OMEGA ZONE 8, ST HELENS

Omega St Helens Ltd / T. J. Morris Limited

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OPP DOC.11.7 Chapter 7: Noise and Vibration

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WSP

8 First Street
Manchester
M15 4RP

Phone: +44 161 200 5000

WSP.com

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TABLES

7. NOISE AND VIBRATION

7.1. INTRODUCTION

7.1.1. This chapter reports the outcome of the assessment of likely significant effects arising from the Proposed Development due to noise and vibration.

7.1.2. The assessment of noise and vibration has established that the following additional mitigation measures are required for ambient goods operation:

- Noise barrier 1.4m high, 278m long, east of Unit 3.

7.1.3. The assessment of noise and vibration has established that the following additional mitigation measures are required for chilled goods operation:

- Noise barrier 2.0m high, 393m long, wrapping around the south west corner of Unit 1;
- Noise barrier 2.0m high, 277m long, west of Unit 2;
- Noise barrier 3.0m high, 376m long, east of Unit 3;
- Noise barrier 2.0m high, 542m long, south of Unit 3 and Unit 4
- Noise barrier 2.0m high, 353m long, wrapping around the north-west corner of Unit 4; and
- Chilled goods prohibited from using or accessing the eastern side of Unit 3.

7.1.4. The following construction noise residual effects have been identified:

- There is likely to be a direct, temporary, medium-term **Negligible adverse** residual effect on the Children's day nursery (not significant);
- There is likely to be a direct, temporary, medium-term **Negligible adverse** residual effect on the Old Hall Farm dwellings (not significant); and
- There is likely to be a direct, temporary, medium-term **Negligible adverse** residual effect on the Bembridge Close dwellings (not significant).

7.1.5. The following construction vibration residual effects have been identified:

- There is likely to be a direct, temporary, medium-term **Minor adverse** residual effect on the Children's day nursery (not significant);
- There is likely to be a direct, temporary, medium-term **Negligible adverse** residual effect on the Old Hall Farm dwellings (not significant); and
- There is likely to be a direct, temporary, medium-term **Negligible adverse** residual effect on the Bembridge Close dwellings (not significant).

7.1.6. The following operational noise residual effects have been identified:

- There is likely to be a direct, permanent, long-term **Minor adverse** residual effect on the Children's day nursery (not significant);
- There is likely to be a direct, permanent, long-term **Minor adverse** residual effect on the Old Hall Farm dwellings (not significant); and
- There is likely to be a direct, permanent, long-term **Minor adverse** residual effect on the Bembridge Close dwellings (not significant).

7.1.7. The following development generated road traffic noise residual effects have been identified:

- There is likely to be an indirect, permanent, long-term **Minor adverse** residual effect on dwellings adjacent to the existing local highway network (not significant);

7.1.8. The following monitoring requirements have been identified:

- Construction noise monitoring at the Children's day nursery where necessary in accordance with requirements of proposed CEMP; and
- Construction vibration monitoring at the Children's day nursery where necessary in accordance with requirements of proposed CEMP.

7.1.9. The following enhancement opportunities have been identified:

- Maximise the distance between noise sources and sensitive receptors; and
- Using building layout to screen service yards.

7.1.10. The remainder of this chapter describes the assessment methodology and the baseline conditions relevant to the assessment, which have been used to reach these conclusions, as well as a summary of the likely significant effects leading to the additional mitigation measures required to avoid, prevent, reduce or, if possible, offset any likely significant adverse effects, and the likely residual effects and any required monitoring after these measures have been employed. Opportunities for enhancement, where such opportunities exist, are also discussed.

7.1.11. This chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to **Chapters 3 Description of the Proposed Development, 5 Approach to EIA** and **12 Transport.**

7.1.12. This chapter is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology is presented in **Appendix 7.1**.

7.2. CONSULTATION, SCOPE, METHODOLOGY AND SIGNIFICANCE CRITERIA

CONSULTATION UNDERTAKEN TO DATE

7.2.1. The proposed scope and approach to the noise and vibration assessment works was outlined within the Scoping Report for the Proposed Development. In addition, to inform the completed assessment work, consultation has been undertaken with the Environmental Health Department of St. Helens Council. This has included seeking agreement of the approach to, and extent of, the required baseline noise survey, the scope of the assessment work to be undertaken and the assessment methodologies to be applied.

7.2.2. **Table 7-1** provides a summary of the consultation activities undertaken in support of the preparation of this assessment.

Table 7-1 - Summary of consultation undertaken

Body / organisation	Individual / stat body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
St. Helens Council	Environmental Health Department.	E-mail dated 13 November 2019	Consultation email from WSP outlining: ▪ The proposed scope of the noise and vibration assessment work;

Body / organisation	Individual / stat body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
			▪ The impacts proposed to be scoped-out of the assessment with supporting reasoning; ▪ The closest identified noise sensitive receptors to the Proposed Development; ▪ A redline boundary plan for the Proposed Development; ▪ Confirmation that the baseline noise survey had been undertaken including provision of the adopted measurement locations and durations with supporting reasoning; ▪ The proposed assessment methodologies to be adopted; and ▪ A request for any comments on the information provided.
St. Helens Council	Environmental Health Department.	E-mail dated 20 November 2019	Requesting response to consultation email dated 13 November.
St. Helens Council	Environmental Health Department.	28 November 2019 – receipt of written comments from the dealing Environmental Health Officer for noise at St Helens Council.	The memo provides a response from the dealing officer to the content of the documentation submitted in support for the application (i.e. the Scoping Report). The response is summarised as follows: ▪ Reference is made to residential properties that are located to the south and west of the application site. ▪ It is confirmed that due to the proximity to the M62, the dominant local noise source is expected to be road traffic noise. ▪ It is agreed that the assessment of noise during both construction and operational phases of the development is scoped-in to the assessment. ▪ It is confirmed that the proposed scope of the assessment works is as expected. ▪ It is agreed that the assessment work should consider noise during the operational phase of the development and noise and vibration during the construction phase of the development. ▪ It is correctly identified that a Construction Environmental Management Plan (CEMP) is being proposed to address potential impacts during the construction phase. ▪ It is agreed that the submission covers the relevant Standards and guidance that are expected to be referenced. ▪ Reference is made to baseline noise monitoring that has already been undertaken. [N.B. at this stage, baseline monitoring had not been undertaken, but the Scoping Report did

Body / organisation	Individual / stat body / organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
			confirm that such survey works will be delivered as part of the EIA] ▪ It is agreed that the baseline survey data should be used to inform the assessment work to be undertaken. ▪ It is confirmed that the Environmental Health Department are satisfied with the scope and approach to the proposed noise and vibration assessment work. ▪ It is requested that consideration is given to potential cumulative impacts. ▪ It is suggested that direct contact is made with the dealing officer to agree the specifics of the methodology prior to the undertaking of additional baseline works being undertaken.
Warrington Borough Council	Planning Department	8 December 2019 – receipt of written comments from the dealing Environmental Health Officer for noise at St Helens Council.	Response to consultation to St. Helens Council providing comment on the '*scoping request*' for the Proposed Development. The following points are raised with respect to noise. ▪ The proposed scope of the assessment work is accepted. ▪ Reference is made to noise surveys having already been carried out [N.B. this is not the case, see above]. ▪ It is confirmed that identified impact (if any) will be presented in the final report for full consideration.
St. Helens Council	Environmental Health Department.	Scoping opinion received 11 December 2019	The noise section of the scoping opinion reiterates the points detailed within the EHO's memo, as summarised in row 4 above. In addition, it is confirmed that the dealing officer has received WSP consultation email, dated 13 November, and confirms that they are satisfied with the assessment approach and methodology.

SCOPE OF THE ASSESSMENT

7.2.3. The scope of this assessment has been established through an ongoing scoping process. Further information can be found in **Chapter 5: Approach to EIA**.

7.2.4. This section provides an update to the scope of the assessment and presents the evidence base where elements have been scoped-out.

ELEMENTS SCOPED-OUT OF THE ASSESSMENT

7.2.5. The elements shown in **Table 7-2** are not considered to give rise to likely significant effects as a result of the Proposed Development and have therefore not been considered within this assessment:

Table 7-2 - Elements scoped out of the assessment

Element scoped out	Justification
Constructed Generated Road Traffic Noise	Construction traffic would use the M62 motorway and Skyline Drive to access the application site. It is anticipated that insignificant noise level changes would occur adjacent to these routes (due to the change in flows arising as a result of construction traffic being small). In addition, there are no sensitive receptors adjacent to Skyline Drive.
Development Generated Vibration	The industrial / commercial activities associated with the operational Proposed Development are not expected to generate significant vibration levels.
Development Generated Road Traffic Groundborne Vibration	Groundborne road traffic vibration is normally caused by Heavy Duty Vehicles (HDVs) travelling over uneven surfaces. The Proposed Development will introduce new smooth road surfaces within the Proposed Development boundary.
Development Generated Noise on Industrial / Commercial Units	Industrial and commercial units, including the Proposed Development, are not considered sensitive receptors.

ELEMENTS SCOPED-IN TO THE ASSESSMENT

Construction Phase

7.2.6. The following elements are considered to have the potential to give rise to likely significant effects during construction of the Proposed Development and have therefore been considered within this assessment:

- The impact of construction noise on existing local receptors in the vicinity of the application site; and
- The impact of construction vibration on existing local receptors in the vicinity of the application site.

Operation Phase

7.2.7. The following elements are considered to have the potential to give rise to likely significant effects during operation of the Proposed Development and have therefore been considered within this assessment:

- The impact of Proposed Development generated road traffic noise on existing sensitive receptors; and
- The impact of noise from the operation of the Proposed Development on existing sensitive receptors.

EXTENT OF STUDY AREA

Construction Phase

7.2.8. The Scoping Report proposed construction noise and vibration study areas extending to 300m from the application site boundary. It has subsequently been identified that this would not encompass a cluster of residential properties that are the closest to the south west and south of the Proposed Development.

7.2.9. The construction noise and vibration study areas have therefore been extended to include the closest existing sensitive receptors to the south west, south and east. To the north, the application site is bounded by the M62 motorway with no sensitive receptors immediately beyond.

Operational Phase

7.2.10. For operational noise, the Scoping Report proposed a study area extending to 300m from the application site boundary. As for the construction phase impacts, this has been extended to include the closest existing noise-sensitive receptors to the south west of the Proposed Development.

7.2.11. Development generated road traffic noise will be assessed for the existing road network. The Scoping Report had proposed to limit the assessment to cover only those routes that would be subject to a noise level increase of at 1dB or more. However, to determine this requires an appraisal of all the road traffic routes adopted within the Transportation Assessment (TA). The full results of this assessment have therefore been presented. The study area therefore extends to cover all road traffic routes encompassed within the TA.

METHOD OF BASELINE DATA COLLATION

Desk Study

7.2.12. At the outset of the assessment and prior to undertaking the baseline noise survey, a desk based study was undertaken to identify the noise and vibration sensitive receptors in the vicinity of the application site.

7.2.13. This included a review of the following data sets for the application site and surrounding area:

- Ordnance Survey 1:50,000 Land Ranger mapping;
- Ordnance Survey 1:25,000 Explorer mapping;
- Defra MAGIC online mapping resource including 1:10,000 mapping;
- Google and ESRI online mapping and aerial photography; and
- Street-view photography for the study area.

Baseline Sound Level Survey

7.2.14. A baseline sound level survey was undertaken at the application site commencing at approximately 12:00 on Thursday 17 October. The survey ran continuously for 7 days and ended at approximately 13:00 on Thursday 24 October. The survey therefore included several full weekdays and a full weekend period.

7.2.15. The survey was undertaken to establish the prevailing levels at locations selected as representative of the closest existing noise-sensitive receptors to the application site . Measurements were undertaken at two locations. Measurement Location 1 was close to the eastern application site boundary, approximately 30m from the Children's day nursery. Measurement Location 2 was towards the western boundary of the application site and was selected as representative of residences at Old Hall Farm further west, being equidistant from the M62 motorway as these dwellings.

7.2.16. Both locations were subject to continuous measurements for the full 7-day survey period.

7.2.17. Microphones were positioned 1.5 m above ground level, in free-field conditions. Microphones were fitted with windshields.

7.2.18. Meteorological conditions throughout the survey have been observed. Wind speeds remained low (less than 5 ms^{-1}) throughout the survey period. Wind directions were mainly southerly, with a period of westerly winds from Sunday 20 October to Monday 21 October. There were several periods of rain all contained within Friday 18 October.

7.2.19. The survey was carried out using class one measurement equipment, as detailed in **Table 7-3**.

Table 7-3 – Summary of equipment used during sound level survey

WSP equipment ID	Equipment description	Manufacturer & type	Serial no.	Calibration due date
SOLO21	Sound Level Meter	01dB-Metravib Blue Solo	61332	03/04/2021
	Pre-Amplifier	01dB-Metravib PRE 21 S	12495	
	Microphone	01dB-Metravib MCE 212 Microphone	67311	
	Calibrator	Norsonic type 1251 Sound Calibrator	31462	02/04/2020
SOLO22	Sound Level Meter	01dB-Metravib Blue Solo	61331	02/05/2021
	Pre-Amplifier	01dB-Metravib PRE 21 S	14575	
	Microphone	01dB-Metravib MCE 212 Microphone	92344	
	Calibrator	Norsonic type 1251 Sound Calibrator	31460	30/04/2020

7.2.20. The hand-held calibrators had been calibrated to tracible standards within the previous 12 months and the measurement systems within the previous 24 months. Each measurement system was calibrated on-site with use of its dedicated hand-held calibrator, both at the start and end of measurements. No significant calibration drifts arose during the survey.

7.2.21. The survey results can be found in Section 7.3 and **Appendix 7.3**.

Purpose and Measurement Locations

7.2.22. Measurement locations are described in **Table 7-4** and shown in **Figure 7.1: Noise measurement locations and noise and vibration sensitive receptors**.

Table 7-4 – Summary of adopted measurement locations

Measurement location	Grid co-ordinates	WSP equipment ID	Description	Purpose
ML-1	355411, 390133	SOLO22	Continuous measurement over a seven-day period. Located on the eastern application site boundary, approximately 30 m from the Stepping Stones Day Nursery. Noise was predominantly from traffic on the M62, and local traffic on Omega Avenue. Wind through foliage of adjacent trees. Children playing at the nursery were also audible.	To determine baseline sound levels representative of the Stepping Stones Day Nursery.
ML-2	355044, 390461	SOLO21	Continuous Measurement over a seven-day period. Located within the application site approximately 800 m east-northeast of dwellings at Old Hall Farm, 440 m south of the M62 (same separation between dwellings and M62) Noise was predominantly from traffic on the M62. Wind in foliage was also audible.	To determine baseline sound levels representative of noise sensitive receptors around Old Hall Farm.

ASSESSMENT METHODOLOGY

APPROACH

7.2.23. The adopted assessment methodologies have been applied to demonstrate compliance with national and local planning policy (see paragraphs 7.5.5 to 7.5.6) and allow determination of whether significant environmental effects would arise as a result of the Proposed Development, as required by the EIA Regulations 2017 [Ref. 1.1]. The adopted assessment methodologies draw upon the British Standards and best practice guidance as applicable to each impact being assessed (see paragraph 7.5.7). For example, the assessment of construction noise is based upon the guidance contained within BS 5228-1:1999+A1 2014: *Code of practice for noise and vibration control on construction and open sites. Noise* (BS 5228-1) [Ref. 7.1] (see **Appendix 7.2**) whilst the assessment of development generated road traffic noise is based upon the guidance contend with the *Design manual for roads and bridges*, Volume 11: *Environmental* assessment, Section 3: *Environmental assessment techniques*, Part 7: HD 213/11: *Noise and vibration* (HD 213/11) [Ref. 7.2] (see **Appendix 7.2**).

7.2.24. The significance of effect has been determined as described in paragraphs 7.2.51 to 7.2.58).

CONSTRUCTION PHASE

Construction Noise

7.2.25. The assessment of construction noise has been undertaken based on the guidance contained within BS 5228-1 [Ref. 7.1]. Drawing upon the results of the baseline noise survey, a series of construction noise assessment criteria have been determined following the ABC method as detailed within Annex E Section E3.2 of this Standard (see **Appendix 7.2**).

7.2.26. A series of example construction noise level predictions have then been undertaken, with the results of these predictions compared against the derived assessment criteria. The margin of compliance / exceedance of the assessment criteria has been used to determine whether a significant effect would arise.

Construction Vibration

7.2.27. The assessment of construction vibration has been undertaken based on the guidance contained within BS 5228-2:1999+A1 2014:*Code of practice for noise and vibration control on construction and open sites. Vibration* (BS 5228-2) [Ref. 7.3] (see **Appendix 7.2**). Drawing upon the historic groundborne vibration measurement data and vibration prediction methods contained within this Standard, a series of typical set-back distances have been determined, at which different degrees of human exposure to groundborne vibration arise. Set-back distances have been determined for a sample of different vibration generative construction operations.

7.2.28. The distances of existing vibration sensitivity receptors have then been compared against the derived set back distances to determine whether resulting effects would be significant or not.

OPERATIONAL PHASE

Development Generated Road Traffic Noise

7.2.29. The impact of development generated road traffic noise during the operational phase, has been undertaken based on the Proposed Development traffic data. Basic Noise Level (BNL) calculations have been undertaken in accordance with the *Calculation of road traffic noise memorandum 1988* (CRTN) [Ref. 7.4] (see **Appendix 7.2**) for each local road traffic route that could be used to access the Proposed Development. Calculations have been undertaken for the following scenarios:

- Scenario A: Year of opening 'Do Minimum' (i.e. without Proposed Development) (2021DM);
- Scenario B: Year of opening 'Do Something' (i.e. with Proposed Development) (2021DS); and
- Scenario C: Future year (year of opening +15) 'Do Something' (i.e. with Proposed Development) (2036DS).

7.2.30. The results for Scenario A have been subtracted from the results for Scenario B to identify the noise level changes that would arise as a result of the Proposed Development in the short-term (i.e. upon opening).

7.2.31. The results for Scenario A have been subtracted from the results for Scenario C to identify the noise level changes that would arise as a result of the Proposed Development in the long-term (i.e. to the future design year, including for natural traffic growth).

7.2.32. The significance of these noise level changes has then been determined by consideration to whether there are any existing noise-sensitive receptors that are in close proximity to the assessed

routes (i.e. that could be subject to the identified level changes), and by application of the short-term and long-term impact magnitude scales presented within HD 213/11 [Ref. 7.2] (see **Appendix 7.2**).

Operational Site Noise

7.2.33. For residential dwellings, operational site noise has been assessed in accordance with BS 4142:2014+A1:2019: *Methods for rating and assessing industrial and commercial sound* (BS 4142) [Ref. 7.5] (see **Appendix 7.2**). Drawing upon the results of the baseline noise survey, daytime and night-time noise assessment criteria have been determined in accordance with This Standard.

7.2.34. A series of example operational noise level predictions have been undertaken for the Proposed Development, representing operation under a sample of different working scenarios. The results of these noise level predications have been assessed in accordance with BS 4142 [Ref. 7.5] by comparison against the derived noise assessment criteria. The assessment results have been used to determine whether a significant effect would arise.

7.2.35. The BS 4142 [Ref. 7.5] assessment method is applicable to residential receptors, not other receptor types such as a children's day nursery as present in this case. Therefore, for this receptor, the predicted operational noise levels have been assessed against the noise assessment criteria selected from the guidance contained within Institute of Acoustics (IOA) document Acoustics of Schools: a design guide (AoS) [Ref. 7.6] (see **Appendix 7.2**), which includes daytime assessment criteria for internal nursery spaces and external spaces for teaching and learning[1].

ASSESSMENT MODELLING

Construction Noise

7.2.36. The methodology adopted for the prediction of construction noise levels follows that set out in BS 5228-1 [Ref. 7.1]. The noise predictions have been made using Microsoft Excel spreadsheets, which have been developed in-house (by WSP) in accordance with BS 5228-1 [Ref. 7.1] methodologies.

7.2.37. The BS 5228-1 [Ref. 7.1] calculation methods allow noise levels to be determined for various construction activities. However, the accuracy of such predictions is necessarily limited by assumptions that have to be made regarding the number and type of plant to be utilised, their location and detailed operating arrangements. Whilst this information will be clarified as the project design progresses and when resources are mobilised, other information (such as exactly where the plant operates and for how long) will remain uncertain, even after works have commenced.

7.2.38. It has therefore been necessary to perform a generic construction phase noise assessment, focussing on key activities, with the aim of identifying whether significant, albeit temporary, noise

[1] Notwithstanding this, it should be noted that the prevailing daytime background noise levels at the Children's day nursery are such that similar target assessment criteria would apply in the case that a BS4142 assessment was undertaken for this receptor.

effects are likely to arise at the nearest sensitive receptors. The plant types, number and utilisations adopted in the completed noise level predictions are those detailed within **Appendix 7.4**.

Construction Vibration

7.2.39. Vibration may arise at several stages during the construction process, for example if vibratory rollers are used during earthworks and from piling operations. The application site is largely "greenfield", therefore no significant breaking activities are anticipated although earth and grading works will be required.

7.2.40. The most recent guidance for the prediction of construction vibration is contained in BS 5228-2 [Ref.7.3], which includes advice on both building damage criteria and human perception and disturbance. Vibration predictions have been made using Microsoft Excel spreadsheets, which have been developed in-house (by WSP) and apply the prediction methods detailed within this Standard.

Operational Site Noise

7.2.41. To inform the assessment of the operational site noise, a detailed noise model has been prepared for the Proposed Development. This model has been prepared within the CadnaA® noise modelling suite and extends to the nearest noise sensitive receptors. The following scenarios were considered:

- Hybrid Application – Ambient goods operation;
- Hybrid Application – Chilled goods (30% electric chillers) operation; and
- Hybrid Application – Chilled goods (30% electric chillers) operation with mitigation.

7.2.42. The following approach was adopted in the generation of the noise model:

- The model was set to apply the prediction methodology set out in the ISO 9613-2:1996: *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2) (Ref 7.7);
- Open source LIDAR Composite DTM (Digital Terrain Model) raster elevation data at 1m spatial resolution topographic data was incorporated into the model for the existing application site and surrounding area, extending to encompass the nearest noise sensitive receptors;
- Within the application site boundary, the LIDAR data was replaced with the ground height data for the detailed planning application site and the outline planning application site;
- The detailed planning application site layout used in the model was taken from the AutoCAD drawing no.: 6385 -150, titled 'Proposed Site Layout Plan with Survey Overlay';
- The outline planning application site layout used in the model was taken from the AutoCAD drawing no.: 4150-CA-00-00-DR-A-05100-SK2, titled 'Zone 8 Masterplan';
- Based on the Proposed Development layouts, proposed buildings are incorporated into the model, the façades are set to be acoustically reflective;
- The model was set to include second order reflected noise from solid structures;
- Building heights for the detailed planning application site were set based on drawing no.: 6385 – 149, titled 'Proposed Building Sections Warrington'.
- Building eaves heights within the outline planning application site were set to be 16m in height, typical of other existing similar units within the Omega Development;
- Existing buildings were incorporated based on Ordnance Survey (OS) mapping and aerial photography. Dwellings are set to 6.0m above local ground height, the Children's day nursery is set to 3.2m above local ground height;

- Globally, ground absorption was set to G = 1 (100% acoustically absorbent ground) with proposed areas of hardstanding (e.g. service yards, car parks and roads) included separately with ground absorption set to G=0 (100% acoustically reflective ground);
- The operational service yard noise sources have been modelled and calibrated using WSPs in-house database of measured noise sources, and typical manufacturers data as described further below in paragraphs 7.2.43 to 7.2.48;
- HGVs arriving and departing each service yard have been incorporated as line sources. The line sources extend from the application site boundary entrance into each of the service yards and return to the application site boundary entrance. The location is based on the layout drawings for the detailed planning application site and the outline planning application site (drawing ref.: 6385 - 150 and ref.: 4150-CA-00-00-DR-A-05100-SK2). The HGV line source height is set at 0.5m above local ground;
- Line sources have also been included, along the same extents, for HGV trailer chillers. The chiller line source height is set at 3.5m above local ground;
- HGV arrivals, manoeuvres, air brakes, loading and unloading, cab idling, and departures have been entered as point sources with a height of 0.5m above local ground for every proposed HGV docking bay;
- Similar point sources have also been added for every HGV parking space (but without the loading and unloading element); and
- Idling trailer chillers have been added as point sources with a height of 3.5m above local ground. These point sources have been added for each and every HGV docking bay and proposed parking space.

Source Noise Data

7.2.43. The source data presented in

7.2.44. **Table 7-5** has been adopted for service yard movements in and around the proposed service yard docking and parking bays. This data has been adopted from WSP's library of in-house historic measurement data for similar facilities to that proposed.

Table 7-5 – Service yard source noise data, dB (linear unless stated)

Activity	Octave Band Centre Frequency (Hz)								Time (s)	$L_{Aeq,T}$ @ 10m	L_{AFmax} @ 10m
	63	125	250	500	1k	2k	4k	8k			
HGV arriving and manoeuvring	71	66	65	66	69	65	58	50	109	72	78
Air brakes	-	-	-	-	-	-	-	-	3	80	81
HGV engine idling	75	58	66	60	62	59	52	42	37	66	-
Unloading activities	-	-	-	-	-	-	-	-	420	60	77
HGV pulling away	71	65	64	65	63	62	56	46	15	68	-
Electric powered HGV trailer chiller	75	71	67	61	58	56	52	45	continuous	65	-

7.2.45. For HGV movements to and from the service yards, source data has been determined based upon the guidance contained within the Noise Advisory Council (NAC) guide entitled: *A guide to*

measurement and prediction of the equivalent continuous sound level Leq (NAC Guide) [Ref. 7.8], a report by a working party for the technical sub-committee of the Noise Advisory Council. This document states that it was prepared for use by practitioners with the appropriate technical background who need to measure or predict environmental noise. It presents general procedures to be followed for the measurement and prediction of L_{eq} noise levels from a number of different sources.

7.2.46. Section 2.5 of the document details a method for calculating the L_{eq} noise level from the combined effect of a number of events (e.g. HGV pass-bys) with their own single event noise exposure level (L_{AX}, also commonly referenced as the SEL). The method is as follows:

$L_{eq} = L_{AX} + 10\log(n) - 10\text{Log}(T)$

Where:

L_{AX} = single event noise exposure level of the event (SEL)

n = the number of events

T = the time in seconds

7.2.47. In addition, Fig 4.1.4 of the document presents a method for determining the L_{AX} (SEL) at a distance of 10m from the nearside kerb edge, for heavy and light vehicles travelling at different speeds. This figure is duplicated in the diagram below:

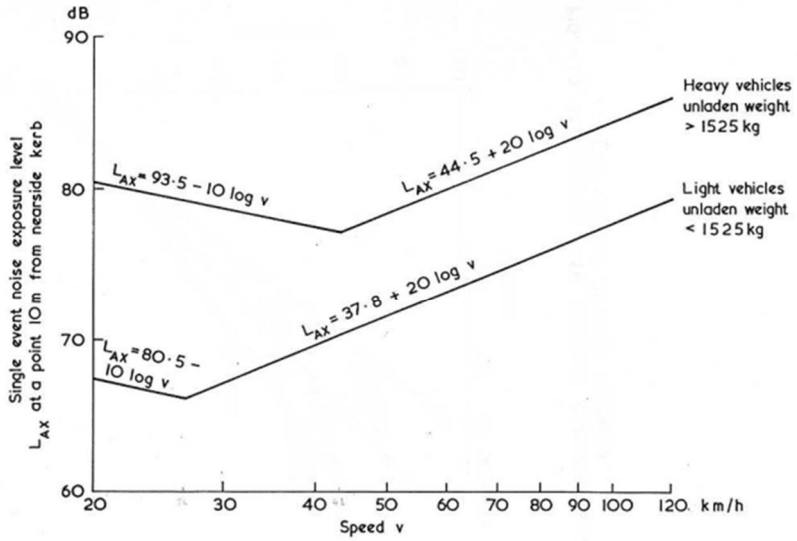

FIG. 4.1.4. RELATIONSHIPS BETWEEN L_{AX} (AT 10 m) AND SPEED

7.2.48. Combining the use of NAC Figure 4.1.4 with the equation adopted from NAC Section 2.5 provides a means of determining the L_{eq} that will arise at 10m as a result of a given number of HGV movements on an access road, or along a defined path. This has been applied assuming a HGV pass-by speed of 30 km/hour. Within the noise model, the sound power levels of the HGV line sources have then been set such that the calculated levels are modelled.

Modelled Scenarios

7.2.49. The levels of noise that will be generated from the operation of the proposed industrial/commercial units will depend upon their future occupants. For example, the use of HGV trailer chillers would be

limited to occupants requiring the storage and distribution of chilled goods. For other 'ambient temperature' operators, the use of HGV trailer chillers would not be requirement. Different occupants may also be subject to different intensities of arrivals and departures depending upon the nature of their business.

7.2.50. At this stage, the future occupants of the Proposed Development are not known for all Units. Therefore, a sample of different operational scenarios have been modelled. These are described below where a 'turnover' includes 1 HGV arrival, 1 HGV manoeuvre, 1 air brakes activated, 1 cab engine idle and 30 minutes of unloading / loading (docks only) and 1 HGV pulling away per docking bay / parking spaces.

Scenario 1 - Ambient goods operation

- 25% of all docking bays and parking spaces subject to a turnover within the 1-hour assessment period (equivalent to 6 turnovers at every dock and bay every 24 hours);
- All docking bays and parking spaces subject to a turnover would have an associated access road HGV arrival and departure movement (1 in and 1 out) within a 1-hour assessment period; and
- No chilled goods (i.e. no trailer chillers).

Scenario 2 - Chilled goods operation

- As scenario 1, but with 30% of turnovers having electric powered trailer chillers.

SIGNIFICANCE CRITERIA

7.2.51. The significance level attributed to each effect has been assessed based on the Sensitivity/value of the affected receptor(s) (See paragraph 7.2.54) and the Magnitude of Impact arising from the Proposed Development (See paragraphs 7.2.59 to 7.2.67), as well as a number of other factors that are outlined in more detail in **Chapter 5: Approach to EIA**. The Sensitivity of the affected receptor is assessed on a scale of high, medium, low and negligible, and the Magnitude of Impact is assessed on a scale of large, medium, small, negligible and no change, as set out in **Chapter 5: Approach to EIA**.

EFFECT SIGNIFICANCE

7.2.52. The following terms have been used to define the significance of the effects identified and apply to both beneficial and adverse effects:

- **Major effect**: where the Proposed Development could be expected to have a substantial improvement or deterioration on receptors;
- **Moderate effect**: where the Proposed Development could be expected to have a noticeable improvement or deterioration on receptors;
- **Minor effect**: where the Proposed Development could be expected to result in a perceptible improvement or deterioration on receptors; and
- **Negligible**: where no discernible improvement or deterioration is expected as a result of the Proposed Development on receptors, including instances where no change is confirmed.

7.2.53. As set out in **Chapter 5: Approach to EIA**, effects that are classified as moderate or above are considered to be **significant** in EIA terms, with effects of Minor, Negligible and No Change considered to be **not significant** in EIA terms**.**

7.2.54. The closest receptors to the Proposed Development are dwellings and a children's day nursery (see Section 7.4). These have been identified to be of 'Medium' Sensitivity. N.B. A High receptor sensitivity applies where a low noise environment is critical such as recording studios, audiology laboratories and libraries etc.

7.2.55. The Magnitude of Impact has been determined drawing upon the applicable guidance in each case, as summarised in the following subsections of this chapter.

7.2.56. **Table 5-4** presents the matrix detailing how the identified Magnitude of Impact and the receptor Sensitivities have been used to determine the resulting significance of effect

7.2.57. This approach to determining significant effects addresses the requirements of EIA Regulations 2017 [Ref. 1.1] to determine whether any effects would be significant or not. In addition, noise related planning policy also references the need to consider significance in terms of the NOEL, LOAEL, and SOAEL Effect Levels as referenced for use in the *Noise policy statement for England* (NPSE) [Ref. 7.9], (see **Appendix 7.2**).

7.2.58. The Magnitude of Impact scales presented in the following subsections also therefore detail how the NOEL, LOAEL and SOAEL descriptors have been applied within this assessment such that compliance with national noise policy is also demonstrated.

Magnitude of Impact and Effect Levels

Construction Noise

7.2.59. For construction noise, the Magnitude of Impact and Effect Level criteria have been determined based upon the margin by which predicted construction noise levels will comply or exceed the receptor construction noise assessment criteria when determined following the ABC assessment method detailed within BS 5228-1 [Ref. 7.1].

7.2.60. **Table 7-6** details the resulting Impact Magnitude and Effect Level criteria that have been applied.

Table 7-6 – Construction noise – Magnitude of Impact and Effect Level criteria

Construction noise level (x) ($L_{Aeq,T}$, dB)	Magnitude of Impact	Effect Level
x < Receptor ABC assessment criteria	No Change to Negligible	NOEL
Receptor ABC assessment criteria ≤ x < Receptor ABC assessment criteria+5dB	Small to Medium	LOAEL to SOAEL
Receptor ABC assessment criteria +5 ≤ x	Medium to Large	Above SOAEL

Construction Vibration

7.2.61. For construction vibration, the Magnitude of Impact and Effect Level criteria have been determined according to the guidance contained within BS 5228-2 [Ref. 7.2] for human perception.

7.2.62. **Table 7-7** details the resulting Magnitude of Impact and Effect Level criteria that have been applied.

Table 7-7 – Construction vibration – Magnitude of Impact and Effect Level criteria

Construction vibration (x) (PPV, mm/s)	Magnitude of Impact	Effect Level
x < 0.3	No Change to Negligible	NOEL
0.3 < x < 1.0	Small to Medium	LOAEL to SOAEL
1.0 < x	Medium to Large	Above SOAEL

Development Generated Road Traffic Noise

7.2.63. For development generated traffic noise, the Magnitude of Impact criteria have been determined based upon the short-term and long-term classification scales detailed within the HD213-11 [Ref. 7.2]. The terminology used within these scales have been updated to reflect that being used in this assessment. The resulting Magnitude of Impact criteria are detailed in **Table 7-8** and **Table 7-9**.

Table 7-8 – Development generated road traffic noise - Magnitude of Impact criteria - Short term.

Noise change ($L_{A10,18hr}$), dB	Magnitude of Impact
0	No Change
0.1 to 0.9	Negligible
1.0 to 2.9	Small
3.0 to 4.9	Medium
≥5.0	Large

Table 7-9 – Development Generated Road Traffic Noise - Magnitude of Impact Criteria - Long Term.

Noise change ($L_{A10,18hr}$), dB	Magnitude of Impact
0	No Change
0.1 to 2.9	Negligible
3.0 to 4.9	Small
5.0 to 9.9	Medium
≥10.0	Large

7.2.64. The Effect Level criteria have been determined based on the absolute road traffic noise levels in accordance with the scale presented in **Table 7-10**.

Table 7-10 – Development generated road traffic noise - Effect Level criteria

Noise change ($L_{A10,18hr}$), dB	Magnitude of Impact
x < 54.5 dB[1]	NOEL
54.5 dB ≤ x < to 67.5 dB[2]	LOAEL to SOAEL
67.5 dB ≤ x	Above SOAEL

1 Equivalent to a criterion of to 50dB $L_{Aeq,16hr}$ free-field, detailed within World Health Organisation's 1999 publication: *Guidelines for community noise* (WHO) [Ref, 7.10] and BS 8233: 2014: *Guidance on sound insulation and noise reduction for buildings* (BS 8233) [Ref. 7.11] or external living spaces.

2 The level, when rounded to the nearest whole dB, that equals the 'specified level' as defined within the *Noise Insulation Regulations 1975* [Ref. 7.12], and which is one of the qualifying criteria for the provision of noise insulation measures, or a grant in respect thereof, under these regulations.

Operational Site Noise

7.2.65. For residential dwellings, the Magnitude of Impact and Effect Level criteria have been determined based upon the guidance contained within BS 4142 [Ref. 7.5] i.e. by consideration of the difference between the sound from the operation of the development (including any correction(s) for noticeable acoustic characteristics – i.e. the Rating level) and the prevailing background sound levels, but also taking into account context and the sound levels in absolute terms.

7.2.66. **Table 7-11** details the resulting Magnitude of Impact and Effect Level criteria that have been applied.

Table 7-11 – Operational site noise – Magnitude of Impact and Effect Level criteria for residential receptors

Difference between Rating level ($L_{Ar,Tr}$) and Background sound level ($L_{A90,T}$) (x)	Magnitude of Impact	Effect Level
x ≤ 0	Negligible	NOEL
0 < x ≤ 3	Small	NOEL to LOAEL
3 < to ≤ 8	Medium	LOAEL to SOAEL
>8	Large	Above SOAEL

7.2.67. For the Children's day nursery, the Magnitude of Impact and Effect Level criteria have been determined based on achieving compliance with the external noise level criteria adopted from AoS [Ref. 7.6]. This guidance states that "*playgrounds, outdoor recreation areas and playing fields are generally considered to be of relatively low sensitivity to noise",* but that where these are used for teaching, communication can be important, and so continues to state the following for such teaching spaces: "*Noise levels in unoccupied playgrounds and playing fields and other outdoor areas should not exceed 55dB $L_{Aeq,30mins}$*" and there should be at least one area suitable for outdoor teaching, activities where noise levels are below 50 dB $L_{Aeq,30\ mins}$. The stated indoor criterion for nursery school rooms is 35 dB $L_{Aeq,30mins}$ for new build facilities and 40 dB $L_{Aeq,30mins}$ for refurbished buildings. These are broadly comparable to the external noise level criterion of 50dB when assuming a 10 to

15dB reduction through a partially open window. **Table 7-12** below presents the resulting Magnitude of Impact and Effect Level criteria based on degrees of compliance with this creation.

Table 7-12 – Operational site noise – Magnitude of Impact and Effect Level criteria for children's day nursery

External Rating Level ($L_{Ar,Tr}$) (x)	Magnitude of Impact	Effect Level
x ≤ 40	Negligible	NOEL
40 < x ≤ 50	Small	NOEL to LOAEL
50 < to ≤ 60	Medium	LOAEL to SOAEL
>60	Large	Above SOAEL

7.3. BASELINE CONDITIONS

7.3.1. The obtained measurement data have been analysed to determine:

- The prevailing daytime ambient ($L_{Aeq,T}$) noise levels for use in determining the applicable construction noise assessment criteria; and
- The prevailing daytime and night-time background sound levels ($L_{A90,T}$) for use in determining the operational noise assessment criteria for dwellings in accordance with BS 4142.

7.3.2. The daytime ambient noise levels have been determined for the proposed construction work hours (see **Appendix 7.4**), or, in the case of the children's day nursery, the assumed opening hours for this receptor (08:00 to 18:00). The results of this analysis are presented within **Appendix 7.3**, and are summarised in **Table 7-13**.

7.3.3. The prevailing background sound levels have been determined in accordance with the guidance contend within BS 4142. The results of this analysis are presented in **Appendix 7.3** with the identified representative values reproduced in **Table 7-14**.

Table 7-13 – Summary of ambient ($L_{Aeq,T}$) noise levels, Free-field, dB

Measurement Location	Weekday daytime (07:00 to 18:00 for MP-1[1] and 07:00 to 19:00 for MP-2)	Saturday daytime (07:00 to 14:00 for MP-2)
ML-1 (Children's day nursery)	54	N/A[2]
ML-2 (Dwellings at Old Hall Farm)	55	54
1 Daytime opening hours at Children's day nursery 2 Children's day nursery assumed to be closed		

Table 7-14 – Summary of background ($L_{A90,T}$) sound levels, Free-field, dB

Measurement location	Daytime $L_{A90,T}$ (07:00 to 23:00)	Night time $L_{A90,T}$ (23:00 to 07:00)
ML-1	46	41
ML-2	45	43

FUTURE BASELINE

7.3.4. The prevailing local noise environment is currently dominated by road traffic noise, including that from the M62 motorway to the north. It is anticipated that small increases in the baseline conditions may arise as a result of natural traffic growth over time. This will serve to increase the prevailing ambient and background sound levels.

7.3.5. Therefore, assessing the potential impacts arising from the Proposed Development based on the current measured baseline noise environment, represents a worst case as prevailing levels can reasonably be expected to be lower than those that will be arise in the future.

7.4. SENSITIVE RECEPTORS

7.4.1. The following sensitive receptors have been identified as those that are closest to the Proposed Development and which therefore have the greatest potential to be subject to significant effects:

- Receptor 1 - The Stepping Stones Children's Day Nursey, Lingley Green Avenue, Great Sankey (referred to within this assessment as Children's day nursery);
- Receptor 2 – Dwellings at Old Hall Farm (accessed via the A57 Warrington Road); and
- Receptor 3 – Dwellings at Bembridge Close, Park Road and Godshill Close

7.4.2. The above receptors locations are shown on **Figure 7.1: Noise measurement locations and noise and vibration sensitive receptors**.

7.5. LEGISLATIVE FRAMEWORK, POLICY AND GUIDANCE

7.5.1. For a development of this nature, there is no specific all-encompassing legislation relating to the standards associated with noise emission/noise effect. Noise legislation, where it does exist, tends to be either EC-derived and focussed on specific items of noise-emitting plant or on more general nuisance, such as that addressed by the provisions of the *Environmental Protection Act 1990* (EPA) [Ref. 7.13] (see **Appendix 7.2**).

7.5.2. In lieu of any all-encompassing legislation, assessing the effect of such a development during the site preparation / construction and operational phases must draw on information from a variety of sources. This assessment, therefore, makes reference to a number of legislative documents, British Standards, national planning guidance and local planning policy documents.

7.5.3. The key referenced documents are listed below with summaries presented in **Appendix 7.2**:

LEGISLATIVE FRAMEWORK

7.5.4. The applicable legislative framework is summarised as follows:

- Control of Pollution Act 1974 (Ref. 7.14); and
- Environmental Protection Act 1990 (Ref. 7.13).

POLICY

7.5.5. The applicable national planning policy is summarised as follows:

- Noise Policy Statement for England (NPSE) [Ref. 7.9]; and
- National Planning Policy Framework (NPPF) [Ref. 7.15];

7.5.6. The application site is located within the St. Helens Council area, but on the border with Warrington Borough Council to the east. The applicable local planning policy (for both Council areas) is summarised as follows:

St. Helens Planning Policy

- St. Helens Local Preferred Options Document (December 2012) [Ref. 7.16];
- St. Helens Local Plan Core Strategy (October 2012) [Ref. 7.17]; and
- Saved Policies of the 1998 Unitary Development Plan (UDP) [Ref. 7.18].

Warrington Borough Council Planning Policy

- Proposed Submission Version Local Plan 2017-2037 (March 2019) [Ref. 7.19].
- Local Plan Core Strategy (LPCS) [Ref. 7.20].
- Environmental Protection, Supplementary Planning Document, May 2013 [Ref. 7.21].

GUIDANCE

7.5.7. The following guidance documents have been used during the preparation of this chapter:

- Planning Practice Guidance (PPracG) [Ref. 7.22];
- BS 5228-1:2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites*. Part 1: *Noise* [Ref. 7.1];
- BS 5228-2:2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites*. Part 2: *Vibration* [Ref. 7.2];
- BS 4142:2014+A1:2019: *Methods for rating and assessing industrial and commercial sound* [Ref. 7.5];
- Building Bulletin 93: *Acoustic design of schools* (BB93) [Ref 7.6];
- Design Manual for Roads and Bridges (DMRB): Volume 11: *Environmental assessment*, Section 3: *Environmental assessment techniques*, Part 7: HD 213/11: *Revision 1: Noise and vibration* [Ref. 7.2];
- *Calculation of road traffic noise* (CRTN) memorandum 1988 [Ref. 7.4];
- Transport Research Laboratory TRL RR 246: *Traffic induced vibration in buildings*: 1990 (Ref. 7.23); and
- Transport Research Laboratory TRL Report 429: *Groundborne vibration caused by mechanised construction works* [Ref. 7.24].

7.6. ASSESSMENT OF POTENTIAL EFFECTS, MITIGATION AND RESIDUAL EFFECTS

CONSTRUCTION PHASE

7.6.1. Assessments of potential effects arising as a result of construction noise and construction vibration can be found in **Appendix 7.4** and **Appendix 7.5** respectively, with a summary of the results presented in **Table 7-15** below.

Table 7-15 – Assessment of potential effects, additional mitigation, residual effects and monitoring during construction

Sensitive receptor	Children's day nursery
Potential effects	Construction Noise The completed assessment has identified that this receptor would be subject to noise as a result of works associated with the construction programme. The assessment has identified that, based on the proposed masterplan for the detailed planning application site, and the indicative masterplan of the outline planning application site, construction noise criteria determined in accordance with applicable guidance (BS 5228-1 [Ref. 7.1]) would be complied with. A possible exception would be during any periods when particularly intensive works are required immediately adjacent to the application site boundary that is closest to this receptor. However, such intensive works would be of short duration. It is however recognised that that the final noise levels that will arise at the Children's day nursery will be dependent upon the final masterplan that is brought forward. Therefore, notwithstanding the margins of compliance that have been identified (between 3 and 12dB for building foundation and construction works), consideration has been given to appropriate mitigation measures. Construction Vibration The completed assessment has identified that this receptor would be subject to groundborne vibration as a result of works associated with the construction programme. The degree of effect is dependent upon the nature of the works being undertaken, with the potential for significant effects only identified to for driven piling works (or similarly vibration generate working operations). Significant effects would not arise as a result of the use of vibratory rollers, bored piling or the passage of Heavy Duty Vehicles (HDVs). Consideration has therefore been given mitigation measures for driven piling or other similarly vibration generative working operations.
Additional mitigation	Construction Noise Generic safeguards exist to minimise the effects of construction noise, these include: ▪ The various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant; and ▪ The powers that exist for local authorities under Sections 60 and 61 of the *Control of pollution act* [Ref. 7.14] to control noise from construction Sites. In addition, the works would be undertaken in accordance with the principle of Best Practicable Means (BPM) as defined in Section 72 of the *Control of Pollution Act 1974* [Ref. 7.14]. Example measures in compliance with BPM are listed within **Appendix 7.4**. The identified measures would be ensured though use of a Construction Environmental Management Plant (CEMP). The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition, which could also require that its content is agreed with St. Helens Council. Construction Vibration The following mitigation measures would be employed: ▪ Once the required locations for any driven piling works (or similarly vibration generative construction operation) are finalised, a revised predictive assessment of groundborne vibration impact will be undertaken.

	▪ The revised assessment will reflect the nature/type of the works to be undertaken at the application site, including the types of plant to be utilised, piles to be inserted and the local ground conditions. ▪ Where the results of the revised assessment identify a likelihood of groundborne vibration levels in excess of 1mm/s PPV (Medium magnitude of impact) at the Children's day nursery, then the proposed working method shall be revisited (e.g. a low vibratory piling method such as auger bored piling shall be adopted where such an approach would result in the required pile performance). ▪ Where adoption of a low vibratory working methods is not possible (e.g. due to pile performance requirements), the Children's day nursery will be provided with notice of when all such works within 100m of their facility shall be undertaken. A groundborne vibration survey shall also be undertaken for the duration of those works, to provide confirmation of the levels that are generated in practice, either at the application site boundary, or at the Children's day nursery itself. The measurement results shall be made available to the Children's day nursery where required. ▪ Were the live measurement results identify that vibration levels in excess of 2mm/s are arising in practice (at the Children's day nursery), the works shall cease unless it can be demonstrated to St. Helens Council that the works are being undertaken in accordance with the principles of Best Practicable Means (BPM). The identified measures would be ensured though use of a CEMP. The preparation of the CEMP, and subsequent compliance with it, could be ensured through the use of a planning condition, which could also require that its content is agreed with St. Helens Council.
Residual effects and monitoring	<u>Construction Noise</u> The sensitivity of the Children's day nursery is Medium, and the magnitude of impact, following mitigation, ranges from No Change to Negligible. Therefore, there is likely to be a direct, temporary, local, medium-term effect of **No Change to Negligible adverse** on the Children's day nursery (**not significant**) following the implementation of mitigation measures. The requirements for any construction phase noise monitoring would be identified through the delivery of, and compliance with, the proposed CEMP <u>Construction Vibration</u> The sensitivity of the Children's day nursery is Medium, and the magnitude of impact, following mitigation, is not larger than Small. Therefore, there is likely to be a direct, temporary, local, medium-term effect of **Minor adverse** at worst on the Children's day nursery (**not significant**) following the implementation of mitigation measures. As detailed within the mitigation section above, groundborne vibration monitoring forms an integral part of the mitigation measures and would be delivered as part of the CEMP where the potential for a significant effect is identified.

Sensitive receptor	Dwellings at Old Hall Farm
Potential effects	<u>Construction Noise</u> The completed assessment has identified that this receptor would be subject to noise as a result of works associated with the construction programme, but that the resulting levels would be low as a result of the separation distances between these receptors and the application site. The assessment has identified that, based on the proposed masterplan for the detailed planning application site, and the indicative masterplan of the outline planning application

	site, construction noise criteria determined in accordance with applicable guidance (BS 5228-1 [Ref. 7.1]) would be complied with by significant margins of between 19 and 29dB. Construction Vibration The completed assessment has identified that due to the separation distance to the application site boundary no significant effects would arise as a result of Construction vibration.
Additional mitigation	Construction Noise Given the levels of compliance that have been identified, consideration to mitigation for this receptor is not considered warranted. Construction Vibration As no significant effect is identified to arise, consideration to mitigation for this receptor is not considered warranted.
Residual effects and monitoring	Construction Noise The sensitivity of the dwellings at Old Hall Farm is Medium, and the magnitude of impact, ranges from No Change to Negligible. Therefore, there is likely to be a direct, temporary, local, medium-term effect of **No Change to Negligible adverse** on the dwellings at Old Hall Farm (**not significant**). There are no requirements for monitoring at this receptor. Construction Vibration The sensitivity of the dwellings at Old Hall Farm is Medium, and the magnitude of impact, is Negligible. Therefore, there is likely to be a direct, temporary, local, medium-term effect of **Negligible adverse** on the dwellings at Old Hall Farm (**not significant**). There are no requirements for monitoring at this receptor.

Sensitive receptor	Dwellings at Bembridge Road
Potential effects	Construction Noise The completed assessment has identified that this receptor would be subject to noise as a result of works associated with the construction programme, but that the resulting levels would be low as a result of the separation distances between these receptors and the application site. The assessment has identified that, based on the proposed masterplan for the detailed planning application site, and the indicative masterplan of the outline planning application site, construction noise criteria determined in accordance with applicable guidance (BS 5228-1 [Ref. 7.1]) would be complied with by significant margins of between 17 and 27dB. Construction Vibration The completed assessment has identified that due to the separation distance to the application site boundary no significant effects would arise as a result of Construction vibration.

Additional mitigation	Construction Noise Given the levels of compliance that have been identified, consideration to mitigation for this receptor is not considered warranted. Construction Vibration As no significant effect is identified to arise, consideration to mitigation for this receptor is not considered warranted.
Residual effects and monitoring	Construction Noise The sensitivity of the dwellings at Bembridge Close is Medium, and the magnitude of impact, ranges from No Change to Negligible. Therefore, there is likely to be a direct, temporary, local, medium-term effect of **No Change to Negligible adverse** on the dwellings at Bembridge Close (**not significant**). There are no requirements for monitoring at this receptor. Construction Vibration The sensitivity of the dwellings at Bembridge Close is Medium, and the magnitude of impact, is Negligible. Therefore, there is likely to be a direct, temporary, local, medium-term effect of **Negligible adverse** on the dwellings at Bembridge Close (**not significant**). There are no requirements for monitoring at this receptor.

OPERATIONAL PHASE

7.6.2. Assessments of potential effects arising as a result of construction noise and construction vibration can be found in **Appendix 7.**6 and **Appendix 7.7** respectively, with a summary of the results presented in Table 7-16 below.

Table 7-16 – Assessment of potential effects, additional mitigation, residual effects and monitoring during operation

Sensitive receptor	Children's day nursery
Potential effects	Industrial / Commercial Noise from the Development The completed assessment has identified that this receptor would be subject to industrial / commercial noise from the development once operational, but that the levels would be dependent upon the nature and intensity of operations undertaken as well as the final Proposed Development layout design that is brought forward for the outline planning application site. An assessment has been undertaken for the proposed masterplan for the detailed planning application site, and the indicative masterplan of the outline planning application site. It has been identified that noise levels generated for ambient goods operations would meet the adopted criteria but that mitigation would be needed for an operational scenario including 30% electric chiller operations.
Additional mitigation	Industrial / Commercial Noise from the Development The following mitigation measures are proposed to reduce ambient goods operational noise level at this receptor: ▪ Noise barrier 1.4m high, 278m long, east of Unit 3.

	The following mitigation measures are proposed to reduce chilled goods operational noise level at this receptor: ▪ Noise barrier 3m high, 376m long, east of Unit 3. ▪ Chilled goods prohibited from using or accessing the eastern side of Unit 3. Appropriate limits have been determined for noise from any future fixed/mechanical plant. Compliance with these limits could be ensure through the use of a planning condition.
Residual effects and monitoring	The sensitivity of the Children's day nursery is Medium, and the magnitude of impact is **Small**. There is likely to be a direct, permanent, local, long-term effect of **Minor adverse** on the Children's day nursery (**not significant**). There are no requirements for monitoring at this receptor.

Sensitive receptor	Dwellings at Old Hall Farm
Potential effects	<u>Industrial / Commercial Noise from the Development</u> The completed assessment has identified that these receptors would be subject to industrial / commercial noise from the development once operational, but that the levels would be dependent upon the nature and intensity of operations undertaken as well as the final Proposed Development layout design that is brought forward for the outline planning application site. An assessment has been undertaken for the proposed masterplan for the detailed planning application site, and the indicative masterplan of the outline planning application site. It has been identified that noise levels generated for ambient goods operations would meet the adopted criteria during daytime and night-time and that this would also be the case for daytime operations including 30% electric chillers, but that mitigation would be needed for this level of chiller use during the night-time.
Additional mitigation	<u>Industrial / Commercial Noise from the Development</u> The following mitigation measures are proposed to reduce operational noise level at this receptor: ▪ Noise barrier 2m high, 393m long, wrapping around the south west corner of Unit 1; ▪ Noise barrier 2m high, 277m long, west of Unit 2; and ▪ Noise barrier 2m high, 353m long, wrapping around the north-west corner of Unit 4. Appropriate limits have been determined for noise from any future fixed/mechanical plant. Compliance with these limits could be ensure through the use of a planning condition.
Residual effects and monitoring	<u>Industrial / Commercial Noise from the Development</u> The sensitivity of the dwellings at Old Hall Farm is Medium and the worst-case magnitude of impact (night-time) is **Small**. There is likely to be a direct, permanent, local, long-term effect of **Minor adverse** on the dwellings at Old Hall Farm (**not significant**). There are no requirements for monitoring at this receptor.

Sensitive receptor	Dwellings at Bembridge Close
Potential effects	Industrial / Commercial Noise from the Development The completed assessment has identified that these receptors would be subject to industrial / commercial noise from the development once operational, but that the levels would be dependent upon the nature and intensity of operations undertaken as well as the final Proposed Development layout design that is brought forward for the outline planning application site. An assessment has been undertaken for the proposed masterplan for the detailed planning application site, and the indicative masterplan of the outline planning application site. It has been identified that noise levels generated for ambient goods operations would meet the adopted criteria during daytime and night-time and that this would also be the case for daytime operations including 30% electric chillers, but that mitigation would be needed for this level of chiller use during the night-time.
Additional mitigation	Industrial / Commercial Noise from the Development The following mitigation measures are proposed to reduce operational noise level at this receptor: ▪ Noise barrier 3m high, 542m long, south of Unit 3 and Unit 4. ▪ Chilled goods prohibited from using or accessing the eastern side of Unit 3. Appropriate limits have been determined for noise from any future fixed/mechanical plant. Compliance with these limits could be ensure through the use of a planning condition
Residual effects and monitoring	Industrial / Commercial Noise from the Development The sensitivity of the dwellings at Bembridge Close is Medium, and the worst-case magnitude of impact (night-time) is **Small**. There is likely to be a direct, permanent, local, long-term effect of **Minor adverse** on the dwellings at Bembridge Close (**not significant**). There are no requirements for monitoring at this receptor.

Sensitive receptor	Receptors adjacent to the existing local road traffic network
Potential effects	Development Generated Traffic Noise There is the potential for increased noise levels are arise at receptors adjacent to the existing local highway network as a result development generated road traffic movements to and from the Proposed Development. However, the completed assessment has identified that for routes where noise sensitive receptors are presented resulting noise level changes would be small and not significant.
Additional mitigation	Development Generated Traffic Noise As no significant effect is identified to arise, consideration to mitigation for these receptors is not considered warranted.

Residual effects and monitoring	Development Generated Traffic Noise The sensitivity of receptors adjacent to the existing local highway network is Medium, and the magnitude of impact, is Negligible to small at worst. Therefore, there are likely to be indirect, permanent, local, long-term effects of **Negligible to Minor adverse** at worst on receptors adjacent to the existing local highway network (**not significant**). There are no requirements for monitoring at these receptors.

ASSESSMENT AGAINST FUTURE BASELINE

7.6.3. As detailed within paragraphs 7.3.4 and 7.3.5, given that the local noise environment is dominated by road traffic noise, it is anticipated that small increases in the baseline conditions may arise as a result of natural traffic growth over time.

7.6.4. The completed assessment work has been undertaken against the existing baseline noise environment, which represents a worst case, as these are lower (and therefore more stringent) than can reasonably be expected to arise in the future.

CUMULATIVE EFFECTS

7.6.5. The following developments have been considered in the cumulative assessment, Omega South Zone 3-6, a mixed-use development including residential (1100 units) located 830m to the east of the Proposed Development, and Lingley Mere, a residential development (275 units) located 400m to the east of the Proposed Development. Both these developments are currently under construction.

7.6.6. The separating distance between Omega South Zone 3-6 and the Proposed Development is considered large enough to discount noise and vibration cumulative impacts from either construction or operation.

7.6.7. There is potential for cumulative construction noise impacts at the Children's day nursery and dwellings at Bembridge Close should the construction phase of the outline planning application site overlap with the Lingley Mere development. This is considered unlikely as Lingley Mere is already under construction and occupiers for the outline planning application site are not known, because of this and taking account of the separating distance between the developments, the potential construction noise cumulative impact is not considered to change the conclusions of the assessment. The separating distance also rules out potential construction vibration cumulative impacts.

7.6.8. There is potential for a cumulative noise impact at the Children's day nursery and at Bembridge Close dwellings following occupation of the Lingley Mere development and after the Proposed Development becomes operational. However, due to the scale of the Lingley Mere development, the separating distance between noise sources, the potential operational noise cumulative impact is not considered to change the conclusions of the assessment.

7.7. OPPORTUNITIES FOR ENHANCEMENT

7.7.1. In the outline planning application site following enhancement opportunities have been identified:

- Maximise the distance between noise sources and sensitive receptors; and
- Using building layout to screen service yards.

7.8. LIMITATIONS AND ASSUMPTIONS

7.8.1. As is typical at application stage, the precise details of the construction plant, plant number, programme and working methodologies to be applied are not known, and will only be finalised after the planning stage when the construction contractor is appointed. The construction noise level predictions have therefore been undertaken based on assumed plant detail drawing upon WSP's experience of similar schemes. Whilst more detailed calculations may be required at a later stage, the completed calculations are considered appropriate to provide an appreciation of any potentially significant effects.

7.8.2. The assessment of vibration from construction activities has been undertaken based on vibration levels associated with a small range of key groundborne vibration generative construction activities. It is possible that activities other than those presented may take place, whilst, similarly, some of those presented may not be applicable to the activities specific to the Site at the time of construction. The conclusions drawn from this assessment, however, provide an indication of the possible effects that could arise during the construction phase. This assessment has assumed that piled foundation works may be required.

7.8.3. The results of the Transport Assessment (TA), in particular the traffic flow data, have been used as the basis for the assessment of noise level changes that could arise from development generated road traffic noise during the operational phase. In applying these traffic figures, a number of assumptions have been incorporated, the precise details of these assumptions are presented within **Chapter 12: Transport**.

At this stage, detailed information on likely fixed/mechanical plant that may be introduced as a result of the Proposed Development or the precise nature of operations within the proposed service areas are not known. These will be dependent upon the future occupants of the proposed development. The approach has therefore been to undertake assessment based on example operating scenarios include those associated with both ambient and chilled goods logistics.

7.9. SUMMARY

7.9.1. **Table 7-17** provides a summary of the findings of the assessment.

Table 7-17 - Summary of noise and vibration effects

Receptor	Potential effects	Additional mitigation	Residual effects	Monitoring
Construction Phase				
Children's day nursery	Noise as a result of on-site operations during the construction programme -- Vibration as a result of on-site operations during the construction programme	Compliance with Best Practicable Means, ensured through use of a CEMP -- Revised groundborne vibration assessment once requirement for piling (or other similarly vibration generative works) is known, with results used to inform working methods selection. Compliance with Best Practicable Means. Provision of notice to receptor of when works will be undertaken. Live groundborne vibration monitoring during works where necessary (drawing on results of revised assessment).	**No change to Negligible adverse (not Significant)** T / D / L / MT -- **Minor adverse (not Significant)** T / D / L / MT	Construction noise monitoring where necessary in accordance with requirements of proposed CEMP. -- Construction vibration monitoring where necessary in accordance with requirements of proposed CEMP.

Receptor	Potential effects	Additional mitigation	Residual effects	Monitoring
Dwellings at Old Hall Farm	Noise as a result of on-site operations during the construction programme -- Vibration as a result of on-site operations during the construction programme	None required -- None Required	**No change to Negligible adverse (not Significant)** T / D / L / MT -- **Negligible adverse (not Significant)** T / D / L / MT	None required -- None required
Dwellings at Bembridge Close	Noise as a result of on-site operations during the construction programme -- Vibration as a result of on-site operations during the construction programme	None required -- None Required	**No change to Negligible adverse (not Significant)** T / D / L / MT -- **Negligible adverse (not Significant)** T / D / L / MT	None required -- None required
Operational Phase				
Children's day nursery	Industrial / commercial noise as a result of on-site operations once completed and occupied.	For ambient operation, a noise barrier 1.4m high, 278m long, east of Unit 3. For chilled goods operation, a noise barrier	**Minor adverse (not Significant)** P / D / L / LT	None required

Receptor	Potential effects	Additional mitigation	Residual effects	Monitoring
		3m high, 376m long, east of Unit 3. In conjunction with chilled goods being prohibited from using and accessing the eastern side of Unit 3. Planning conditions specifying fixed/mechanical plant noise level limits		
Dwellings at Old Hall Farm	Industrial / commercial noise as a result of on-site operations once completed and occupied.]	Noise barrier 2m high, 393m long, wrapping around the south west corner of Unit 1. Noise barrier 2m high, 277m long, west of Unit 2. Noise barrier 2m high, 353m long, wrapping around the north-west corner of Unit 4. Planning conditions specifying fixed/mechanical plant noise level limits	**Negligible to Minor adverse (not Significant)** P / D / L / LT	None required
Dwellings at Bembridge Close	Industrial / commercial noise as a result of on-site operations once completed and occupied.]	Noise barrier 2m high, 542m long, south of Unit 3 and Unit 4. Chilled goods prohibited from using and accessing the eastern side of Unit 3.	**Negligible to Minor adverse (not Significant)** P / D / L / LT	None required

Receptor	Potential effects	Additional mitigation	Residual effects	Monitoring
		Planning conditions specifying fixed/mechanical plant noise level limits		
Receptors adjacent to the existing local highway network	Change in noise levels as a result of development generated road traffic movements.	None required	**Negligible to Minor adverse (not Significant)** P / I / L / LT	None required

Key to table:

P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N/A = Not Applicable
L = Local

7.10. REFERENCES

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- Ref. 7.26: HMSO (1963), (Wilson) Committee on the problem of noise – Final report.