none"> • Changes, due to the Scheme, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders. • Change, due to the Scheme, would not affect a regulatory threshold, statutory standard or guideline (if applicable). • There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from the Scheme and changes to health outcomes. • In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the Scheme.

*Judgement based on most relevant criteria, it is likely in any given analysis that some criteria will span categories. Adapted from Pyper *et al.* (2022).

Table 12.28 Significance matrix

		Magnitude of impact			
		Negligible	Minor	Moderate	Major
Health sensitivity	High	Neutral or slight	Slight or moderate	Moderate or large	Large
	Medium	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral or slight	Slight	Slight	Slight or moderate

Adapted from DMRB LA 104 Table 3.8.1 and the IEMA Guidelines Table 7.3 (Pyper *et al.*, 2022)

Timescales

12.12.29 Human health effects are reported for construction and for up to 15 years of operation, unless otherwise indicated due to data limitations.

12.12.30 The following terms are used to describe the duration of impacts:

- Transient impacts are those that would typically last up to two days, such as disruption caused in the case of a weekend road closure
- Short-term impacts are those lasting up to six months
- Medium-term effects are those lasting six months to five years
- Long-term effects are those lasting more than five years.

12.13 Assessment assumptions and limitations

- 12.13.1 This assessment has been undertaken for the Scheme design (as shown on Figure 2.2: Scheme Design of the Environmental Statement Figures (TR010064/APP/6.2)) and assumes a reasonable worst-case basis afforded by the limits of deviation (see Section 2.5 of Environmental Statement Chapter 2: The Scheme (TR010064/APP/6.1)). While the limits of deviation (as shown on the Works Plans (TR010064/APP/2.2)) could result in the Scheme being closer to some receptors or resources, it is not considered this would result in a greater level of significance than provided in this assessment.
- 12.13.2 The assessment considers health effects and data at a population level, rather than health data and effects relating to individuals. The aggregated data and statistics used to support the assessment cannot be used to make inferences about the health of individuals within the communities assessed.
- 12.13.3 Although the assessment refers to research that demonstrates evidence of association between changes in health determinants and effects on health, this should not be interpreted as causation. It is not possible to draw conclusions on cause-and-effect relationships for human health using aggregated population-level data.
- 12.13.4 There are difficulties in estimating the level of exposure of the population to impacts on certain health determinants. For example, it is difficult to ascertain what proportion of their lives each individual within a given population spends in a place that is exposed to the impact and also whether individuals have been exposed to other factors also associated with a given health outcome. It is also difficult to estimate exposure due to the nature of environmental assessment results yielded by the industry standard guidelines applied for various environmental aspects. For example, the landscape and visual assessment assesses visual impacts from specific viewpoints and therefore the scale and nature of impact on views of greenspace from individual households is uncertain. Any such uncertainty is set out in the assessment reported in Section 12.18.
- 12.13.5 The availability of health data in some cases is limited either due to the geographic scale, or the timescale that it covers. Where data are not available for the local geographical scale or do not reflect the 15-year timescale required by DMRB LA 112, this is made clear in the part of the assessment where the data are used.

12.14 Study area

- 12.14.1 The study area for human health consists of the wards that coincide with the Order Limits, as set out on Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.1).
- 12.14.2 In line with DMRB LA 112, this study area is deemed sufficient to understand the baseline health population of communities likely to be affected by the Scheme and to capture the likely significant effects on human health associated with changes in air and noise pollution, and temporary and permanent changes in land use and access during construction and operation of the Scheme.

12.15 Baseline conditions

Baseline sources

- 12.15.1 Community health profile data have been sourced from OHID's public health profiles and Fingertips webtool, National Census data, OS 1:25,000 mapping, and various other sources as referenced throughout.

Baseline information

Community health profile

General health

- 12.15.2 Data have been obtained for the wards that coincide with the Order Limits to indicate local health issues. Although the Manchester ward boundary of Higher Blackley abuts the Order Limits, there are no residential areas close to the Scheme as the land use is Heaton Park. The main settlements of Higher Blackley ward are over 1km away and therefore health data for this ward has been excluded from the baseline as it is considered not relevant.
- 12.15.3 Table 12.29 and Plate 12.3 set out data for each ward for certain health indicators as required by DMRB LA 112. As can be seen from the table, the population of Besses and St Mary's wards score significantly worse than average for England for indicators of COPD emergency admissions, long-term illness, deaths from coronary heart disease, life expectancy and income deprivation. These communities also score worse than average across a number of the other health indicators, including premature deaths. It is also notable that Besses also has the highest proportion of children compared to other wards in the study area, with 21.3% aged 15 or under. This indicates that these communities may, on average, be more sensitive to pollution and problems of traffic than other communities and have less capacity to adapt to change. There may also be a greater dependency on public transport, taxis, walking and cycling among people in income deprived communities to access services and employment.

Plate 12.3 General health by ward

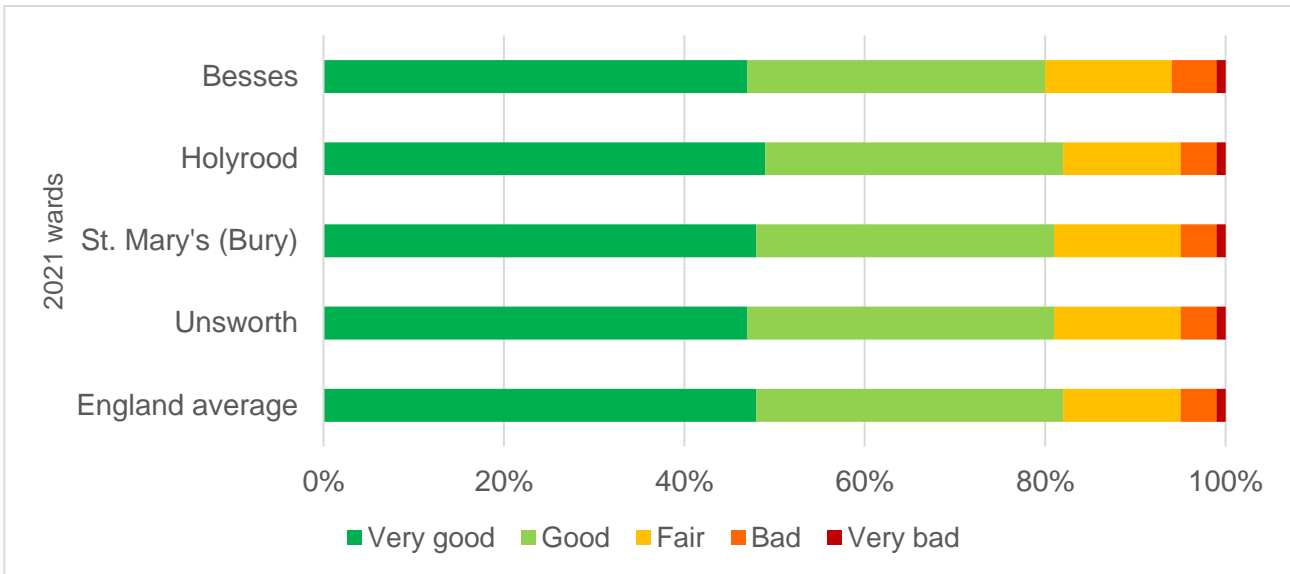
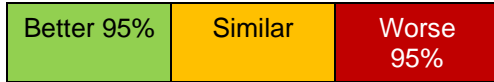


Table 12.29 Health profile of local communities (ward level data)

Health indicator ¹	Wards in study area				England average
	Holyrood	Unsworth	Besses	St Mary's	
Percentage of total resident population age 0-15 years of age (2020) ²	20.8	18.0	21.3	18.2	19.2
Percentage of total resident population who are 65 and over (2020) ³	18.0	22.8	14.8	18.5	18.5
Emergency hospital admissions for COPD (2019) (standardised admissions ratio (SAR))	64.3	86.1	146.1	86.0	100
Percentage of people who reported long-term illness or disability (2021)	17.8	18.1	19.3	20.0	17.6
Deaths from respiratory diseases, all ages, (2016-2020) (standardised mortality ratio (SMR))	111.2	81.1	131.4	101.9	100
Deaths from coronary heart disease, all ages, (2016-2020) (SMR)	118.0	104.9	171.5	146.7	100
Income deprivation (English Indices of Deprivation 2019) (%)	12.6	12.1	20.2	15.0	12.9
Life expectancy at birth (male) (2016-2020) (years)	79.6	81.7	76.4	76.6	79.5

Health indicator ¹	Wards in study area				England average
	Holyrood	Unsworth	Besses	St Mary's	
Life expectancy at birth (female) (2016-2020) (years)	84.3	82.1	81.3	81.7	83.2

Legend:



Quintiles:



¹ Health indicator values that are significantly worse (within the 95% upper or lower confidence interval as appropriate) than the national average are indicated in red. Those which are significantly better (within the 95% upper or lower confidence interval as appropriate) are indicated in green. Further detail regarding methodology used for individual health indicators can be found at the following weblink: <https://fingertips.phe.org.uk/profile/guidance>.

^{2 & 3} Data collected in 2020 for this health indicator is limited as it does not cover the full year.

12.15.4 Overall health data in Holyrood appear to be comparable to the national average. The number of emergency hospital admissions for COPD is, however, significantly better in Holyrood than in England.

12.15.5 Within Unsworth ward 18.1% of people reported to live with a disability or long-term illness, compared to only 17.6% in England. This may reflect that Unsworth has a relatively high proportion of older residents (22.8% aged 65 years or older) compared to England as a whole and to the other wards within the study area.

Vulnerable groups

12.15.6 The following vulnerable groups have been identified in the study area.

Children and young people

12.15.7 Children are more sensitive to air pollution. Differences in susceptibility to traffic collisions are also reported. Concern around speed and volume of traffic is a strong predictor of how much independent mobility children are granted, which is important for children's mental and social development. Children's physical activity levels in Bury appear to be significantly lower than average, with only 38.6% of children accumulating at least an hour of physical activity per day against 47.2% nationally (Sport England, 2022). Denford *et al.* (2020) highlighted individual level (motivation, enjoyment), interpersonal (e.g., parent to children's relationships) and environmental factors (access to green spaces), as the main barriers hindering participation in physical activity in children.

12.15.8 The schools in the study area will be locations where children congregate. In particular, Unsworth Academy, Parrenthorn High School, St Margaret's Church of England Primary School and Our Lady of Grace Roman Catholic Primary School are all located very close (within 100m) to the Order Limits and so there is a likelihood that this vulnerable group would be exposed to various impacts from the Scheme. Simister Green Playground in Simister is also located very close to the Order Limits and it is anticipated that younger children would be regularly present at the playground. As noted above, there is an above average proportion of under-15 year olds in Besses ward, meaning there is likely to be a relatively high proportion of children in the housing close to the Scheme off the eastbound side of the M60 motorway in Whitefield.

Older people

12.15.9 Older people are at greater risk of the effects of air pollution than the general population. Participation in social networks is an important protective factor for mental wellbeing in later life, and therefore this group may be more susceptible to impacts of community severance.

12.15.10 As noted above, Unsworth ward has a higher than average proportion of people aged 65 years old and over. There are some care homes within the human health study area, the nearest of which to the Order Limits is the Spurr House Assisted Living facility, which is located approximately 178m from the Order Limits, just to the north of Unsworth Cricket Club and to the west of Unsworth Academy.

People with physical or learning disabilities or difficulties

12.15.11 People with physical or learning disabilities or difficulties are likely to be disproportionately affected by impacts on accessibility and access. They are potentially more susceptible to impacts on mental wellbeing due to a greater likelihood of social exclusion, isolation, discrimination and past exposure to stressful events.

12.15.12 Cloughside College is located approximately 275m south-west of the Order Limits near M60 J17. This is a community special school (non-boarding) catering for children aged 11–19 with hearing impairment, speech, language and communication issues and social, emotional, and mental health issues. It currently has 11 pupils (with capacity for 40) (Gov.uk, 2022). Although not immediately close to the Order Limits, children at this school are potentially more sensitive to the impacts from the Scheme.

12.15.13 Unsworth ward reports higher than average levels of people with disabilities.

People on low income

12.15.14 As noted above, the populations of Besses and St Mary's wards are significantly worse than average in terms of income deprivation. Deprivation is linked to a greater burden of ill health and therefore these groups are likely to be more sensitive to impacts from the Scheme and have less capacity to adapt.

People living in areas known to exhibit poor economic and/or health indicators

12.15.15 As noted above, the population of Besses and St Mary’s wards score significantly worse than average for several health indicators and for income deprivation.

People with mental health conditions

12.15.16 Greater Manchester Mental Health (GMMH) NHS Foundation Trust Prestwich Site is located approximately 430m south-west of the Order Limits. The site offers specialist services for a range of mental health illnesses. The service users of this facility are likely to be more vulnerable than average to potential impacts from the Scheme.

12.15.17 Table 12.30 sets out mental health indicator data. These data are only available at former Clinical Commissioning Group or district level, rather than ward level. The level of anxiety and depression in Bury is significantly higher (15.3%) than the national average figure (13.7%) (Bury Metropolitan Borough Council and NHS Greater Manchester Integrated Care, 2022). There is therefore a likelihood of a higher than average proportion of people in the study area who may have less capacity to adapt to change and maybe more sensitive than the general population to potential impacts from the Scheme, particularly during the construction stage.

Table 12.30 Mental health indicators for Bury

Mental health indicator	Bury ⁽¹⁾	England
Depression and anxiety prevalence (GP Patient Survey): % respondents aged 18+ (2016/17) ^{(2) (3)}	15.3	13.7
Long-term mental health problems (GP Patient Survey): % respondents (2018/19) ⁽²⁾	10.8	9.9
Suicide rate (2019 -2021)	12.0	10.4
Estimated dementia diagnosis rate (aged 65 and older) (2022) ⁽³⁾	73.9	62.0

Datasource: OHID (2023) Public Health Profiles.

Legend:

Significantly better than England average ⁽¹⁾	Similar to England average	Significantly worse than England average ⁽¹⁾
--	----------------------------	---

Notes:

⁽¹⁾ Health indicator values that are significantly worse (within the 95% upper or lower confidence interval as appropriate) than the national average are indicated in red. Those which are significantly better (within the 95% upper or lower confidence interval as appropriate for most indicators) are indicated in green. The indicator for estimated dementia diagnosis rate uses the 66.7% upper and lower confidence intervals to determine significance. Further detail regarding methodology used for individual health indicators can be found at the following weblink: <https://fingertips.phe.org.uk/profile/guidance>.

⁽²⁾ Indicator is for National Health Service (NHS) Bury Clinical Commissioning Group (not district).

⁽³⁾ The OHID Fingertips website identifies a concern over the reliability of data for this indicator. However this indicator is used in the Bury Mental Health Market Position Statement 2022 (Bury Metropolitan Borough Council and NHS Greater Manchester Integrated Care, 2022)

Health determinants

Location and type of community, recreational and education facilities and severance/separation of communities from such facilities

- 12.15.18 The location and type of community, recreational and education facilities are shown on Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2). These include sports and leisure facilities, retail facilities, schools and churches. Facilities within close proximity of the Scheme are described above in the land use and accessibility baseline (Section 12.7 of this chapter). The M60 motorway causes a barrier between communities north and south of it as there are relatively few places where the motorway can be crossed (namely a footbridge over the M60 to Philips Park some 630m west of the Order Limits; the subways and Prestwich footbridge at M60 J17; Bury Old Road; Sandgate Road, and Haweswater Aqueduct underpass permissive path). However it should be noted that much of the community north of the M60 between Sandgate Road and M60 J18 was developed after the motorway was constructed so the motorway did not introduce any community severance when originally constructed.
- 12.15.19 Generally, it is likely that residents south of the M60 would tend to use facilities in Whitefield and Kirkhams south of the M60, while residents to the north would use facilities located in Whitefield, Prestwich and Unsworth on the north side. However, the Parrenthorn High School catchment area crosses the M60, meaning schoolchildren north of the M60 would have to use Sandgate Road (over 2km for children who live east of Derwent Avenue) or the permissive path via Haweswater Aqueduct underpass, which can be muddy and appears to attract antisocial behaviour, to get to the school. For children in Simister, the route to Parrenthorn High School is relatively direct via the Simister Lane road bridge.
- 12.15.20 Bury New Road (the A56) is a relatively broad transport corridor (approximately 20m wide) which includes a dual carriageway. It is likely the road width and limited number of pedestrian crossing points would contribute to physical separation east and west of the road, while the traffic flows and noise may increase perceived severance for residents.

Location of green/open space and severance/separation of communities from such facilities

- 12.15.21 A review on access to greenspace by PHE (2020) identified pathways through which greenspace can promote positive health and wellbeing outcomes such as encouraging greater physical activity, recreational activities, connection with nature, and community and social cohesion.
- 12.15.22 The locations of greenspace areas likely to be used by the local communities which coincide with or abut the Order Limits are described in the land use and accessibility baseline (Section 12.7 of this chapter) under 'Community land and assets' in Table 12.12 and shown on Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2) (along with other greenspace in the wider study area).

- 12.15.23 Whitefield Golf Course, Prestwich Forest Park and Philips Park are large areas of greenspace to the west of the Order Limits. Prestwich Forest Park encompasses Philips Park and comprises woodland, scrub and some amenity grass areas. It is an important area for outdoor recreation, including mountain biking and has an estimated 654,045 visits per year (Day and Smith, 2018). In the east of the study area there are agricultural fields and Pike Fold Golf Course, while to the south-east of the Order Limits, there is Heaton Park which covers over 240ha and has an estimated 2,433,340 visits per year (Day and Smith, 2018). There are further areas of greenspace accessible to the communities within the study area, such as Fusiliers Meadow between Thatch Leach Lane and Albert Road north of the M60, and Boz Park in Unsworth west of the M66.
- 12.15.24 The construction of the M60 and M66 severed some local rights of way and caused a degree of separation between residents on one side of the motorways and greenspace to the other due to the relatively limited number of places where the motorways can be crossed.
- 12.15.25 Tree planting on the soft estate along the M60, M66 and M62 corridors provides a visual screen, while in addition to green space used by communities, most residential properties in the study area have private gardens which provide greenspace for individual households.

Location of healthcare facilities and severance/separation of communities from such facilities

- 12.15.26 There are several healthcare facilities within the study area (Figure 12.1: Population and Human Health Context of the Environmental Statement Figures (TR010064/APP/6.2)) which include dentists, general practitioner (GP) surgeries, and care homes. These services are provided north and south of the M60, so it is unlikely that there is significant separation from communities and these facilities as it is expected they would choose the facilities most convenient to them.

Outline spatial characteristics of the transport network and usage in the area

- 12.15.27 Baseline information on routes used by walkers and cyclists is presented in the land use and accessibility baseline (Section 12.7 of this chapter) under 'WCH' with key routes described in Table 12.15.
- 12.15.28 There are several bus services that run within the study area. These bus routes serve shorter routes in the local community but also for longer journeys out of the study area towards Bury to the north and Manchester city centre to the south. Two routes which use the M60 J18 are the X41 service connecting Manchester city centre with Accrington, and the X43 service which connects Manchester city centre with Burnley. A number of the services run along Bury New Road and Bury Old Road. There are no bus/coach stations within the study area.

12.15.29 The Manchester Metrolink tram network bisects the study area and Scheme north to south at the point where Bury Old Road also crosses the Scheme. Within the study area there are four tram stops on this line, Heaton Park, Prestwich, Besses o' th' Barn and Whitefield. Services running northbound go to Bury, and southbound to Manchester Piccadilly or to Altrincham. This service could provide links for shorter journeys within the local area or longer journeys using links at Bury and Manchester.

Air quality management areas (AQMA) and ambient air quality

- 12.15.30 Poor air quality is the largest environmental risk to public health in the UK (PHE, 2018). The key traffic related air pollutants of concern to public health in the UK are particulate matter (PM) and NO_x, notably NO₂. PM is classified by aerodynamic size. PM₁₀ relates to particles that are less than 10 microns (µm) in diameter, while PM_{2.5} refers to particles which are less than 2.5µm in diameter.
- 12.15.31 Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1) describes the baseline air quality conditions. As can be seen from Figure 5.2: Air Quality Operational Study Area of the Environmental Statement Figures (TR010064/APP/6.2), the Scheme is located almost entirely within the Bury AQMA, which forms part of the Greater Manchester AQMA and was declared for exceedances of NO₂ AQO in 2016.
- 12.15.32 Baseline monitoring has shown exceedances of the NO₂ AQO within the air quality modelled study area in 2018 (see Table 5.15 of Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1) for further information). Residents most likely to be exposed to these exceedances are those whose homes abut the highway corridors.
- 12.15.33 Background air pollutant mapping by Defra for the Base year (2018) construction worst-case year (2028), and Opening year (2029) for the grid squares that cover the affected road network (ARN) identified for the air quality study area show that annual mean background concentrations of NO₂, NO_x, and particulate matter (PM₁₀ and PM_{2.5}) are all within the AQOs for the Opening year, although there are exceedances of NO_x for the Base year (see Table 5.16 of Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1) for further information).

12.15.34 There is good evidence that transport-related air pollutants such as PM₁₀, PM_{2.5} and NO₂ are associated with an increased risk of a range of health outcomes (refer to Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)). The WHO revised its guidelines in 2021 for long-term exposure to an annual mean of 5µg/m³ for PM_{2.5} and 15µg/m³ for PM₁₀ (WHO, 2021). These guideline values are substantially more conservative than the current UK AQOs which are 25µg/m³ for PM_{2.5} and 40µg/m³ for PM₁₀ and reflect more recent scientific evidence. There is no safe level of PM_{2.5} and NO₂ pollution below which no health effects are observed in a population and as such they are considered to be non-threshold pollutants. Any decrease in air pollution exposure is therefore considered to be beneficial for health, while any increase is adverse. However, significant impacts on population health (i.e., where it is likely that there would be a substantial change in the level of health outcomes attributable to air pollution) are only judged likely where the Scheme would cause an exceedance of the AQOs or where a substantial change in concentrations of pollutants are anticipated compared to the baseline (do minimum).

Areas sensitive to noise

- 12.15.35 Noise from road traffic alone is the second most harmful environmental stressor in Europe, behind only air pollution from fine particulate matter (WHO, 2018). The harmful effects of noise arise mainly from the stress reaction it causes in the human body, which can also occur during sleep.
- 12.15.36 Section 11.7 of Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1) describes the baseline noise environment. The six Noise Important Areas (NIAs) within 600m of the Scheme are indicated on Figure 11.1a: Noise Study Areas, Noise Important Areas and Existing Noise Barriers of the Environmental Statement Figures (TR010064/APP/6.2), while noise sensitive receptors (residential dwellings, schools, healthcare facilities, places of worship, community services and leisure facilities) are indicated on Figure 11.2: Noise Sensitive Receptors of the Environmental Statement Figures (TR010064/APP/6.2).
- 12.15.37 NIA reference 1671 is adjacent to the Scheme on the M60 extending from west of M60 J17 to west of M60 J18. 821 dwellings are within this NIA. These dwellings are mostly within the Besses and Holyrood ward. NIA reference 8188 is on the M60 J18. 170 residential dwellings, mostly within Simister, are within this NIA.
- 12.15.38 There is good evidence that increased long-term exposure to traffic noise is associated with significant increases in the prevalence and the incidence of IHD (van Kempen *et al.*, 2018). It should be noted that while research shows this association, the level of risk attributed to noise exposure is much smaller than for other risk factors such as diet, exercise, and smoking. Noise is also associated with sleep disturbance and annoyance.

- 12.15.39 The WHO guideline level for day-time road traffic noise exposure is set at 53.3dB L_{den} (WHO, 2018). Below this level it is considered unlikely that there was an increased risk of serious health outcomes. For night-time noise exposure the guideline recommendation is 45dB L_{night} as road traffic noise above this level is associated with adverse effects on sleep (WHO, 2018).
- 12.15.40 Baseline noise levels in the study area show the majority of the population in the study area is likely to be exposed to road traffic noise substantially above these guidelines. Public feedback to the statutory consultation indicates substantial public concern regarding existing noise levels from the motorways (see the Consultation Report (TR010064/APP/5.1) for further details).

Sources and pathways of potential pollution

- 12.15.41 The main pollution sources and pathways in the study area of relevance to human health are traffic emissions (air pollution and noise) from traffic using the highway network as outlined above.
- 12.15.42 Chapter 9: Geology and Soils of this Environmental Statement (TR010064/APP/6.1), identifies potential sources of land contamination such as railway infrastructure, current and former industrial uses, a fuel station, areas of made ground, coal tar associated with the original carriageway construction, pre-dating the mid-1980s and possible pulverised fuel ash (PFA) within an area of raised ground immediately north of M60 J18. Potential sources of ground gases, including historical landfill sites and localised peaty soils, have been identified on and in close proximity to the Scheme.
- 12.15.43 Chapter 13: Road Drainage and the Water Environment of this Environmental Statement (TR010064/APP/6.1), identifies that all Water Framework Directive (WFD) Regulation waterbodies identified in that assessment's study area fails in terms of chemical status. The failures are primarily due to priority hazardous substances, notably: polybrominated diphenyl ethers (PBDE), mercury and its compounds and perfluorooctane sulphonate (PFOS). Vehicles and road runoff are not typically considered as significant sources of these pollutants. Several of these pollutants are banned in the UK with pollution levels due to historical use.
- 12.15.44 Light pollution is also present and is outlined below in relation to landscape amenity.

Landscape amenity




- 12.15.45 Chapter 7: Landscape and Visual of this Environmental Statement (TR010064/APP/6.1) describes the baseline landscape and visual baseline. Transport corridors are dominant within the area while the density of urban areas also has a substantial influence on views. The night-time landscape is heavily influenced by lighting from of the existing M60 J18 and mainline M60, M62 and M66 lighting. Heaton Park is a high value landscape, along with the Bury Special Landscape Area. Away from Heaton Park, the landscape character areas in the study area are valued as medium sensitivity, while the townscapes are valued low (see Chapter 7: Landscape and Visual of this Environmental Statement (TR010064/APP/6.1) for further details).

Safety information associated with the existing affected road network

- 12.15.46 A collision analysis has been undertaken for the Scheme. Collision analysis would normally be undertaken for the three year period prior to the start of construction. However, during the period July 2014 to August 2018 the M60 J8-18 and M62 J8-J20 were upgraded as part of the Manchester Smart Motorway (MSM) causing significant traffic congestion and a distortion in traffic flows around the Simister Island junction. In addition, during 2020 and 2021 the lockdowns and restrictions in movement due to the COVID-19 pandemic resulted in very low traffic flows which presented atypical conditions. Therefore, the collision analysis used data for the five-year period between 1st January 2010 to 31st December 2014 inclusive and included 2019 data to ensure that the 2010 – 2014 data is still valid. A summary of the results is shown in Table 12.31.
- 12.15.47 The data show that between 2010 and 2014 a total of 103 vehicle collisions were recorded, of which eight involved cases where people were killed or seriously injured (KSI). One fatal collision within the dataset involved a suicide, where a pedestrian jumped off Bury Old Road overbridge (M60 J17-18 link) and this was removed from the collision analysis as it was not related to highway layout. In 2019 there were 28 collisions, of which one involved a case of KSI. Compared to the strategic road network (SRN) motorway average, the stretches of motorway covered by the Scheme rates of collisions involving KSI are significantly lower, however rates of slight collisions are higher. It should be noted that slight collision data is less reliable than data for KSI as it can be underreported to the police.

Table 12.31 Collision summary

Collision type	Total no. collisions	Annual average no. collisions	Collision rate (per billion vehicle miles)	
Scheme area 2010-2014				SRN motorway average 2012
Fatal	1	0.2	0.8	1.2
Serious	7	1.4	5.5	8.1
KSI	8	1.6	6.2	9.3
Slight	95	19.0	74.1	74.3
All	103	20.6	80.3	83.6
KSI Severity Ratio	7.8%			11.1%
Scheme area 2019				SRN motorway average 2019
Fatal	0	0.0	0.0	1.4
Serious	1	1.0	3.6	11.2
KSI	1	1.0	3.6	12.7
Slight	27	27.0	97.2	45.9

Collision type	Total no. collisions	Annual average no. collisions	Collision rate (per billion vehicle miles)	
All	28	28.0	100.8	58.6
KSI Severity Ratio	3.6%			21.6%
Key:				
	Worse than SRN motorway average			
	Similar to SRN motorway average			
	Better than SRN motorway average			

- 12.15.48 OHID provided feedback on the preliminary Population and Human Health assessment presented in the PEIR (Annex L of the Consultation Report Annexes (TR010064/APP/5.2)) (see Table 12.24 of this chapter). It highlighted the presence of the GMMH Prestwich site which at the time of the PEIR (Annex L of the Consultation Report Annexes (TR010064/APP/5.2)) assessment was within 60m of the provisional Order Limits (note: the Scheme boundary has since been reduced such that the Order Limits are now 430m from the GMMH Prestwich site). OHID noted that *‘There is sufficient evidence linking railway suicides and the location of mental health facilities, as such it is plausible that road infrastructure poses a similar link’*. The nearest motorway structures which could present a suicide risk (M60 J17 and Philips Park footbridge) are no longer within the extents of the Scheme.
- 12.15.49 As noted in paragraph 12.15.47 a suicide occurred from Bury Old Road overbridge during the period 2010-14. However a review of coroners’ reports by Bury Metropolitan Borough Council’s Public Health team has not revealed any recent suicides involving highway structures within the Order Limits (S. Senior, personal communication, 13 July 2023).
- 12.15.50 OHID noted National Highways’ Suicide Prevent Strategy Reports and suggested these should be included within the Environmental Statement if required. However, this was not part of the proposed scope of assessment presented in the Environmental Scoping Report (TR010064/APP/6.6)) raised at the scoping stage. The National Highways Suicide Prevention Tool Kit and Suicide Site Assessment Guidance will be referred to at the detailed design stage of the Scheme and was therefore not available for this Environmental Statement. Commitment PHH21 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5), is a commitment to contact the local DPH, Suicide Prevention Team, and police to inform the new structures design to mitigate the risk of suicide.

Future baseline

- 12.15.51 The likely population growth anticipated for the Heywood / Pilsworth Northern Gateway (JPA1.1) and Simister and Bowlee (Northern Gateway) (JPA1.2) allocations (see Section 12.7 of this chapter for further details) would also mean a likely increase in demand for local health services and a greater population exposed to potential hazards associated with the operation of the motorway corridors in the study area.

12.15.52 Furthermore the COVID-19 pandemic that has affected the UK since 2020 may continue to influence future trends. For example, there has been an increase in people working from home and hybrid working, altering travel patterns and the length of time people spend in their homes (ONS, 2022). This may mean more people are exposed traffic related pollution from the motorway corridors over a longer period.

Value (sensitivity) of receptors

12.15.53 Table 12.32 sets out the judgement of sensitivity applied to the identified population groups within the study area, based on interpretation of the IEMA guidelines (Pyper *et al.*, 2022).

Table 12.32 Sensitivity of relevant population groups

Population groups	Sensitivity and supporting narrative	
General population in Holyrood ward	Medium	Population generally scores average across key health indicators with moderate levels of deprivation.
General population in Unsworth ward	Medium	Population generally scores average across key health indicators. While the ward has lower than average levels of income deprivation, it has an older population with higher than average levels of self-reported long-term illness or disability.
General population in Besses ward	High	Population scores worse than average on a number of health indicators and reports higher than average bad or very bad health and higher than average levels of income deprivation.
General population in St Mary's ward	High	Population scores worse than average on a number of health indicators and reports higher than average bad or very bad health and higher than average levels of income deprivation.
Vulnerable groups in study area: <ul style="list-style-type: none"> • Children and young people • Older people • People with physical or learning disabilities or difficulties • People on low income • People living in areas known to exhibit poor economic and/or health indicators • People with mental health conditions 	High	Groups identified in study area where there are wide health inequalities, groups prevented from undertaking daily activities, dependents and people with poor health status and/or a very low capacity to adapt.

12.16 Potential impacts

Construction

Access to the natural environment and outdoor recreation

- 12.16.1 Access to the natural environment and outdoor recreation could potentially be reduced by the following impacts:
- Diversions and temporary closures of PRow causing physical loss of access
 - Land take from community assets such as parks, golf courses and playing fields
 - Loss of other greenspace including vegetation clearance and land take from agricultural land (with consequent loss of visual access to greenspace)
- 12.16.2 Since there is a growing body of evidence suggesting positive associations between exposure to greenspace and positive mental and physical health outcomes, the loss of access to greenspace is a plausible pathway to adverse mental and physical health outcomes.

Accessibility for walking and cycling

- 12.16.3 During construction there is potential to physically prevent accessibility for walking and cycling through temporary closures of PRow and other routes. There is also potential to discourage walking and cycling through impacts on the amenity of routes from noise, dust and general disruption such as diversion routes and impacts on road surface condition. The presence of construction vehicles on local roads may also dissuade some people from walking and cycling. This has potential to reduce the amount of physical activity undertaken with consequent associations with weight gain, loss of cardiovascular fitness and loss of wellbeing. There are other potential impacts such as loss of social interaction within neighbourhoods, with further potential associations with reduced social capital and mental wellbeing.

Connections to employment, services, facilities and leisure

- 12.16.4 Traffic management and disruption to walking and cycling routes could delay access to services for some people. There is potential to disrupt access to Parrenthorn High School for some children where the construction of the Scheme would result in temporary closure of walking routes and the need for diversions. It is not anticipated that access to the majority of key community facilities (such as GP surgeries and shops selling essential goods) or leisure facilities would be prevented due to the relatively limited footprint of the Order Limits.

Community severance

- 12.16.5 Changes in traffic patterns within the local area due to highway closures or as a result of construction vehicles accessing site have potential to cause or worsen existing community severance on a temporary basis. This could lead to potential negative impacts on mental health associated with reduced community cohesion, and on physical and health if the change in traffic patterns is sufficient to discourage the use of routes used by walkers and cyclists for the reasons described in paragraph 12.16.3.

Employment opportunities including training opportunities

- 12.16.6 There is potential for the Principal Contractor engaged in the construction of the Scheme to offer employment and training opportunities, which may be taken up by local residents. This may help to reduce health inequalities by tackling unemployment in the local area.

Quality of urban and natural environments (including biophysical determinants such as air pollution and noise)

- 12.16.7 Construction noise and dust and views of construction works could adversely affect the quality of the natural environment for people who live, work or undertake recreational activities in close proximity to the Order Limits, with potential for negative impacts on both physical and mental health. There is potential for sleep disturbance due to noise and task lighting from night-time working but also, due to noise from diverted traffic during night-time closures of the motorway.

Operation

Access to the natural environment and outdoor recreation

- 12.16.8 Landscaping design would help mitigate the loss of visual access to the natural environment caused by vegetation removal during the construction phase, however changes to the access or amenity of routes used by walkers and cyclists could have either a beneficial or adverse effect on access to the natural environment and outdoor recreation.

Accessibility for walking and cycling

- 12.16.9 There is potential to change the length or quality of walking and cycling routes, which may affect accessibility.

Connections to employment, services, facilities, and leisure

- 12.16.10 The Scheme has potential to improve the reliability of journeys via the motorway network within the study area, which would be positive for connections to employment, services, facilities, and leisure undertaken by these routes (which includes some bus services). The Scheme has limited potential to impact on other transport modes.

Community severance

- 12.16.11 There is potential to affect community severance should the Scheme result in changes to traffic speed and patterns on the surrounding road network. However, this is a low likelihood since the main works are to the motorway network.

Quality of urban and natural environments (including biophysical determinants such as air pollution and noise)

- 12.16.12 There is potential to impact on this determinant of health if air quality and noise modelling (see Chapter 5: Air Quality and Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1), respectively) indicate that increases in noise and pollution levels would occur as a result of changing traffic patterns in the local area.
- 12.16.13 There is also potential for the landscaping design (as set out in the Environmental Masterplan (Figure 2.3 of the Environmental Statement Figures (TR010064/APP/6.2))) to improve the quality of environment in the medium to long term, once planting becomes established.

12.17 Design, mitigation and enhancement measures

- 12.17.1 Mitigation is included in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5), which forms part of the DCO submission, with more detail to be provided in the Second Iteration EMP.

Embedded mitigation

- 12.17.2 In addition, to the land use and accessibility measures identified in Section 12.9 of this chapter, embedded mitigation as identified in Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1) including low noise surfacing and reinstallation of the existing barrier located on the M60 J18 eastbound off-slip road would help reduce noise impacts (commitments NV3 and NV5, respectively, of the REAC contained within the First Iteration EMP (TR010064/APP/6.5)).
- 12.17.3 The Environmental Masterplan (Figure 2.3 of the Environmental Statement Figures (TR010064/APP/6.2)) sets out designs for planting and PRow diversions which would help to mitigate impacts on access to the natural environment and outdoor recreation.
- 12.17.4 Sensitive lighting design such as the use of horizontally mounted flat glass lanterns, the use of modern dimmable light-emitting diodes (LEDs) with cut-off properties, together with dynamic systems of operation to provide the minimum amount of light required at different times, would help to reduce obtrusive light (light pollution) during the operational phase.

Essential mitigation

- 12.17.5 Some essential mitigation would occur as a matter of course due to legislative requirements or standard sector practices. The following essential mitigation measures have been identified and included in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5):

- Commitment PHH15 – Traffic management measures as documented in the Outline Traffic Management Plan (TR010064/APP/7.5) (which will be developed into a Traffic Management Plan prior to construction (Requirement 10 of the draft DCO (TR010064/APP/3.1))), will be implemented to ensure safe access along roads within the site where necessary. The construction works will be phased such that disruption to access is reduced, with full road closures restricted to nights and weekends wherever practicable and feasible.
 - Commitment PHH17 – A Community Liaison Manager will be appointed to oversee communication with residents, schools, landowners and other interested parties regarding construction activities, programme, and alterations to access routes and to respond to concerns and queries which may arise. This will help with protective factors for mental health such as giving communities enhanced control and facilitating participation.
 - Commitment PHH18 – A community feedback monitoring strategy will be developed at pre-construction stage to inform the monitoring approach through construction. This will enable a record of community concern and feedback as an indicator of impacts on health and wellbeing.
 - Commitment PHH19 – A Scheme feedback tool will be implemented. This will provide a means for the general public to provide feedback during construction.
 - Commitment PHH20 – Monitoring of public feedback and concerns will be undertaken throughout the construction period and measures will be taken to address concerns. This will enable a record of community concern and feedback as an indicator of impacts on health and wellbeing, and will allow specific issues, such as noise to be addressed. It will also provide evidence as to how concerns have been dealt with and how effective those measures were, and will facilitate lessons to be learned for implementation on future schemes.
 - Commitment PHH21 – During detailed design the Principal Designer will contact the local DPH and police and seek feedback to inform the new structures design to mitigate the risk of suicide.
- 12.17.6 Essential mitigation measures to reduce effects of dust and noise are set out in paragraph 5.9.5 of Chapter 5: Air Quality and paragraph 11.9.5 of Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1) and are not duplicated here.
- 12.17.7 Essential mitigation measures to reduce impacts on landscape amenity are set out in paragraph 7.9.18 of Chapter 7: Landscape and Visual of this Environmental Statement (TR010064/APP/6.1) and are not duplicated here.
- 12.17.8 Essential mitigation measures to effectively manage potential risks to human health relating to ground conditions are set out in paragraph 9.9.3 of Chapter 9: Geology and Soils of this Environmental Statement (TR010064/APP/6.1) and are not duplicated here.

12.17.9 Essential mitigation measures relating to water environment pollution sources and pathways are set out in paragraph 13.9.22 of Chapter 13: Road Drainage and the Water Environment of this Environmental Statement (TR010064/APP/6.1) and are not duplicated here.

Socio-economic commitments

12.17.10 The following socio-economic commitments have been identified and included in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)):

- Commitment PHH22 – The Principal Contractor will set targets for its Employment and Skills Strategy ahead of the construction phase. Stakeholders such as Bury Metropolitan Borough Council will be engaged to support the target-setting process. Targets will be set against the monitoring criteria set out in Table 12.39 of this chapter as well as any further targets agreed as part of the target setting process, for example the number of new starts employed from the local (Bury) area. This will deliver employment opportunities, skills and training. Refer to Section 12.19 of this chapter for details on monitoring for employment and skills performance.
- Commitment PHH23 – The performance of the Principal Contractor's Employment and Skills Strategy will be monitored through the quantification of the monitoring criteria set in the Employment and Skills Strategy and included in Table 12.39 of this chapter.
- Commitment PHH24 – Any temporary and/or permanent job openings identified by the Principal Contractor working on the construction of the Scheme will be advertised in local job centres in Bury and Manchester. This will help enable local communities, including those in areas of higher than average rates of income deprivation, to benefit from employment openings which may arise from the Scheme.
- Commitment PHH25 – The Applicant and Principal Contractor will aim to work with national and local organisations/partnerships and will set targets ahead of the construction phase for spend through local small and medium-sized enterprises. This will enable local businesses and the supply chain to benefit in the local area.
- Commitment PHH26 – The Principal Contractor will offer apprenticeships and work placements and Science, Technology, Engineering and Maths (STEM) ambassadors to work with local schools and colleges. The Principal Contractor will also work with organisations to support access into construction for diverse groups.

12.18 Assessment of likely significant effects

Construction

Access to the natural environment and outdoor recreation

Besses ward

- 12.18.1 The closure of footpath 9WHI during construction for approximately 36 to 42 months (see Table 12.20 of this chapter) would restrict public access to greenspace on the east side of the M66 (see Figure 12.3: Key Population and Human Health Impacts of the Environmental Statement Figures (TR010064/APP/6.2)). This would most likely affect communities on the eastern edge of Besses ward who would have to take further alternative routes either via footpath 7WHI through Unsworth underpass or byway BUR85 (Castle Road) to the north to get to greenspace east of the M66 motorway corridor, or via footpath 18WHI (Sandgate Road) to the south to get to the Heaton Park area.
- 12.18.2 Several other PRoW in the area would also be disrupted by construction traffic, although access for walkers and others would generally be maintained (see Table 12.20 of this chapter). Nevertheless, the presence of construction traffic and activities would adversely affect the recreational amenity of these routes.
- 12.18.3 The Scheme footprint would impinge on tee boxes at the Pike Fold Golf Course (see Figure 12.3: Key Population and Human Health Impacts of the Environmental Statement Figures (TR010064/APP/6.2)) and so alterations to the golf course would be required to maintain its current outdoor recreation function. It is assumed that there would be at least some temporary disruption of outdoor recreation at this facility while the golf club makes alterations to its course to accommodate the footprint of the Scheme, although the timescales for this are uncertain. Again, this is most likely to affect residents on the eastern edge of Besses ward as this is the most local golf course to them, although alternative golf courses are present in the local area such as Bury Golf Club.
- 12.18.4 Vegetation clearance, and temporary and permanent land take from agricultural landholdings to the north-west and north-east of M60 J18 for the construction of the Northern Loop, Simister Pike Fold Viaduct and Simister Pike Fold Bridge and the construction of ponds would reduce greenspace, including loss of visual access to the natural environment for residents in the eastern communities of Besses ward.
- 12.18.5 The sensitivity of the local population to these impacts on greenspace is judged to be high as the higher levels of deprivation and lower health status of the population in this ward is likely to mean a greater dependence on local access and limited ability to travel further distances to access greenspace and outdoor recreation.

- 12.18.6 The magnitude of change due to the Scheme is predicted to be moderate. The impact on greenspace is of medium scale over the medium term and would likely affect a substantial minority of the population in the Besses ward. Severity of health outcomes in the evidence (see Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)) relate to a likely moderate adverse change on quality-of-life during construction. This judgement is supported by the public concern for trees, greenspace and wildlife indicated in the statutory consultation responses (see the Consultation Report (TR010064/APP/5.1) and Annex Q of the Consultation Report Annexes (TR010064/APP/5.2) for further details). Following construction there would be a gradual reversal of impacts on access to the natural environment and outdoor recreation as PRow would be reopened and the planting as set out in the Environmental Masterplan (Figure 2.3 of the Environmental Statement Figures (TR010064/APP/6.2)) becomes established.
- 12.18.7 The significance of the health effect on the population for this determinant of health is **moderate negative (significant)**. The professional judgement is that there would be a slight negative change in the health baseline for residents of Besses ward during construction. Although there is a degree of uncertainty as to whether there is an association between short to medium term reductions in greenspace and negative health outcomes (the literature review reported in Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3) only identifies studies which set out associations between long-term exposure to greenspace and positive health outcomes), the judgement of significance reflects the high sensitivity of the population, relative importance to green infrastructure set out in the NPS NN and the public concern for greenspace revealed in the statutory consultation (see the Consultation Report (TR010064/APP/5.1) and Annex Q of the Consultation Report Annexes (TR010064/APP/5.2) for further details).
- Holyrood ward***
- 12.18.8 No impact on the ability to use the pitches at Prestwich Heys Football Club is anticipated. The impacts on public footpaths 28aPRE and 29aPRE (see Table 12.20 of this chapter) are not likely to have a discernible impact on access to outdoor recreation as people tend to use bridleway 27aPRE, which is a more functional route in the baseline context. The amenity of bridleway 27aPRE would be reduced in the medium term due to the adjacent construction activities, however access would be maintained.
- 12.18.9 Vegetation clearance, and temporary and permanent land take from agricultural landholdings and the highway estate to the south-west and south-east of M60 J18 would reduce greenspace, including loss of visual access to the natural environment for residents in the Parrenthorn Road, Heywood Road and Simister Lane area of Holyrood ward.
- 12.18.10 The magnitude of change in Holyrood ward from this construction impact is judged to be minor on the basis that the level of exposure to any reduced access to greenspace and outdoor recreation would likely be very low and small scale. The community would continue to have access to the nearby Heaton Park which is a relatively high value alternative green space that would not be directly affected by the Scheme.

- 12.18.11 The significance of effect on health in Holyrood ward is judged to be **slight negative (not significant)** which takes into account the scientific literature, policy importance and public concern outlined in paragraph 12.18.7 whilst recognising that the impacts would be reversible on completion of the Scheme.
- Unsworth ward***
- 12.18.12 Footpath 84BUR may need to be temporarily closed for up to four weeks (see Table 12.20 of this chapter) which would have most effect on residents in the housing estate between Hollins Lane and Hollins Vale. The temporary disruption to public footpath 7WHI to construct Pond 2 (see Table 12.20 of this chapter) is not expected to prevent access.
- 12.18.13 The closure of footpath 9WHI during construction, vegetation clearance, and temporary and permanent land take from agricultural landholdings to the north-east of M60 J18 for the construction of the Northern Loop, Simister Pike Fold Viaduct and Simister Pike Fold Bridge and the construction of Pond 1 would reduce access to greenspace within Unsworth ward, however, as noted above, the nearest population to this is within Besses ward and therefore relatively few residents of Unsworth ward would be exposed to these impacts.
- 12.18.14 The magnitude of change in Unsworth ward from this construction impact is judged to be minor on the basis that the level of exposure to any reduced access to greenspace and outdoor recreation would likely be very low and small scale, or short-term in nature. Health impact is likely to relate to a minor change in quality-of life and no change in morbidity.
- 12.18.15 The significance of effect on Unsworth ward's population is **slight negative (not significant)** which takes into account the scientific literature, policy importance and public concern outlined in paragraph 12.18.7 whilst recognising that the impacts would be reversible on completion of the Scheme.
- St Mary's ward***
- 12.18.16 Negligible impact on access to the natural environment and outdoor recreation is predicted for residents of St Mary's ward. The closest areas of greenspace to residents in this ward (Prestwich Forest Park, Philips Park and Whitefield Golf Club) would be unaffected by the Scheme. Small amounts of vegetation clearance along the M60 corridor highway estate just west of M60 J17 may impact on visual access to greenspace for some residents, for example those on Cross Avenue.
- 12.18.17 The magnitude of impact is predicted to be negligible adverse due to the very few people anticipated to be affected by changes to this health determinant. Health impact is likely to relate to a minor change in quality-of life and no change in morbidity.
- 12.18.18 The significance of effect is **slight negative (not significant)** which takes into account the scientific literature, policy importance and public concern outlined in paragraph 12.18.7 whilst recognising that the impacts would be reversible on completion of the Scheme.

Vulnerable groups

- 12.18.19 It is not considered likely that the vulnerable groups identified in this assessment would be disproportionately affected by impacts on access to the natural environment and outdoor recreation compared to the ward populations presented above. Therefore, **no likely significant differential health effects** in relation to this determinant are predicted.

Accessibility for walking and cycling

- 12.18.20 Impacts on rural PRow are reported above in relation to access to the natural environment and outdoor recreation. No further health assessment of those impacts is presented here as it is considered they are mainly used for outdoor recreation and the health issues would be as reported above.
- 12.18.21 No direct impacts on active travel routes are predicted in Holyrood, Unsworth or St Mary's wards.
- 12.18.22 The short-term closure of the permissive path via Haweswater Aqueduct underpass for six to eight weeks (see Table 12.20 of this chapter) would reduce accessibility for residents in the south-east of Besses ward seeking to get south of the M60. Alternative access would be via Sandgate Road (footpath 18WHI). The sensitivity of the general population to this impact is likely to be low as there are limited reasons to use this path and it is already unsuitable for people with disabilities or cyclists in the baseline context. However, schoolchildren would be more sensitive as this route represents the most direct access to Parrenthorn High School for many of these residents.
- 12.18.23 During night (and potentially also weekend) closures of the motorways there would be an increase in traffic on designated diversion routes which would mostly affect routes in Besses and Unsworth wards. The increase in traffic would have the potential to discourage walking and especially cycling (on-road), but since the impacts would mainly occur at night, the scale of impact would be limited. Weekend closures would lead to a greater degree of impact, but these would take place less frequently than night closures. Diversion routes would be agreed with the local highways authorities where the local road network is to be used (see Chapter 4 of the Outline Traffic Management Plan (TR010064/APP/7.5) for further details).
- 12.18.24 The magnitude of change on the general population from the impacts identified above would be negligible as it would affect very few people, is of short-term duration, relates to a minor change in quality of life and the change would be reversed in completion of the Scheme.

- 12.18.25 The magnitude of change for schoolchildren would be minor as it would be short-term duration, affect a small minority of schoolchildren in the ward, while health impacts would likely be a moderate change in quality-of-life for these children due to the additional inconvenience they would face. It is unlikely that a modal shift to car use during the time of the closure would affect morbidity due to the relatively short timescale of exposure to the associated reduction in physical activity. Similarly, for those children who walk the additional distance (some 1.7km for the diversion via Sandgate Road during the temporary closure of the permissive path via Haweswater Aqueduct underpass) it is unlikely to affect morbidity due to the short-term exposure to this change.
- 12.18.26 The significance of effect for the general population is **slight negative (not significant)**. This conclusion reflects the negligible magnitude of change in accessibility for walking and cycling in the general population.
- 12.18.27 The significance of effect for schoolchildren is also judged **slight negative (not significant)**. This reflects the minor magnitude of change for this sub-group, the baseline high sensitivity for this group, which includes lower than average levels of physical activity, and the marginal effect that this short-term impact would have on health policy or health outcomes.

Connections to employment, services, facilities and leisure

- 12.18.28 No physical obstruction of access to employment, services, facilities and leisure is anticipated during construction outside of the changes in the 'Access to the natural environment and outdoor recreation' and 'Accessibility by walking and cycling' sub-sections reported above.
- 12.18.29 There is potential for traffic management during construction to impact on the reliability of car and bus journey times during the construction period. This would also include the occasional night closures of the motorway which would be required for some construction activities when diversion routes would be in place. However, these impacts would not reduce overall connectivity to employment, services, facilities and leisure. No change to tram and train networks is anticipated.
- 12.18.30 The magnitude of impact on this determinant during construction would be minor reflecting that changes to connections would be occasional events during construction and affect a small minority of the population in the study area. There would be a rapid reversal of impacts on completion of construction health severity would relate to a moderate change in quality of life for those affected.
- 12.18.31 The residual significance during construction would be **slight negative (not significant)** both without and with essential mitigation. It is not considered there would be significant disproportionate effects between the general population and vulnerable groups for the construction impacts on this determinant.

Community severance

- 12.18.32 Construction compound locations and access routes are set out in Table 2.8 of Chapter 2: The Scheme of this Environmental Statement (TR010064/APP/6.1). During the enabling works, which would last approximately four to six months, construction traffic (i.e. construction plant and HGVs) would use the following routes:

- Mode Hill Lane (Besses ward)
- Griffe Lane (Unsworth ward)
- Egypt Lane (Unsworth ward)
- Simister Lane (Holyrood ward).

- 12.18.33 The localised and rural nature of these routes, short-term duration over which they would be used for construction vehicle access and limited residents in the vicinity who would be exposed means that magnitude of change in relation to community severance would be negligible and would relate to a minor change in quality of life for those affected. The changes would affect very few people in Unsworth, Besses and Holyrood wards. St Mary's ward would not be affected by construction access routes.
- 12.18.34 No physical severance from resources or destinations likely to be regularly used by vulnerable groups have been identified in these affected locations and therefore no disproportionate effects in relation to community severance at the construction stage are anticipated.
- 12.18.35 Following the initial enabling works, the majority of construction traffic access would be directly from the M60 and M66 motorways, meaning there is no potential for community severance during the main construction stage from construction traffic. However, the routes listed above would also be used for access by construction worker vehicles and small goods vehicles (such as vans), and it is anticipated that some traffic would divert through local roads to avoid traffic management associated with the Scheme. This could increase perceived community severance due to increased traffic flows through some communities. This is assumed to affect all wards.
- 12.18.36 The residual significance of effect on community severance during construction would be **slight negative (not significant)**. There is limited evidence for changes to health outcomes due to community severance (see Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)) although it is recognised that use of some lanes by construction traffic during the enabling period and construction worker vehicles/small goods vehicles during main construction, would likely result in some local concern and wellbeing impacts.

Employment opportunities including training opportunities

- 12.18.37 The construction phase of the Scheme would bring potential employment opportunities for local communities. It is expected that there would be 230 construction staff on-site during the peak construction period of the Scheme.
- 12.18.38 The bulk of construction work would be delivered by supply chain partners. It is not possible to predict with accuracy at this early stage of the Scheme how many new jobs would be created, as construction plans continually evolve and so do market and employment conditions.

- 12.18.39 However, as noted in paragraph 12.17.9 of this chapter, the Scheme is committed to advertising permanent positions in local job centres (commitment PHH24 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)).
- 12.18.40 There are also commitments in paragraph 12.17.9 of this chapter to set targets for spend through small and medium-sized enterprises (commitment PHH25 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)), and to offer apprenticeships and work placements and STEM ambassadors to work with local schools and colleges (commitment PHH26 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)). This would have a positive impact on the local economy, as well as access to training and education, although the level of benefit is currently uncertain.
- 12.18.41 On the basis of the above analysis, it is predicted that the Scheme would bring a net increase in employment, training and education opportunities. Given the size of local labour force and relatively small scale of the construction works, the magnitude of impact is likely to be negligible as very few people are likely to benefit. The population in Besses and St Mary's wards are considered to have high sensitivity to this impact due to high levels of income deprivation, while the general population is considered to have medium sensitivity.
- 12.18.42 The residual significance is assessed as **slight positive (not significant)** for the general population in the study area and the high sensitivity populations of Besses and St Mary's wards. This reflects that the changes due to the Scheme are likely to have a marginal effect on the ability to narrow health inequalities due to its limited influence.

Quality of urban and natural environments (including biophysical determinants such as air pollution and noise)

Construction-related air pollution

- 12.18.43 Section 5.10 of Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1) provides the assessment of construction effects on local air quality (see Figure 5.8: Construction Human Health Assessment Results of the Environmental Statement Figures (TR010064/APP/6.2)). The results from the air quality modelling show that in the modelled 2028 construction year, there would be exceedances of the relevant AQOs for NO₂ at seven 'worst case' receptors. This would also be the case in the Do Minimum scenario and for each receptor location, the concentrations modelled for the Do Something are slightly lower than for the Do Minimum scenario (see Table 5.23 in Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1)) and therefore the Scheme provides an improvement. The magnitude of the increases using the magnitude criteria detailed in Table 5.12 would be 'small'.
- 12.18.44 Overall, modelling of the construction of the Scheme showed a reduction in NO₂ concentrations at 317 human health receptors and an increase at 88 human health receptors, with all modelled changes in NO₂ concentrations deemed to be 'imperceptible' or 'small' (paragraph 5.10.12 of Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1)).

- 12.18.45 Annual mean PM₁₀ concentrations are modelled to be well within both of the PM₁₀ and PM_{2.5} AQO/Limit Values at all receptors (i.e. 40µg/m³ and 20µg/m³, respectively) with the highest PM₁₀ concentration predicted in either assessment scenario (i.e. DM or construction DS) to be 18.2µg/m³. All of the receptors were modelled to experience an 'imperceptible' change in both PM₁₀ and PM_{2.5} concentrations as a result of the construction of the Scheme (paragraph 5.10.13 of Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1)). The results in Appendix 5.2: Air Quality Results of the Environmental Statement Appendices (TR010064/APP/6.3) show no receptors would experience an increase in PM₁₀ or PM_{2.5} concentrations during construction compared to the Do Minimum scenario.
- 12.18.46 The reductions in air pollutants in the study area are as a result of traffic redistributing away from the Scheme and using other roads. None of the changes in traffic on other roads were sufficient to trigger screening criteria for air quality modelling, therefore it is assumed increases in air pollution elsewhere from redistributed traffic would be imperceptible but there is uncertainty over where these changes would occur and whether imperceptible increases elsewhere would outweigh the imperceptible and small decreases in air pollution concentrations within the study area.
- 12.18.47 These findings indicate a negligible magnitude of impact in terms of health outcomes associated with air pollution during construction. The significance is assessed as **negligible uncertain (not significant)**. This judgement reflects that while it is recognised there are non-threshold health effects associated with NO₂ and PM_{2.5}, the reductions in air pollutant emissions would not result in (i) any improvements of an AQO already above objective or (ii) any removal of an existing exceedance. Therefore, no change in compliance with statutory standards can be attributed to the Scheme, and therefore no significant effects on population health or health inequalities are likely.
- 12.18.48 Construction activities can give rise to emissions of dust, which could cause annoyance associated with the soiling of surfaces. Construction dust emissions can also elevate airborne particulate matter concentrations at off-site locations, which may affect human health if mitigation measures are not implemented. Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1) identifies the construction dust risk as 'high', based on criteria within DMRB LA 105. The First Iteration EMP (TR010064/APP/6.5) includes measures to control fugitive dust so that there are no likely significant health effects. The potential impact of localised annoyance from dust is considered below under the 'Interaction of impacts and likely health outcomes' sub-section.

Construction-related noise

- 12.18.49 Section 11.10 of Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1) provides the assessment of construction effects on the noise environment. The noise assessment identifies locations where the significant observable adverse effects level (SOAEL) are predicted to be exceeded (see Figures 11.3a to 11.6b of the Environmental Statement Figures (TR010064/APP/6.2)) during both daytime works and night-time works. The SOAEL is the level above which significant adverse effects on health and quality of life occur as defined by the NPSE (Defra, 2010). The greatest number of residents would be exposed to exceedances of the SOAEL during online works. This construction noise would affect residents in all wards of the human health study area. Reference should be made to Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1) and its associated figures (TR010064/APP/6.2) for more detail.
- 12.18.50 Analysis of statutory consultation responses from the public revealed widespread concern over construction noise, with many residents referring to experience of annoyance and sleep disturbance from noise related to current traffic, maintenance activities and past highway works (see the Consultation Report (TR010064/APP/5.1) and Annex Q of the Consultation Report Annexes (TR010064/APP/5.2) for further details). This indicates a high degree of public concern relating to this issue.
- 12.18.51 It is concluded that the magnitude of health change due to the Scheme's influence on this determinant would be moderate. This reflects that there would be frequent noise events through the medium term due to construction and a substantial minority of the population within the wards surrounding the Scheme would be affected. The severity of health outcome would likely be a major change of quality of life.
- 12.18.52 The significance of health effect from this impact is predicted to be **large negative (significant)** for all communities. This reflects that the SOAEL would be crossed, the widespread public concern, and strong health evidence that noise impacts of this scale are associated with sleep disturbance and annoyance, as well as a small effect size on more severe outcomes such as IHD, which is associated with long-term exposure to high levels of traffic noise.

Other sources and pathways of potential pollution

- 12.18.53 No likely pathways from other environmental impacts such as potential water pollution or ground contamination to the local communities are expected from the Scheme following the implementation of essential mitigation as set out in Section 9.9 of Chapter 9: Geology and Soils of this Environmental Statement (TR010064/APP/6.1) and Section 13.9 of Chapter 13: Road Drainage and the Water Environment of this Environmental Statement (TR010064/APP/6.1). Therefore, the effect of these wider determinants is **neutral**.

Landscape amenity (lighting)

- 12.18.54 Details about changes to the local landscape character during construction are provided in Chapter 7: Landscape and Visual of this Environmental Statement (TR010064/APP/6.1). Amenity effects related to access to greenspace are reported above for the inter-related health determinant 'Access to the natural environment and outdoor recreation' sub-section and are not repeated here.
- 12.18.55 During construction lighting would be used, including task lighting in low light or night-time conditions and security lighting. Lighting would be directed to avoid glare or light spill onto neighbouring properties. It is therefore considered unlikely that it could disturb sleep. However, there is a possibility that lighting in previously unlit areas, such as near Pike Fold Golf Club, would be regarded as visually intrusive and cause some local concern. Given the temporary nature of the construction phase, and the baseline situation where there is already lighting associated with the motorways and M60 J17 and M60 J18, the magnitude of change to health is assessed as negligible. Very few people would be affected by construction lighting, the health outcomes would likely relate to a minor change in quality of life compared to the baseline, and the situation would be immediately reversed on completion of the Scheme construction activities. This is not expected to result in any notable change to population health outcomes and so the effect is assessed as **slight negative (not significant)**.

Interaction of impacts and likely health outcomes

- 12.18.56 The combination of construction noise, localised dust, lighting, changes to accessibility and traffic is likely to result in annoyance among residents in communities most affected by the construction of the Scheme. No research was identified through the literature review (see Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)) that assessed any level of association between major infrastructure construction schemes of the nature of the Scheme, and mental health outcomes. In the absence of scientific evidence, it is judged probable that, despite mitigation, there is a moderate to high risk of adverse mental wellbeing outcomes, such as psychosocial stress, among those individuals most adversely affected by the Scheme. For vulnerable groups, particularly those with existing mental health conditions, there is potential for disproportionate effects, as they may have less capacity to cope with the additional stress.
- 12.18.57 The mitigation to appoint a Community Liaison Manager (see commitment PHH17 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)) to oversee communication with the public during construction would help to mitigate potential adverse impacts on mental wellbeing by providing people with information on construction and allowing opportunity to have concerns addressed where practicable.

- 12.18.58 Due to the medium-term timescale of the construction period, and the relatively widespread exposure to construction impacts due to the close proximity of communities in Besses, Unsworth and Holyrood wards, the health impact is judged to be **moderate negative (significant)**. This is on the basis that the annoyance impacts would be relatively widespread over the medium term. The health effect is expected to relate to a medium term change on quality of life rather than a change in morbidity or mortality. The interaction of impacts on the St Mary's ward communities is expected to be **slight negative (not significant)** on the basis that very few residents would be exposed to construction impacts on a regular basis.

Operation

Access to the natural environment and outdoor recreation

- 12.18.59 In the medium to long term, the planting, as set out in the Environmental Masterplan (Figure 2.3 of the Environmental Statement Figures (TR010064/APP/6.2)), would restore visual access to greenspace for residents.
- 12.18.60 The replacement route for footpaths 28aPRE and 29aPRE through an environmental mitigation area close to the northbound carriageway of the M60 south of J18, would provide a marginally enhanced connection to nature compared to the baseline situation where footpaths 28aPRE and 29aPRE follow a route through grazed pasture and is therefore considered positive. However, this impact, together with the realignment of footpath 9WHI, would overall have negligible impact on opportunities for access to the natural environment. This reflects the marginal change from the baseline context and that the sum of these routes and locations would affect very few people in the study area.
- 12.18.61 The overall effect on health is predicted to be **negligible positive (not significant)** for all communities. This reflects the limited change from the baseline situation and the suggestive evidence of health benefits from access to greenspace.

Accessibility for walking and cycling

- 12.18.62 Replacement routes would be provided for the existing PRow affected by the Scheme, including any public footpaths where they are affected by new ponds, wetlands or swales. The Scheme relates to the motorway itself and does not accommodate improvements to facilities for walkers and cyclists.
- 12.18.63 On the basis of the above, no change in population health outcomes associated with regular exercise is predicted. Therefore, the effect is assessed as **neutral** for the general population in all wards.

Connections to employment, services, facilities and leisure

- 12.18.64 No changes to the availability or accessibility of routes used by pedestrians and cyclists providing access to employment, services, facilities and leisure is anticipated as a result of the Scheme. A small minority of the communities would benefit from reduced congestion on the M60, M62 and M66 as a result of the Scheme, which would also be beneficial to some bus services that use the motorway network. The overall magnitude of impact on health due to changes to this determinant is assessed as minor. It is plausible that some individuals may have positive wellbeing outcomes due to more reliable journeys and therefore health effects would relate to a moderate change in quality of life for those affected.
- 12.18.65 The significance of health effect is predicted to be **slight positive (not significant)** for both the general population and vulnerable groups. This relates to the Scheme having negligible impact on delivering health priorities related to increasing connections by active travel and the suggestive evidence that quality of life may improve from reduced congestion.

Community severance

- 12.18.66 The Scheme would not cause any new severance, and the motorway is not considered to have caused community severance when originally constructed as the community between Sandgate Road and M60 J18 did not exist, while roads between extent residential areas were retained. The magnitude of health impacts related to community severance is assessed as negligible negative. This reflects that there would be marginal change from the baseline context, while also recognising that expected population growth to the east of the study area associated with the Heywood / Pilsworth Northern Gateway (JPA1.1) and Simister and Bowlee (Northern Gateway) (JPA1.2) allocations (see Section 12.7 of this chapter) could result in increased community severance in the future baseline due to the limited crossing points across the motorways.
- 12.18.67 The significance of health effect is assessed as **negligible negative (not significant)** for both the general population and vulnerable groups. There is likely to be a very limited change population health compared to the baseline and the Scheme would have a negligible impact on meeting policy aspirations for reducing community severance and would not narrow health inequalities between vulnerable groups (e.g. older people and people with physical disabilities) and the general population.

Quality of urban and natural environments (including biophysical determinants such as air pollution and noise)

Air pollution

- 12.18.68 Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1) reports the assessment of effects on air quality for the worst-case location at receptors i.e. at the receptor outside edge, closest to the highway. However, in recognition that air pollution is non-threshold in terms of health impact, this population and human health assessment has obtained the full modelling results for both the Opening year (2029) and the Design year (2044) and the modelling results presented in this chapter are representative of the centre points for each human health receptor (as opposed to the worst-case outside edge of the receptor) and indicate average concentrations of air pollutants for each key location so that ward level statistics could be derived. See Table 5.12 in Chapter 5: Air Quality of this Environmental Statement (TR010064/APP/6.1) for definitions of the magnitude of change criteria referred to in this section.
- 12.18.69 While DMRB LA 112 requires health effects to be reported for ‘up to year 15 of operation’, the Opening year represents the worst case for air pollution and therefore those results are reported in this health assessment. The results have been examined by ward to identify which communities have the potential to be most exposed to any impacts of the Scheme.

Besses ward

- 12.18.70 Table 12.33 presents a summary of air quality impact results for the 624 modelled receptors in Besses ward, which compare the predicted impacts of the Scheme compared to the Do Minimum scenario in 2029 (i.e. the future baseline).

Table 12.33 Air quality impacts in Besses ward for 2029 Opening year

Impacts	NO₂	PM₁₀
No. receptors that experience an increase with Scheme	331	624
No. receptors that experience a decrease with Scheme	283	0
No. receptors that experience no change with Scheme	10	0
Greatest level of increase of pollutant concentrations (µg/m ³) with Scheme	0.98	0.22
Greatest level of decrease of pollutant concentrations (µg/m ³) with Scheme	-3.62	N/A*

*N/A as all receptors would experience an increase in PM10 concentrations.

- 12.18.71 The results show that approximately 53% of modelled receptors would experience an increase in NO₂ compared to 45% that would experience a decrease. The greatest level of increase in NO₂ would be classed as ‘small’, while the greatest level of decrease would be ‘medium’ based on the air quality magnitude of change criteria. No exceedances of AQOs would occur.

- 12.18.72 The results show that all receptors would experience an increase in PM₁₀ concentrations. The increase in PM₁₀ would be classed as ‘imperceptible’. PM_{2.5} is a fraction of PM₁₀ and therefore within the imperceptible level of change. No exceedances of AQOs would occur.
- 12.18.73 The magnitude of health change due to the Scheme in Besses ward is predicted to be negative but minor. This is on the basis that for NO₂ exposure, the net difference in numbers of receptors where an increase in concentrations is predicted as opposed to a decrease is relatively small (8%). Furthermore, in some cases the reductions in NO₂ concentrations are greater than the levels of increase, which would be expected to counteract the level of population health change to a degree. In the case of particulates, while all receptors would experience an increase in concentrations, the level of increase would be imperceptible. The scale of exposure to traffic related particulate pollution would be very low compared to exposure to other background pollution sources.
- 12.18.74 The significance of effect on health in Besses ward is **slight negative (not significant)**. This reflects the high sensitivity of the baseline population due to the prevalence of poor health indicators, the scientific evidence that there is a causal link between NO₂ and PM_{2.5} and certain population health impacts (including mortality), but that the magnitude is expected to be minor as overall increase in concentrations of air pollution would be small or imperceptible and within statutory standards which demonstrates an acceptable level of health protection.
- Holyrood ward*
- 12.18.75 Table 12.34 presents a summary of air quality impact results for the 604 modelled receptors in Holyrood ward, which compare the predicted impacts of the Scheme compared to the Do Minimum scenario in 2029 (i.e. the future baseline).

Table 12.34 Air quality impacts in Holyrood ward for 2029 Opening year

Impacts	NO ₂	PM ₁₀
No. receptors that experience an increase with Scheme	238	536
No. receptors that experience a decrease with Scheme	358	63
No. receptors that experience no change with Scheme	8	5
Greatest level of increase of pollutant concentrations (µg/m ³) with Scheme	0.23	0.11
Greatest level of decrease of pollutant concentrations (µg/m ³) with Scheme	-2.48	-0.39

- 12.18.76 The results show that overall more receptors would experience a reduction in NO₂ concentrations than an increase. Approximately 39% of modelled receptors would experience an increase in NO₂ compared to 59% that would experience a decrease. The greatest level of reduction would be classed as ‘medium’ based on the air quality magnitude of change criteria whereas the greatest level of increase would be classed as imperceptible.

- 12.18.77 For particulate pollution, a greater number of receptors would experience an increase. Approximately 88% of modelled receptors would experience an increase in PM₁₀ compared to 10% that would experience a decrease. However the level of change in PM₁₀ concentrations would be 'imperceptible'. PM_{2.5}, as a fraction of PM₁₀, would be within this level of change.
- 12.18.78 It is judged, on the basis that PM_{2.5} is a non-threshold pollutant for health effects (see glossary and Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)), that the overall health impact would be negative since more receptors would experience increases than would experience decreases. No exceedances of AQOs would occur.
- 12.18.79 The magnitude of health change due to the Scheme in Holyrood ward is predicted to be negligible as the contribution of the Scheme to increases in PM₁₀ (and PM_{2.5} as a fraction of this) is imperceptible and the negative health effect would be countered by the overall improvement in NO₂ expected.
- 12.18.80 The significance of effect on health in Holyrood ward is **negligible negative (not significant)**. This reflects the medium sensitivity of the baseline population, the scientific evidence that there is a causal link between PM_{2.5} and certain population health impacts (including mortality), but that the magnitude is expected to be negligible and overall levels of air pollution would be within statutory standards which demonstrates an acceptable level of health protection.

Unsworth ward

- 12.18.81 Only one receptor was identified in the air quality results for this ward. Overall, there would be an increase of 0.20µg/m³ for NO₂ concentrations, and 0.06µg/m³ for PM₁₀ concentrations. These changes between the Do Minimum and Do Something scenario (the scenario taking account of predicted traffic growth and with the Scheme in place) are classed as 'imperceptible' in terms of the air quality magnitude of change criteria. PM_{2.5}, as a fraction of PM₁₀, would be within this level of change. No exceedances of AQOs would occur.
- 12.18.82 Given the very few people exposed to the change, the magnitude of health change is negligible.
- 12.18.83 The significance of effect on health in Unsworth ward is **negligible negative (not significant)**. This reflects the medium sensitivity of the baseline population, the scientific evidence that there is a causal link between NO₂ and PM_{2.5} and certain population health impacts (including mortality), but that the magnitude of health impact is judged to be negligible and overall levels of air pollution would be within statutory standards which demonstrates an acceptable level of health protection.

St Mary's ward

- 12.18.84 Table 12.35 presents a summary of air quality impact results for the 90 modelled receptors in St Mary's ward, which compare the predicted impacts of the Scheme compared to the Do Minimum scenario in 2029 (i.e. the future baseline which takes account of predicted traffic growth but without the Scheme in place).

Table 12.35 Air quality impacts in St Mary’s ward for 2029 Opening year

Impacts	NO ₂	PM ₁₀
No. receptors that experience an increase with Scheme	90	90
No. receptors that experience a decrease with Scheme	0	0
No. receptors that experience no change with Scheme	0	0
Greatest level of increase of pollutant concentrations (µg/m ³) with Scheme	0.35	0.08
Greatest level of decrease of pollutant concentrations (µg/m ³) with Scheme	N/A	N/A

- 12.18.85 The results show that all receptor locations would experience increases in concentrations of both NO₂ and PM₁₀. The greatest levels of increases for both pollutants would be classed as ‘imperceptible’ according to the air quality magnitude of change criteria. PM_{2.5}, as a fraction of PM₁₀, would be within this level of change. No exceedances of AQOs would occur.
- 12.18.86 It is judged, on the basis that NO₂ and PM_{2.5} are non-threshold pollutants for health effects (see glossary and Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)), that the overall health impact would be negative due to an overall increase, albeit at imperceptible levels.
- 12.18.87 The magnitude of health change due to the Scheme in St Mary’s ward is predicted to be minor due to the imperceptible level of increase in air pollution contributed by the Scheme, suggesting that the effect size on population health outcomes would be small.
- 12.18.88 The significance of effect on health in St Mary’s ward is **slight negative (not significant)**. This reflects the high sensitivity of the baseline population, the scientific evidence that there is a causal link between NO₂ and PM_{2.5} and certain population health impacts (including mortality), but that the magnitude of health impact is judged to be minor and overall levels of air pollution would be within statutory standards which demonstrates an acceptable level of health protection.

Noise

- 12.18.89 Quantified and monetised results of predicted noise impacts on the health outcomes of ‘annoyance’, ‘sleep disturbance’ and ‘heart attack’ have been obtained from work undertaken to inform the Case for the Scheme (TR010064/APP/7.1), which are the health outcomes where the evidence for an effect size is strongest (see Appendix 12.2: Human Health Literature Review and Evidence of the Environmental Statement Appendices (TR010064/APP/6.3)). The results (summarised in Tables 12.36 and 12.37 below) relate to the expected impact on these population health outcomes fifteen years after the Scheme commences operation.

Table 12.36 Quantitative noise results

Quantitative results (year 15)	
No. of households experiencing increased daytime noise in forecast year	74
No. of households experiencing reduced daytime noise in forecast year	1166
No. of households experiencing increased night-time noise in forecast year	84
No. of households experiencing reduced night-time noise in forecast year	911

12.18.90 The calculation of health impact takes account of the numbers of households to experience an increase and decrease of impact, the magnitude of increase and decrease of noise level, together with exposure-response function for each health outcome.

Table 12.37 Monetised health outcomes due to noise

Monetised health outcomes (year 15)		Effect
Net present value of impact on sleep disturbance (£)	5,020,187	Positive
Net present value of amenity ('annoyance') (£)	3,070,460	Positive
Net present value of impact on heart attacks (£)	737,992	Positive

- 12.18.91 The results show positive health effects for all three health outcomes.
- 12.18.92 The noise results were examined in relation to each of the wards using results of a distributional analysis to see whether any communities would experience an overall increase.
- 12.18.93 Besses ward, St Mary's ward and Holyrood ward would all experience a greater number of receptors with reduced noise than increased noise due to the Scheme. However, Unsworth ward would have a greater number of receptors experiencing an increase in noise than a decrease. The greatest level of increase to be experienced would be 0.4dB L_{den} (12 receptor locations), which is an imperceptible level of change and therefore of negligible magnitude for this ward population.
- 12.18.94 Overall, for the general population across the study area, the magnitude of change for health outcomes is assessed as major positive on the basis that the majority of population within the study area would benefit from the resurfacing of M60 eastbound and westbound carriageways between J17 and J18 using a surface with better noise reducing properties than a conventional low noise surface (LNS) (commitment NV4 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)). The health outcomes that can be attributed to these long term improvements of noise, which would be of continuous frequency, include reduced mortality and morbidity.
- 12.18.95 The significance of effect for both the general population and vulnerable groups is **large positive (significant)** in all wards. This reflects the strong evidence in scientific literature relating to the effect size of exposure to long term noise on the population health outcomes identified above, as well as perceptible reductions in noise in NIA 1671 (see Chapter 11: Noise and Vibration of this Environmental Statement (TR010064/APP/6.1) for more detail).

Other sources and pathways of potential pollution

- 12.18.96 No likely pathways from other environmental impacts such as potential water pollution or ground contamination to the local communities are expected from the Scheme following essential mitigation as set out in Section 9.9 of Chapter 9: Geology and Soils of this Environmental Statement (TR010064/APP/6.1) and Section 13.9 of Chapter 13: Road Drainage and the Water Environment of this Environmental Statement (TR010064/APP/6.1). Therefore the effect of these environmental determinants is **neutral**.

Landscape amenity (lighting)

- 12.18.97 Details about changes to the local landscape character during operation are provided in Chapter 7: Landscape and Visual of this Environmental Statement (TR010064/APP/6.1). Amenity effects related to access to greenspace are reported above for the inter-related health determinant 'Access to the natural environment and outdoor recreation' sub-section and are not repeated here.
- 12.18.98 The lighting design is described in Section 2.5 of Chapter 2: The Scheme of this Environmental Statement (TR010064/APP/6.1). This includes upgrading lighting on M60 J18 from the current High Pressure Sodium lighting with modern LED luminaires which offer improved control of the emitted light to give less spill into adjacent areas and reduce upward light. However, the Northern Loop would be lit and this would introduce some lighting in one of the darker areas of the baseline environment near Pike Fold Golf Course. Therefore, the improved lighting standard is balanced somewhat by the introduction of more lit infrastructure. On this basis the magnitude of change for health is assessed as negligible. Relatively few people would be exposed to any change in lighting and the health outcomes are expected to reflect a minor change in quality of life.
- 12.18.99 The significance of effect is assessed as **slight negative (not significant)**. This is on the basis that lighting is of limited relevance to the health priorities of the study area and the lack of health evidence attributing changes in health outcomes to lighting. The lighting design is not likely to significantly affect concerns of the public around artificial lighting in the local environment.

Distribution of health impacts by community

- 12.18.100 To enable an understanding of which communities would be most affected by a combination of health effects from the Scheme, the above assessment results have been summarised by ward in Table 12.38.
- 12.18.101 The results show that communities in Besses ward would be subject to a combination of adverse health effects from impacts on health determinants during construction. This would indicate a greater impact on quality of life for this community during construction. During operation, Besses ward would not be disproportionately affected. Given the medium term and temporary nature of construction impacts compared to the long term impacts from operation, it is not considered likely that the Scheme would have a long term impact on widening health inequalities.

Table 12.38 Distribution of health effects by ward

		Besses	Holyrood	Unsworth	St. Mary's
Baseline sensitivity of ward population		High	Medium	Medium	High
Determinants of health (construction)					
Access to the natural environment and outdoor recreation		Moderate negative	Slight negative	Slight negative	Slight negative
Accessibility for walking and cycling		Slight negative*	Neutral	Neutral	Neutral
Connections to employment, services, facilities and leisure		Slight negative	Slight negative	Slight negative	Slight negative
Community severance		Slight negative	Slight negative	Slight negative	Slight negative
Employment opportunities including training opportunities		Slight positive	Slight positive	Slight positive	Slight positive
Quality of urban and natural environments	Construction-related air pollution	Negligible uncertain	Negligible uncertain	Negligible uncertain	Negligible uncertain
	Construction-related noise	Large negative	Large negative	Large negative	Large negative
	Other pollution pathways	Neutral	Neutral	Neutral	Neutral
	Landscape amenity (lighting)	Slight negative	Slight negative	Slight negative	Slight negative
Interaction of construction impacts		Moderate negative	Moderate negative	Moderate negative	Slight negative
Determinants of health (operation)					
Access to the natural environment and outdoor recreation		Negligible positive	Negligible positive	Negligible positive	Negligible positive
Accessibility for walking and cycling		Neutral	Neutral	Neutral	Neutral
Connections to employment, services, facilities and leisure		Slight positive	Slight positive	Slight positive	Slight positive
Community severance		Negligible negative	Negligible negative	Negligible negative	Negligible negative
Quality of urban and natural environments	Air pollution	Slight negative	Negligible negative	Negligible negative	Slight negative
	Noise pollution	Large positive	Large positive	Large positive	Large positive
	Other pollution pathways	Neutral	Neutral	Neutral	Neutral
	Landscape amenity (lighting)	Slight negative	Slight negative	Slight negative	Slight negative
*This impact also relates to the vulnerable group 'children and young people'					

Key:

	Significant negative health effect
	Not significant negative health effect
	Neutral health effect
	Not significant positive health effect
	Significant positive health effect

12.19 Monitoring

- 12.19.1 A strategy for monitoring community feedback will be developed during the pre-construction phase (commitment PHH18 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)). The monitoring will include a record of concerns raised to the Community Liaison Manager and how the concerns were addressed (commitment PHH20 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)). Public feedback will also be monitored via National Highways' Scheme feedback tool (commitment PHH19 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)).
- 12.19.2 There is uncertainty as to the level of benefit likely to be provided in terms of employment opportunities, skills and training from the Scheme and therefore monitoring is proposed. The Principal Contractor will set targets for its Employment and Skills Strategy ahead of the construction phase. Stakeholders such as Bury Metropolitan Borough Council will be engaged to support the target-setting process. Targets will be set against the monitoring criteria set out in Table 12.39 below, as well as any further targets agreed as part of the target setting process, for example the number of new starts employed from the local (Bury) area (commitment PHH22 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)).
- 12.19.3 The performance of the Principal Contactor's Employment and Skills Strategy will be monitored through the quantification of the following employment and skills outputs (Table 12.39) (commitment PHH23 in the REAC, contained within the First Iteration EMP (TR010064/APP/6.5)).

Table 12.39 Monitoring criteria

Employment or skill criterion	Definition
Apprenticeship start	A new employee of the Principal Contractor or its suppliers as an apprentice into the workforce and enrolled on an approved Apprenticeship Standard relevant to the delivery of the works.
Job start	A new job start for an individual recruited as a result of the contract. This could include a graduate job start (non-workless).
Placement position	A position intended to enable an individual to learn, develop or enhance their knowledge and skills in an industry or role by providing a short work experience placement.

Employment or skill criterion	Definition
Professional status attainment	Number of individuals supported to attain professional registration and status in agreed critical skills shortage disciplines at no cost to the individuals supported. This includes registration at technician, incorporated and chartered levels.
Sector skills qualifications attainment	Number of individuals supported to attain technical or occupational skills relevant to the delivery of the Scheme construction at no cost to the individuals supported. This includes NVQs, health and safety qualifications, and leadership qualifications.

D. Summary

12.20 Land use and accessibility

12.20.1 Table 12.40 summarises the residual significant land use and accessibility effects. All significant effects would relate to the construction stage. These include temporary and permanent loss of agricultural land, and temporary adverse impacts on recreational PRow and a permissive path used as a school route.

Table 12.40 Summary of residual significant effects for land use and accessibility

Land use and accessibility matter	Summary of residual significant effects	
	Construction	Operation
Private property and housing	No significant effects identified	No significant effects identified
Community land and assets	No significant effects identified	No significant effects identified
Development land and business	No significant effects identified	No significant effects identified
Agricultural land holdings	<ul style="list-style-type: none"> • Temporary adverse (moderate) significant effect on landholding SW1 • Temporary adverse (moderate) significant effect on landholding NW1 • Permanent adverse (moderate) significant effect on landholding NE2 • Temporary adverse (moderate) significant effect on landholding NE4 	No significant effects identified
WCH	<ul style="list-style-type: none"> • Temporary adverse (very large) significant effect on permissive path via Haweswater Aqueduct underpass • Temporary adverse (moderate) significant effect on footpath 9WHI • Temporary adverse (moderate) significant effect on footpath 84BUR 	No significant effects identified

12.21 Human health

12.21.1 Table 12.41 summarises the residual significant human health effects. These show significant effects on access to the natural environment and outdoor recreation for residents in Besses ward and significant effects on quality of life from construction noise for some residents in all wards in the human health study area. During operation, the improved noise performance from the motorway surfacing would result in overall reductions in long-term exposure to traffic noise, which is associated with health benefits and is therefore assessed as significant and positive.

Table 12.41 Summary of residual significant effects for human health

Determinant of human health	Summary of residual significant effects	
	Construction	Operation
Access to the natural environment and outdoor recreation	Temporary negative (moderate) significant effect for residents in Besses ward	No significant effects identified
Accessibility for walking and cycling	No significant effects identified	No significant effects identified
Connections to employment, services, facilities and leisure	No significant effects identified	No significant effects identified
Community severance	No significant effects identified	No significant effects identified
Employment opportunities including training opportunities	No significant effects identified	No significant effects identified
Quality of urban and natural environments (environmental noise)	Temporary negative (large) significant effect on quality of life in all wards in study area due to construction related noise	Permanent positive (large) significant effect on health outcomes (morbidity and mortality) in all wards in study area due to overall reductions in long-term exposure to traffic noise
Interaction of construction impacts	Medium-term negative (moderate) significant effect on quality of life in Besses, Unsworth and Holyrood wards	N/A

Acronyms and initialisms

Acronym or initialism	Term
µg	microgram
µm	micrometre
AMI	Acute myocardial infarction
AQMA	Air Quality Management Area
AQO	Air Quality Objective
ARN	Affected Road Network
BA	Bachelor of Arts
CEnv	Chartered Environmentalist
COPD	Chronic obstructive pulmonary disease
DALY	Disability adjusted life year
dB	Decibel
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DPH	Director of Public Health
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EUPHA	European Public Health Association
GMCA	Greater Manchester Combined Authority
GMMH	Greater Manchester Mental Health
GMODIN	Greater Manchester Open Data Infrastructure Map
GP	General Practitioner surgery
ha	Hectare
HGV	Heavy Goods Vehicle
IAIA	International Association for Impact Assessment
IEMA	Institute of Environmental Management and Assessment
IGCB(N)	Interdepartmental Group on Costs and Benefits - Noise subgroup
IHD	Ischaemic heart disease
JSNA	Joint Strategic Needs Assessment
KSI	Killed or seriously injured
L _{den}	Day-evening-night weighted sound pressure level.

Acronym or initialism	Term
LED	Light emitting diode
L _{night}	Equivalent continuous sound pressure level when the reference time interval is the night.
LNS	Low noise surfacing
LOAEL	Lowest observable adverse effects limit
MHCLG	Ministry of Housing, Communities and Local Government (now called the Department for Levelling Up, Housing and Communities)
MIEMA	Full member of the Institute of Environmental Management and Assessment
MPH	Master of Public Health
MSc	Master of Science
MSM	Manchester Smart Motorway
N/A	Not applicable
NCN	National Cycle Network
NHS	National Health Service
NIA	Noise Important Area
NO ₂	Nitrogen dioxide
NOEL	No observable effects limit
NO _x	Nitrogen oxides
NPPG	National Planning Practice Guidance
NPS NN	National Policy Statement for National Networks
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Project
OHID	Office for Health Improvement and Disparities (formerly Public Health England)
ONS	Office for National Statistics
ORVal	Outdoor Recreation Valuation tool
OS	Ordnance Survey
PBDE	Polybrominated diphenyl ethers
PEIR	Preliminary Environmental Information Report
PFA	Pulverised fuel ash
PFOS	Perfluorooctane sulphonate
PHE	Public Health England
PM _{2.5/10}	Particulate matter, where the number indicates the size of the particle in microns
PRoW	Public Right of Way

Acronym or initialism	Term
REAC	Register of Environmental Actions and Commitments
SAR	Standardised admissions ratio
SMR	Standardised mortality ratio
SOAEL	Significant observable adverse effects limit
SRN	Strategic Road Network
STEM	Science, Technology, Engineering and Maths
TAG	Transport Analysis Guidance
TfGM	Transport for Greater Manchester
UKHSA	United Kingdom Health and Security Agency (formerly Public Health England)
WCH	WCH
WCHAR	Walking, Cycling and Horse-Riding Assessment and Review
WFD	Water Framework Directive
WHIASU	Welsh Health Impact Assessment Support Unit
WHO	World Health Organisation

Glossary

Term	Definition
Accessibility	The ability of users to access land, property, infrastructure, businesses and community facilities.
Affected road network (ARN)	All roads that trigger the traffic screening criteria and adjoining roads within 200m.
Agricultural landholdings	Land and associated infrastructure for the purpose of agricultural production, e.g. arable farming, dairy farming etc.
Air quality management area (AQMA)	An area declared by a local authority which has been determined will exceed the relevant air quality strategy objective.
Air quality objective (AQO)	The threshold below which harmful effects from pollutant exposure are not expected, set out within the Air Quality Standards Regulations 2010.
Air quality threshold	Generic term to represent the relevant pollutant averaging period and concentration value described by the air quality strategy objectives or EU limit values.
Background concentration	The ambient pollutant concentration from multiple sources.
Bridleway	A highway over which the public have a right of way on foot and a right of way on horseback or leading a horse. In some cases it may include a right to drive animals of any description along the highway. Statute has added the right to ride a bicycle (not a mechanically propelled vehicle), although cyclists must give way to pedestrians and persons on horseback.

Term	Definition
Byway	A road or track not following a main route; a minor road or path. A 'restricted byway' allows a right of way on foot, on horseback, or leading a horse, cycling and for any vehicles other than mechanically propelled vehicles. In some cases there may also be a right to drive animals. Byways open to all traffic (BOATs) are highways over which the public right of way is for vehicles and all other kinds of traffic, but which are used mainly for the purposes for which footpaths and bridleways are used.
Clinical health	Having to do with the examination and treatment of patients. Health status of individual patients.
Community	A group of people living in the same place or having a particular characteristic in common.
Community land and assets	Land, buildings and infrastructure providing a service/resource to a community, e.g. open spaces, village greens, village halls, healthcare and education facilities.
Compensation code	The national compensation code (the compensation code or the land compensation code) is the collective term for the principles derived from statute and case law, relating to compensation for compulsory acquisition, which ensures that when land is needed for an infrastructure project, the owners receive compensation to help them relocate. The code also ensures that those who experience real, physical events, for example vibration or noise, from a scheme once it is in operation, are entitled to compensation.
Development land	Land identified in national or local plans, policies or strategies for development (including intensification of existing uses) and land subject to planning permission.
Do-minimum (DM)	The scenario that represents the situation that would occur without the project in operation, which includes permitted developments.
Do-something (DS)	The scenario that represents the situation that would occur with the project in operation, which includes permitted developments.
EU Limit Value	Legally binding threshold for individual pollutants, as prescribed in the European Commission Ambient Air Quality Directive (2008/50/EC).
Footway	A way comprised in a highway which also comprises a carriageway, being a way over which the public have a right of way on foot only. A footway is essentially a pavement alongside a carriageway – it is the part of a carriageway highway set aside for pedestrians.
Health inequalities	The unfair and avoidable differences in exposure to health risk factors and to health status, health across the population, and between different groups within society. Note that where these are unfair and avoidable differences, these are also known as health inequities.
Heavy goods vehicle (HGV)	A commercial carrier vehicle with a gross vehicle weight of more than 3.5 tonnes.

Term	Definition
L _{den}	The L _{den} is a noise index that is mainly used by the World Health Organisation and health professionals. It provides a single weight noise level taking into account the commonly used three periods of day (07:00 to 19:00), evening (19:00 to 23:00) and night (23:00 to 07:00). Before the noise levels from these three periods are added together, the evening period has a +5dB(A) correction applied and the night period a +10dB(A) correction applied.
L _{eq} or L _{Aeq}	Acoustic nomenclature indicating that a value is expressed in terms of the equivalent continuous sound pressure level.
L _{night}	The free-field noise level in the L _{Aeq} index from 23:00 to 07:00.
Lowest observed adverse effect level (LOAEL)	The level above which adverse effects on health and quality of life can be detected.
Mental health	A state of wellbeing in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.
No observed effect level (NOEL)	The noise level below which no effect can be detected.
Noise Important Area (NIA)	Locations where the 1% of the population that are affected by the highest noise levels from major roads are located, as defined by the Defra Noise Action Plan: Roads (Defra, 2019)
Non-threshold	A term used to describe a pollutant which may cause adverse effects at any level above zero exposure. In other words no safe level of exposure to the substance has been scientifically established.
Population health	The health outcomes of a group of individuals, including the distribution of those outcomes within the group.
Private property and housing	Land, buildings and infrastructure for the purpose of residential use.
Public right of way (PRoW)	A right to cross land owned by another person is known as a 'right of way'. If this is a right exercisable by the public at large, it is a 'public right of way'.
Risk factor	Social, economic or biological status, behaviours or environments which are associated with, or cause, increased susceptibility to a specific disease, ill health or injury.
Significant observed adverse effect level (SOAEL)	The level of noise exposure above which significant adverse effects on health and quality of life occur.
Source-pathway-receptor	The 'source-pathway-receptor' model defines those receptors considered to be at risk. The term 'source' describes the origin of potential effects (e.g. construction activities) and the term 'pathway' describes the means (e.g. through air, water or ground) by which the effect reaches the receiving sensitive 'receptor' (e.g. terrestrial habitats/species, human receptors). If the source, pathway or receptor is absent, no link exists and thus there will be no potential for an impact to occur.

Term	Definition
Standardised admissions ratio (SAR)	The SAR is a health measure that allows a comparison of hospital admissions data between areas, while accounting for differences in population structures (i.e. age profile) between those areas. It is calculated by using admissions data from a standard population to estimate the number of admissions expected in the study population. The estimate is then compared with the actual (observed) number of admissions and multiplied by 100 to yield the SAR. If the observed admissions are the same as the expected admissions the SAR will be 100. An SAR greater than 100 indicates that admissions are higher than would be expected for the age structure in the study population. An SAR less than 100 indicates it is lower than expected.
Standardised incidence ratio (SIR)	The SIR is a health measure that allows a comparison of incidence of diseases between areas, while accounting for differences in population structures (i.e. age profile) between those areas. It is calculated from mortality data using the same approach as for the SAR.
Standardised mortality ratio (SMR)	The SMR is a health measure that allows a comparison of mortality data between areas, while accounting for differences in population structures (i.e. age profile) between those areas. It is calculated from mortality data using the same approach as for the SAR.
Walkers, cyclists and horse riders (WCH)	<p>Users that include:</p> <ul style="list-style-type: none"> • Pedestrians – including mobility impaired and vulnerable pedestrians • Cyclists – including mobility impaired and vulnerable cyclists • Equestrians – including mobility impaired and vulnerable equestrians <p>Other users considered as part of this group include (but are not limited to):</p> <ul style="list-style-type: none"> • Scooter riders (non-motorised) • Cyclists with electrically assisted pedal cycles (where these conform to Department for Transport or other relevant regional regulations and where they can legally be used) • Users of powered wheelchairs (where these conform to Department for Transport regulations and where they can legally be used)
Wider determinants of health	Personal, social, economic and environmental factors which determine the health status of individuals and communities.

References

- Barton, H. and Grant, M. (2006) A health map for the local human habitat. The Journal for the Royal Society for the Promotion of Health, 126 (6). pp. 252-253. ISSN 1466-4240.
- Bury Metropolitan Borough Council (1997). Bury Unitary Development Plan.
- Bury Metropolitan Borough Council (2021). "Let's Do It!" Bury Strategy 2030. Accessed July 2023.
- Bury Metropolitan Borough Council (2022). The Bury Directory. Accessed July 2023.
- Bury Metropolitan Borough Council and NHS Greater Manchester Integrated Care (2022). Bury mental health market position statement 2022. Accessed July 2023.
- Bury Metropolitan Borough Council Health and Wellbeing Board (2023). Bury Joint Strategic Needs Assessment (JSNA). Accessed July 2023.
- Day, B.H. and Smith, G. (2018). Outdoor Recreation Valuation (ORVal) User Guide: Version 2.0. Land, Environment, Economics and Policy (LEEP) Institute, Business School, University of Exeter.
- Denford, S. et al. (2020). 'Barriers and facilitators to physical activity among children, adolescents, and young adults with cystic fibrosis: A systematic review and thematic synthesis of qualitative research', BMJ Open, 10(2). doi:10.1136/bmjopen-2019-035261.
- Department for Environment, Food and Rural Affairs (2010). Noise Policy Statement for England.
- Department for Transport (2014). National Policy Statement for National Networks. London: Her Majesty's Stationery Office.
- Department for Transport (2022). Transport Analysis Guidance (TAG) Unit A3.
- Department for Transport (2023). Draft National Policy Statement for National Networks. London: His Majesty's Stationery Office.
- Greater Manchester Combined Authority (2021). Places For Everyone Joint Development Plan Document – Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, Wigan Publication Stage.
- Health Innovation Manchester (2019). Greater Manchester Mental Health Research Priorities Listening exercise: Considering priorities for mental health research for the Greater Manchester population.
- Highways England (2019a). Design Manual for Roads and Bridges, GG 142 Walking, cycling and horse-riding assessment and review. Revision 0.
- Highways England (2019b). LA 105 Air quality. Revision 0.
- Highways England (2020a). Design Manual for Roads and Bridges, LA 112 Population and Human Health. Revision 1.
- Highways England (2020b). Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring. Revision 1.
- Highways England (2020c). Design Manual for Roads and Bridges, LA 111 Noise and Vibration. Revision 2.
- HM Government (2011). Healthy Lives, Healthy People: Our Strategy for Public Health in England. Accessed July 2023. <https://www.gov.uk/government/publications/healthy-lives-healthy-people-our-strategy-for-public-health-in-england>.
- International Association for Impact Assessment and European Public Health Association (2020). Human health: Ensuring a high level of protection. Accessed July 2023.

https://www.iaia.org/uploads/pdf/Human%20Health%20Ensuring%20Protection%20Main%20and%20Appendices_compressed.pdf.

Marmot, M. (2010). Fair Society, healthy lives: the Marmot Review: strategic review of health inequalities in England. Accessed July 2023.

<https://www.parliament.uk/globalassets/documents/fair-society-healthy-lives-full-report.pdf>.

National Highways (2023). M60/M62/M66 Simister Island Interchange Preliminary Environmental Information Report. Report no. HE548642-JAC-EGN-SII_MLT-RP-LE-0001. Revision number P05.

Office for Health Improvement and Disparities (2023). Public health profiles. Accessed June 2023. <https://fingertips.phe.org.uk>.

Office for National Statistics (2020). Household projections for England. Accessed June 2023.

Office for National Statistics (2022). Is hybrid working here to stay?. Accessed June 2023.

Office for National Statistics (2023). Census 2021, TS001 - Number of usual residents in households and communal establishments.

Public Health England (2020). Improving access to greenspace. A new review for 2020. p. 112.

Pyper, R., Waples, H., Beard, C., Barratt, T., Hardy, K., Turton, P., Netherton, A., McDonald, J., Buroni, A., Bhatt, A., Phelan, E., Scott, I., Fisher, T., Christian, G., Ekermawi, R., Devine, K., McClenaghan, R., Fenech, B., Dunne, A., Hodgson, G., Purdy, J., Cave, B. (2022). IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment.

Sport England (2022). "Children's activity levels recover to pre-pandemic levels". Accessed July 2023. <https://www.sportengland.org/>.

Strava (2022). Global Heatmap. Accessed June 2023.

Welsh Health Impact Assessment Support Unit (n.d.). Health Impact Assessment, A Practical Guide. Appendix 2. Vulnerable/Disadvantage Groups Checklist. Accessed July 2023.

World Health Organisation (1948). Official Records of the World Health Organization No. 2: Summary Report on Proceedings, Minutes and Final Acts of the International Health Conference Held in New York From 19 June to 22 July 1946. Geneva: World Health Organization.

World Health Organisation (2017). Determinants of health. Accessed July 2023.

<https://www.who.int/news-room/questions-and-answers/item/determinants-of-health>.

World Health Organisation (2018). Environmental Noise Guidelines for the European Region. WHO Regional Office for Europe. Copenhagen, Denmark.