BT-NG-020621-545-0098

Bramford to Twinstead Reinforcement

Volume 6: Environmental Information

Document 6.3.14.2: ES Appendix 14.2 – Construction Traffic Noise and Vibration Assessment

Final Issue A
April 2023

Planning Inspectorate Reference: EN020002

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

nationalgrid

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1. Introduction

1.1 Overview

1.1.1 National Grid Electricity Transmission plc (here on referred to as National Grid) is making an application for development consent to reinforce the transmission network between Bramford Substation in Suffolk, and Twinstead Tee in Essex. The Bramford to Twinstead Reinforcement ('the project') would be achieved by the construction and operation of a new electricity transmission line over a distance of approximately 29km (18 miles), the majority of which would follow the general alignment of the existing overhead line network.

1.1.2 This appendix, detailing the construction traffic noise and vibration assessment, has been produced to support the application for development consent and the accompanying Environmental Statement (ES) under the Planning Act 2008.

1.1.3 The appendix is split into three main areas of assessment: Chapter 2 covers construction traffic noise on the public highway; Chapter 3 covers construction traffic noise on temporary access routes; and, Chapter 4 covers construction traffic vibration.

2. Construction Traffic Noise (Public Highways)

2.1 Assessment Methodology

2.1.1 The assessment of construction traffic noise has been conducted following the guidance detailed in Design Manual for Roads and Bridges LA 111 (Highways England *et al*., 2020e). This provides guidance for the assessment and noise and vibration impacts from road projects, however, the guidance is widely used in the assessment of construction noise and vibration impacts from other types of project, particularly with regards to construction traffic noise in lieu of other guidance.

Data Sources

2.1.2 The assessment is based on traffic data and assumptions that has been produced by National Grid to support the Transport Assessment (**application document 5.7**), including the proposed numbers of heavy goods vehicles (HGV).

Study Area

2.1.3 Noise from construction traffic on the existing local road network has been assessed based on the proposed construction traffic routes shown on Figure 12.1: Traffic and Transport Study Area (**application document 6.4**). The study area is defined following the guidance detailed in LA 111 (Highways England *et al.,* 2020e) which states that the construction traffic study areas shall be defined to include a 50m width from the kerb line of public roads with the potential for an increase in basic noise level (BNL) of 1dB(A) or more as a result of the additional construction traffic to existing traffic levels.

Assessment Criteria

2.1.4 Noise from construction traffic on the public highway has been calculated in accordance with the Calculation of Road Traffic Noise (CRTN) (Department of Transport and Welsh Office, 1988) and assessed against the criteria detailed in LA 111 (Highways England *et al.,* 2020e). The BNL from public roads used as construction traffic routes has been calculated in accordance with CRTN for the Do-minimum and Do-something scenarios in the construction period. The calculated BNL values were compared to determine the magnitude of the impact.

2.1.5 The BNL is standardised metric for determining the noise level from a road and is defined as the noise level exceeded for 10% of the time at a reference of 10m away from the nearside carriageway edge obtained from traffic flow, speed, composition road gradient and road surface, and is calculated in line with the methodology described in CRTN.

2.1.6 Calculations are based on the Annual Average Weekday Traffic over the 18 hour period between 06:00 and 00:00 (AAWT,18h). The standard CRTN BNL calculation is applicable where the AAWT,18h traffic flows are greater than 4000 vehicles per 18 hour day. Where flows are between 1000 and 4000 vehicles per day, a 'low flow' correction can be applied which is a function of the distance from the carriageway. For the purposes of the initial assessment, a typical worst-case distance of 10m has been assumed (the correction reduces with increased distance, with no correction applied beyond 30m). Where flows are less than 1000 vehicles per day, the BNL has been calculated and compared but it results should be treated with caution as CRTN states calculations of traffic flows below 1000 vehicles per 18 hour day are unreliable. However, where traffic flows are low, absolute noise levels would be expected to be low and would not likely lead to significant adverse effects. Additional discussion is provided in these cases, where applicable.

2.1.7 Where there are potential changes in the BNL on roads greater than or equal to 1dB(A) a subsequent assessment of the impacts on noise sensitive receptors (NSR) within 50m of routes where there are potential significant effects has been conducted. NSR include dwellings (including listed buildings), healthcare facilities, education facilities or other buildings where noise or vibration can cause disturbance to people using the buildings.

2.1.8 Exceedance of the change in traffic noise by greater than or equal to 3.0dB and less than 5dB is considered medium magnitude impact, while a change in traffic noise level of Greater than or equal to 5dB is considered a large magnitude impact. Construction traffic noise effects are considered to be significant where there are medium or large magnitude impacts for a duration of ten or more days in any 15 consecutive days or for a total number of days exceeding 40 in any six consecutive months.

2.2 Noise Assessment

2.2.1 The results of the construction traffic noise assessment are provided in Table 2.1. It is assumed that there is no change in average speed between the do-minimum and do something scenarios. The results indicate that there is a potential medium magnitude impact along one construction traffic route; namely Rands Roads between Hadleigh Heath and Layham, which has nine residential NSR located within 50m. However, both existing and construction traffic flows are very low on this route (below the CRTN calculation range for reliable results) and as such absolute noise levels would be low. In context, therefore, the effect of construction traffic noise on Rands Road would be expected to be not significant.

2.2.2 There is also a potential low magnitude impact on one traffic route ('Church Road 2', which runs between the A131 and Henny Road, Lamarsh via Twinstead), with negligible impacts or no change on all other construction traffic routes.

2.2.3 Overall, the effects of construction traffic noise are therefore not significant.

Table 2.1 – Construction Traffic Noise Assessment – Public Highway

Access Route Name/ID	Baseline Data		Baseline Data Plus Construction Traffic		BNL, dB $L_{A10,18h}$		Change, dB(A)	Outcome
	Total Daily Vehicles	% HGV	Total Daily Vehicles	% HGV	Baseline	Baseline Plus Construction Traffic		
A1071/1	7,314	16	7,578	16	71.9	72.0	0.1	Negligible – Not significant
A1071/2	7,962	14	8,191	14	72.1	72.1	0.1	Negligible – Not significant
A1071/3	8,338	14	8,527	13	72.1	72.2	0.1	Negligible – Not significant
A1071/4	8,547	12	8,840	12	72.0	72.2	0.2	Negligible – Not significant
A1071/5	8,722	11	9,017	11	71.9	72.1	0.2	Negligible – Not significant
A1071/6	8,739	9	9,039	9	71.6	71.8	0.2	Negligible – Not significant
A1071/7	13,120	10	13,444	11	73.7	73.8	0.1	Negligible – Not significant
A1071/8	12,040	12	12,374	12	73.5	73.6	0.2	Negligible – Not significant
A1124	9,437	13	9,489	13	72.6	72.6	0.0	No change – Not significant
A1124/1 - Eastern Segment	9,553	13	9,579	13	72.6	72.6	0.0	No change – Not significant
A1124/1 - Western Segment	12,166	11	12,192	11	73.5	73.5	0.0	No change – Not significant
A1214 - Northern Segment	13,444	7	13,778	7	73.2	73.3	0.2	Negligible – Not significant
A1214 - Southern Segment	26,282	6	26,616	6	75.9	76.0	0.1	Negligible – Not significant
A131/1	8,586	14	8,663	14	72.3	72.4	0.0	No change – Not significant
A131/2 - Northern Segment	8,336	13	8,500	13	72.1	72.2	0.1	Negligible – Not significant
A131/2 - Southern Segment	11,843	10	11,965	10	73.2	73.2	0.0	No change – Not significant
A131/3 - Northern Segment	16,686	7	16,834	7	74.2	74.2	0.0	No change – Not significant

Access Route Name/ID	Baseline Data		Baseline Data Plus Construction Traffic		BNL, dB $L_{A10,18h}$		Change, dB(A)	Outcome
	Total Daily Vehicles	% HGV	Total Daily Vehicles	% HGV	Baseline	Baseline Plus Construction Traffic		
A131/3 - Southern Segment	12,797	12	12,945	11	73.7	73.8	0.0	No change – Not significant
A131/4	22,812	10	22,960	10	76.0	76.1	0.0	No change – Not significant
A131/5	17,937	11	18,085	11	75.1	75.2	0.0	No change – Not significant
A134/1 - Northern Segment	23,928	9	24,225	10	76.1	76.2	0.1	Negligible – Not significant
A134/1 - Southern Segment	17,872	10	18,169	10	74.9	75.0	0.1	Negligible – Not significant
A134/2 - Northern Segment	10,475	9	10,772	10	72.5	72.7	0.2	Negligible – Not significant
A134/2 - Southern Segment	14,026	8	14,323	9	73.6	73.8	0.2	Negligible – Not significant
A134/3	9,050	16	9,347	17	72.8	73.0	0.2	Negligible – Not significant
A134/5	9,194	17	9,564	17	73.0	73.2	0.2	Negligible – Not significant
A134/6	10,184	13	10,471	13	73.0	73.1	0.1	Negligible – Not significant
A134/7	14,286	12	14,366	12	74.3	74.3	0.0	No change – Not significant
B1068/1	3,510	11	3,528	11	68.0	68.0	0.0	No change – Not significant *
B1070/5 - Northern Segment	4,885	11	4,900	11	69.4	69.5	0.0	No change – Not significant
B1070/5 - Southern Segment	7,808	10	7,819	10	71.3	71.4	0.0	No change – Not significant
B1113/1 - Northern Segment	14,782	11	14,783	11	74.2	74.2	0.0	No change – Not significant
B1113/1 - Southern Segment	5,841	12	5,844	12	70.4	70.4	0.0	No change – Not significant
B1508/1	4,650	10	4,736	10	69.2	69.2	0.1	Negligible – Not significant

Access Route Name/ID	Baseline Data		Baseline Data Plus Construction Traffic		BNL, dB $L_{A10,18h}$		Change, dB(A)	Outcome
	Total Daily Vehicles	% HGV	Total Daily Vehicles	% HGV	Baseline	Baseline Plus Construction Traffic		
B1508/2 - Northern Segment	12,092	6	12,140	6	72.6	72.7	0.1	Negligible – Not significant
B1508/2 - Southern Segment	5,836	10	5,884	11	70.1	70.2	0.1	Negligible – Not significant
Bell Hill	929	12	1,016	11	Very low flow	59.8	0.2	Negligible – Not significant **
Brick Kiln Lane	1,571	8	1,572	8	62.7	62.7	0.0	No change – Not significant *
Bullen Lane	224	29	227	29	Very low flow	Very low flow	0.0	No change – Not significant **
Bures Road	1,397	13	1,444	13	62.7	62.8	0.2	Negligible – Not significant *
Church Hill	806	12	815	12	Very low flow	Very low flow	0.1	Negligible – Not significant **
Church Road 1	697	15	697	15	Very low flow	Very low flow	0.0	No change – Not significant **
Church Road 2 - Eastern Segment	87	11	154	6	Very low flow	Very low flow	1.7	Low – Not significant **
Church Road 2 - Western Segment	427	14	494	12	Very low flow	Very low flow	0.4	Negligible – Not significant **
Clay Hill 1	190	15	190	15	Very low flow	Very low flow	0.0	No change – Not significant **
Clay Lane	441	12	446	13	Very low flow	Very low flow	0.1	Negligible – Not significant **
Colchester Road	5,287	11	5,410	11	69.9	69.9	0.1	Negligible – Not significant
Colne Road	1,471	11	1,518	11	62.7	62.9	0.2	Negligible – Not significant *
Cuckoo Hill	1,050	13	1,116	12	60.3	60.7	0.4	Negligible – Not significant *
Duke Street	2,464	8	2,491	8	65.7	65.8	0.1	Negligible – Not significant *
Hadleigh Road	456	13	473	12	Very low flow	Very low flow	0.1	Negligible – Not significant **

Access Route Name/ID	Baseline Data		Baseline Data Plus Construction Traffic		BNL, dB $L_{A10,18h}$		Change, dB(A)	Outcome
	Total Daily Vehicles	% HGV	Total Daily Vehicles	% HGV	Baseline	Baseline Plus Construction Traffic		
Head Lane	6,606	6	6,634	6	69.9	69.9	0.0	Negligible – Not significant
Heath Road	400	10	420	10	Very low flow	Very low flow	0.1	Negligible – Not significant **
Hedingham Road	3,443	12	3,443	12	68.0	68.0	0.0	No change – Not significant *
Henny Back Road	23	22	23	22	Very low flow	Very low flow	0.0	No change – Not significant **
Henny Road	671	18	758	16	Very low flow	Very low flow	0.3	Negligible – Not significant **
Henny Street	569	19	635	17	Very low flow	Very low flow	0.2	Negligible – Not significant **
High Road	227	11	236	11	Very low flow	Very low flow	0.2	Negligible – Not significant **
Holt Road	623	10	643	10	Very low flow	Very low flow	0.1	Negligible – Not significant **
Lamarsh Hill	831	12	918	10	Very low flow	Very low flow	0.3	Negligible – Not significant **
Lorkin's Lane	47	32	47	32	Very low flow	Very low flow	0.0	No change – Not significant **
Loshes Lane	37	16	37	16	Very low flow	Very low flow	0.0	No change – Not significant **
Millwood Road	254	17	275	16	Very low flow	Very low flow	0.2	Negligible – Not significant **
Old Road	255	13	257	13	Very low flow	Very low flow	0.1	Negligible – Not significant **
Overbury Hall Road	446	9	448	9	Very low flow	Very low flow	0.0	No change – Not significant **
Pond Hill Road	2,028	7	2,055	8	64.4	64.5	0.2	Negligible – Not significant **

Access Route Name/ID	Baseline Data		Baseline Data Plus Construction Traffic		BNL, dB $L_{A10,18h}$		Change, dB(A)	Outcome
	Total Daily Vehicles	% HGV	Total Daily Vehicles	% HGV	Baseline	Baseline Plus Construction Traffic		
Rands Road	205	11	301	23	Very low flow	Very low flow	3.3	**Medium** – Potentially significant. However, in the context of the existing baseline and construction traffic flows being very low, in context the impact is not significant.**
Rectory Lane	48	17	48	17	Very low flow	Very low flow	0.0	No change – Not significant **
Shawlands Avenue - Northern Segment	11,763	6	11,791	6	72.5	72.5	0.0	No change – Not significant
Shawlands Avenue - Southern Segment	8,397	7	8,425	7	71.1	71.1	0.0	No change – Not significant
Springett's Hill	929	12	1,016	11	Very low flow	59.8	0.2	Negligible – Not significant **
Stackwood Road	510	12	550	11	Very low flow	Very low flow	0.2	Negligible – Not significant **
Station Hill	2,632	11	2,723	11	66.5	66.7	0.1	Negligible – Not significant *
The Street 1	1,407	12	1,493	11	62.5	62.9	0.4	Negligible – Not significant *
The Street 3	806	12	815	12	Very low flow	Very low flow	0.1	Negligible – Not significant **
Twinstead Road Eb	375	23	375	23	Very low flow	Very low flow	0.0	No change – Not significant **
Twinstead Road SW	369	18	369	18	Very low flow	Very low flow	0.0	No change – Not significant **
Watery Lane	155	19	155	19	Very low flow	Very low flow	0.0	No change – Not significant **

* Low flow between 1000 and 4000 vehicles per day (low flow correction applied at 10m).
** Very low flow less than 1000 vehicles per day (indicative change but absolute levels likely to be low).

3. Construction Traffic Noise (Temporary Access Routes)

3.1 Assessment Methodology

3.1.1 Once construction traffic (either light good vehicles (LGV) or HGV) leaves the public highway and enters a temporary access route, the noise generated is classified as construction noise and assessed accordingly as per other construction activities. This chapter details the assessment of construction traffic noise on temporary access routes within the Order Limits.

3.1.2 Construction traffic flows would vary on the various temporary access routes within the Order Limits.

3.1.3 The temporary access routes traffic noise assessment has been undertaken with reference to the methods and empirical data outlined in BS 5228:2009+A1:2014 Part 1 (BS 5228-1). The predicted construction noise levels at NSR have been compared against the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 as a worst-case. These are considered to represent the Significant Observed Adverse Effect Level (SOAEL); namely 65dB $L_{Aeq,T}$ during daytime period. Significance at non-residential NSR are considered based on their respective sensitivity to noise.

3.2 Noise Assessment

3.2.1 The assessment is based on typical worst-case values as follows:

- A maximum traffic speed of 15mph (good practice measure GG26);
- An individual vehicle sound level of 80dBA L_{max} at 10m during pass-by based on BS 5228-1 data reference C.2.34 (Lorry) for HGV; and
- An individual vehicle sound level of 70dBA L_{max} at 10m during pass-by based on library data for light vehicles (cars and vans).

3.2.2 Table 3.1 presents the findings of the noise assessment of construction traffic on temporary access routes. The assessment considers the closest NSR to the respective temporary access routes as a worst case. Noise levels at NSR further from the temporary access routes would be lower.

3.2.3 The results indicate that noise impacts from construction traffic on the temporary access routes would be not significant at all NSR.

Table 3.1 – Construction Traffic Noise Assessment – Temporary Access Routes

Receptor	Distance to Temporary Access Route (m)	Angle of View, °	Anticipated Maximum Daily Vehicle Movements		Construction Traffic Noise Level at Receptor, dB $L_{Aeq,10h}$	Magnitude of Impact	Receptor Sensitivity	Significance
			LGV	HGV				
Bramwell House, Colchester Road, Assington, CO10 5LX (594984,237821)	35	160	251	88	61	Low	Residential	Not Significant
Charity Cottage, Duke Street, Hintlesham, IP8 3PL (608049,242724)	5	171	16	9	59	Low	Residential	Not Significant
West View, Duke Street, Hintlesham, IP8 3PL (608039,242702)	5	160	16	9	59	Low	Residential	Not Significant
Mill House, Bures Road, Assington, CO19 5LZ (593372,237346)	11	165	79	5	57	Low	Residential	Not Significant
HVR Studio, Unit 4,Fenn Farm, Hadleigh Road, Burstall, IP8 3EG (610678,243701)	30	133	256	17	56	Low	Low	Not Significant
Langlands Flat, Hill Farm,Brick Kiln Hill, Boxford, CO10 5NY (596072,238417)	35	140	8	42	56	Low	Residential	Not Significant
Scout Camp Site, Green Lane,Twinstead, CO10 7NE (584934,237089)	6	152	67	0	56	Low	Medium	Not Significant
Broomhills Farm,Catley Cross, Pebmarsh, CO9 2PD (584653,234900)	50	180	179	9	54	Low	Residential	Not Significant
Heath Barn, Stoke Road, Leavenheath, CO9 2PD (595825,237741)	30	50	8	42	52	Low	Residential	Not Significant
Stantons Farm,Dorking Tye, Assington, CO10 5NG (591558,237167)	40	140	79	5	50	Low	Residential	Not Significant

Receptor	Distance to Temporary Access Route (m)	Angle of View, °	Anticipated Maximum Daily Vehicle Movements		Construction Traffic Noise Level at Receptor, dB $L_{Aeq,10h}$	Magnitude of Impact	Receptor Sensitivity	Significance
			LGV	HGV				
Bradfields, Pond Hall Road, Hintlesham, IP8 3QN (606960,242456)	35	148	16	9	50	Low	Residential	Not Significant
Church Hall, Church Road, Twinstead, CO10 7NA (586122,236695)	27	150	67	0	49	Negligible	High	Not Significant
Broomhill,Boxford Road, Polstead, CO6 5DW (597873,239164)	9	140	15	0	47	Negligible	Residential	Not Significant
Daws Hall Cottage, Henny Road, Lamarsh, CO8 5EX (588753,236616)	10	25	84	0	47	Negligible	Residential	Not Significant
Lodge House, The Green, Twinstead, CO107NE (584891,236748)	37	72	67	0	45	Negligible	Residential	Not Significant
Chestnut Grove, Bures Road, Assington, CO10 5NF (592591,236932)	11	10	79	5	44	Negligible	Residential	Not Significant
1 Orchard Lands, Ipswich Road, Burstall, IP8 3DZ (609236,245185)	31	93	6	3	44	Negligible	Residential	Not Significant
Hill View, Nayland Road, Assington, CO10 5LR (594111,237239)	30	105	6	2	43	Negligible	Residential	Not Significant
Annexe at Manderley Lodge, School Road, Wickham St. Paul, CO9 2PR (582828,236166)	11	95	10	0	43	Negligible	Residential	Not Significant
Bullocks Hole Farm, Church Road, Church Road, Wickham St. Paul, CO9 2PH (583323,237100)	26	160	10	0	42	Negligible	Residential	Not Significant

Receptor	Distance to Temporary Access Route (m)	Angle of View, °	Anticipated Maximum Daily Vehicle Movements		Construction Traffic Noise Level at Receptor, dB $L_{Aeq,10h}$	Magnitude of Impact	Receptor Sensitivity	Significance
			LGV	HGV				
Columbines, Henny Road, Lamarsh, CO8 5EU (589019,235856)	32	20	84	0	41	Negligible	Residential	Not Significant
Millfield House, Heath Road, Polstead, CO6 5AN (599674,239629)	30	90	17	0	41	Negligible	Residential	Not Significant
Mobile Home at The Barn, Hill Farm, Burstall Hill, Burstall, IP8 3EB (609062,245477)	32	40	6	3	40	Negligible	Residential	Not Significant
Jubilee, Clay Hill, Hintlesham, IP8 3QL (607768,242060)	35	110	10	0	39	Negligible	Residential	Not Significant
Kingsmead, School Road, Wickham St. Paul, CO9 2PR (582901,236172)	45	122	10	0	38	Negligible	Residential	Not Significant
Oakleigh, Rectory Lane, Wickham St. Paul, CO9 2PJ (583039,236898)	10	10	10	0	34	Negligible	Residential	Not Significant

4. Construction Traffic Vibration

4.1 Assessment Methodology

4.1.1 This chapter details the assessment of construction traffic vibration on the existing public highway. However, the outcomes are equally applicable to construction traffic on the temporary access routes.

4.1.2 As described in LA 111 (Highways England *et al.*, 2020e), construction traffic vibration is caused by irregularities in the road surface (e.g. potholes). Where the road surface is free of irregularities, significant levels of vibration from road traffic would not be expected. It is noted that maintenance of the local road network is the responsibility of the relevant highway authority, which is Suffolk and Essex County Councils in relation to the project. National Grid (and their Contractor) would be responsible for the maintenance of temporary access routes. Good practice measure GG27 in the Code of Construction Practice (**application document 7.5.1**) states that the Contractor would undertake regular inspections of the temporary access routes and bellmouths to check for potholes or other defects and that these would be repaired in a timely manner.

4.1.3 Determination of road surface defects along proposed construction traffic routes and temporary access routes is outside the scope of this assessment, but indicative road traffic vibration levels have been calculated for various defect depth, various vehicle speeds, and at various distances from the defect, based on the methodology described in Transport and Road Research Laboratory Research Report 246 Traffic induced vibration in buildings (Department of Transport, 1990). The formula is shown below.

Road Traffic Vibration Formula

$$PPV_{max} = 0.028 \cdot a \cdot (v/48) \cdot t \cdot p \cdot (r/6)^{x} \qquad \text{(Equation 3)}$$

Where:

a = maximum height or depth of the surface defect in mm

t = ground scaling factor

r =distance of the foundation from the defect

v = maximum expected speed of HGVs in km/h

p = wheel path correction

x = power factor

Road Traffic Vibration Assumptions

4.1.4 The following assumptions have been made:

a = various (10 and 30mm)

v = various (10 to 50km/h)

t = 0.94 (standard sand/gravel ground)

p = 0.75 (assumes single wheel path, e.g. pothole)

r = various (1 to 20m)

x = -0.74 (standard sand/gravel ground)

Criteria

4.1.5 There are no specific criteria for construction vibration effects from road traffic. However, based on guidance from LA 111 and BS 5228-2, the Lowest Observed Adverse Effect Level (LOAEL) can be considered to be a vibration level of 0.3mm/s, and the SOAEL can be considered to be a vibration level of 1.0mm/s.

4.2 Vibration Assessment

4.2.1 Equation 3 has been used to predict vibration levels from construction road traffic. The predictions are shown for various defect depths, vehicle speeds, and distances from the defect in Figures 4.1 to 4.3. The results indicate that the vibration LOAEL of 0.3mm/s or SOAEL of 1mm/s peak particle velocity (PPV) are not likely to be exceeded where roads are free from defects, traffic speeds are low, or where the distance from the defect is beyond a few metres, depending on the various factors. As the defect size reduces and tends towards 0mm, the vibration level tends towards 0mm/s PPV. This shows that construction traffic vibration is not expected to be significant.

Figure 4.1 – Predicted Road Traffic Vibration Levels – 30mm Defect Depth

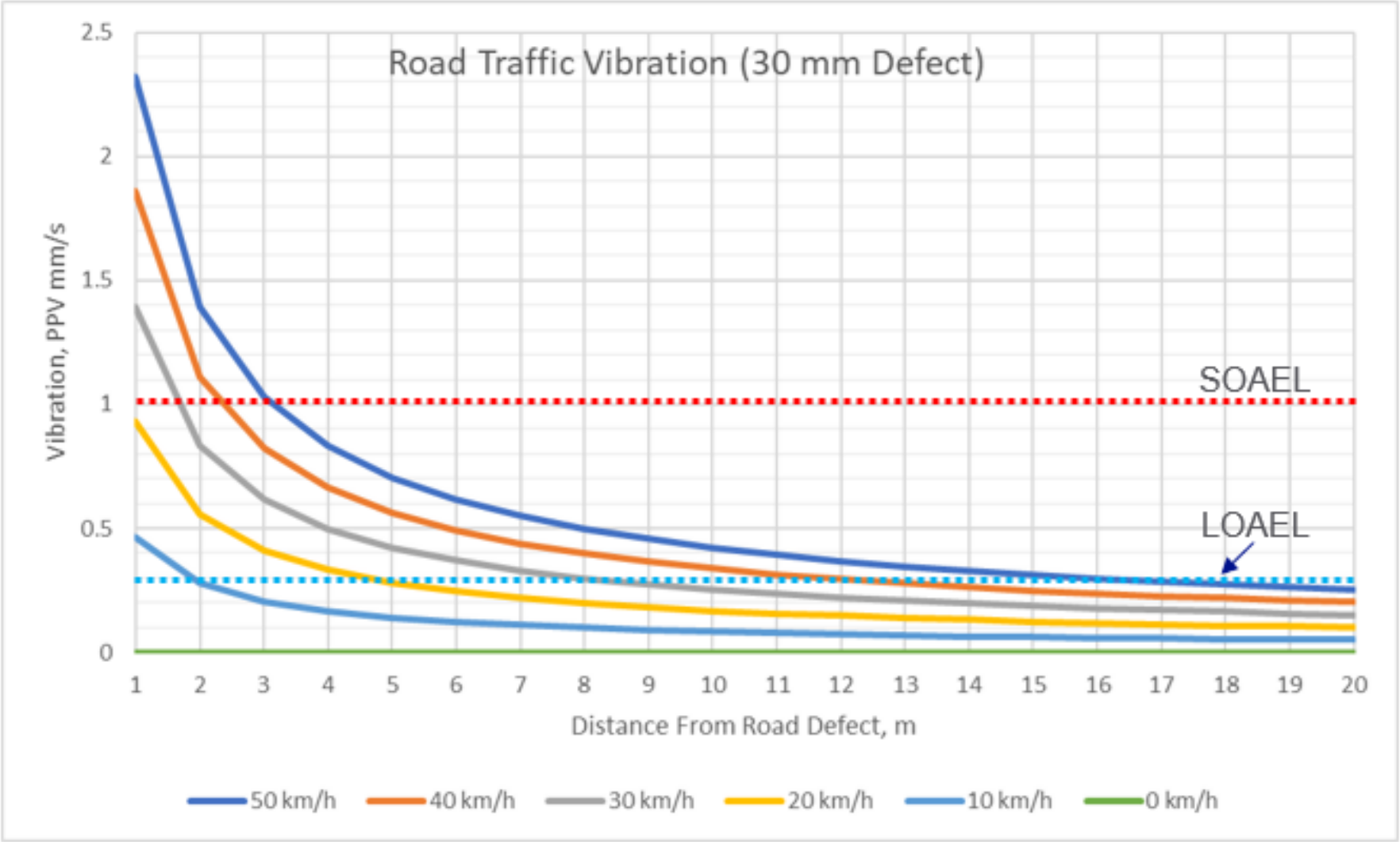


Figure 4.2 – Predicted Road Traffic Vibration Levels – 10mm Defect Depth

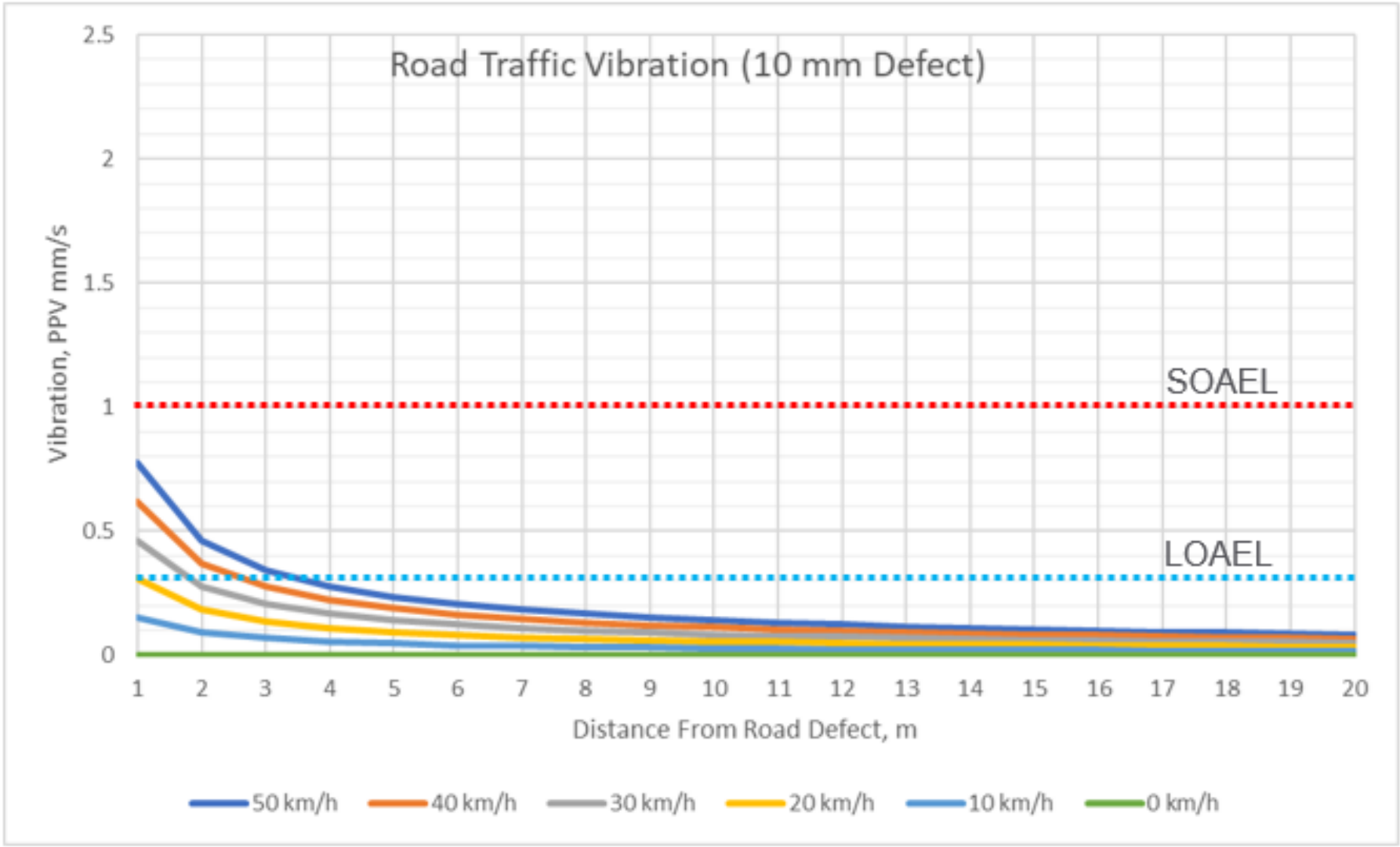
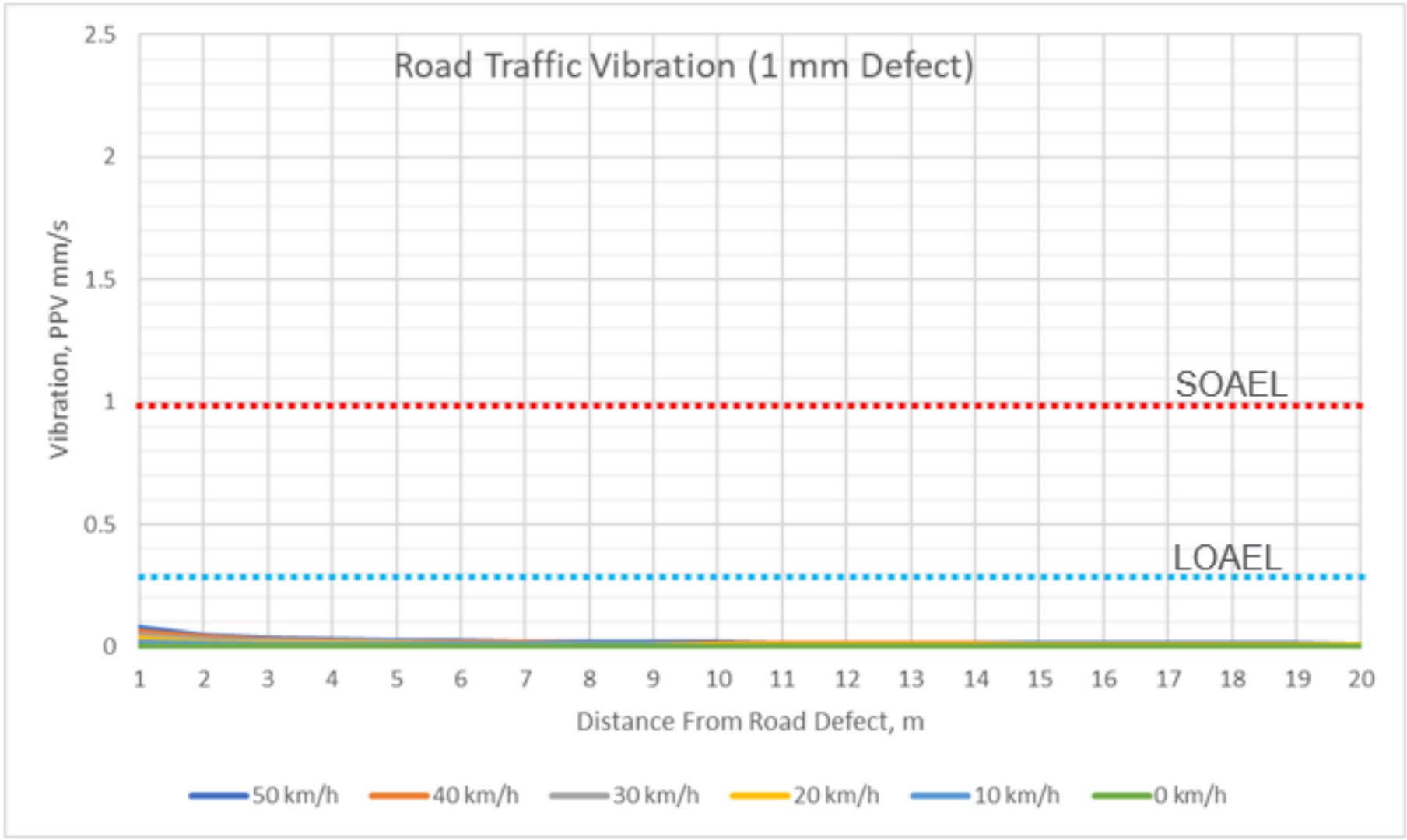


Figure 4.3 – Predicted Road Traffic Vibration Levels – 1mm Defect Depth



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