

Appendix 10.1: Demolition and Construction Stage Noise Assessment

Land North of Bryn Lane, Wrexham

Construction Noise Assessment

784-B032645



Net World Sports Limited

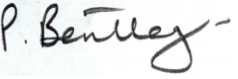
May 2023

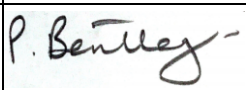
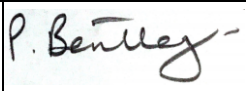


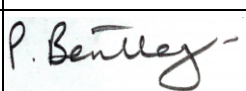
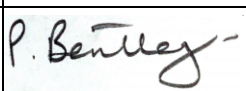
DOCUMENT CONTROL

Document:	Construction Noise Assessment
Project:	Land North of Bryn Lane, Wrexham
Client:	Net World Sports Limited
Project Number:	784-B032645
File Origin:	\\lds-dc-vm-101\Data\Projects\784-B032645 Net World Sports Land North of Bryn Lane Wrexham AQ 31Aug21\

Revision:	0	Prepared by:	Neil Fletcher Senior Consultant	
Date:	04/04/2023	Checked by:	Gus Egan Principal Consultant	
Status:	First Issue	Approved By:	Paul Bentley Associate	
Description of Revision:				

Revision:	1	Prepared by:	Neil Fletcher Senior Consultant	
Date:	27/04/2023	Checked by:	Gus Egan Principal Consultant	
Status:	Second Issue	Approved By:	Paul Bentley Associate	
Description of Revision:	Amendments to construction and Demolition context and other minor changes.			

Revision:	2	Prepared by:	Neil Fletcher Senior Consultant	
Date:	26/05/2023	Checked by:	Paul Bentley Associate	
Status:	Third Issue	Approved By:	Paul Bentley Associate	
Description of Revision:	Construction traffic assessment added			

Revision:	3	Prepared by:	Suzy Everett Senior Consultant	
Date:	19/06/2023	Checked by:	Paul Bentley Associate	
Status:	Fourth Issue	Approved By:	Paul Bentley Associate	
Description of Revision:	Updated development description			

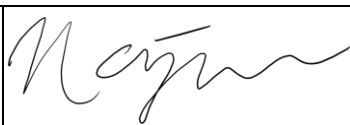
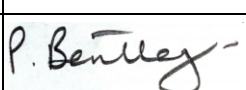
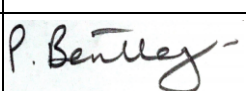
Revision:	4	Prepared by:	Najwa Adnan-Smith Environmental Assistant	
Date:	19/07/2023	Checked by:	Paul Bentley Associate	
Status:	Fifth Issue	Approved By:	Paul Bentley Associate	
Description of Revision:	Updated construction programme			

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 Purpose of this Report.....	1
1.2 Planning Policy	2
1.3 Consultation	2
1.4 Acoustic Consultants' Qualifications and Professional Memberships	3
2.0 ASSESMENT CRITERIA	4
2.1 Construction Noise Criteria.....	4
2.2 Construction Vibration Criteria.....	4
2.3 Construction Traffic Assessment Criteria	5
3.0 ASSESSMENT METHODOLOGY	6
3.1 Noise Modelling Methodology	6
3.2 Model Input Data	7
3.2.1 Construction Programme	7
3.2.2 Demolition and Construction Data	7
3.2.3 Construction Traffic Data	10
3.3 Sensitive Receptors	11
4.0 ASSESSMENT OF EFFECTS	13
4.1 Construction Noise Assessment	13
4.2 Construction Vibration Assessment.....	15
4.3 Construction Traffic Noise Assessment	16
5.0 MITIGATION	17
6.0 CONCLUSIONS	18

LIST OF TABLES

Table 1.1: Acoustic Consultants' Qualifications & Experience	3
Table 2.1: Noise Level Criteria and Actions.....	4
Table 2.2: Perceptible Vibration from Construction Activities at Distance	5
Table 3.1: Modelling Parameters Sources and Input Data	6
Table 3.2: Indicative Construction Programme.....	7
Table 3.3: Mobile Plant Noise Data	8
Table 3.4: Sensitive Receptor Locations	12
Table 4.1: Construction Noise Assessment (Fixed Limits Method) - Enabling and Demolition Works	13
Table 4.2: Construction Noise Assessment (Fixed Limits Method) - Excavation and Sub-structure Works ...	14
Table 4.3: Construction Noise Assessment (Fixed Limits Method) - Construction of Superstructure.....	14
Table 4.4: Construction Noise Assessment (Fixed Limits Method) - External/Landscaping	14
Table 4.5: Construction Vibration Impacts	15

LIST OF FIGURES

Figure 3.1: Sensitive Residential Receptor Locations	12
--	----

APPENDICES

Appendix A: Glossary of Terminology

Appendix B: Noise Contour Plots

Appendix C: Report Conditions

1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This report presents the findings of a construction noise assessment undertaken to accompany a planning application seeking a hybrid planning approval for a proposed industrial/commercial development (the 'proposed development') at Land North of Bryn Lane, Wrexham (the 'application site').

The proposed development is commercial in nature and encompasses:

- Detailed Component:
 1. Demolition of existing buildings, site clearance and preparation works, including removal of vegetation and reprofiling of topsoil, where necessary;
 2. Construction of a new warehouse unit, providing 33,595 sqm Gross External Area (GEA) for B1c (light industry appropriate in a residential area), B2 (general industrial) and B8 (storage & distribution) uses (Unit 2);
 3. Construction of 8 new smaller units (Units 3-7; 14-16), providing a total of 29,659 sqm GEA for B1c (light industry appropriate in a residential area), B2 (general industrial) and B8 (storage & distribution) uses;
- Outline Component:
 1. Construction of up to 72,635 sqm GEA for employment uses (B1c (light industry appropriate in a residential area), B2 (general industrial) and B8 (storage & distribution) uses), ancillary retail/drive thru facilities and potential for a hotel and petrol filling station (A1, A3, C1 or sui generis). The overall quantum of A1, A3, C1 or sui generis use would not exceed 16,150 sqm GEA;
 2. The proposed buildings will be up to 28.5m in height above ground level;
- Site Wide
 1. Access and parking provision, including new access junctions, internal roads, service yards and car and HGV parking. Two new junctions are proposed (in detail) providing vehicular access, as well as cycle and pedestrian access, from Bryn Lane/Industrial Estate Road with an additional access road for a substation. Car parking spaces, HGV trailer spaces and HGV lorry spaces are proposed across the application site;
 2. Retention and enhancement of some existing on-site green spaces and provision of landscaping around the application site; and
 3. Implementation of drainage/attenuation measures.
 4. The noise levels from the proposed construction activities have been predicted at local representative receptors using CadnaA noise modelling software which incorporates ISO 9613-2 methodologies and calculations. The predicted levels have been compared to a fixed target criterion set based on the guidance in BS5228:2009+A1:2014.
 5. The potential for construction vibration to cause disturbance to humans has been considered based on professional judgement and with regard to the information contained within BS 5228-2.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and Report Conditions are presented in Appendix D.

1.2 PLANNING POLICY

British Standard BS 5228 is a two-part standard which was subject to minor amendments in 2014 which comprises:

- BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Part 1: Noise’; and
- BS 5228-2:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration’.

The Standard provides guidance, information and procedures on the control of noise and vibration from demolition and construction sites. The control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 approved BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 for the purpose of giving guidance on appropriate methods for minimising noise from construction and open sites in exercise of powers conferred on the Secretary of State by sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974.

There are no set standards for the definition of the significance of construction noise effects, however, for noise, example criteria are provided in BS 5228-1:2009+A1:2014 Annex E and for vibration, example criteria are provided in BS 5228-2:2009+A1:2014 Annex B. The assessment of whether changes in noise levels due to construction activity constitute significant effects will be dependent on the absolute levels of ambient and construction noise, as well as the magnitude, duration, time of occurrence and frequency of the noise change.

BS 5228-1:2009+A1:2014 provides basic information and recommendations for methods of noise control relating to construction and open sites where work activities/operations generate significant noise levels. It includes sections on: community relations; noise and persons on-site, neighbourhood nuisance; project supervision; and control of noise. However, annexes include information on legislative background; noise sources, remedies and their effectiveness (mitigation options); current and historic sound level data; on-site equipment and site activities; significance of noise effects; calculation procedures estimating sound emissions from the sites and sound level monitoring; types of piling; and air overpressure.

1.3 CONSULTATION

An EIA Scoping Report was produced in November 2022 to outline the assessment approach and methodology. A response was received from Wrexham Borough Council (WBC) in December 2022 in which the WBC confirmed their acceptance of the proposed methodology outlined in the scoping document.

The scoping report outlined the following methodology in relation to construction noise and vibration:

“Noise levels from potential on-site activity and construction vehicle movements associated with the development of the application site will be assessed in accordance with BS 5228-1+A1 2014 criteria which indicate if a significant effect is likely to occur at noise sensitive properties.

Point sources and line sources representing all likely items of plant and construction traffic will be presented in the model, and in the case of mobile plant, these will be placed in worst-case locations with respect to nearby noise sensitive receptors.

Construction vibration associated with the development of the application site will be assessed in accordance with BS 5228-2+A1 2014 criteria which indicate if a significant effect is likely to occur at vibration sensitive properties.”

1.4 ACOUSTIC CONSULTANTS’ QUALIFICATIONS AND PROFESSIONAL MEMBERSHIPS

The lead project Acoustic Consultant is Neil Fletcher. The report has checked by Paul Bentley and verified by Nigel Mann. Relevant qualifications, membership and experience are summarised in Table 1.1 below.

Table 1.1: Acoustic Consultants’ Qualifications & Experience

Name	Education	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Neil Fletcher	BSc 1996 MSc 2005	Mar 2020	Mar 2020	May 2023
Paul Bentley	BSc 2004 MSc 2005 PgDip 2012	Feb 2008	Jun 2012	Aug 2016
Nigel Mann	BSc 1997 MSc 1999	Nov 1998	Nov 2001	July 2005

2.0 ASSESMENT CRITERIA

2.1 CONSTRUCTION NOISE CRITERIA

Noise levels from potential construction activity associated with the proposed development has been assessed in accordance with BS 5228-1:2009+A1:2014 criteria which indicate if a significant effect is likely to occur at noise sensitive receptors (i.e., residential properties). To ensure that the assessment is worst-case, it has been assumed that all proposed construction activities are occurring simultaneously. The construction noise criteria adopted for this assessment are presented in Table 2.1 below, fixed limits for rural areas have been adopted.

Table 2.1: Noise Level Criteria and Actions

Effect Level	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level	Fixed Limits In rural areas noise levels exceed 50dB	No Action Required Complaints Relating to Plant Noise Unlikely
Lowest Observed Adverse Effect Level	Fixed Limits In rural areas noise levels exceed 60dB	Mitigate to achieve total noise levels below relevant category threshold
Significant Observed Adverse Effect	Fixed Limits In rural areas noise levels exceed 70dB	Mitigate to achieve total noise levels below relevant category threshold
Unacceptable Observed Adverse Effect	Fixed Limits In rural areas noise levels exceed 80dB	Mitigate to achieve total noise levels below relevant category threshold

2.2 CONSTRUCTION VIBRATION CRITERIA

There are currently no British Standards that provide a methodology for predicting levels of vibration from construction activities other than BS 5228-2, which relates to percussive, vibratory, rolling and piling only. However, as stated in BS 5228-2, and as generally accepted, the threshold of vibration perception for humans is typically in the peak particle velocity (PPV) range 0.14 mms^{-1} to 0.3 mms^{-1} at frequencies between 8 Hz and 80 Hz in residential environments. Based on professional judgement and having regard to information contained within BS 5228-2, Table 2.2 details the distance at which certain activities are likely to give rise to 'just perceptible' levels of vibration.

Table 2.2: Perceptible Vibration from Construction Activities at Distance

Construction Activity	Distance from activity when vibration may just be perceptible (m) ¹
Heavy Vehicles	5 – 10
Excavation	10 – 15
Concreting	15 – 20
CFA Bored Piling	15 – 20
Rotary Bored Piling	20 – 30

Note ¹ Distances for perceptibility are dependent on a number of factors and may be greater than indicated. The principal factors are dependent on the radial distance between source and receiver, source energy per blow or per cycle, ground conditions, underlying geology and upon foundations and construction of the building itself.

2.3 CONSTRUCTION TRAFFIC ASSESSMENT CRITERIA

Table 2.3 below has been produced with reference to Table 3.54a of Design Manual for Roads and Bridges LA111 'Noise and Vibration' published in May 2020, which presents an example classification of the magnitude of noise impacts for the assessment of changes in traffic noise levels.

Table 2.3: Noise Level Criteria (Traffic Noise Assessment)

Effect Level	Change in Traffic Noise Levels $L_{A10\ 18hr}$ or L_{night} Short Term Assessment
Negligible	< 1.0 dB
Minor	1.0 – 2.9 dB
Moderate	3.0 – 4.9 dB
Major	≥5.0 dB

3.0 ASSESSMENT METHODOLOGY

3.1 NOISE MODELLING METHODOLOGY

Three-dimensional noise modelling has been undertaken to predict noise levels at a number of locations both horizontally and vertically. CadnaA noise modelling software has been used. This model is based on ISO 9613-2 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data and model settings as given in the table below have been used.

Table 3.1: Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	DEFRA	OS 1:25,000 contours
Building heights – around site	Tetra Tech Observations	8 m height for two storey residential properties.
Receptor positions	Tetra Tech	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties. 1.5 m height for model grid.
Proposed Plans	SGP	Drawing No. – 22136-SGP-ZZ-ZZ-DR-A-111004 Drawing Title – Parameters Plan dated 28/03/2023
Modelling Methodology	CADNAA	3D noise propagation model ISO 9613-2
Ground Absorption	Tetra Tech	G = 0.5 (Intermediate ground)
Order of Reflections	Tetra Tech	3 no.
Barrier Heights	Tetra Tech	Site hoarding 2.4m height above ground level

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case to ensure the full potential for any likely noise effects during the demolition and construction stage are captured.

3.2 MODEL INPUT DATA

3.2.1 Construction Programme

A detailed development programme has not yet been prepared. To enable assessment of likely environmental effects within the EIA, an indicative, but feasible, programme has been developed by the Applicant based on several assumptions and professional judgement.

The indicative construction phase programme is set out in Table 3.2 below. It is envisaged that the proposed development will be delivered in multiple phases over an 88-month period, with site preparation and enabling works anticipated to commence in Q3 2023, with completion anticipated in Q4 2030. The first phases of the development (detailed planning) are expected to be completed and become operational by 2028.

Table 3.2: Indicative Construction Programme

Phase	Start Date	Finish Date	Duration (months)
Site preparation & Enabling Works	Q3 2023	Q2 2027	52
Demolition Works	Q1 2024	Q2 2027	44
Highways Works (detailed component)	Q3 2023	Q2 2027	52
Development Zone - Detailed component construction works	Q2 2024	Q4 2027	48
Development Zone – Outline component construction works	Q1 2025	Q4 2030	72
Landscaping Works within Detailed & Outline Components	Q4 2026	Q4 2030	52
Total			88

3.2.2 Demolition and Construction Data

Typical source levels for items of plant identified have been taken from BS 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 1: Noise'. Calculations have been carried out using the methodology contained within the same standard.

The items of plant anticipated to be used during each of these phases, together with the associated noise levels, are presented in Table 3.3 below.

Table 3.3: Mobile Plant Noise Data

Mobile Plant	BS 5228-1:2009 Annex C Ref.	Octave Band Sound Pressure Levels (Hz)								Model Input L _{Aeq,T} dB at 10 m
		63	125	250	500	1K	2K	4K	8K	
Enabling and Demolition Works										
Tracked Excavator (44t)	Table C.1 No.12	79	81	83	79	77	75	70	62	82
Articulated Dump Truck	Table C.1 No.11	94	76	77	75	76	73	68	63	80
Dozer	Table C.2 No.1	79	77	76	74	68	67	60	59	75
Wheeled backhoe loader (8t)	Table C2 No.8	74	66	64	64	63	60	59	50	68
Hand-held hydraulic breaker (20kg/69 bar)	Table C1 No. 7	82	81	87	87	88	86	83	87	93
Lorry 4-axle wagon	Table C.2 No. 34	73	78	78	78	74	73	68	66	80
Excavation and Sub-structure Works										
Concrete mixer truck and concrete pump	Table C.4 No.28	79	80	73	72	69	68	59	53	75
Vibratory tamper	Table C.4 No.35	59	71	54	56	57	55	55	49	63
Tracked Excavator (22t)	Table C.2 No.3	80	83	76	73	72	70	69	66	78
Articulated Dump Truck	Table C4 No.1	90	87	77	79	75	73	67	63	81
Crane mounted auger	Table C3 No. 16	87	86	77	73	75	72	67	59	79
Generator for Welding	Table C.3 No. 32	75	72	67	68	70	66	62	60	73

Mobile Plant	BS 5228-1:2009 Annex C Ref.	Octave Band Sound Pressure Levels (Hz)								Model Input L _{Aeq,T} dB at 10 m
		63	125	250	500	1K	2K	4K	8K	
Construction of Superstructure										
Power for site cabins – diesel generator	Table C.4 No.76	80	74	57	54	53	48	45	36	61
Diesel generator – Power for Welder	Table C.4 No.85	69	69	67	60	59	60	56	53	66
Lorry 4-axle wagon	Table C.2 No.34	73	78	78	78	74	73	68	66	80
Cutting concrete slabs – Hand-held circular saw (petrol)	Table C4 No.72	69	75	77	74	71	70	74	69	79
Mobile telescopic crane (80t)	Table C4 No. 39	87	82	78	74	71	67	60	52	77
Gas Cutter	Table C.1 No. 18	72	72	69	72	73	72	71	71	79
External/Landscaping										
Tracked Excavator	Table C.5 No.18	76	79	75	75	76	73	70	65	80
Articulated dump truck	Table C.5 No.16	88	90	80	79	76	71	65	61	81
Asphalt paver (+ tipper lorry)	Table C.5 No.30	78	77	72	72	71	69	62	56	75
Cutting concrete slabs – Hand-held circular saw	Table C4 No.72	69	75	77	74	71	70	74	69	79
Telescopic handler	Table C4 No. 55	82	72	63	65	67	64	56	49	70

Mobile Plant	BS 5228-1:2009 Annex C Ref.	Octave Band Sound Pressure Levels (Hz)								Model Input L _{Aeq,T} dB at 10 m
		63	125	250	500	1K	2K	4K	8K	
Road roller	Table C.5 No. 19	87	85	75	73	75	73	69	63	80

3.2.3 Construction Traffic Data

All roads expected to make a significant contribution have been included within this assessment. Traffic flows and HGV percentage have been based on traffic data provided by Cora IHT transport consultants, whilst vehicle speeds have been set to the speed limit of the road. Baseline data has been provided for the Year 2023.

Road	2023 Baseline		2023 Baseline + Construction Traffic	
	AAWT 18hr	HGV %	AAWT 18hr	HGV %
A534	29826	9	30106	9
Sandy Lane	319	35	365	38
Borras Hall Lane	1325	1	1325	1
A534 Wrexham Road	6322	6	6328	6
Industrial Estate Road (North)	12935	10	13127	11
Industrial Estate Road (South)	12186	8	12378	9
Abenbury Way	4830	15	4830	15
Ash Road North	1558	26	1558	26
Bryn Lane	3220	13	3412	16
Site Access 1	0	0	0	0
Site Access 2	0	0	192	60
Bryn Lane (East)	2922	14	2922	14
Ridley Wood	2387	2	2387	2
B5130 (North)	1832	1	1832	1
B5130 (South)	999	3	999	3

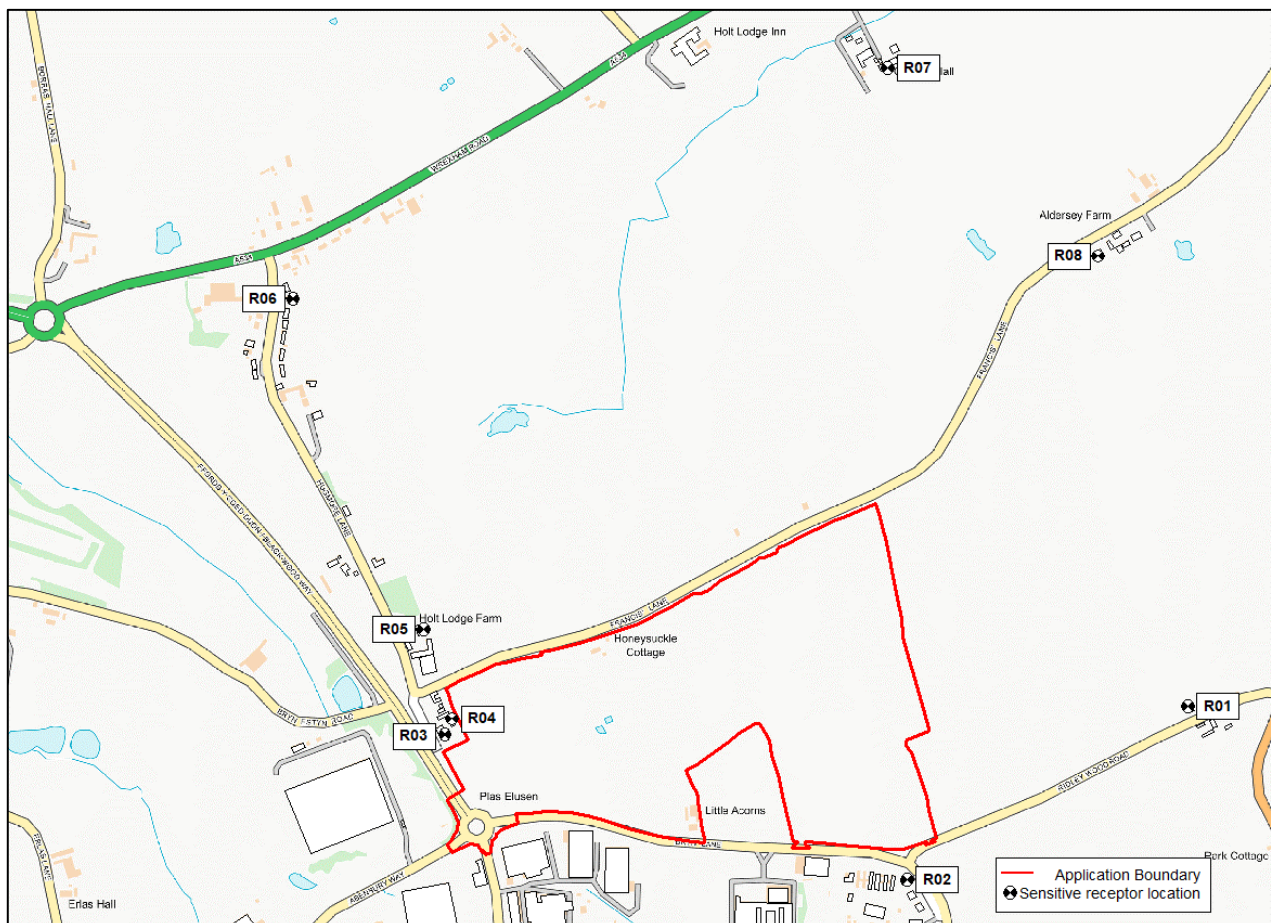
3.3 SENSITIVE RECEPTORS

Table 3.4 below summarises the existing sensitive receptor locations. The locations of the receptors are shown in Figure 3.1 below. Sensitive receptors have been identified as the nearest residential receptors to the application red line boundary and therefore, the receptors most likely to be affected by noise impacts. An impact may be experienced at other receptors, but this is likely to be equal or less than those stated below.

Table 3.4: Sensitive Receptor Locations

Ref.	Description	Use Classification	Relative Height (m AOD) Daytime / Night-time
R01	Harcourt	Residential	1.5 / 4.0
R02	2 Bryn Lane	Residential	1.5 / 4.0
R03	Spring Grove	Residential	1.5 / 4.0
R04	Ty Gwanwyn	Residential	1.5 / 4.0
R05	Holt Lodge Farm	Residential	1.5 / 4.0
R06	Ambergate	Residential	1.5 / 4.0
R07	Cornish Hall	Residential	1.5 / 4.0
R08	Aldersey Farm	Residential	1.5 / 4.0

Figure 3.1: Sensitive Residential Receptor Locations



Not to scale
OS Licence No. AL553611

4.0 ASSESSMENT OF EFFECTS

4.1 CONSTRUCTION NOISE ASSESSMENT

Noise levels from potential construction activity associated with the proposed development of the site have been assessed in accordance with BS 5228 criteria which indicates if a significant effect is likely to occur at noise sensitive properties.

This assessment has been undertaken to establish the maximum external noise levels at neighbouring properties for the construction activity anticipated in relation to the proposed development and whether noise emissions from typical plant and activities will be within these levels. To present a worst-case assessment, the model considers that all sources will be operating together for a total of 60 minutes every hour. Point sources representing all likely items of plant will be presented in the model, and in the case of mobile plant, these will be placed in worst-case locations with respect to nearby noise sensitive receptors.

Based on the implementation of Best Practicable Means (BPM) during the demolition and construction stage, as defined in Section 72 of the Control of Pollution Act 1974, the assessment has assumed 2.4m high solid site hoarding surrounding the site. Landscape bunding proposed for the completed development has not been considered as this would be completed at the end of the construction period and a worst-case assessment has been undertaken without the bunding which would provide acoustic attenuation.

Tables 4.1 – 4.4 below show predicted levels of construction noise at existing noise sensitive properties for comparison with the BS 5228-1 noise limit criteria of 70 dBA for each of the four construction phases.

For indicative purposes, the construction noise contour plots are presented in Appendix B.

Table 4.1: Construction Noise Assessment (Fixed Limits Method) - Enabling and Demolition Works

Ref	Construction Noise Level (dBA)	Criteria (dBA)	Within Recommended Fixed Noise Limit
R01	49.5	70.0	Yes
R02	58.0	70.0	Yes
R03	59.7	70.0	Yes
R04	64.9	70.0	Yes
R05	62.6	70.0	Yes
R06	47.9	70.0	Yes
R07	44.9	70.0	Yes
R08	48.3	70.0	Yes

Table 4.2: Construction Noise Assessment (Fixed Limits Method) - Excavation and Sub-structure Works

Ref	Construction Noise Level (dBA)	Criteria (dBA)	Within Recommended Fixed Noise Limit
R01	42.3	70.0	Yes
R02	54.6	70.0	Yes
R03	55.8	70.0	Yes
R04	57.8	70.0	Yes
R05	51.5	70.0	Yes
R06	40.3	70.0	Yes
R07	37.7	70.0	Yes
R08	41.0	70.0	Yes

Table 4.3: Construction Noise Assessment (Fixed Limits Method) - Construction of Superstructure

Ref	Construction Noise Level (dBA)	Criteria (dBA)	Within Recommended Fixed Noise Limit
R01	40.9	70.0	Yes
R02	51.9	70.0	Yes
R03	57.0	70.0	Yes
R04	59.3	70.0	Yes
R05	49.8	70.0	Yes
R06	39.4	70.0	Yes
R07	36.3	70.0	Yes
R08	39.6	70.0	Yes

Table 4.4: Construction Noise Assessment (Fixed Limits Method) - External/Landscaping

Ref	Construction Noise Level (dBA)	Criteria (dBA)	Within Recommended Fixed Noise Limit
R01	43.2	70.0	Yes
R02	55.9	70.0	Yes
R03	57.9	70.0	Yes
R04	61.0	70.0	Yes
R05	52.1	70.0	Yes
R06	41.6	70.0	Yes

Ref	Construction Noise Level (dBA)	Criteria (dBA)	Within Recommended Fixed Noise Limit
R07	38.7	70.0	Yes
R08	41.9	70.0	Yes

The results presented above show the predicted noise levels at each of the sensitive receptors when construction activities are modelled in worst-case locations (closest distance to receptors) for 100% on-time. Even when over-predicting the noise impact on sensitive receptors, noise levels are below the fixed limit guideline criteria in accordance with BS 5223-1.

4.2 CONSTRUCTION VIBRATION ASSESSMENT

Table 4.5 below presents the approximate distances of the closest sensitive receptors to construction activities on-site and the likely impact due to vibration effects in accordance with the criteria presented within Table 2.2 above. Demolition and construction phase works are transient and will not occur for a prolonged or continuous period of time in any one location and will move across the entire site in a phased manner in accordance with a phased plan of works.

Table 4.5: Construction Vibration Impacts

Ref.	Approximate distance from construction activities (m)	Impact
R01	500	Negligible
R02	65	Negligible
R03	40	Negligible
R04	15	Vibration from heavy vehicles and excavation may just be perceptible.
R05	120	Negligible
R06	780	Negligible
R07	840	Negligible
R08	630	Negligible

The results shown in Table 2.2 indicate that vibration may just be perceptible when construction activities are at their closest distance to receptor R04.

4.3 CONSTRUCTION TRAFFIC NOISE ASSESSMENT

Based on the traffic data provided by Cora IHT transport consultants, A DMRB assessment was conducted to compare the different scenarios given to determine the change in road traffic noise levels resulting from construction traffic. Table 4.6 below presents the results of change in noise level from the baseline versus baseline + construction traffic flow.

Table 4.6: Difference in Traffic Noise (Short-Term Assessment)

Receptor Location	2023 Baseline Noise Level $L_{A10,18hr}$ (dB)	2023 Baseline + Construction Traffic Noise Level $L_{A10,18hr}$ (dB)	Change between 2023 Baseline and 2023 Baseline + Construction Traffic Noise Level (dB)
R01	44.4	44.6	0.2
R02	61.6	61.8	0.2
R03	63.1	63.4	0.3
R04	48.1	48.6	0.5
R05	45.4	45.7	0.3
R06	53.2	53.3	0.1
R07	41.4	41.7	0.3
R08	44.1	44.2	0.1

When the differences of the above scenario are compared against the noise change criteria presented in Table 2.1 of this report, the short-term change in noise levels due to construction traffic from the proposed development is predicted to be less than 1 dB and therefore 'negligible' significance at all existing sensitive receptors.

5.0 MITIGATION

The assessments presented above are inclusive of site hoarding at a height of 2.4m above ground level. In addition, other Best Practicable Means (BPM) as defined in Section 72 of the Control of Pollution Act 1974 will be employed to keep the level of noise and vibration generated on site as low as practicable. Measures to be considered in implementing BPM will be consistent with the recommendations of BS 5228-1 and BS 5228-2 and will include but not be limited to:

- Careful programming to ensure activities which may generate noise and vibration are planned well in advance and sensitive receptors are notified of the works.
- Identification and use of low noise techniques. For example, equipment that breaks concrete by munching or similar, rather than by percussion. Where construction plant is known to generate significant levels of noise than it is to be used sparingly and the construction activity monitored to minimise noise levels.
- All plant brought onto site should comply with the relevant EC/UK noise limits applicable to that equipment or should be no noisier than would be expected based on the noise levels quoted in BS 5228-1. Plant should be properly maintained and operated in accordance with manufacturers' recommendations.
- Where feasible, all stationary plant should be located so that the noise at all occupied sensitive receptors is minimised and, if practicable, every item of static plant when in operation should be sound attenuated using methods based on the guidance and advice given in BS 5228-1 (e.g., local screening).
- Items of plant on the site operating intermittently should be shut down in the intervening periods between use.
- Adoption of a noise monitoring regime and the establishment of noise Action Levels in consultation with Wrexham Borough Council, above which consideration would be given to the use of alternative techniques and/or other means of controlling noise levels.
- Use of hoarding to the required height and density appropriate to the noise sensitivity of the site and;
- Implementation of a Construction Logistics Plan (CLP) to pre-plan and manage traffic associated with the works to minimise disturbance to sensitive receptors. The CLP would include aspects such as operation of a 'Just in Time' policy for the delivery and supply of materials for the work to minimise the disruption to the local community.

These measures will be included within a Construction Environmental Management Plan (CEMP) which will be secured through an appropriately worded planning condition.

6.0 CONCLUSIONS

This report presents the findings of a construction noise and vibration assessment to accompany a planning application for a proposed industrial/commercial development at Land North of Bryn Lane, Wrexham.

The results indicate that the noise levels at the façades of the existing noise sensitive properties are within criterion in accordance with BS 5228-1.

Vibration levels at the closest sensitive receptor are likely to be 'just perceptible' when vibration creating construction activities are in close proximity to the property. Therefore, the mitigation measures outlined in Section 6.0 will ensure vibration levels are controlled within an acceptable level.

Changes in noise levels due to construction traffic have been assessed in accordance with guidelines provided in DRMB, and construction traffic noise impacts are predicted to be of 'negligible' significance.

Demolition and construction phase works are transient and will not occur for a prolonged or continuous period of time in any one location and will move across the entire site in a phased manner in accordance with a phased plan of works. Best Practicable Means will be implemented during the demolition and construction works to keep the level of noise and vibration generated on site as low as practicable and minimise any potential impacts to the sensitive receptors whilst works are ongoing. These measures will be included within a Construction Environmental Management Plan (CEMP) which will be secured via an appropriately worded planning condition.

APPENDICES

APPENDIX A – ACOUSTIC TERMINOLOGY AND ABBREVIATIONS

Acoustic Terminology

- dB** Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.
- dB(A)** Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.
- L_{Aeq}** Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq, 07:00 - 23:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower than the $L_{Aeq, 07:00 - 23:00}$.
- L_{Amin}** The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.
- L_{Amax}** The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.
- L_n** Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say, 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10, 1 hr} = x$ dB.
- The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90} , the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.
- R_w** The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Abbreviations

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

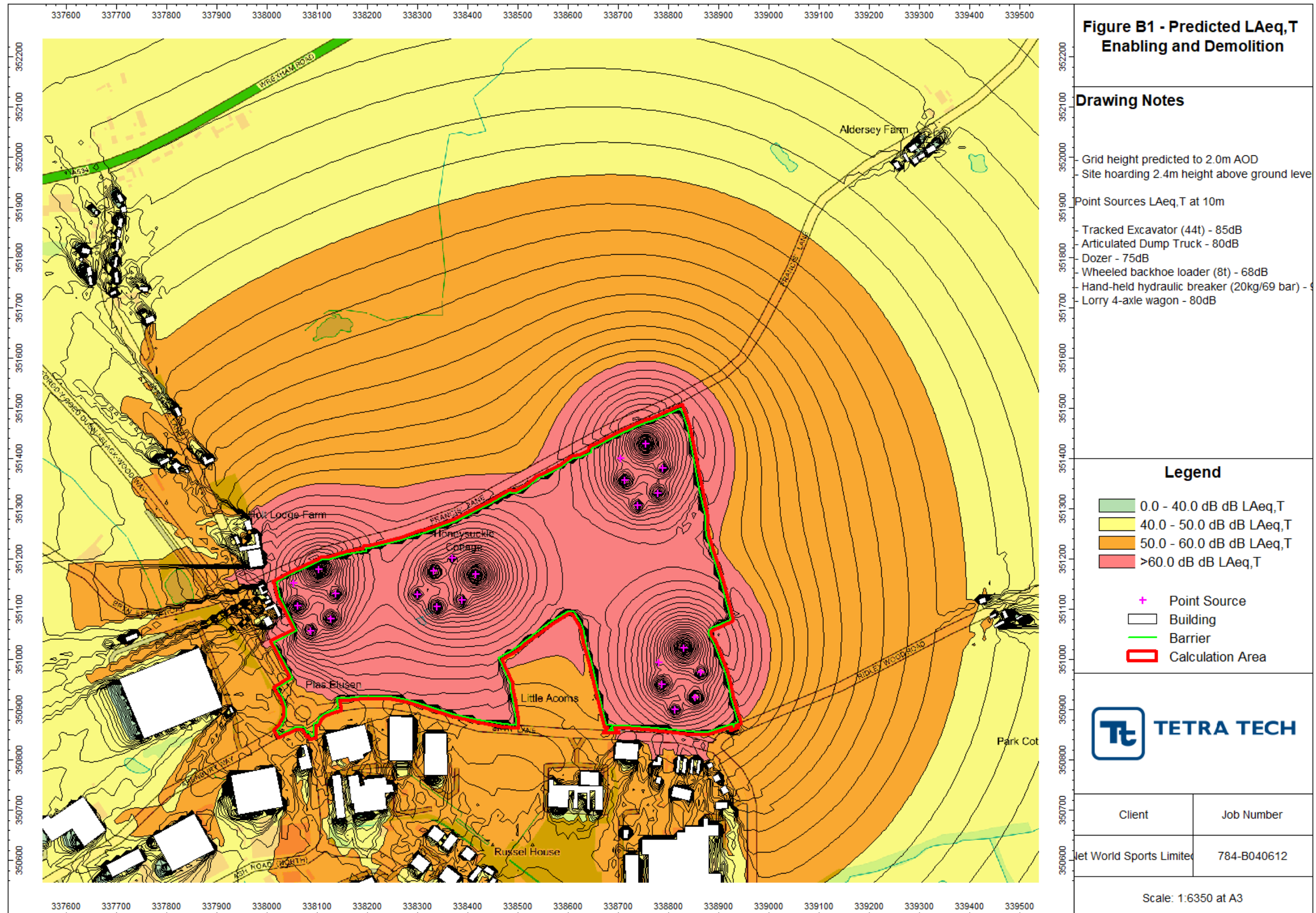
HGV – Heavy Goods Vehicle

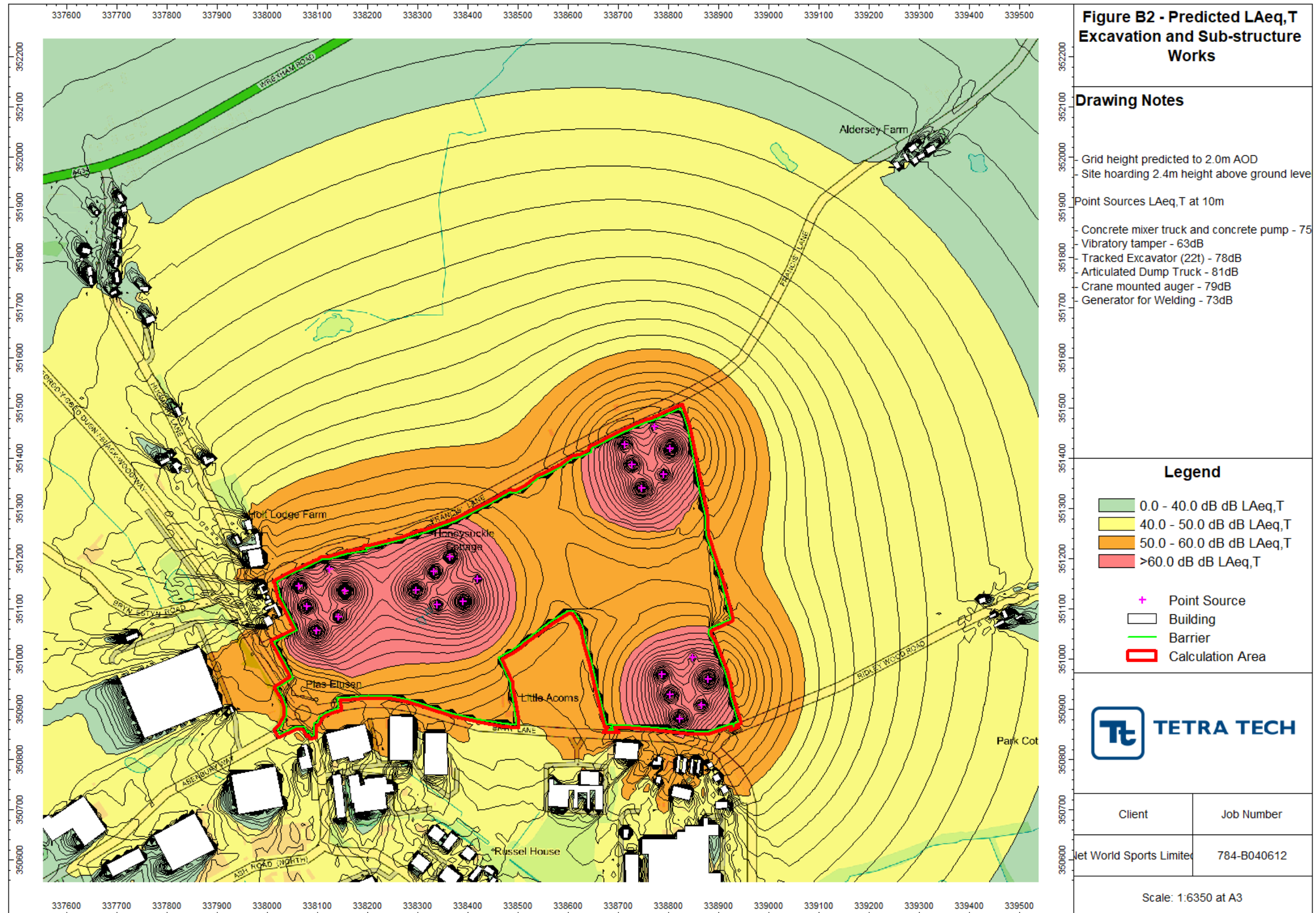
PPG – Planning Practice Guidance

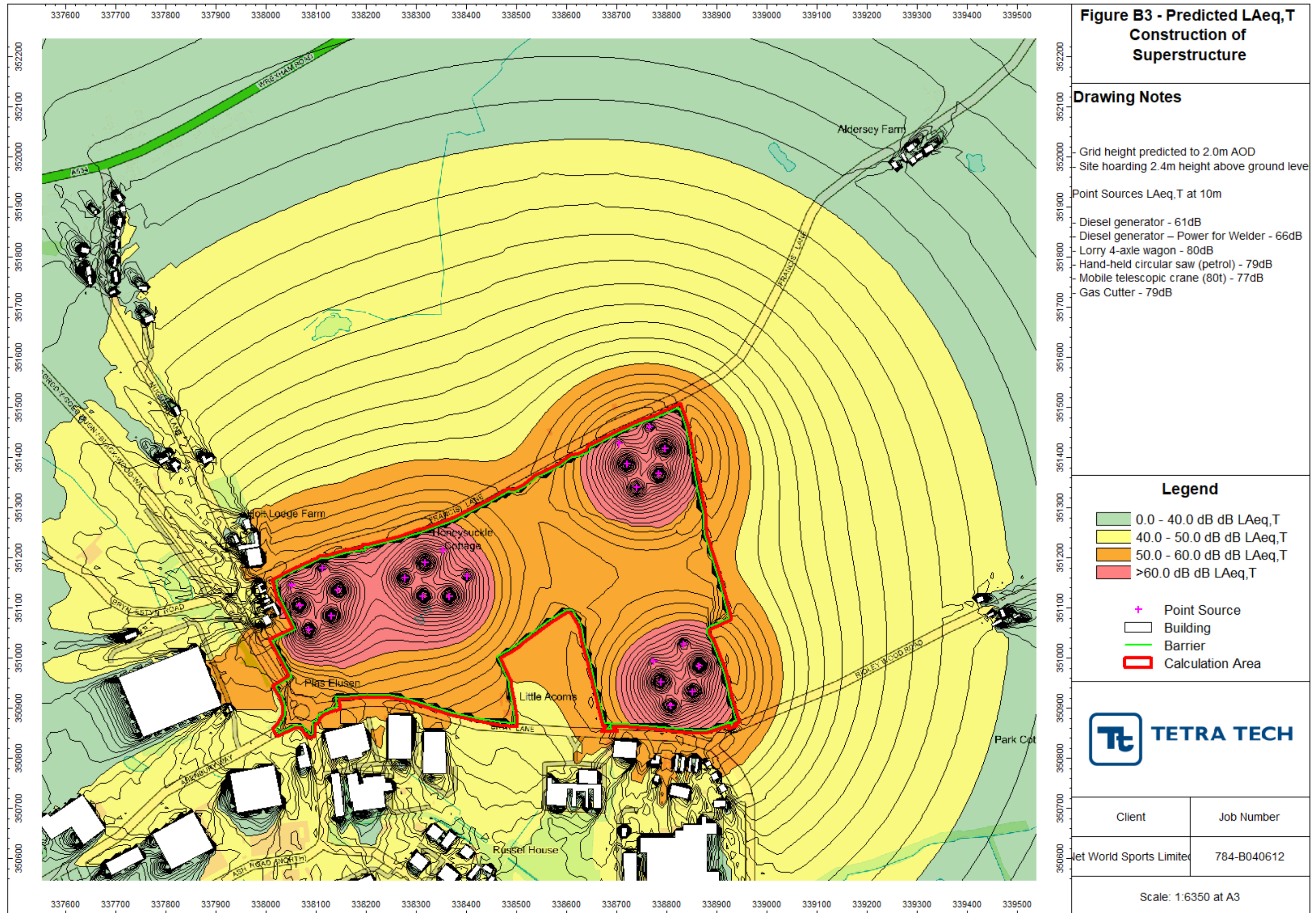
UDP – Unitary Development Plan

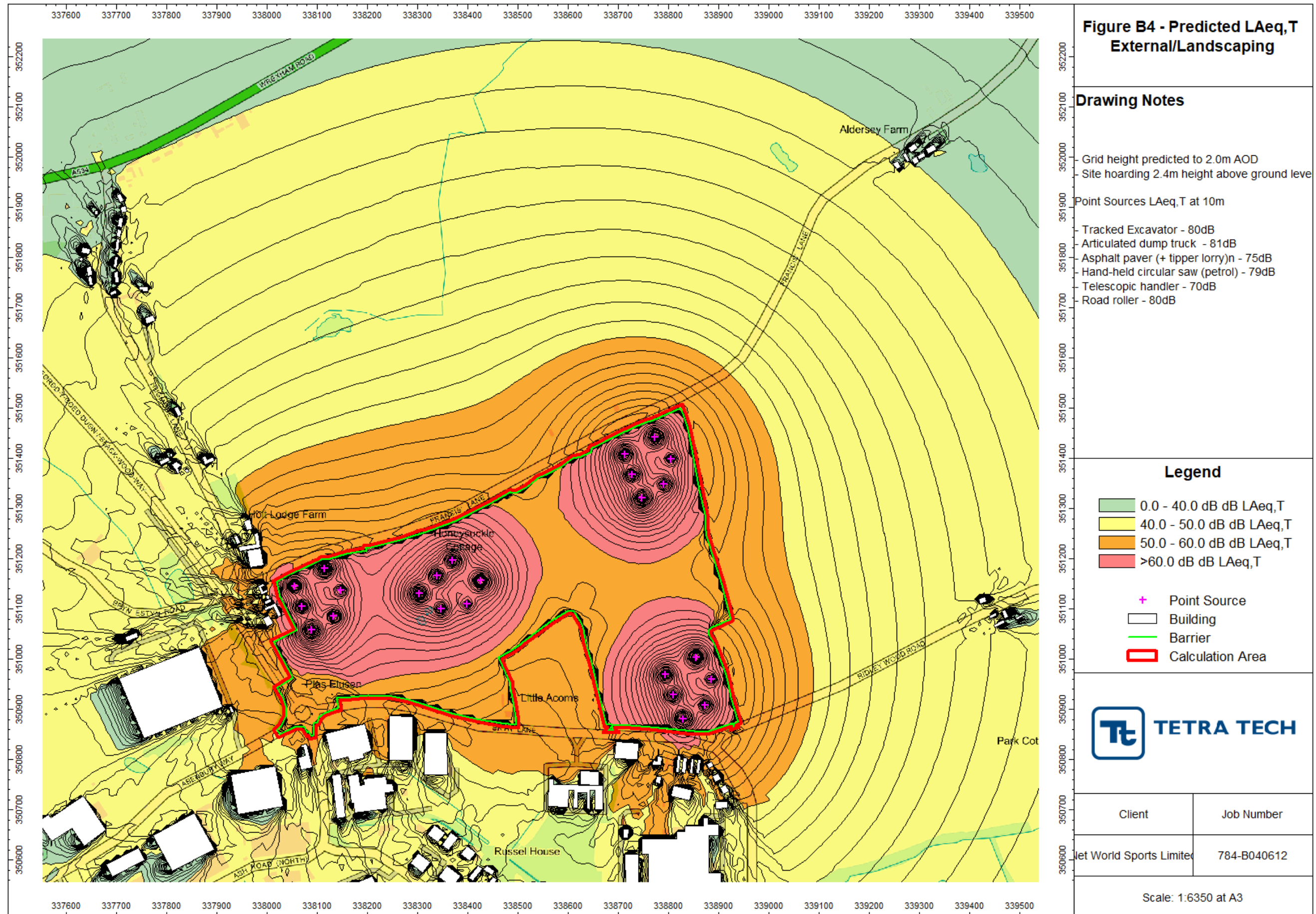
UKAS – United Kingdom Accreditation Service

APPENDIX B – NOISE CONTOUR PLOTS









APPENDIX D – REPORT CONDITIONS

This Report has been prepared using reasonable skill and care for the sole benefit of Net World Sports Limited (“the Client”) for the proposed uses stated in the report by [Tetra Tech Limited] (“Tetra Tech”). Tetra Tech exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder’s permission.

No liability is accepted, or warranty given for; unconfirmed data, third party documents and information supplied to Tetra Tech or for the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report. Tetra Tech does not purport to provide specialist legal, tax or accounting advice.

The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary, and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The “shelf life” of the Report will be determined by a number of factors including; its original purpose, the Client’s instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accept no liability for issues with performance arising from such factors.