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HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix SV-003-0MA07

Sound, noise and vibration

MA07: Davenport Green to Ardwick

Operational sound, noise and vibration report

M273

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Department for Transport

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1 Introduction

1.1.1 This report is an appendix to the sound, noise and vibration assessment relating to the Davenport Green to Ardwick area (MA07). This appendix presents detailed operational sound, noise and vibration levels.

1.1.2 This appendix should be read in conjunction with:

- Volume 2, Community Area reports;
- Volume 3, Route-wide effects;
- Volume 4, Off-route effects; and
- Volume 5, Appendices.

1.1.3 The sound, noise and vibration appendices comprise three sections. The first of these is an introduction to relevant policy and assessment methodology (see Volume 5, Appendix SV-001-00000); this relates to the sound, noise and vibration assessment for all areas.

1.1.4 In addition to this report for the Davenport Green to Ardwick area, a baseline and construction sound, noise and vibration report is set out (see Volume 5, Appendix SV-002-0MA07). This includes details of regional and local policy guidance and engagement.

1.1.5 The outcomes of the sound, noise and vibration assessments are summarised in the Volume 2, Community Area reports, including commentary regarding any likely significant effects identified in the assessment.

1.1.6 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 2, MA07 Map Book and Volume 5, Sound, noise and vibration Map Book.

2 Scope, assumptions and limitations

2.1 Methodology

2.1.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Environmental Impact Assessment Scope and Methodology Report (SMR) (see Volume 5, Appendix CT-001-00001).

2.2 Assumptions

2.2.1 Route-wide assumptions are outlined in Volume 1, Section 8, and are further detailed in Volume 5, Appendix SV-001-00000. Local assumptions that apply to the assessment of operational sound, noise and vibration within this area are set out in Volume 2, Community Area Report: Davenport Green to Ardwick (MA07), Section 13.

2.3 Limitations

2.3.1 The route-wide limitations and the approach adopted to ensure that they will not compromise the robust assessment of sound, noise and vibration are presented in Volume 5, Appendix SV-001-00000 and Volume 2, Community Area Report: Davenport Green to Ardwick (MA07), Section 13.

3 Operational

3.1 Evaluation of impacts and effects

3.1.1 This appendix provides a quantitative assessment of operational noise and vibration impacts and effects and a qualitative assessment of likely significant effects, based on the impacts and effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

3.1.2 Indirect effects arising from permanent changes in traffic patterns on the existing road and rail networks as a consequence of the Proposed Scheme are also reported in this appendix, where they would occur within the study area as defined in Volume 5, Appendix SV-001-00000.

3.1.3 Route-wide impacts, effects and significant effects associated with noise or vibration from the operation of the Proposed Scheme are reported in Volume 3, Route-wide effects.

3.1.4 Off-route effects of noise or vibration arising from the operation of the Proposed Scheme, including those likely to arise from permanent changes in traffic patterns on roads or railways outside of the study area for direct effects are reported in Volume 4, Off-route effects.

3.1.5 In undertaking the assessment of sound, noise and vibration, consistent with Environmental Impact Assessment (EIA) Directive[1] and planning practice and guidance on noise[2] a differentiation between impacts, effects, adverse effects and significant effects is made. Further information is provided in Volume 5, Appendix SV-001-00000.

3.1.6 The assessment of impacts has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The operational assessment locations employed in this assessment are presented on Volume 5, Sound, noise and vibration Map Book, Map Series SV-02.

3.1.7 Baseline sound level data have been collected at locations representative of the airborne sound-sensitive receptors and presented in Volume 5, Appendix SV-002-0MA07, Table 1.

[1] European Commission, *Environmental Impact Assessment – EIA.* Available online at: Environmental Impact Assessment - EIA - Environment - European Commission (europa.eu).

[2] Ministry of Housing Communities & Local Government (2019), *National Planning Policy Framework*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf.

3.2 Effects arising during operation

Introduction

3.2.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts, effects and significant effects are presented. The significant effects and the evidence used to support these conclusions are presented in Volume 2, Community Area report: Davenport Green to Ardwick (MA07), Section 13.

Avoidance and mitigation measures

3.2.2 These are set out in Volume 2, Community Area report: Davenport Green to Ardwick (MA07), Section 13.

Quantitative identification of impacts and effects

Ground-borne sound and vibration

3.2.3 Assessment locations defined for the quantitative assessment of impacts are shown on Volume 5, Sound, noise and vibration Map Book, Map Series SV-02. SV-02 also displays ground-borne noise and vibration impacts and any resultant significant effects.

3.2.4 For each assessment location, the assessment results for residential and non-residential receptors are presented in Table 2. Explanation of the information in Table 2 is provided in Volume 5, Appendix SV-001-00000, with the following additional notes in Table 1.

Table 1: Explanatory notes for assessment results

Symbol	Explanation
V1-V4	Type of receptor (ground-borne vibration) – (V1) vibration sensitive research and manufacturing; hospitals with vibration sensitive equipment/operations; universities with vibration sensitive research equipment/operations, (V2) hotels, hospital wards and education dormitories, (V3) offices, schools and places of worship, (V4) workshops.
G1-G4	Type of receptor (ground-borne sound) – (G1) theatres/large auditoria and concert halls, (G2) sound recording/broadcast studios, (G3) places of meeting for religious worship/courts/cinemas/lecture theatres/museums/small auditoria or halls, (G4) offices/schools/colleges/hospitals/hotels/libraries.
NA	Type of effect - Generally no adverse effect.
A	Ground-borne sound or vibration levels from the Proposed Scheme exceed Lowest Observed Adverse Effect Level (LOAEL): the significance criteria set out in Volume 5: Appendix SV-001-00000, Annex A are considered when establishing significant effects.
S	Ground-borne sound or vibration levels from the Proposed Scheme exceed Significant Observed Adverse Effect Level (SOAEL).
VDV	Vibration Dose Value.

Symbol	Explanation
~	When considered under the significance criteria set out in Volume 5: Appendix SV-001-00000, Annex A, these adverse effects are not considered to be significant on a community basis.
<>	The quantitative impact methodology has identified an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not gives rise to a significant effect.
	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced residential community area, or individual receptor.
	For residential receptors yellow denotes a low ground-borne noise impact or a minor ground-borne vibration impact.
	For residential receptors orange denotes a medium ground-borne noise impact or a moderate ground-borne vibration impact.
	For residential receptors red denotes a high ground-borne noise impact or a major ground-borne vibration impact.
	For residential receptors dark red denotes a very high ground-borne noise impact.

Table 2: Operational ground-borne sound and vibration levels, noise and vibration impacts and effects for residential and non-residential receptors

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s $^{1.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615006	Rowarth Road, Manchester	6	0.01	0.01	-	10	NA	R	T	-	-	-	-	
615008	Rowarth Road, Manchester	18	0.03	0.02	-	9	NA	R	T	-	-	-	-	
615010	Shepton Drive, Manchester	12	0.02	0.01	-	16	NA	R	T	-	-	-	-	
615011	Rowarth Road, Manchester	8	0.01	0.01	-	14	NA	R	T	-	-	-	-	
615012	Rowarth Road, Manchester	20	0.03	0.02	-	25	NA	R	T	-	-	-	-	
615013	Greenbrow Road, Manchester	9	0.02	0.01	-	35	NA	R	T	-	-	-	-	
615014	Greenbrow Road, Manchester	21	0.04	0.02	-	14	NA	R	T	-	-	-	-	
615017	Clever Clowns Day Nursery, Greenbrow Road, Wythenshawe	7	0.02	0.01	-	1	NA	G4/V 3	T	-	-	-	-	
615019	Oldwood Road, Manchester	18	0.03	0.02	-	13	NA	R	T	-	-	-	-	
615021	Greenbrow Road, Manchester	9	0.02	0.01	-	13	NA	R	T	-	-	-	-	
615022	Oldwood Road, Manchester	11	0.02	0.01	-	21	NA	R	T	-	-	-	-	
615023	Tree of Life Community Centre, Greenbrow Road, Wythenshawe	13	0.02	0.01	-	1	NA	G3/V 3	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615026	Wensleydale Close, Manchester	6	0.01	0.01	-	44	NA	R	T	-	-	-	-	
615029	Partridge Avenue, Manchester	22	0.07	0.04	-	7	NA	R	T	-	-	-	-	
615034	Saxfield Drive, Manchester	13	0.03	0.02	-	8	NA	R	T	-	-	-	-	
615041	Open University, Wythenshawe, Manchester	23	0.07	0.05	-	1	NA	G4/V 3	T	-	-	-	-	
615043	The Royals (Offices), Wythenshawe, Manchester	21	0.06	0.04	-	1	NA	G4/V 3	T	-	-	-	-	
615044	Altrincham Road, Manchester	13	0.03	0.02	-	4	NA	R	T	-	-	-	-	
615046	The Church Of Jesus Christ Of Latter-Day Saints, Altrincham Road, Wythenshawe	25	0.08	0.05	-	1	NA	G3/V 3	T	-	-	-	-	
615048	Netherwood Road, Manchester	13	0.03	0.02	-	26	NA	R	T	-	-	-	-	
615049	Elwyn Avenue, Manchester	26	0.10	0.06	-	39	NA	R	T	-	-	-	-	
615052	Kingsley Trading Centre (Offices), Kingsley Road, Wythenshawe	29	0.13	0.08	-	1	NA	G4/V 3	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615054	Palatine Road (Offices), Wythenshawe	19	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
615057	31 Church Road (Offices), Wythenshawe	30	0.13	0.09	-	1	NA	G4/V 3	T	-	-	-	-	
615058	Brett Street (Offices), Wythenshawe	22	0.07	0.04	-	1	NA	G4/V 3	T	-	-	-	-	
615059	Transformulas House (Offices), Brett Street, Manchester	30	0.14	0.09	-	1	NA	G4/V 3	T	-	-	-	-	
615060	Express Solicitors (Offices), Palatine Road, Manchester	17	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
615064	Palatine Road, Manchester	14	0.05	0.03	-	1	NA	R	T	-	-	-	-	
615068	Palatine Road, Manchester	14	0.05	0.03	-	30	NA	R	T	-	-	-	-	
615069	Palatine Road, Manchester	14	0.05	0.03	-	75	NA	R	T	-	-	-	-	
615070	Britannia Country House Hotel, Palatine Road, Manchester	13	0.04	0.03	-	1	NA	G4/V 2	T	-	-	-	-	
615075	Palatine Road, Manchester	12	0.04	0.03	-	61	NA	R	T	-	-	-	-	
615076	Winchester Park, Manchester	12	0.04	0.03	-	17	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615077	Adamson Gardens, Manchester	23	0.07	0.05	-	59	NA	R	T	-	-	-	-	
615080	Wilmslow Road, Manchester	11	0.04	0.03	-	74	NA	R	T	-	-	-	-	
615082	Wilmslow Road (Offices), Manchester	18	0.06	0.04	-	1	NA	G4/V 3	T	-	-	-	-	
615083	Mayville Drive, Manchester	21	0.07	0.04	-	43	NA	R	T	-	-	-	-	
615084	Sandileigh Avenue, Manchester	12	0.04	0.03	-	44	NA	R	T	-	-	-	-	
615087	Ferndene Road, Manchester	12	0.04	0.03	-	4	NA	R	T	-	-	-	-	
615088	Wilmslow Road, Manchester	21	0.07	0.04	-	7	NA	R	T	-	-	-	-	
615089	Lynway Drive, Manchester	10	0.04	0.02	-	17	NA	R	T	-	-	-	-	
615090	Wilmslow Road, Manchester	23	0.07	0.05	-	4	NA	R	T	-	-	-	-	
615091	The Circuit, Manchester	13	0.04	0.03	-	9	NA	R	T	-	-	-	-	
615092	The Circuit, Manchester	16	0.05	0.03	-	8	NA	R	T	-	-	-	-	
615093	Ferndene Gardens, Manchester	17	0.05	0.03	-	6	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615094	Wilmslow Road, Manchester	20	0.06	0.04	-	4	NA	R	T	-	-	-	-	
615095	Lynway Drive, Manchester	14	0.05	0.03	-	8	NA	R	T	-	-	-	-	
615096	Lynway Drive, Manchester	11	0.04	0.03	-	6	NA	R	T	-	-	-	-	
615097	Wensley Drive, Manchester	15	0.05	0.03	-	10	NA	R	T	-	-	-	-	
615098	Parkville Road, Manchester	11	0.04	0.03	-	4	NA	R	T	-	-	-	-	
615101	Parkville Road, Manchester	17	0.05	0.03	-	6	NA	R	T	-	-	-	-	
615102	Wilmslow Road, Manchester	15	0.05	0.03	-	7	NA	R	T	-	-	-	-	
615103	Parkville Road, Manchester	21	0.07	0.04	-	4	NA	R	T	-	-	-	-	
615104	Parkville Road, Manchester	20	0.06	0.04	-	10	NA	R	T	-	-	-	-	
615105	Alpino Cars (Office), Wilmslow Road, Manchester	13	0.04	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
615107	Rathen Road, Manchester	20	0.06	0.04	-	29	NA	R	T	-	-	-	-	
615108	Oak Road, Manchester	12	0.04	0.03	-	7	NA	R	T	-	-	-	-	
615109	Wilmslow Road, Manchester	19	0.06	0.04	-	21	NA	R	T	-	-	-	-	
615111	Rathen Road, Manchester	16	0.05	0.03	-	47	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615112	The Christie Foundation NHS Trust (Hospital), Wilmslow Road, Manchester and committed development (Mapbook ref: MA07/445)	11	0.04	0.02	-	1	NA	G4/V 1	T	-	-	-	-	[3]
615113	The Christie Clinic, Cotton Lane, Manchester	18	0.06	0.04	-	1	NA	G4/V 2	T	-	-	-	-	
615114	Cotton Lane, Manchester	19	0.06	0.04	-	22	NA	R	T	-	-	-	-	
615115	Oglesby Building (Cancer Research Centre), Wilmslow Road, Manchester	12	0.04	0.03	-	1	NA	G4/V 2	T	-	-	-	-	
615117	St Cuthbert's RC Primary School, Heyscroft Road, Manchester	12	0.04	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
615121	Braemar Road, Manchester	17	0.06	0.03	-	112	NA	R	T	-	-	-	-	
615124	Moseley Road, Fallowfield	24	0.07	0.05	-	47	NA	R	T	-	-	-	-	

[3] See risk assessment in Annex A.

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615129	Birchfields Road, Manchester	18	0.06	0.04	-	4	NA	R	T	-	-	-	-	
615130	Birchfields Road, Manchester	22	0.07	0.05	-	4	NA	R	T	-	-	-	-	
615131	Kingsway, Manchester	11	0.04	0.03	-	12	NA	R	T	-	-	-	-	
615132	Birchfields Road, Manchester	16	0.05	0.03	-	4	NA	R	T	-	-	-	-	
615134	Birchfields Road, Manchester	13	0.05	0.03	-	6	NA	R	T	-	-	-	-	
615135	Peaceville Road, Manchester	12	0.04	0.03	-	16	NA	R	T	-	-	-	-	
615137	Birchfields Road, Manchester	12	0.04	0.03	-	3	NA	R	T	-	-	-	-	
615138	Birchfields Road, Manchester	11	0.04	0.03	-	3	NA	R	T	-	-	-	-	
615141	Birchfields Primary School (Primary School), Lytham Road, Manchester	13	0.04	0.02	-	1	NA	G4/V 3	T	-	-	-	-	
615143	Kingsway Avenue, Manchester	15	0.04	0.03	-	11	NA	R	T	-	-	-	-	
615144	Lytham Road, Manchester	13	0.04	0.02	-	40	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615146	Lytham Road, Manchester	16	0.05	0.03	-	6	NA	R	T	-	-	-	-	
615147	MEA Central (Secondary School), Lytham Road, Manchester	14	0.04	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
615148	Lindsay Avenue, Manchester	12	0.04	0.02	-	29	NA	R	T	-	-	-	-	
615150	Lindsay Avenue, Manchester	16	0.05	0.03	-	7	NA	R	T	-	-	-	-	
615152	Lindsay Avenue, Manchester	13	0.04	0.02	-	21	NA	R	T	-	-	-	-	
615153	Collingwood Road, Manchester	15	0.04	0.03	-	2	NA	R	T	-	-	-	-	
615161	St. Benedicts Avenue, Manchester	26	0.06	0.04	-	47	NA	R	T	-	-	-	-	
615165	Rostron Avenue, Manchester	14	0.03	0.02	-	14	NA	R	T	-	-	-	-	
615168	Whixhall Avenue, Manchester	11	0.02	0.01	-	15	NA	R	T	-	-	-	-	
615169	Bennett Street, Manchester	17	0.03	0.02	-	19	NA	R	T	-	-	-	-	
615170	St. Benedicts Avenue, Manchester	26	0.06	0.04	-	41	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615171	Hayfield Close, Manchester	20	0.04	0.02	-	37	NA	R	T	-	-	-	-	
615172	Wigley Street, Manchester	24	0.05	0.03	-	7	NA	R	T	-	-	-	-	
615173	Anthony Close, Manchester	27	0.06	0.04	-	10	NA	R	T	-	-	-	-	
615174	Anthony Close, Manchester	16	0.03	0.02	-	20	NA	R	T	-	-	-	-	
615175	Anthony Close, Manchester	21	0.04	0.03	-	9	NA	R	T	-	-	-	-	
615176	Wigley Street, Manchester	18	0.03	0.02	-	6	NA	R	T	-	-	-	-	
615177	Anthony Close, Manchester	20	0.04	0.02	-	23	NA	R	T	-	-	-	-	
615178	Anthony Close, Manchester	22	0.04	0.03	-	7	NA	R	T	-	-	-	-	
615179	Anthony Close, Manchester	15	0.03	0.02	-	12	NA	R	T	-	-	-	-	
615180	Anthony Close, Manchester	16	0.03	0.02	-	5	NA	R	T	-	-	-	-	
615181	Anthony Close, Manchester	28	0.07	0.04	-	8	NA	R	T	-	-	-	-	
615182	Anthony Close, Manchester	16	0.02	0.02	-	4	NA	R	T	-	-	-	-	
615183	Anthony Close, Manchester	21	0.04	0.02	-	4	NA	R	T	-	-	-	-	
615184	Anthony Close, Manchester	14	0.02	0.01	-	6	NA	R	T	-	-	-	-	
615368	Calderbank Medical Chambers (Clinic), Wilmslow Road, Manchester	12	0.04	0.03	-	1	NA	G4/V 2	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
615377	West Gorton Medical Centre, Clowes Street, Manchester	14	0.03	0.02	-	1	NA	G4/V 2	T	-	-	-	-	
615401	Palatine Road, Manchester	12	0.04	0.03	-	17	NA	R	T	-	-	-	-	
616006	The Robert Parfett Building, The Christie Hospital NHS Foundation Trust, Kinnaird Road, Manchester	15	0.05	0.03	-	1	NA	G4/V 2	T	-	-	-	-	
616008	Oldwood Road, Manchester	13	0.02	0.02	-	24	NA	R	T	-	-	-	-	
616009	Foxfield Road, Manchester	12	0.02	0.01	-	12	NA	R	T	-	-	-	-	
616010	Foxfield Road, Manchester	22	0.04	0.03	-	6	NA	R	T	-	-	-	-	
616011	Foxfield Road, Manchester	21	0.04	0.03	-	13	NA	R	T	-	-	-	-	
616012	Foxfield Road, Manchester	6	0.02	0.01	-	13	NA	R	T	-	-	-	-	
616013	Foxfield Road, Manchester	10	0.02	0.01	-	15	NA	R	T	-	-	-	-	
616014	Rodborough Road, Manchester	6	0.02	0.01	-	13	NA	R	T	-	-	-	-	
616015	Foxfield Road, Manchester	13	0.03	0.02	-	15	NA	R	T	-	-	-	-	
616016	Tuffley Road, Manchester	18	0.03	0.02	-	10	NA	R	T	-	-	-	-	
616017	Foxfield Road, Manchester	23	0.05	0.03	-	11	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616018	Tuffley Road, Manchester	22	0.04	0.03	-	23	NA	R	T	-	-	-	-	
616019	Luton Drive, Manchester	23	0.06	0.04	-	16	NA	R	T	-	-	-	-	
616020	Malling Road, Manchester	13	0.03	0.02	-	27	NA	R	T	-	-	-	-	
616023	Chalford Road, Manchester	23	0.05	0.03	-	11	NA	R	T	-	-	-	-	
616024	Whitburn Road, Manchester	13	0.04	0.02	-	22	NA	R	T	-	-	-	-	
616025	Whitburn Road, Manchester	21	0.06	0.04	-	11	NA	R	T	-	-	-	-	
616026	Millbrook Road, Manchester	22	0.05	0.03	-	23	NA	R	T	-	-	-	-	
616027	Chalford Road, Manchester	10	0.03	0.02	-	21	NA	R	T	-	-	-	-	
616028	Appleford Avenue, Manchester	8	0.02	0.01	-	27	NA	R	T	-	-	-	-	
616029	Tuffley Road, Manchester	7	0.02	0.01	-	15	NA	R	T	-	-	-	-	
616030	Whitburn Road, Manchester	21	0.05	0.03	-	14	NA	R	T	-	-	-	-	
616031	Whitburn Road, Manchester	17	0.05	0.03	-	11	NA	R	T	-	-	-	-	
616032	Colshaw Road, Manchester	14	0.04	0.02	-	12	NA	R	T	-	-	-	-	
616033	Netley Road, Manchester	9	0.03	0.02	-	21	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616034	Colshaw Road, Manchester	10	0.03	0.02	-	14	NA	R	T	-	-	-	-	
616035	Colshaw Road, Manchester	12	0.04	0.02	-	4	NA	R	T	-	-	-	-	
616036	Colshaw Road, Manchester	19	0.05	0.03	-	5	NA	R	T	-	-	-	-	
616037	Colshaw Road, Manchester	18	0.05	0.03	-	5	NA	R	T	-	-	-	-	
616038	Balmer Drive, Manchester	22	0.07	0.05	-	11	NA	R	T	-	-	-	-	
616039	Balmer Drive, Manchester	14	0.05	0.03	-	4	NA	R	T	-	-	-	-	
616040	Dunnisher Road, Manchester	13	0.04	0.03	-	16	NA	R	T	-	-	-	-	
616041	Dunnisher Road, Manchester	15	0.05	0.03	-	14	NA	R	T	-	-	-	-	
616042	Dunnisher Road, Manchester	20	0.07	0.05	-	18	NA	R	T	-	-	-	-	
616043	Dunnisher Road, Manchester	23	0.09	0.06	-	17	NA	R	T	-	-	-	-	
616044	Firbank Road, Manchester	19	0.06	0.04	-	12	NA	R	T	-	-	-	-	
616045	Highdales Road, Manchester	12	0.04	0.03	-	10	NA	R	T	-	-	-	-	
616046	Heybrook Road, Manchester	23	0.09	0.05	-	11	NA	R	T	-	-	-	-	
616047	Atlow Drive, Manchester	23	0.09	0.06	-	24	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616048	Heybrook Road, Manchester	23	0.08	0.05	-	18	NA	R	T	-	-	-	-	
616049	Wendon Road, Manchester	14	0.05	0.03	-	15	NA	R	T	-	-	-	-	
616050	Wendon Road, Manchester	12	0.05	0.03	-	6	NA	R	T	-	-	-	-	
616051	Bude Walk, Manchester	12	0.04	0.03	-	12	NA	R	T	-	-	-	-	
616052	Heybrook Road, Manchester	13	0.05	0.03	-	13	NA	R	T	-	-	-	-	
616053	Partridge Avenue, Manchester	16	0.06	0.04	-	13	NA	R	T	-	-	-	-	
616054	Nethercote Avenue, Manchester	11	0.04	0.03	-	12	NA	R	T	-	-	-	-	
616055	Partridge Avenue, Manchester	27	0.10	0.06	-	5	NA	R	T	-	-	-	-	
616056	Partridge Avenue, Manchester	19	0.05	0.03	-	3	NA	R	T	-	-	-	-	
616057	Blackcarr Road, Manchester	13	0.04	0.02	-	6	NA	R	T	-	-	-	-	
616058	Roundwood Road, Manchester	29	0.13	0.08	-	50	NA	R	T	-	-	-	-	
616059	Shawdene Road, Manchester	30	0.14	0.09	-	26	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616060	Calder Avenue, Manchester	20	0.06	0.04	-	39	NA	R	T	-	-	-	-	
616061	Roundwood Road, Manchester	25	0.09	0.06	-	39	NA	R	T	-	-	-	-	
616062	Roundwood Road, Manchester	21	0.06	0.04	-	49	NA	R	T	-	-	-	-	
616063	Roundwood Road, Manchester	29	0.13	0.08	-	16	NA	R	T	-	-	-	-	
616064	Chapel Road, Manchester	30	0.15	0.09	-	34	NA	R	T	-	-	-	-	
616065	Corda Avenue, Manchester	25	0.09	0.06	-	10	NA	R	T	-	-	-	-	
616066	Chapel Road, Manchester	21	0.06	0.04	-	38	NA	R	T	-	-	-	-	
616067	Beech Avenue, Manchester	17	0.05	0.03	-	20	NA	R	T	-	-	-	-	
616068	Heybrook Road, Manchester	22	0.07	0.05	-	26	NA	R	T	-	-	-	-	
616069	Longley Lane, Manchester	15	0.04	0.03	-	17	NA	R	T	-	-	-	-	
616070	Kingsley Road, Manchester	30	0.14	0.09	-	15	NA	R	T	-	-	-	-	
616071	Kingsley Road, Manchester	29	0.12	0.08	-	5	NA	R	T	-	-	-	-	
616072	Kingsley Road, Manchester	25	0.09	0.06	-	4	NA	R	T	-	-	-	-	
616073	Palatine Road (Offices), Manchester and committed	23	0.08	0.05	-	1	NA	G4/V 3	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
	development (Mapbook ref: MA07/042)													
616074	Allanson Road, Manchester	30	0.13	0.08	-	18	NA	R	T	-	-	-	-	
616075	Palatine Road, Manchester	15	0.04	0.03	-	38	NA	R	T	-	-	-	-	
616076	Brett Street, Manchester	27	0.09	0.06	-	7	NA	R	T	-	-	-	-	
616077	Queenhill Road, Manchester	21	0.06	0.04	-	12	NA	R	T	-	-	-	-	
616078	Brett Street, Manchester	18	0.06	0.04	-	8	NA	R	T	-	-	-	-	
616079	Queenhill Road, Manchester	27	0.09	0.06	-	22	NA	R	T	-	-	-	-	
616080	Allanson Road, Manchester	23	0.07	0.05	-	14	NA	R	T	-	-	-	-	
616081	Allanson Road, Manchester	18	0.05	0.03	-	14	NA	R	T	-	-	-	-	
616082	Mill Lane, Manchester	19	0.06	0.04	-	6	NA	R	T	-	-	-	-	
616083	Queenhill Road, Manchester	18	0.06	0.04	-	10	NA	R	T	-	-	-	-	
616084	Mill Lane, Manchester	16	0.05	0.03	-	17	NA	R	T	-	-	-	-	
616085	Mill Lane, Manchester	13	0.04	0.03	-	8	NA	R	T	-	-	-	-	
616086	Allanson Road, Manchester	28	0.09	0.06	-	9	NA	R	T	-	-	-	-	
616088	Peggy Lane, Manchester	22	0.07	0.04	-	53	NA	R	T	-	-	-	-	

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616090	Holme Road, Manchester	19	0.06	0.04	-	12	NA	R	T	-	-	-	-	
616091	Holme Road, Manchester	13	0.05	0.03	-	13	NA	R	T	-	-	-	-	
616093	Dundreggan Gardens, Manchester	13	0.04	0.03	-	20	NA	R	T	-	-	-	-	
616094	Holme Road, Manchester	25	0.08	0.05	-	19	NA	R	T	-	-	-	-	
616095	Holme Road, Manchester	15	0.05	0.03	-	65	NA	R	T	-	-	-	-	
616096	Lancaster Road, Manchester	25	0.08	0.05	-	18	NA	R	T	-	-	-	-	
616097	Elm Road, Manchester	25	0.08	0.05	-	8	NA	R	T	-	-	-	-	
616098	Elm Road, Manchester	17	0.05	0.03	-	19	NA	R	T	-	-	-	-	
616099	Parkfield Road South, Manchester	13	0.04	0.03	-	8	NA	R	T	-	-	-	-	
616100	Barlow Moor Road, Manchester	15	0.05	0.03	-	42	NA	R	T	-	-	-	-	
616101	Barlow Moor Road, Manchester	20	0.06	0.04	-	7	NA	R	T	-	-	-	-	
616102	Barlow Moor Road, Manchester	17	0.05	0.03	-	5	NA	R	T	-	-	-	-	
616103	Parkfield Road South, Manchester	17	0.05	0.03	-	1	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
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616104	Elm Road, Manchester	26	0.08	0.05	-	10	NA	R	T	-	-	-	-	
616105	Parkfield Road South, Manchester	16	0.05	0.03	-	18	NA	R	T	-	-	-	-	
616106	Elm Road, Manchester	15	0.05	0.03	-	8	NA	R	T	-	-	-	-	
616107	Ballbrook Avenue, Manchester	25	0.08	0.05	-	81	NA	R	T	-	-	-	-	
616108	Ballbrook Avenue, Manchester	25	0.08	0.05	-	24	NA	R	T	-	-	-	-	
616109	Lapwing Lane, Manchester	22	0.07	0.04	-	33	NA	R	T	-	-	-	-	
616110	Holmwood Road, Manchester	20	0.06	0.04	-	17	NA	R	T	-	-	-	-	
616111	Wilmslow Road, Manchester	16	0.05	0.03	-	11	NA	R	T	-	-	-	-	
616112	Lyndhurst Road, Manchester	13	0.04	0.03	-	4	NA	R	T	-	-	-	-	
616113	Ballbrook Avenue, Manchester	19	0.06	0.04	-	25	NA	R	T	-	-	-	-	
616114	Pine Road, Manchester	14	0.05	0.03	-	7	NA	R	T	-	-	-	-	
616115	Pine Road, Manchester	12	0.04	0.03	-	20	NA	R	T	-	-	-	-	
616116	Alan Road, Manchester	25	0.08	0.05	-	55	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
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616117	Heaton Road, Manchester	18	0.06	0.04	-	14	NA	R	T	-	-	-	-	
616118	Cotton Lane, Manchester	15	0.05	0.03	-	8	NA	R	T	-	-	-	-	
616119	Heaton Road, Manchester	13	0.05	0.03	-	13	NA	R	T	-	-	-	-	
616120	Pridmouth Road, Manchester	25	0.08	0.05	-	20	NA	R	T	-	-	-	-	
616121	Pridmouth Road, Manchester	13	0.05	0.03	-	24	NA	R	T	-	-	-	-	
616123	Cottonfield Road, Manchester	25	0.08	0.05	-	26	NA	R	T	-	-	-	-	
616124	School Grove, Manchester	24	0.08	0.05	-	27	NA	R	T	-	-	-	-	
616125	Alan Road, Manchester	25	0.08	0.05	-	34	NA	R	T	-	-	-	-	
616126	Fairholme Road, Manchester	23	0.07	0.05	-	30	NA	R	T	-	-	-	-	
616127	School Grove, Manchester	25	0.08	0.05	-	16	NA	R	T	-	-	-	-	
616128	Ashdene Road, Manchester	25	0.08	0.05	-	18	NA	R	T	-	-	-	-	
616129	Ashdene Road, Manchester	24	0.08	0.05	-	10	NA	R	T	-	-	-	-	
616130	Ashdene Road, Manchester	14	0.05	0.03	-	16	NA	R	T	-	-	-	-	
616131	Fairholme Road, Manchester	12	0.04	0.03	-	24	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616133	Parsonage Road, Manchester	25	0.08	0.05	-	8	NA	R	T	-	-	-	-	
616134	Brookleigh Road, Manchester	20	0.06	0.04	-	12	NA	R	T	-	-	-	-	
616135	Mauldeth Road (Residential), Manchester	19	0.06	0.04	-	42	NA	R	T	-	-	-	-	
616136	Booth Avenue, Manchester	13	0.04	0.03	-	20	NA	R	T	-	-	-	-	
616137	Shireoak Road, Manchester	25	0.08	0.05	-	11	NA	R	T	-	-	-	-	
616138	St. Chads Road, Manchester	25	0.08	0.05	-	15	NA	R	T	-	-	-	-	
616139	Lathom Road, Manchester	13	0.04	0.03	-	16	NA	R	T	-	-	-	-	
616140	Lathom Road, Manchester	12	0.04	0.03	-	8	NA	R	T	-	-	-	-	
616142	St. Chads Road, Manchester	25	0.08	0.05	-	3	NA	R	T	-	-	-	-	
616143	St. Chads Road, Manchester	21	0.07	0.04	-	6	NA	R	T	-	-	-	-	
616144	Mauldeth Road, Manchester	17	0.06	0.04	-	6	NA	R	T	-	-	-	-	
616145	Egerton Road, Manchester	12	0.04	0.03	-	16	NA	R	T	-	-	-	-	
616146	Egerton Road, Manchester	13	0.04	0.03	-	11	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616147	Exbury Street, Manchester	16	0.05	0.03	-	63	NA	R	T	-	-	-	-	
616148	Exbury Street, Manchester	13	0.04	0.03	-	15	NA	R	T	-	-	-	-	
616149	Ladybarn Lane, Manchester	20	0.06	0.04	-	28	NA	R	T	-	-	-	-	
616151	Ladybarn Lane, Manchester	25	0.08	0.05	-	100	NA	R	T	-	-	-	-	
616153	Edgeworth Drive, Manchester	19	0.06	0.04	-	37	NA	R	T	-	-	-	-	
616154	Shippey Street, Manchester	26	0.09	0.05	-	8	NA	R	T	-	-	-	-	
616155	Exbury Street, Manchester	12	0.04	0.03	-	14	NA	R	T	-	-	-	-	
616158	Edgeworth Drive, Manchester	26	0.08	0.05	-	8	NA	R	T	-	-	-	-	
616160	Headingley Road, Manchester	25	0.08	0.05	-	12	NA	R	T	-	-	-	-	
616161	Headingley Road, Manchester	15	0.05	0.03	-	21	NA	R	T	-	-	-	-	
616162	Headingley Road, Manchester	25	0.08	0.05	-	7	NA	R	T	-	-	-	-	
616163	Kingswood Road, Manchester	26	0.09	0.05	-	15	NA	R	T	-	-	-	-	
616164	Kingswood Road, Manchester	25	0.08	0.05	-	12	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616165	Kingswood Road, Manchester	25	0.08	0.05	-	10	NA	R	T	-	-	-	-	
616166	Kingswood Road, Manchester	14	0.05	0.03	-	6	NA	R	T	-	-	-	-	
616167	Kingswood Road, Manchester	12	0.04	0.03	-	12	NA	R	T	-	-	-	-	
616168	Mostyn Avenue, Manchester	15	0.05	0.03	-	34	NA	R	T	-	-	-	-	
616169	Abersoch Avenue, Manchester	25	0.08	0.05	-	10	NA	R	T	-	-	-	-	
616170	Mostyn Avenue, Manchester	12	0.04	0.03	-	4	NA	R	T	-	-	-	-	
616171	Mostyn Avenue, Manchester	14	0.05	0.03	-	17	NA	R	T	-	-	-	-	
616172	Mostyn Avenue, Manchester	11	0.04	0.02	-	10	NA	R	T	-	-	-	-	
616174	Abergele Road, Manchester	25	0.08	0.05	-	12	NA	R	T	-	-	-	-	
616175	Lindleywood Road, Manchester	24	0.08	0.05	-	8	NA	R	T	-	-	-	-	
616176	Lindleywood Road, Manchester	21	0.06	0.04	-	11	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616177	Lindleywood Road, Manchester	17	0.06	0.04	-	20	NA	R	T	-	-	-	-	
616178	Pensarn Avenue, Manchester	15	0.05	0.03	-	5	NA	R	T	-	-	-	-	
616179	Colwyn Avenue, Manchester	25	0.08	0.05	-	10	NA	R	T	-	-	-	-	
616180	Abergele Road, Manchester	23	0.09	0.05	-	8	NA	R	T	-	-	-	-	
616181	Colwyn Avenue, Manchester	25	0.08	0.05	-	4	NA	R	T	-	-	-	-	
616182	Colwyn Avenue, Manchester	17	0.06	0.04	-	14	NA	R	T	-	-	-	-	
616183	Whitby Road, Manchester	12	0.04	0.03	-	11	NA	R	T	-	-	-	-	
616185	Brailsford Road, Manchester	25	0.08	0.05	-	15	NA	R	T	-	-	-	-	
616186	Brailsford Road, Manchester	25	0.08	0.05	-	14	NA	R	T	-	-	-	-	
616187	Brailsford Road, Manchester	12	0.04	0.03	-	25	NA	R	T	-	-	-	-	
616188	Brailsford Road, Manchester	14	0.05	0.03	-	15	NA	R	T	-	-	-	-	
616190	Elsdon Road, Manchester	15	0.04	0.03	-	12	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616191	Beresford Road, Manchester	16	0.06	0.04	-	8	NA	R	T	-	-	-	-	
616192	Beresford Road, Manchester	28	0.12	0.07	-	4	NA	R	T	-	-	-	-	
616193	Campbell Road, Manchester	23	0.10	0.06	-	79	NA	R	T	-	-	-	-	
616194	Beresford Road, Manchester	16	0.06	0.04	-	10	NA	R	T	-	-	-	-	
616195	Beresford Road, Manchester	14	0.05	0.03	-	8	NA	R	T	-	-	-	-	
616196	Beresford Road, Manchester	22	0.09	0.06	-	6	NA	R	T	-	-	-	-	
616197	Longsight, Manchester	22	0.09	0.06	-	12	NA	R	T	-	-	-	-	
616198	Longsight, Manchester	13	0.05	0.03	-	11	NA	R	T	-	-	-	-	
616199	Reynell Road, Manchester	15	0.06	0.04	-	15	NA	R	T	-	-	-	-	
616200	Longsight, Manchester	13	0.05	0.03	-	10	NA	R	T	-	-	-	-	
616201	Reynell Road, Manchester	23	0.09	0.06	-	16	NA	R	T	-	-	-	-	
616202	Campbell Road, Manchester	16	0.06	0.04	-	10	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616203	Hamilton Road, Manchester	13	0.05	0.03	-	5	NA	R	T	-	-	-	-	
616204	Campbell Road, Manchester	18	0.07	0.05	-	9	NA	R	T	-	-	-	-	
616205	Campbell Road, Manchester	23	0.09	0.06	-	10	NA	R	T	-	-	-	-	
616206	Buller Road, Manchester	15	0.06	0.04	-	17	NA	R	T	-	-	-	-	
616207	Montgomery Road, Manchester	24	0.10	0.06	-	14	NA	R	T	-	-	-	-	
616208	Buller Road, Manchester	24	0.10	0.06	-	22	NA	R	T	-	-	-	-	
616209	Buller Road, Manchester	23	0.09	0.06	-	19	NA	R	T	-	-	-	-	
616210	Hector Road, Manchester	13	0.05	0.03	-	21	NA	R	T	-	-	-	-	
616211	Hamilton Road, Manchester	14	0.05	0.03	-	7	NA	R	T	-	-	-	-	
616212	Montgomery Road, Manchester	13	0.05	0.03	-	3	NA	R	T	-	-	-	-	
616213	Hamilton Road, Manchester	19	0.07	0.04	-	6	NA	R	T	-	-	-	-	
616214	Palm Street, Manchester	13	0.05	0.03	-	20	NA	R	T	-	-	-	-	
616215	Palm Street, Manchester	11	0.04	0.02	-	5	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616216	Farrer Road, Manchester	14	0.05	0.03	-	9	NA	R	T	-	-	-	-	
616217	Farrer Road, Manchester	17	0.06	0.04	-	12	NA	R	T	-	-	-	-	
616218	Hamilton Road, Manchester	24	0.10	0.06	-	6	NA	R	T	-	-	-	-	
616219	Hamilton Road, Manchester	16	0.05	0.03	-	29	NA	R	T	-	-	-	-	
616220	Clitheroe Road, Manchester	25	0.08	0.05	-	62	NA	R	T	-	-	-	-	
616221	Tatham Close, Manchester	17	0.05	0.03	-	13	NA	R	T	-	-	-	-	
616222	Tatham Close, Manchester	12	0.04	0.03	-	23	NA	R	T	-	-	-	-	
616223	Clitheroe Road, Manchester	13	0.05	0.03	-	8	NA	R	T	-	-	-	-	
616224	Hamilton Road, Manchester	16	0.05	0.03	-	5	NA	R	T	-	-	-	-	
616225	Portland Road, Manchester	26	0.08	0.05	-	81	NA	R	T	-	-	-	-	
616226	Clitheroe Road, Manchester	16	0.05	0.03	-	8	NA	R	T	-	-	-	-	
616227	Hamilton Road, Manchester	14	0.04	0.03	-	6	NA	R	T	-	-	-	-	
616228	Hamilton Road, Manchester	12	0.04	0.03	-	6	NA	R	T	-	-	-	-	
616229	Portland Road, Manchester	26	0.09	0.06	-	23	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616230	Stamford Road, Manchester	26	0.08	0.05	-	16	NA	R	T	-	-	-	-	
616232	Rainforth Street, Manchester	16	0.05	0.03	-	4	NA	R	T	-	-	-	-	
616234	Norman Grove, Manchester	11	0.04	0.02	-	30	NA	R	T	-	-	-	-	
616235	Victoria Terrace, Manchester	21	0.07	0.04	-	10	NA	R	T	-	-	-	-	
616236	Kirkmanshulme Lane, Manchester	14	0.04	0.03	-	8	NA	R	T	-	-	-	-	
616237	Meldreth Drive, Manchester	14	0.04	0.03	-	10	NA	R	T	-	-	-	-	
616238	Kirkmanshulme Lane, Manchester	16	0.05	0.03	-	16	NA	R	T	-	-	-	-	
616239	Ainsdale Street, Manchester	11	0.02	0.02	-	17	NA	R	T	-	-	-	-	
616240	Fairhaven Street, Manchester	13	0.03	0.02	-	15	NA	R	T	-	-	-	-	
616241	Fairhaven Street, Manchester	17	0.03	0.02	-	13	NA	R	T	-	-	-	-	
616242	Wendon Road, Manchester	13	0.05	0.03	-	30	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616243	Norleigh Road, Manchester	16	0.04	0.03	-	5	NA	R	T	-	-	-	-	
616244	Morrell Road, Manchester	19	0.06	0.04	-	10	NA	R	T	-	-	-	-	
616246	Chapel Road, Manchester	18	0.05	0.03	-	4	NA	R	T	-	-	-	-	
616247	Chapel Road, Manchester	18	0.05	0.03	-	2	NA	R	T	-	-	-	-	
616248	Church Road, Manchester	27	0.10	0.07	-	26	NA	R	T	-	-	-	-	
616249	Church Road, Manchester	20	0.06	0.04	-	8	NA	R	T	-	-	-	-	
616250	Church Road, Manchester	18	0.05	0.03	-	30	NA	R	T	-	-	-	-	
616251	Church Road, Manchester	30	0.13	0.08	-	26	NA	R	T	-	-	-	-	
616252	Church Road, Manchester	31	0.15	0.10	-	21	NA	R	T	-	-	-	-	
616253	Church Road, Manchester	22	0.07	0.04	-	19	NA	R	T	-	-	-	-	
616254	Holme Road, Manchester	22	0.07	0.04	-	12	NA	R	T	-	-	-	-	
616255	Dundreggan Gardens, Manchester	17	0.05	0.03	-	18	NA	R	T	-	-	-	-	
616257	Lancaster Road, Manchester	17	0.06	0.04	-	1	NA	R	T	-	-	-	-	
616258	Barlow Moor Road, Manchester	11	0.04	0.03	-	57	NA	R	T	-	-	-	-	
616259	Parkfield Road South, Manchester	12	0.04	0.03	-	11	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616260	Parkfield Road South, Manchester	15	0.05	0.03	-	12	NA	R	T	-	-	-	-	
616263	Raincliff Avenue, Manchester	14	0.04	0.03	-	4	NA	R	T	-	-	-	-	
616264	Slade Grove, Manchester	13	0.05	0.03	-	3	NA	R	T	-	-	-	-	
616265	St. Benedicts Avenue, Manchester	23	0.04	0.03	-	1	NA	R	T	-	-	-	-	
616266	Rowarth Road, Manchester	9	0.02	0.01	-	8	NA	R	T	-	-	-	-	
616267	Rowarth Road, Manchester	24	0.05	0.03	-	9	NA	R	T	-	-	-	-	
616268	Rowarth Road, Manchester	22	0.04	0.03	-	14	NA	R	T	-	-	-	-	
616269	Crowland Road, Manchester	6	0.01	0.01	-	9	NA	R	T	-	-	-	-	
616270	Greenbrow Road, Manchester	24	0.05	0.03	-	14	NA	R	T	-	-	-	-	
616271	Oldwood Road, Manchester	23	0.05	0.03	-	11	NA	R	T	-	-	-	-	
616272	Wensleydale Close, Manchester	8	0.02	0.01	-	40	NA	R	T	-	-	-	-	
616274	Rushall Walk, Manchester	6	0.01	0.01	-	4	NA	R	T	-	-	-	-	
616275	Oldwood Road, Manchester	23	0.05	0.03	-	13	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616276	Partridge Avenue, Manchester	20	0.05	0.03	-	8	NA	R	T	-	-	-	-	
616277	Partridge Avenue, Manchester	27	0.10	0.06	-	7	NA	R	T	-	-	-	-	
616278	Altrincham Road, Manchester	12	0.03	0.02	-	1	NA	R	T	-	-	-	-	
616279	Partridge Avenue, Manchester	18	0.05	0.03	-	6	NA	R	T	-	-	-	-	
616280	Anthony Close, Manchester	28	0.06	0.04	-	5	NA	R	T	-	-	-	-	
616281	Anthony Close, Manchester	29	0.07	0.05	-	10	NA	R	T	-	-	-	-	
616282	Wigley Street, Manchester	27	0.06	0.04	-	6	NA	R	T	-	-	-	-	
616284	Ashover Avenue, Manchester	25	0.05	0.03	-	40	NA	R	T	-	-	-	-	
616285	Reabrook Avenue, Manchester	27	0.08	0.05	-	41	NA	R	T	-	-	-	-	
616286	Hayfield Close, Manchester	20	0.04	0.03	-	26	NA	R	T	-	-	-	-	
616287	Rathen Road, Manchester	25	0.08	0.05	-	47	NA	R	T	-	-	-	-	
616288	The Circuit, Manchester	14	0.05	0.03	-	9	NA	R	T	-	-	-	-	
616289	The Circuit, Manchester	21	0.07	0.04	-	8	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616290	Wilmslow Road, Manchester	25	0.08	0.05	-	7	NA	R	T	-	-	-	-	
616291	Wilmslow Road, Manchester	19	0.06	0.04	-	13	NA	R	T	-	-	-	-	
616292	Wilmslow Road, Manchester	12	0.04	0.03	-	42	NA	R	T	-	-	-	-	
616293	Hardon Grove, Manchester	28	0.12	0.08	-	52	NA	R	T	-	-	-	-	
616294	Elsdon Road, Manchester	27	0.11	0.07	-	70	NA	R	T	-	-	-	-	
616295	Birchfields Road, Manchester	25	0.08	0.05	-	6	NA	R	T	-	-	-	-	
616297	Palatine Road, Manchester	19	0.06	0.04	-	30	NA	R	T	-	-	-	-	
616298	Winchester Park, Manchester	15	0.05	0.03	-	13	NA	R	T	-	-	-	-	
616300	Mayville Drive, Manchester	25	0.08	0.05	-	42	NA	R	T	-	-	-	-	
616301	Wilmslow Road, Manchester	25	0.08	0.05	-	4	NA	R	T	-	-	-	-	
616302	Danesmoor Road, Manchester	18	0.06	0.04	-	17	NA	R	T	-	-	-	-	
616304	Winchester Park, Manchester	21	0.07	0.04	-	17	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616305	Fallowfield, Manchester	25	0.08	0.05	-	36	NA	R	T	-	-	-	-	
616306	Braemar Road, Manchester	25	0.08	0.05	-	105	NA	R	T	-	-	-	-	
616307	Adamson Gardens, Manchester	25	0.08	0.05	-	17	NA	R	T	-	-	-	-	
616308	Birchfields Primary School (Primary School), Playing Fields, Lytham Road, Manchester	14	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616500	Beverly Road, Manchester	24	0.08	0.05	-	26	NA	R	T	-	-	-	-	
616501	Albert Grove (School), Manchester	9	0.03	0.02	-	1	NA	G4/V 3	T	-	-	-	-	
616503	Palatine Road, Manchester and committed development (Mapbook ref: MA07/041)	21	0.06	0.04	-	12	NA	R	T	-	-	-	-	
616505	Noddys Day Nursery, Firbank Road, Manchester	11	0.04	0.02	-	1	NA	G4/V 2	T	-	-	-	-	
616701	Hatro House (Offices), Palatine Road, Manchester	14	0.04	0.02	-	1	NA	G4/V 3	T	-	-	-	-	
616702	Northenden Players Theatre Club, Church Road, Manchester	20	0.06	0.04	-	1	NA	G2/V 3	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616705	Boundary Veterinary (Offices), Wilmslow Road, Manchester	15	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616708	National Autistic Society (Charity), Chapel Road, Wythenshawe	17	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616710	Newall Green Primary School, Firbank Road, Manchester	10	0.03	0.02	-	1	NA	G4/V 3	T	-	-	-	-	
616712	Mauldeth Road (Offices), Manchester	14	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616718	Longsight Community Primary School & Children's Centre, Farrer Road, Manchester	23	0.10	0.06	-	1	NA	G4/V 3	T	-	-	-	-	
616721	St Agnes CoE Primary School, Hamilton Road, Manchester	13	0.04	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616724	Slade Lane (Offices/High Street Retail), Manchester	15	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616725	Stamford Road (Offices), Stockport Road, Manchester	19	0.06	0.04	-	1	NA	G4/V 3	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s 1$^{.75}$ Night-time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
616726	Stockport Road (Offices), Manchester	18	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616728	Stanley Grove (Offices), Manchester	17	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616730	Redgate Holdings (Offices), Redgate Lane, Manchester	20	0.04	0.03	-	1	NA	G4/V 3	T	-	-	-	-	
616732	Jubilee Church, Hyde Road, Manchester	10	0.02	0.02	-	1	NA	G3/V 3	T	-	-	-	-	
616737	St Chad's Church, St Chads Road, Withington	25	0.08	0.05	-	1	NA	G3/V 3	T	-	-	-	-	
616740	Parkville Road, Manchester	12	0.04	0.03	-	6	NA	R	T	-	-	-	-	
616861	MEA Central (Secondary School), Lytham Road, Manchester	16	0.05	0.03	-	1	NA	G4/V 3	T	-	-	-	-	

3.2.5 The Christie Foundation NHS Trust (Hospital), Wilmslow Road, Manchester and committed development CD ref: 123748/FO/2019 (assessment location ref: 615112) is located approximately 90m from the route of the Proposed Scheme. Following consultation with representatives of the hospital it has been identified that vibration sensitive equipment/operations are undertaken on this site and therefore, in accordance with the spatial scope defined in the Volume 5, Appendix-CT-001-00001, a specific vibration risk assessment has been completed and is presented in Annex A.

Ground-borne sound and vibration impact summary

3.2.6 The operational ground-borne noise and vibration impacts identified in Table 2 are summarised in Table 3 and Table 4.

Table 3: Summary of operational ground-borne noise impacts

Property type	Number of ground-borne noise impacts			
	Low	Medium	High	Very high
Residential properties	0	0	0	0
Non-residential properties				0

Table 4: Summary of operational ground-borne vibration impacts

Property type	Number of ground-borne vibration impacts			
	Minor	Moderate	Major	Risk of building damage
Residential properties	0	0	0	0
Non-residential properties			0	0

Airborne sound: direct impacts and effects

3.2.7 The direct effects from the operation of the Proposed Scheme as well as any new, amended or altered roads or railway lines, which are identified as part of the Proposed Scheme, are presented in Table 6 for residential receptors and Table 7 for non-residential receptors.

3.2.8 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 6 and Table 7 respectively. The results should be considered in conjunction with the information contained in Volume 5, Sound, noise and vibration Map Book, Map Series SV-02.

3.2.9 Explanation of the information in Table 6 and Table 7 is provided in Volume 5, Appendix SV-001-00000, with the following additional notes in Table 5.

Table 5: Explanatory notes for operational assessment results

Symbol	Explanation
	Where the significant effect column is marked, then a significant effect is identified at the referenced group of dwellings, or individual residential or non-residential receptor.
	Yellow denotes a minor impact at a residential building. A minor impact is identified where the "Proposed Scheme only (year 15 traffic)" is greater than LOAEL, and either the change is ≥3dB – <5dB, or where a high baseline is identified during the corresponding period the change is ≥1dB – <3dB.
	Orange denotes a moderate impact at a residential building. A moderate impact is identified where the "Proposed Scheme only (year 15 traffic)" is greater than LOAEL, and either the change is ≥5dB – <10dB, or where a high baseline is identified during the corresponding period the change is of ≥3dB – <5dB.
	Red denotes a major impact at a residential building. A major impact is identified where the "Proposed Scheme only (year 15 traffic)" is greater than LOAEL, and either the change is ≥10dB, or where a high baseline is identified during the corresponding period the change is of ≥5dB.
	Green denotes a beneficial impact at a residential building. A beneficial impact is identified where the relevant baseline value is greater than LOAEL and the change is of >3dB.
*	Day - $L_{pAeq,07:00 – 23:00.}$
**	Night - $L_{pAeq,23:00 – 07:00.}$
***	Max - L_{pAFmax}. In the 'Proposed Scheme only' column where two train noise level values are presented. The first value represents the highest maximum noise level from HS2 services. The second value is provided where there are additional services (Northern Powerhouse Rail) operating on the HS2 Scheme and where maximum noise levels from additional services are anticipated to be higher than from HS2 services. In the 'Without Proposed Scheme' column, the value is the arithmetic average $L_{pAFmax,5min}$ as presented in the corresponding baseline technical appendix. For further information refer to Volume 5: Appendix SV-001-00000.
****	Where the Proposed Scheme modifies an existing source, i.e. road or railway realignments, the *Proposed Scheme only* and *(Opening year baseline + Year 15 traffic)* levels in the table include the sound from the modified source.
A	Sound levels from the Proposed Scheme exceed LOAEL: the significance criteria set out in Volume 5: Appendix SV-001-00000, Annex A are considered when establishing significant effects.
B	For non-residential receptors further detail about the type of effect is set out in the text of Volume 5: Appendix SV-001-00000.
CD	Committed Development. The 'Area represented' column contains information about the potential number of impacts included in the development.
A1 – A4	Type of receptor (airborne sound) - (A1) large and small auditoria; concert halls, sound recording and broadcast studios and theatres, (A2) places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls, (A3) schools; colleges; hospitals, hotels and libraries (A4) offices and amenity spaces.
H	High existing ambient sound level. Defined as >65dB $L_{Aeq, day}$ and/or >55dB $L_{Aeq, night.}$
L	Low existing ambient sound level. Defined as <42dB $L_{Aeq, day}$ and/or <32dB $L_{Aeq, night.}$
LD	Landscape receptor.
NA	Sound levels from the Proposed Scheme do not exceed LOAEL, therefore, generally no adverse effect.

Symbol	Explanation
NI	The receptor is predicted to qualify for mitigation, which shall be provided to the specification defined in the Noise Insulation (Railways and other Guided Rail Systems) Regulations 1996[4].
R	Residential receptor.
RM	Residential mooring.
S	Sound levels from the Proposed Scheme exceed SOAEL: noise insulation therefore provided.
T	Type of receptor: Typical.
+	The use and sensitivity of this non-residential receptor or land use is very sensitive to noise and has been included in the detailed assessment (presented in Volume 2) where there is a change less than 3dB. In each case specific information is presented in an associated footnote.
#	A change of 3dB or greater has been identified however, the assessment methodology only defines an impact where the absolute sound level from the Proposed Scheme is greater or equal to 50dB $L_{pAeq,07:00 - 23:00}$ during the daytime or 40dB $L_{pAeq,23:00 - 07:00}$ at night. At the receptor denoted the absolute level condition is not met and therefore no impact is identified.
~	When considered under the significance criteria set out in Volume 5: Appendix SV-001-00000, Annex A, these adverse effects are not considered to be significant on a community basis.
$	The impact methodology for non-residential receptors includes a screening criterion for A1 building use of 50dB $L_{pAeq,07:00 - 23:00}$ and 50dB $L_{pAeq,23:00 - 07:00}$, A2 building use of 50dB $L_{pAeq,07:00 - 23:00}$, A3 building use of 50dB $L_{pAeq,07:00 - 23:00}$, and 45dB $L_{pAeq,23:00 - 07:00}$ and for A4 building use 55dB $L_{pAeq,07:00 - 23:00}$. At the receptor denoted, the screening criteria is met but a change of 3dB or greater has not been identified and therefore no impact is identified. Further information is provided in Volume 5: Appendix SV-001-00000.
<>	The quantitative impact methodology has identified an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not gives rise to a significant effect.

[4] *The Noise Insulation (Railway and Other Guided Transport Systems) Regulations 1996*. Her Majesty's Stationery Office, London.

Table 6: Operational airborne sound, noise impacts and significant effects: residential receptors

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615001	Bleasdale Road, Manchester	<30	23	<40/42	58	51	56	57	51	0	0	NA	35	R	T	-	-	-	-	
615002	Bleasdale Road, Manchester	<30	22	<40/41	63	57	62	63	57	0	0	NA	23	R	T	H	-	-	-	
615003	Bowley Avenue, Manchester	<30	22	<40/40	54	48	53	54	48	0	0	NA	28	R	T	-	-	-	-	
615004	Rowarth Road, Manchester	<30	23	42/43	58	52	57	58	52	0	0	NA	25	R	T	-	-	-	-	
615005	Rowarth Road, Manchester	<30	25	44/46	52	46	51	52	46	0	0	NA	8	R	T	-	-	-	-	
615006	Rowarth Road, Manchester	<30	23	47/48	52	45	50	52	45	0	0	NA	10	R	T	-	-	-	-	
615007	Burbage Road, Manchester	<30	22	43/44	51	45	50	51	45	0	0	NA	54	R	T	-	-	-	-	
615008	Rowarth Road, Manchester	<30	<20	47/48	51	44	49	50	44	0	0	NA	9	R	T	-	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615009	Compton Drive, Manchester	<30	<20	<40/40	53	47	52	53	47	0	0	NA	22	R	T	-	-	-	-	
615010	Shepton Drive, Manchester	<30	<20	46/47	49	43	48	49	43	0	0	NA	16	R	T	-	-	-	-	
615011	Rowarth Road, Manchester	<30	<20	48/49	49	43	48	49	42	0	0	NA	14	R	T	-	-	-	-	
615012	Rowarth Road, Manchester	<30	<20	<40/<40	49	43	48	49	43	0	0	NA	25	R	T	-	-	-	-	
615013	Greenbrow Road, Manchester	<30	<20	44/45	51	44	49	51	44	0	0	NA	35	R	T	-	-	-	-	
615014	Greenbrow Road, Manchester	<30	<20	<40/<40	49	43	48	49	43	0	0	NA	14	R	T	-	-	-	-	
615015	Rushall Walk, Manchester	<30	21	47/47	48	41	46	48	41	0	0	NA	5	R	T	-	-	-	-	
615016	Galway Walk, Manchester	<30	22	46/47	49	43	48	49	43	0	0	NA	4	R	T	-	-	-	-	
615018	Crowland Road, Manchester	<30	<20	45/46	49	43	48	49	43	0	0	NA	24	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615019	Oldwood Road, Manchester	<30	<20	<40/<40	55	48	60	59	53	4	5	NA	13	R	T	-	-	-	-	#
615020	Crowland Road, Manchester	<30	22	44/45	49	43	48	49	43	0	0	NA	27	R	T	-	-	-	-	
615021	Greenbrow Road, Manchester	<30	<20	43/44	55	48	60	64	58	9	10	NA	13	R	T	-	-	-	-	#
615022	Oldwood Road, Manchester	<30	<20	<40/<40	50	44	49	50	44	0	0	NA	21	R	T	-	-	-	-	
615024	Kinsale Walk, Manchester	<30	21	42/43	50	44	49	50	44	0	0	NA	9	R	T	-	-	-	-	
615025	Rowfield Drive, Manchester	<30	<20	43/44	49	43	48	49	43	0	0	NA	14	R	T	-	-	-	-	
615026	Wensleydale Close, Manchester	<30	<20	42/43	55	48	60	65	58	10	10	NA	44	R	T	-	-	-	-	#
615027	Newall Road, Manchester	<30	20	41/42	52	46	51	52	46	0	0	NA	24	R	T	-	-	-	-	
615162	Rostron Avenue, Manchester	<30	21	<40/41	52	47	50	52	47	0	0	NA	19	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615165	Rostron Avenue, Manchester	<30	20	41/43	54	39	48	54	46	0	7	NA	14	R	T	-	-	-	-	#
615167	Bennett Street, Manchester	<30	22	42/43	55	50	51	55	50	0	0	NA	41	R	T	-	-	-	-	
615168	Whixhall Avenue, Manchester	<30	21	43/44	54	39	48	54	49	0	10	NA	15	R	T	-	-	-	-	#
615169	Bennett Street, Manchester	<30	21	43/44	54	39	48	55	49	1	10	NA	19	R	T	-	-	-	-	#
615170	St. Benedicts Avenue, Manchester	<30	20	43/44	54	39	48	54	49	0	10	NA	41	R	T	-	-	-	-	#
615171	Hayfield Close, Manchester	<30	22	45/46	48	43	46	48	43	0	0	NA	37	R	T	-	-	-	-	
615172	Wigley Street, Manchester	<30	21	45/46	50	45	48	50	45	0	0	NA	7	R	T	-	-	-	-	
615173	Anthony Close, Manchester	<30	22	46/47	48	44	46	48	44	0	0	NA	10	R	T	-	-	-	-	
615174	Anthony Close, Manchester	<30	23	46/47	47	43	46	47	43	0	0	NA	20	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615175	Anthony Close, Manchester	<30	23	47/48	49	46	48	49	46	0	0	NA	9	R	T	-	-	-	-	
615176	Wigley Street, Manchester	<30	21	46/47	51	48	51	51	48	0	0	NA	6	R	T	-	-	-	-	
615177	Anthony Close, Manchester	30	24	48/49	48	45	48	48	45	0	0	NA	23	R	T	-	-	-	-	
615178	Anthony Close, Manchester	<30	23	48/49	51	48	51	51	48	0	0	NA	7	R	T	-	-	-	-	
615179	Anthony Close, Manchester	<30	24	48/49	55	51	54	55	51	0	0	NA	12	R	T	-	-	-	-	
615180	Anthony Close, Manchester	<30	20	<40/<40	54	50	53	54	50	0	0	NA	5	R	T	-	-	-	-	
615181	Anthony Close, Manchester	30	25	51/52	58	55	58	58	55	0	0	NA	8	R	T	H	-	-	-	
615182	Anthony Close, Manchester	30	25	50/51	60	57	60	60	57	0	0	NA	4	R	T	H	-	-	-	
615183	Anthony Close, Manchester	<30	<20	46/47	45	42	58	45	42	0	0	NA	4	R	T	-	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615184	Anthony Close, Manchester	<30	21	50/51	60	57	60	60	57	0	0	NA	6	R	T	H	-	-	-	
615203	Ashton Old Road, Manchester	31	26	45/46	66	60	65	66	60	0	0	NA	16	R	T	H	-	-	-	
615204	Ashton Old Road, Manchester	31	26	48/50	65	59	64	65	59	0	0	NA	30	R	T	H	-	-	-	
615207	Ashton Old Road, Manchester	<30	21	42/43	63	57	62	63	57	0	0	NA	30	R	T	H	-	-	-	
615209	Wren Way, Manchester	34	29	48/49	61	55	60	61	55	0	0	NA	5	R	T	H	-	-	-	
615211	Wren Way, Manchester	33	28	47/49	60	54	59	60	54	0	0	NA	5	R	T	-	-	-	-	
615212	Wren Way, Manchester	34	29	47/49	59	53	58	60	53	0	0	NA	5	R	T	-	-	-	-	
615214	Wren Way, Manchester	35	30	50/52	58	52	57	58	52	0	0	NA	3	R	T	-	-	-	-	
615219	Bell Crescent, Manchester	32	26	46/47	53	47	52	53	47	0	0	NA	15	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615220	Rylance Street, Manchester	33	28	44/45	54	48	52	54	48	0	0	NA	6	R	T	-	-	-	-	
615221	Wynne Close, Manchester	31	25	43/44	49	43	48	49	43	0	0	NA	29	R	T	-	-	-	-	
615222	Paxton Place, Manchester	40	35	52/53	57	51	56	57	51	0	0	NA	4	R	T	-	-	-	-	
615223	Paxton Place, Manchester	38	33	50/51	52	46	51	53	47	0	0	NA	11	R	T	-	-	-	-	
615225	Lloyd Wright Avenue, Manchester	36	30	48/49	47	41	45	47	42	0	1	NA	16	R	T	-	-	-	-	
615226	Lloyd Wright Avenue, Manchester	36	31	48/49	47	41	45	47	41	0	0	NA	19	R	T	-	-	-	-	
615227	Holly Street, Manchester	41	36	52/54	54	48	52	53	48	0	0	NA	6	R	T	-	-	-	-	
615229	Paxton Place, Manchester	37	32	48/50	51	45	49	50	45	0	0	NA	9	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615231	Aldridge Road, Manchester	34	28	46/47	48	42	47	48	42	0	0	NA	21	R	T	-	-	-	-	
615232	Lloyd Wright Avenue, Manchester	34	29	45/47	47	41	45	47	41	0	0	NA	14	R	T	-	-	-	-	
615236	Viaduct Street, Manchester	43	38	54/56	51	45	49	51	45	0	0	NA	5	R	T	-	-	-	-	
615237	Holly Street, Manchester	41	36	52/54	51	45	49	50	45	0	0	NA	6	R	T	-	-	-	-	
615238	Paxton Place, Manchester	34	29	46/48	50	40	50	50	40	0	0	NA	14	R	T	-	-	-	-	
615240	Viaduct Street, Manchester	43	38	56/58	47	42	45	48	43	1	1	A	5	R	T	-	-	-	-	
615243	Olympic Street, Manchester	41	36	53/54	50	45	48	50	45	0	0	NA	25	R	T	-	-	-	-	
615245	Stadium Drive, Manchester	34	29	45/46	50	40	50	50	40	0	0	NA	20	R	T	-	-	-	-	
615249	Viaduct Street, Manchester	43	38	56/58	47	41	45	48	43	1	1	A	4	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615250	Lloyd Wright Avenue, Manchester	36	30	47/48	43	37	41	43	38	0	1	NA	27	R	T	-	-	-	-	
615254	Stadium Drive, Manchester	36	30	47/48	50	40	50	50	40	0	0	NA	23	R	T	-	-	-	-	
615255	Holly Street, Manchester	40	35	51/53	47	44	54	48	44	0	0	NA	21	R	T	-	-	-	-	
615257	Viaduct Street, Manchester	43	38	56/57	46	41	44	47	42	1	1	NA	18	R	T	-	-	-	-	
615259	Markham Close, Manchester	44	39	57/58	47	41	44	48	42	1	2	A	5	R	T	-	-	-	-	
615260	Morna Walk, Manchester	47	42	58/59	49	43	47	51	45	2	2	A	5	R	T	-	-	-	-	
615261	Commonwealth Avenue, Manchester	36	31	47/48	50	40	50	50	40	0	0	NA	28	R	T	-	-	-	-	
615262	Helsby Walk, Manchester	44	38	56/58	46	40	43	47	42	1	2	A	11	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615269	Morna Walk, Manchester	47	42	58/59	49	43	47	51	45	2	2	A	5	R	T	-	-	-	-	
615270	Commonwealth Avenue, Manchester	39	33	50/51	46	42	52	46	42	0	0	NA	17	R	T	-	-	-	-	
615271	Aden Close, Manchester	40	35	50/51	47	41	46	47	42	0	1	NA	6	R	T	-	-	-	-	
615274	Alderman Square, Manchester	42	36	55/57	45	39	42	46	41	1	1	NA	20	R	T	-	-	-	-	
615275	Spire Walk, Manchester	41	35	53/55	45	40	43	46	41	1	1	NA	11	R	T	-	-	-	-	
615276	Viaduct Street, Manchester	41	36	54/55	45	41	43	46	41	1	1	NA	25	R	T	-	-	-	-	
615283	Aden Close, Manchester	41	36	52/54	46	40	44	47	41	1	1	NA	5	R	T	-	-	-	-	
616001	Anthony Close, Manchester	32	27	47/48	59	56	59	59	56	0	0	NA	565	CD-R	T	H	-	-	-	
616286	Hayfield Close, Manchester	<30	<20	42/43	46	41	43	46	41	0	0	NA	26	R	T	-	-	-	-	

Table 7: Operational airborne sound, noise impacts and significant effects: non-residential receptors

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615017	Clever Clowns Day Nursery, Greenbrow Road, Wythenshawe	<30	<20	42/43	55	48	60	62	56	7	8	B	1	A3	T	-	-	-	-	
615023	Tree of Life Community Centre, Greenbrow Road, Wythenshawe	<30	<20	<40/<40	55	48	60	61	55	6	7	B	1	A2	T	-	-	-	-	
615028	Greenbrow Road Social Club, Greenbrow Road, Wythenshawe	<30	<20	42/43	55	48	60	65	59	10	11	B	1	A2	T	-	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
615185	Universal Square (Education), Devonshire Street, Manchester and committed development (Mapbook ref: MA07/463)	40	35	53/54	72	67	70	72	67	0	0	B	1	A3	T	H	-	-	-	
616734	Matthew Street Units (Offices), Manchester	<30	<20	<40/<40	44	39	40	44	39	0	0	B	1	A4	T	-	-	-	-	
616736	Vaughan Street (Offices), Manchester	<30	<20	44/45	47	43	46	47	43	0	0	B	1	A4	T	-	-	-	-	

Direct impact – summary

3.2.10 The operational airborne noise impacts identified in Table 6 and Table 7 are summarised in Table 8.

Table 8: Summary of operational airborne sound impacts

Receptor type	Numbers of impacts (Number of impacts excluding those in committed developments)				
	Above LOAEL	Above SOAEL	Impacts		
			Minor	Moderate	Major
Residential properties	35 (35)	0 (0)	0 (0)	0 (0)	0 (0)
Non-residential properties	N/A	N/A			0
Schools	N/A	N/A			0
Quiet areas	N/A	N/A			0

Airborne sound: indirect impacts and effects

3.2.11 The transport assessment presented in Volume 5, Appendices TR-001, TR-002, TR-003 and TR-005, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5, Appendix SV-001-00000.

3.2.12 No roads or railways which exceed the criteria defined in Volume 5, Appendix SV-001-00000 have been identified in this study area. The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

Airborne sound levels used in other assessments

3.2.13 The operational sound results contained in this document have been used by other disciplines, namely agriculture, historic environment, landscape and visual, communities and socio economics, in their assessments. This includes the information in Table 6 and Table 7. Locations of interest to these other disciplines which may not appear in Table 6 and Table 7 are presented in Table 9.

Table 9: Operational airborne sound levels for use in cross-discipline assessments

Assessment location		Impact criteria										Discipline			
Reference	Area represented	Proposed Scheme only (year 15 traffic)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Agriculture	Ecology	Historic environment	Landscape and visual
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **				
No additional assessment locations to inform the agriculture, ecology, historic environment and landscape and visual assessments are identified in this area.															

Annex A

The Christie Foundation NHS Trust (Hospital), Wilmslow Road, Manchester and committed development CD ref: 123748/FO/2019 (assessment location ref: 615112) is located approximately 90m from the route of the Proposed Scheme. Following consultation with representatives of the hospital it has been identified that vibration sensitive equipment/operations are undertaken on this site and therefore, in accordance with the spatial scope defined in the EIA SMR[5], a specific vibration risk assessment has been completed.

Through engagement with representatives of the hospital, vibration assessment criteria have been established for the hospital's most vibration sensitive equipment, which include Magnetic resonance imaging (MRI) scanners, imaging equipment and computerized tomography (CT) scanners. The agreed criteria expressed in terms of the vibration indicators peak particle velocity (PPV) or root mean square (RMS) velocity, the type of equipment and the location are presented in Table A 1.

Table A 1: The Christie Hospital vibration criteria

Location	Type of equipment	Vibration criteria
Basement of the Paterson Building (Building no. 54)	MRI scanners and imaging equipment	Equipment manufacturer's vibration criteria (Bruker Biospec MRI) VC[6]-B[7]
Upper floors of the Paterson Building (Building no. 54)	Advanced imaging / histology	VC-A[8]
Building block numbers 19, 20 and 22.	CT and MRI scanners	Equipment manufacturers' vibration criteria (MRI Linac Koninklijke, MRI Koninklijke, Siemens 3T MR)

Vibration at The Christie Hospital from trains passing through the tunnels have been predicted at the foundation of the relevant buildings using the ground-borne noise and vibration prediction model as presented in Appendix SV-001-00000, Annex D1. One of the outputs of the model is RMS velocity spectrum. Where necessary, the agreed criteria have been converted into RMS velocity in order to compare with the model output. For criteria expressed in PPV, a theoretical crest factor (i.e. ratio between PPV and RMS velocity) of $\sqrt{2}$

[5] Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

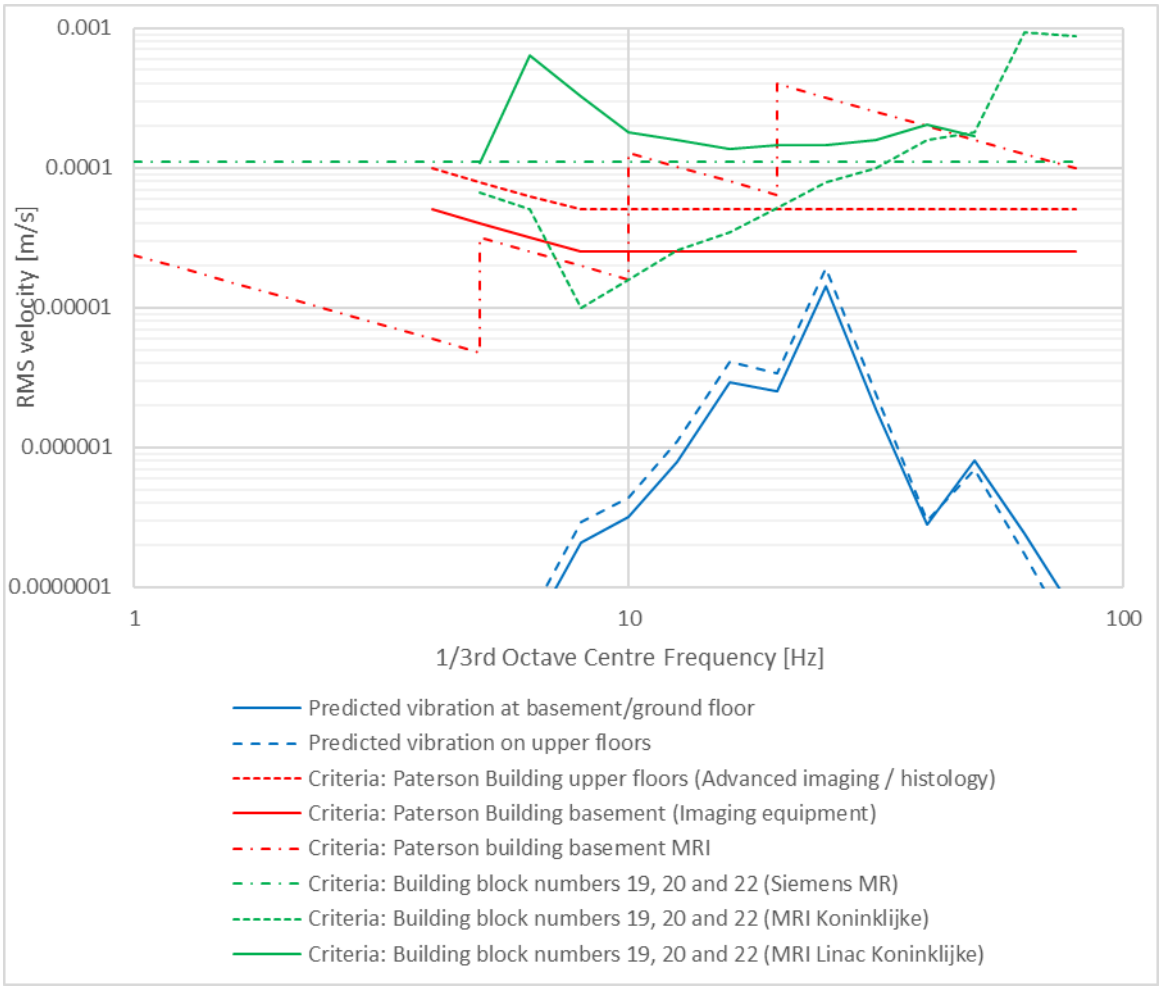
[6] Vibration criterion (VC) curves are a set of vibration curves defined in Sound and Vibration Control, *The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE): HVAC Applications (SI Edition), 2007*. These are used as the basis of assessing vibration on sensitive equipment or processes. The criteria apply to vibration as measured in the vertical and two horizontal directions.

[7] VC-A equates to a maximum velocity level, expressed as a PPV, of 25µm/s in the frequency range 1 to 80 Hz.

[8] VC-A equates to a maximum velocity level, expressed as a PPV, of 50µm/s in the frequency range 8 to 80 Hz.

has been assumed. Figure A 1 shows the predicted PPV levels on each floor and the vibration criteria.

Figure A 1: Predicted vibration and vibration criteria at The Christie Foundation NHS Trust



The predicted vibration levels at The Christie Foundation NHS Trust are below the agreed criteria for the hospital's most sensitive equipment, indicating that vibration from passing trains should not affect the operation of vibration sensitive equipment, and therefore a likely significant effect has not been identified.

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