

Transpennine Route Upgrade (TRU) Bradley Junction Compound

Noise Impact Assessment

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BACKGROUND

- 1.1.1. The Transpennine Route Upgrade (TRU) project is proposing to set-up a temporary compound located off Leeds Road between Deighton Station and the Heaton Lodge Junction, to facilitate parking and welfare facilities as well as a bridge deck assembly and storage space. The compound will be used for storage and maintenance of related plant and equipment.
- 1.1.2. It is proposed that the site would be in operation as a TRU compound until December 2027. The compound would comprise 27 staff parking spaces, welfare units, bridge deck assembly area and general storage.
- 1.1.3. A site location is shown in Figure 1.

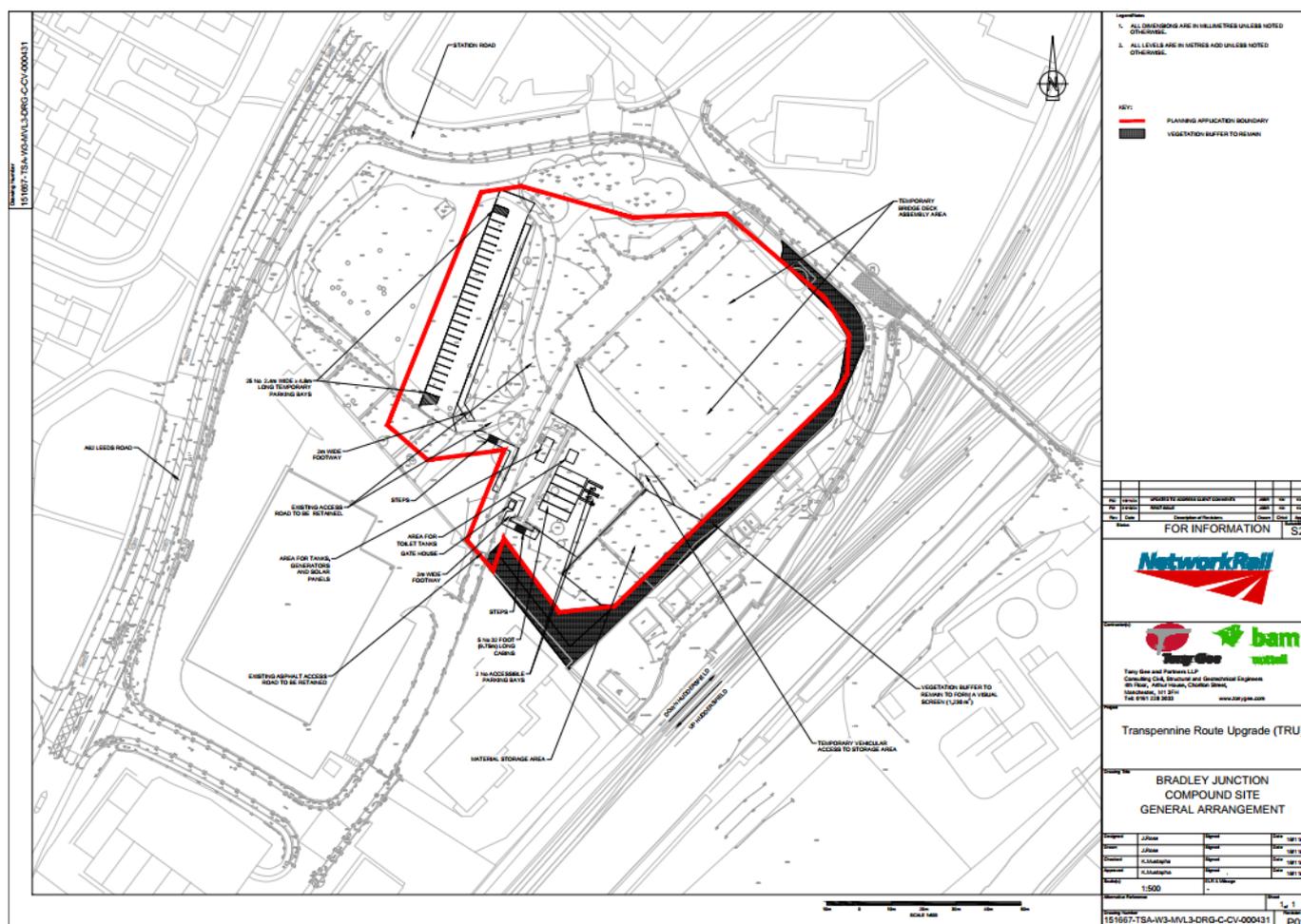


Figure 1 - Location of TRU Bradley Nursery Compound

- 1.1.4. This technical note provides an initial high-level assessment of the potential noise risks associated with the compound use and identifies any outline noise control measures that may be considered appropriate.

2.1. POLICY

- 2.1.1. The Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy: to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.
- 2.1.2. The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:
- Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life; and
 - Where possible, contribute to the improvement of health and quality of life.
- 2.1.3. In its aims, the NPSE uses the key phrases ‘significant adverse’ and ‘adverse’. The NPSE states in its explanatory note that there are two established concepts that are currently being applied to noise impacts, which are:
- NOEL – No Observed Effect Level. This is the level below which no effect can be detected; and
 - LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.
- 2.1.4. The NPSE then extends this concept to include:
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

2.2. CONSTRUCTION NOISE GUIDANCE

- 2.2.1. Although there are no statutory construction noise limits, BS 5228:2009+A1:2014 ‘Code of practice for noise and vibration on construction and open sites. Part 1 – Noise’ (BS 5228-1) provides example criteria for deriving appropriate construction noise significance criteria. The standard explains that the assessor needs to consider other Scheme-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect.
- 2.2.2. The NPSE notes that it is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to vary for different noise sources, receptors and times. Relevant SOAELs have been identified for the Scheme taking account of the sources of exposure and receptors.
- 2.2.3. The construction noise SOAEL is considered to be exceeded where the threshold values stated in Table 1 are exceeded based on the example criteria provided in Table E.2 of BS 5228-1, or where the ambient sound level is exceeded by 5 dB, whichever is higher.

Table 1 - Examples of time periods, averaging times and noise levels associated with the determination of eligibility for noise insulation

Day	Time (hours)	Averaging period, T	Noise insulation trigger level, dB LAeq,T
Mondays to Fridays	0700 – 0800	1 hour	70
	0800 – 1800	10 hours	75
	1800 – 1900	1 hour	70
	1900 – 2200	1 hour	65
	2200 – 0700	1 hour	55
Saturdays	0700 – 0800	1 hour	70
	0800 – 1300	5 hours	75
	1300 – 1400	1 hour	70
	1400 – 2200	1 hour	65
	2200 – 0700	1 hour	55
Sundays and Public Holidays	0700 – 2100	1 hour	65
	2100 – 0700	1 hour	55

^{A)} All noise levels are predicted or measured at a point 1m in front of the most exposed of any windows and doors in any façade of any eligible dwelling

- 2.2.4. The following are considered significant time periods for SOAEL thresholds to be exceeded based on the guidance provided in BS 5228-1:
- A period of 10 or more days of working in any 15 consecutive days during construction; or
 - For a total of 40 days or more in any 6 consecutive months during construction.
- 2.2.5. Significant adverse effects are deemed to occur at NSRs where both the SOAEL, as detailed in Table 1, and temporal criteria stated above are exceeded.
- 2.2.6. Network Rail will offer noise insulation or temporary rehousing if construction noise at NSRs is expected to be significant, in accordance with the criteria detailed above, and all reasonable measures to reduce noise have been incorporated.
- 2.2.7. NSRs considered for noise insulation or temporary rehousing will be regarded as ‘eligible’ NSRs. Those NSRs which are then deemed to be entitled to noise insulation or temporary rehousing, will be regarded as ‘qualifying’ NSRs. Calculations have been conducted to predict construction noise levels at all NSRs in the study area due to the works. NSRs that may experience significant adverse effects and would therefore be qualified have been highlighted.

2.3. CONSTRUCTION AND OPERATIONAL TRAFFIC GUIDANCE

- 2.3.1. Noise due to construction traffic on public highways and temporary diversions has been calculated in accordance with technical memorandum ‘Calculation of Road Traffic Noise’ (CRTN) and assessed in accordance with the Design Manual for Roads and Bridges LA 111 (DMRB).
- 2.3.2. DMRB provides guidance on the impact magnitudes resulting from changes in the road traffic

noise. The magnitude of noise impacts in terms of noise change in the short-term are provided in Table 8-4.

Table 2 - Classification of impact magnitudes in terms of changes in noise level in the short-term

Magnitude of impact (adverse or beneficial)	Opening year/short-term noise change, dB
No change	0
Negligible	0.1 – 0.9
Minor	1.0 – 2.9
Moderate	3.0 – 4.9
Major	≥5.0

- 2.3.3. Significant adverse effects are deemed likely to occur where the short-term noise increase from construction traffic and/or temporary diversions is moderate or greater (≥ 3 dB) depending on context.

- 3.1.1. Baseline noise measurements were undertaken at Station Road, Deighton (Easting/Northing 417208/420017) (adjacent to the railway) and 70m from the A62 on Glenfield Avenue, Deighton (E/N 416720/419399), as part of the Environmental Statement – Volume 3, Appendix 8: Noise and vibration of the ‘The Network Rail (Huddersfield to Westtown (Dewsbury) Improvements) Order’. This Information is replicated below:
- Station Road, Deighton:
 - 60 dB LAeq,16h during daytime periods; and,
 - 57 dB Lnight during night-time periods.
 - 70m from the A62 on Glenfield Avenue:
 - 56 dB LAeq,16h during daytime periods; and,
 - 52 dB Lnight during night-time periods.
- 3.1.2. Due to the close proximity to A62 Leeds Road and the Transpennine Rail route, baseline noise levels at the nearest noise sensitive receptors are expected to be dominated by road and rail noise. Strategic noise maps, produced by the Department for Environment, Food and Rural Affairs (DEFRA)¹, indicate road traffic noise levels would be in the order of 70 dB LAeq,16hr during the daytime period and 60 dB Lnight during the night time period.
- 3.1.3. The site is located off Leeds Road between Deighton Station and the Heaton Lodge Junction. The nearest noise sensitive receptor to the site is 2 Station Road located approximately 10m to the southeast of the site. Additional noise sensitive receptors are located around the site as shown in Figure 2.
- 3.1.4. The NSRs in Figure 2 are considered representative of areas around the proposed compound.
- 3.1.5. Table 3 outlines each NSR’s property name, distance to the closest proposed site activity and the assumed baseline noise level taken from either noise measurements taken during the Environmental Statement or DEFRA noise maps.

¹ Available to view online at: <http://www.extrium.co.uk/noiseviewer.html>



Figure 2 - NSR Locations

Table 3 - NSR Information and closest works

NSR ID	Property Name	Distance from site	NSR Type	Assumed Baseline Noise Levels
NSR 1	2 Station Rd, HD2 1US	10m	Residential	60 dB $L_{Aeq,16h}$ (Day) 57 dB L_{night} (Night)
NSR 2	62 Huntington Ave, HD2 1TN	157m	Residential	70 dB $L_{Aeq,16hr}$ (Day) 60 dB L_{night} (Night)
NSR 3	84 Woodman Ave, HD2 1SP	87m	Residential	70 dB $L_{Aeq,16hr}$ (Day) 60 dB L_{night} (Night)
NSR 4	1153 Leeds Rd, HD2 1UX	109m	Residential	70 dB $L_{Aeq,16hr}$ (Day) 60 dB L_{night} (Night)

4.1. CONSTRUCTION OF CONSTRUCTION COMPOUND

- 4.1.1. The following construction plant and associated assumed noise source noise levels are required to undertake the proposed works. Table 4 presents the amount of plant operating at any one time for each activity and its resultant noise level at 10m.

Table 4 - Construction Plant Data

Activity	Plant Item	Number of	BS 5228 Ref	Sound Level at 10m	% on-time	Resultant Plant sound level at 10m	Activity Sound level at 10m
Activity 1 - De-Veg and setup of short term compound area	Low Loaders	1	C.2.8	68	5	55	79
	13T Excavator	1	C.2.7	70	50	67	
	5T Roller	1	C.2.39	74	30	69	
	10T Dumper	1	C.4.4	76	30	71	
	8 Wheel Tipper	1	C.11.10	77	30	72	
	Chainsaws	1	C.4.72	79	30	74	
	Chippers	1	C.4.72	79	30	74	
Activity 2 - Carpark and Drainage	25T Excavator	1	C.2.19	77	80	76	80
	10T Hydremas	1	C.4.4	76	80	75	
	10T Roller	1	C.2.38	73	80	72	
	Tarmac paver + Tipper	1	C.5.30	75	5	62	
Activity 3 - Compound Construction	25T Excavator	1	C.2.19	77	80	76	81
	10T Hydremas	1	C.4.4	76	80	75	
	10T Roller	1	C.2.38	73	80	72	
	8 Wheel Tipper	1	C.11.10	77	80	76	

- 4.1.2. Noise levels have been predicted at the nearest NSRs in accordance with BS 5228-1. The results are provided in Table 5, assuming all plant is operating simultaneously i.e. a worst case scenario, and assuming that mitigation measures, such as screening, are in place where feasible. The SOAEL threshold during daytime for all NSRs is 75 L_{Aeq,T}, it is understood that works would be undertaken during daytime core hours only.

Table 5 - Predicted Noise levels at Each NSR - Construction

Activity description	Working period	NSR 1	NSR 2	NSR 3	NSR 4
	Daytime SOAEL:	75	75	75	75
Activity 1 - De-Veg and setup of short term compound area	Daytime	61	48	48	48
Activity 2 - Carpark and Drainage	Daytime	67	48	49	49
Activity 3 - Compound Construction	Daytime	66	50	55	54

No Exceedance

Day Exceedance

- 4.1.3. The assessment indicates that the SOAEL thresholds would not be exceeded at any NSR, even when assuming all plant operating simultaneously, and therefore no significant effects are expected.
- 4.1.4. Although no significant effects are predicted, high noise levels during sensitive periods may still have the potential to disturb nearby NSRs. A range of mitigation measures and Best Practicable Means to reduce construction noise as far as reasonably practicable are recommended in Section 5.

4.2. OPERATION OF CONSTRUCTION COMPOUND

Traffic Noise

- 4.2.1. There is potential for increased traffic movements during the operation of the construction compound. An assessment of potential traffic noise impacts is presented in Table 6.

Table 6 - Traffic Operational Noise

Road Name	Total Current Traffic (AAWT,1 8h)	Current % HGV	Additional Operational Traffic	Additional Operational Traffic % HGV	Current Traffic Noise Level, dB	With Scheme Noise Level, dB	Noise Change , dB
Brooklands	1583.1	0.5%	4	0.0%	57.9	57.9	0.0
A62 Leeds Rd SW	20103.9	3.5%	53	0.0%	70.2	70.2	0.0
A62 Leeds Rd NE	18574.5	3.8%	79	0.0%	69.8	69.8	0.0

- 4.2.2. Changes in road traffic noise due to the mobilisation and operation of the construction compound are expected to be negligible due to the relatively small number of vehicles using the site compared to the high volume of traffic on the surrounding road network.

Compound Noise

- 4.2.3. During operation of the construction compound there are likely to be several static items of plant on the compound site, commensurate with typical site compound use. These could

include generators for welfare facilities and lighting towers. Given the distances to the nearest noise sensitive receptors and high baseline noise levels it is not expected that the use of construction plant on the site would result in potential significant effects from construction noise.

- 4.2.4. The following plant and associated assumed noise source noise levels are required to undertake works associated with bridge deck assembly and transportation. Table 7 demonstrates the amount of plant operating at any one time for each activity and its resultant noise level at 10m.

Table 7 – Operational Compound Plant Data

Activity	Plant Item	Number of	BS 5228 Ref	Sound Level at 10m	% on-time	Resultant Plant sound level at 10m	Activity Sound level at 10m
Bridge Deck Construction Area	HGVs	1	C.2.34	80	20	73	78
	Low Loaders	1	C.4.14	67	5	54	
	800T Crane	1	C.4.50	71	5	58	
	100T Crane	1	C.3.28	67	40	63	
	Telehandler	1	C.2.35	71	30	66	
	25T Excavator	1	C.2.19	77	50	74	
	Stihl Saws	1	C.4.72	79	10	69	
	Hand Tools	1	C.3.35	65	80	64	
	Concrete Pump	1	C.4.4	76	5	63	
Concrete Wagons	1	C.3.26	75	5	62		

- 4.2.5. As the construction compound activities are temporary and related to the construction of TRU, noise levels have been predicted and assessed in accordance with BS 5228-1 as with construction noise.
- 4.2.6. The results are provided in Table 8 assuming all plant is operating simultaneously i.e. worst case scenario, and assuming that mitigation measures, such as screening, are in place. The SOAEL threshold during daytime for all NSRs is 75 $L_{Aeq,T}$, while the corresponding threshold during night-time is 55 $L_{Aeq,T}$ (unless uplifted to take account of ambient noise level). The colour key used in Table 8 is shown below.

No Exceedance	Day Exceedance	Night Exceedance	Day & Night Exceedance
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Table 8 - Predicted Noise levels at Each NSR – Compound Operation

Activity description	Working period	NSR 1	NSR 2	NSR 3	NSR 4
	Daytime SOAEL:	75	75	75	75
	Night-time SOAEL:	62	65	65	65
Bridge Deck Construction Area	Daytime and Night-time	59	44	47	47

- 4.2.7. The assessment indicates that the SOAEL thresholds would not be exceeded at any NSR

bridge deck xx works are undertaken during either daytime or night-time periods and therefore no significant effects are expected. Predictions have been made assumed screening around the bridge deck assembly and storage area, without screening there would be the potential to exceed SOAEL thresholds at NSR 3.

- 4.2.8. Although no significant effects are predicted, high noise levels during sensitive periods may still have the potential to disturb nearby NSRs. A range of mitigation measures and Best Practicable Means to reduce construction noise as far as reasonably practicable are recommended in Section 5.

In developing the control measures, Best Practicable Means will be applied during all construction works to minimise noise at neighbouring residential properties and other sensitive receptors. In doing so, due consideration will be given to the recommendations contained within BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise', approved by the Secretary of State as the Code of Practice for noise and vibration control on construction and open sites.

5.1.2. The following outline control measures should be considered in carrying out the construction works:

1. All plant and equipment will comply with the noise limit and noise marking requirements prescribed by the "Noise Emission in the Environment by Equipment for Use Outdoors. Regulations 2001" and the "Noise Emission in the Environment by Equipment for Use Outdoors (Amendment) Regulations 2005".
2. All plant, equipment and noise control measures applied to plant and equipment shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable. As far as reasonably practicable, any plant, equipment or items fitted with noise control equipment found to be defective will not be operated until repaired.
3. All generators shall be super-silenced units. Where reasonably practicable, other fixed items of construction plant should be electrically powered in preference to diesel or petrol driven.
4. Vehicles and mechanical plant employed for any activity associated with the construction works will, where reasonably practicable, be fitted with effective exhaust silencers and shall be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable.
5. Machines in intermittent use will be shut down or throttled down to a minimum during periods between works.
6. Whenever used, all percussion tools shall be fitted with appropriate mufflers or dampers of the type recommended by the manufacturers.
7. Static noise emitting equipment operating continuously (generators, compressors etc) will be screened or housed within suitable acoustic enclosure, where appropriate.
8. Noisy plant or equipment shall be sited as far away as possible from noise sensitive buildings. The use of noise barriers or site hoarding shall be employed around the bridge deck assembly area to ensure the SOAEL thresholds are not exceeded.
9. All personnel on site will undergo site specific inductions and briefings, to include any consent requirements and noise and vibration control measures. Where relevant, specific noise control measures will be incorporated into Works Package Plans.
10. A programme of community liaison will be carried out, including notification of works and details of the complaints process.
11. Noise from reversing alarms from delivery and construction vehicles will be controlled and limited as far as possible through the following means:
 - Designing the site layout to limit the need for reversing vehicles;
 - The use of banksmen for traffic management at site entrance gates and within site footprint;

- Reversing alarms incorporating directional sounders, broadband signals self-adjusting output sounders or flashing warning lights; and
- Setting reversing alarms to the minimum output noise level required for health and safety compliance.

12. All works and operations on the site should be undertaken during weekday daytime periods where practicable to do so.

- 6.1.1. Changes in road traffic noise due to the operation of the compound are expected to be negligible due to the relatively small number of vehicles using the site compared to the high volume of traffic on the surrounding road network.
- 6.1.2. Due to the proximity of major roads, baseline noise levels in the area are expected to be high which reduces the risk of additional noise impacts from any plant associated with the mobilisation and operation of the construction compound.

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