Polyethylene Terephthalate Plastics Recycling Facility (PETPRF) Noise & Vibration Management Plan

Client: Enviroo Project Company Ltd

Ref No.: K0419-AYE-R-ENV-00006
Date: January 2026

Document control

Revision	Revision/ Review Date	Details of Issue	Authorised		
			Prepared By	Checked By	Approved By
00	July 2024	Draft Issued	C Finney	J Baxter	J Baxter
01	November 2025	Final Issued	C Heward	J Baxter	J Baxter
02	January 2026	Final Issued	E Greenhalgh	J Baxter	J Baxter

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Revision List

Revision number / Report Reference	Revision authorised by	Date submitted to Environment Agency	Revision owner

Content

Appendices

[1] Introduction

[1.1] Report Objectives

This Noise and Vibration Management Plan (NVMP) supports an application by Enviroo Project Company Limited (Enviroo) for a Plastic Recycling Facility (PRF).

This NVMP will form part of the Operating Techniques to control and manage noise and vibration and presents the potential noise emissions, pathways and receptors sensitive to noise. Section 6 contains noise and vibration controls, and section 7 provides community engagement, reporting and contingency measures.

[1.2] Responsibility for implementation

The Chief Operating Officer (COO) and General Manager are responsible for the NVMP and ensuring staff are suitability trained in the content of the NVMP. A copy of this NVMP will be included in the Site Management System held at the site office and all members of staff will have access to this document.

All staff to be employed on site would be given training and instruction on implementing the NVMP. Training will be part of the initial induction process and reviewed annually.

[1.3] Site Location

The site is located at Plot 13 of Protos Plastic Park part of the wider Protos Recovery Park located at Ince Marshes. The recovery park covers an area of approximately 54 hectares with various waste and energy industries occupying plots. Adjacent plots comprise a glass bottle manufacturing plant, resource recovery facility and biomass facility. The plastic park will comprise various plastic recycling and recovery facilities and a plastic to hydrogen facility.

The site occupies an area of approximately 2.3 hectares and is located approximately 1.6km east of the town of Ince, and 1.1km northeast to the town of Elton, within a mixed industrial and semi-rural setting. The site address is Enviroo Project Co., Marsh Lane, Ince, CH2 4FP at approximate National Grid Reference 346508 376458.

The site lies at circa 8m AOD. There is a fall from west to east with the western boundary at approximately 9m AOD and the eastern boundary at 4.5m AOD. The northern boundary is formed by Marsh Lane, to the northwest is Protos Plot 10b and to the south a restricted byway (public right of way), which runs adjacent to Grinsome Road. The eastern boundary is located approximately 20m from the restricted byway which links to Marsh Lane to the northeast of the site.

[1.4] Site Layout

Access is via Marsh Lane to the north of the site. The PRF will comprise a portal framed modular build warehouse building with a pitched roof approximately 170 m in length, 45 m in width and at its highest point will be 17.45 m (PRF building).

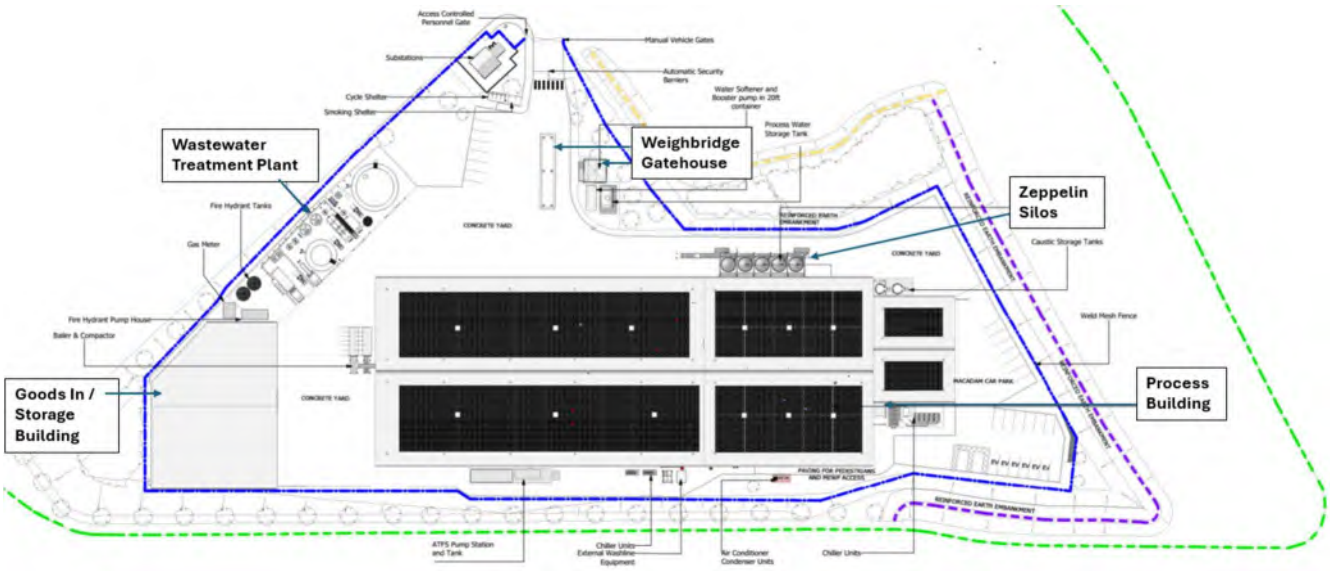
The PRF building will have five vehicular access doors, two on the northern aspect, one on the southern aspect and two on the western aspect to allow delivery of waste plastic and the export of rPET and waste materials. The site layout is shown on drawing reference 250064-WDK-XX-XX-D-A-0400 entitled Proposed Site Plan dated 21 May 2025. A feedstock area is to be located in a separate goods in / storage building to the west of the PRF building.

A weighbridge and gatehouse will be located adjacent to the entrance to the north and off Marsh Lane.

To the northwest of the site will be the Wastewater Treatment Plant (WwTP).

An extract of the site layout is provided below at Figure 1.

Figure 1 Site Layout Extract



[2] Scope of the Activities

[2.1] Operational Overview

[2.1.1] Proposed Activities

Enviroo propose to accept up to 35,000 tonnes per annum of plastic bales for processing comprising sorting, shredding, grinding, heating, washing and drying to create a plastic pellet product which meets end of waste criteria specifically food grade recycled Polyethylene terephthalate (rPET) for the plastic manufacturing sector. Annual production of recycled plastic pellets is estimated at 17,500 tonnes. All activities will be confined within a portal framed modular build warehouse with air extraction and treatment.

The plastic bales will be from waste management companies who have accepted the material from household waste recycling collections. The material will be subject to sorting, either at source or at the site.

The recycling process involves the following main processes:

- Delivery of baled plastic.
- Screening and de-labelling.
- Sorting and segregation.

- Reduction in size of plastic waste and washing.
- Flaking of PET material and drying.
- Extrusion involving blending and heating of flakes to create a PET product.

The treatment process produces a large amount of process water, which will be reused were possible. A portion of process water however will require treatment prior to discharge to surface water.

On-site noise sources associated with the activities are discussed in section 3.1.1.

[3] Potential Emissions

[3.1] Noise and Vibration

[3.1.1] On-Site Sources

The proposed activities associated with the PRF that have the potential to produce noise and vibration emissions are:

- Vehicle movements to, from and within the site.
- Process and goods in building.
- Operation of recycling process comprising the following:
  - Screening and de-labelling.
  - Sorting and segregation.
  - Reduction in size of plastic waste and washing.
  - Flaking of PET material and drying.
  - Extrusion involving blending and heating of flakes to create a PET product.
- Air extraction system.
- Water treatment system.

Noise prediction modelling was undertaken using computer-based modelling software CadnaA in accordance with ISO9613-2 to predict noise associated with the proposed activities.

Baseline sound levels were undertaken by Enzygo in November 2018 at the receptors. The baseline levels reported at the receptors varied between 36.7 to 45.2 dB LA90 at night and 42.5 and 52.9 dB LA90 during the day.

The PRF reported the following noises in the NIA based in the technology provider:

- Process Building reverberant sound pressure level (SPL): 85dB LAeq

- Goods In Building reverberant SPL: 80dB LAeq
- Waste Water Treatment Plant:
  - Pumps (5): 70dB LAeq @ 1m
  - Blowers (2): 73dB LAeq @ 1m
  - DAF1 & DAF2: 85dB LAeq @ 1m
  - Mixer: 70dB LAeq @ 1m
  - Sludge thickening plant): 60dB LAeq @ 1m
- Sub-station: Inside sub-station reverberant SPL 65dB LAeq.
- Compactor: 86dB LAeq @ 1m
- Process Water Pumps: 75dB LAeq @ 1m
- Caustic Soda Tank Pumps: 85dB LAeq @ 1m
- Air conditioning plant: 82dB LAeq @ 1m
- Chiller Units: 62dB LAeq @ 10m (southern façade)
- Chiller Units: 67dB LAeq @ 10m (eastern façade)
- Zeppelin Silo conveyor: 92dB LAeq @ 10m
- Booster Pump container: 75dB LAeq @ 1m
- Pump Station: 80dB LAeq @ 1m.

[3.1.1.1] Proposed mitigation measures

The process and goods in facility will be fitted within a purpose-built building having cladding to a minimum weighted sound reduction index Rw of 24dB.

The grinder used to flake the recycling plastic will be mounted within an acoustically treated enclosure.

Acoustic screen mounted on two sides of the two DAF units to 4m height located on southern and western side of plant. Screen having a minimum mass of 13kg/m^2 and an acoustic absorbent inside face (towards the plant) e.g. Tilon (TENB45A) or similar.

Acoustic screen mounted around the two sides of the compactor/bailer units to 5m height located on southern and western side of plant. Screen having a minimum mass of 13kg/m^2 and an acoustic absorbent inside face (towards the plant) e.g. Tilon (TENB45A) or similar.

[3.1.2] Off-Site Sources

The site is located at Plot 13 of Protos Plastic Park part of the wider Protos Recovery Park. This covers an area of approximately 54 hectares with various waste and energy industries occupying plots. Adjacent plots comprise a glass bottle manufacturing plant, resource recovery facility and biomass facility. The plastic park will comprise various plastic recycling and recovery facilities and a plastic to hydrogen facility.

The industrial / commercial facilities and the roads surrounding the site have the potential for generating noise.

[4] Potential Receptors and Pathways

[4.1] Receptor Locations

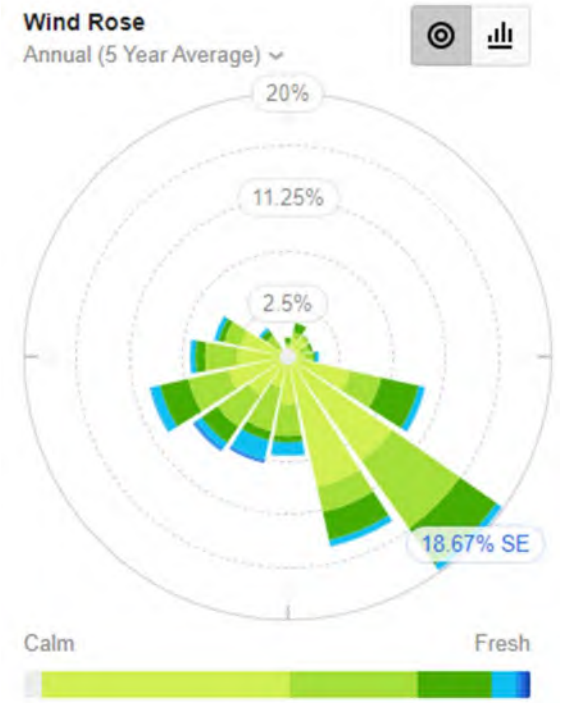
When choosing the receptors, the closest or the most sensitive (if different from the closest) have been considered in each direction from the hazard. Account has been taken of the mechanism of transport to the sensitive receptor e.g. wind direction or a physical connection to the site. The probability of exposure is determined by the distance of the receptor to the site and the likelihood of the hazard reaching the receptor. This stage of the assessment assumes that exposure has resulted from an uncontrolled emission i.e. without mitigation.

Meteorological data from Ince and is expected to provide representative meteorological data for the area has been used to determine the prevailing wind direction which is from the southeast as shown at Figure 2. The percentage the wind blows from each direction is presented in Table 1 below.

Table 1 Wind Direction Data Ince (5-year average)

Wind direction	5-year average percentage	Wind direction	5-year average percentage
North	1.36%	South	7.09%
North-northeast	2.47%	South-southwest	7.80%
Northeast	1.89%	Southwest	8.27%
East-northeast	1.83%	West-southwest	10.09%
East	2.22%	West	6.99%
East south-east	10.04%	West-northwest	5.39%
Southeast	18.67%	Northwest	2.52%
South-southeast	13.90%	North northwest	0.00%

Figure 2 Windrose from Ince



The nearest sensitive receptors and the distance of these receptors to the site boundary and their direction relative to the site are detailed in Table 2.

Table 2 Potential Sensitive Receptors within 1km

No.	Receptor Description	Receptor Type	Direction from Site	Distance from Site (m)	Frequency Downwind (%)
1	Protos Ince Marsh Recovery Park Industrial Estate Adjacent plots. Including Standardkessel Baumgarte GmbH, Ince Park Renewables, Ince Park Biomass Energy Plant, CF Fertilisers UK.	Industrial / Commercial / Road	NW to ESE	10	5.39 to 18.67
2	Ince Marshes/Goldfinch Meadow	Surface Water / Recreational / Footpath	WNW to E	10	6.99 to 18.67
3	Farmland	Industrial / Commercial	NE to SE	220 to 535	2.52 to 10.09
4	Encirc Glass	Surface Water / Commercial / Industrial	S to WNW	230	1.36 to 10.04
5	Railway/Ince and Elton Train Station	Commercial / Recreational	SE to SW	630	1.35 to 2.52
6	Residential properties located off Orchard Park Lane/Ash Road	Residential / Recreational / Road	S to SW	750	1.36 to 2.47
7	Holme Farm/JH Willis & Son	Industrial / Commercial / Surface Water	NW	785	18.67

No.	Receptor Description	Receptor Type	Direction from Site	Distance from Site (m)	Frequency Downwind (%)
8	Manchester Ship Canal	Industrial / Commercial / Recreational / Surface Water	N to NNE	795	7.09 to 7.8
9	Waste Water Pumping Station	Industrial / Commercial	SSW	880	2.47
10	Mersey Estuary (Ramsar/SSSI/SPA)	Surface Water and sensitive habitat	N	880	7.09
11	Hoolpool Gutter	Surface Water	ENE to E	980	6.99 to 10.09
12	Surface water drainage network – Protos SWMP	Surface Water and sensitive habitats	E, N and S	10	1.36 to 7.09
13	Protos Habitat Mitigation Scheme	Sensitive habitats	W to E	100	2.22 to 18.67
14	On-site priority habitat – Woodland Management Plan	Sensitive Habitat	On-site – N	On-site	7.09
15	Marsh Lane	Road	NE to W	10	1.36 to 10.09
16	Ash Road	Road	SW	100	1.89
17	Residential Properties off Station Road / Ince Orchards	Residential	SW	990	1.89

[4.2] Receptor Types

[4.2.1] Residential, recreational, industrial, commercial and educational premises

The potential noise emissions from the site may impact on persons occupying residential, industrial and commercial premises. Although, exposure to emissions for persons at industrial or commercial premises is likely to be lower as they are more likely to be inside during the working day or they may be transient visitors to the premises. Certain industrial premises may also generate emissions similar to or greater than the PRF. The PRF is to be located adjacent various industrial premises including plastic recycling and recovery facilities and a plastic to hydrogen facility all of which will generate noise and vibration emissions.

Residential receptors are limited to properties located off Orchard Park Lane / Ash Road and properties off Station Road / Ince Orchards which are over 500m from the PRF. The closest residential areas are on Orchard Park Lane / Ash Road with approximately 750 m from the PRF.

[4.2.2] Highways and footpaths

The transitory nature of highways means receptors using those locations will be exposed to potential emissions for short (albeit variable) periods of time. Pedestrians will have longer and more direct exposure to emissions compared to vehicle users. Marsh and Pool Lane run adjacent to the north and south boundary of the site respectively and form the main access roads to the Resource Recovery Park.

[4.2.3] Habitats

The potential noise emissions from the site may impact on wildlife occupying Local Wildlife Sites (LWS), Local Nature Reserves (LNR) and Priority Habitats.

Frodsham and Helsby and Ince Marshes LWS is located adjacent to the north boundary of the site.
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Extensive habitat protection work has been completed in support of the planning process and is summarised in Section 2.5 of application document K0419-AYE-R-ENV-0002. This work identified the habitat and LWS is directly affected by the development of the land as part of the wider Protos Ince Marsh Recovery Park. It also identified that compensatory habitat has been provided as part of the planning conditions. RSK prepared a Habitat Creation and Management Plan (HCMP) for a circa 49ha mitigation area associated with the development of the Ince Park at Ince Marshes (Report Ref: P660444/03/11/01 Rev 15 dated July 2021). The compensatory habitat area will be approximately 100 m to the west of the site at its closest point. The compensatory area was selected to provide a suitable habitat that would not be adversely impacted by the proposed activities.

Consequently, it is considered that: the low levels of operation noise and vibration (Section 5); in combination with the operational controls; physical barriers; low level of receptor noise sensitivity and distance to the compensatory habitat will prevent any impact from noise and vibration emissions.

The Habitats Regulations Assessment and Ecological Risk Assessment provided at Appendix A of application document K0419-AYE-R-ENV-0002 concludes that there is no likely significant effects from the proposed PRF.

[5] Noise Risk Assessment

A Noise Impact Assessment (NIA) was undertaken by Noise and Vibration Consultants Ltd on 16th December 2025 (Report Ref: R20.1001/DRK). A copy is provided at Appendix B.

The NIA was undertaken in accordance with the following British Standards:

- BS4142: 2014+A1: 2019 'Methods for rating and assessing industrial and commercial sound'.
- BS5228-1: 2009+A1: 2014 'Code of practice for noise and vibration control on construction and open sites'.
- World Health Organisation (WHO) Guidelines for Community Noise: April 1999.
- BS8233: 2014 'Guidance in sound insulation and noise reduction for buildings'.

The aim of the NIA was to provide information and advice on the following:

- Typical operating noise levels from the sites plant based on information from the Technology Providers.
- Typical background and residual sound levels at nearest sensitive receptors from noise monitoring data undertaken in November 2018 by Enzygo Environmental Consultants.
- Construction noise levels to demonstrate compliance with Condition 23 of existing planning permission for the Proposed Development (ref. 20/04396/FUL).
- Advise of any operations that are shown to exceed the appropriate and relevant noise criteria and where appropriate provide recommendations.

The sources of noise and vibration associated with the site are discussed in Section 3.1.1.

The results of the survey and analysis have shown the following:

- The predicted noise contribution from the application site using ISO9613-2 methodology and CadnaA noise modelling software shows noise levels from site at residential receptors to range between 28dB and 36dB LAeq during maximum site operations.

- Based on measured background sound levels provided by Enzygo (for a recent planning application for Plot 4 on the Protos Site), noise levels at the nearest NSRs are shown to produce a low impact and therefore acceptable according to BS4142: 2014+A1:2019. Site rating noise levels were shown to be between 5dB and 19dB lower than background sound levels and therefore not significant.

- Predicted noise levels are well within the existing planning consent noise condition limits set out in condition 25 of the Proposed Development. Noise levels are between 2dB and 20dB lower at nearest receptors than the condition limits and are therefore not significant in terms of contribution.

- In terms of predicted absolute noise levels, these are shown to be well below sleep disturbance criteria according to WHO guidelines where external levels should be below 40dB LAeq8hrs and well below internal room design criteria according to BS8233: 2014 within a living room or bedroom with the window open (i.e. 30dB LAeq,8hrs).

- The assessment therefore concludes that operating the site would be acceptable and within all relevant guidance and standards for noise.

- The assessment concluded that the proposed operation of the site would generate noise levels well within relevant noise standards, guidance and existing planning consent noise condition limits at nearest noise sensitive receptors and therefore noise would be not significant.

[6] Noise and Vibration Controls

[6.1] Planning Controls

Noise limits are applied in condition 25 of the Planning Permission 20/04396/FUL dated 12 May 2021. The condition states:

All operational noise emissions from the facility shall be controlled using individual plot boundary noise emissions limits to provide overall compliance with the following noise control objectives:

Table 3 Noise Limits

Noise sensitive receptor locations	Daytime noise levels Laeq(1hour) 0700 - 2300	Nighttime noise levels Laeq(5mins) 2300 - 0700
Holme Farm	52	41
Station Road - North of Kemira Road	48	41
Duke of Wellington	40	35
Ince Orchards	45	41
Redwoods Drive, Elton	51	37

Reason: To limit the impact on the residential and local amenity and in the interest of protecting local amenity and to protect future amenity of other Plots.

[6.2] PRF Controls

As part of the site development and operation, the following measures are in place to minimise noise and vibration from the site:

- All mobile plant on site will be electric.
- The PRF will be fitted within a purpose-built building having cladding to a minimum weighted sound reduction index Rw of 24dB.
- Grinder used to flake the recycling plastic will be mounted within an acoustically treated enclosure.
- All plant and equipment are to be properly serviced, maintained, and operated in accordance with the manufactures' instructions to ensure that the occurrence of malfunctions which can give rise to elevated noise levels is reduced and any malfunctions that do occur are swiftly repaired.
- The PRF process equipment is to be controlled by a supervisory control and data acquisition (SCADA) control system which provides alarm history and alarm configurations to inform maintenance and repairs of the equipment were identified and required.
- All reasonable steps will be taken to limit the amount of vehicle queuing or waiting to enter / exit the site, this will be achieved through pre-acceptance procedures and acceptance procedures at the weighbridge.
- Vehicle noise will be kept as low as possible (e.g. excessive revving of vehicles will not be permitted).
- Appointment of a site contact to whom complaints or queries about operational activities can be directed. Any complaints to be investigated and action taken where appropriate (see Section 7.3).

Additional controls are in place for vehicles. Vehicles arriving or exiting the site or drivers of mobile plant are required to consider the following general management procedures based on guidance within the 'quiet deliveries demonstration scheme':

- Consideration to noise and the neighbours is shown as you approach the site and manoeuvring in the site.
- The vehicle horn is not to be used to alert the site on your arrival/waiting at the entrance.
- Wherever practicable avoid reversing of vehicles.
- Engines are switched off when not manoeuvring.
- Radios are switched off and doors not slammed when alighting the cab.
- Load retaining straps/bars/chains are carefully restrained or placed in stowage points and not allowed to drop onto the floor.

- Minimise excessive air braking noise.
- Switch off engines for prolonged stops but minimize unnecessary start-ups and engine revving. Start-up plant and vehicles sequentially rather than simultaneously.
- Always unload in the designated feedstock area, unless instructed by the site management to do otherwise.
- Report any circumstances to management where adherence to these instructions cannot be fulfilled.
- Where front loaders are being used to move waste, drivers instructed to avoid unnecessary scraping, `rattling' or `banging' of loading bucket to minimise impact noise.

[7] Community Engagement, Reporting and Contingencies

[7.1] Overview

Prevention will be viewed as the most effective means of controlling noise and vibration before an impact occurs. The Source → Pathway → Receptor model determined above allows for the identification of the critical control points where noise and vibration can arise, how it can travel to a receptor and the likely impact.

The performance of a NVMP will ultimately be judged by the impact of the site on the receptors. Should complaints be received, a procedure will be in place to effectively deal with the issue in a sensitive, efficient and auditable manner.

The controls are detailed in previous sections of this report. The management of those controls will be based on the on-going monitoring regime on site. The monitoring regime can work as an early warning system against potential problems (e.g. meteorological monitoring) or a diagnostic tool to establish the cause of a noise or vibration event (e.g. perimeter monitoring).

[7.2] Noise Monitoring

This section provides the procedures, instrumentation and specification for undertaking noise monitoring where required.

Noise monitoring may be undertaken where the following occur:

- Complaints are received for noise and vibration emission.
- Emissions limits in the NIA are exceeded.
- Introduction of new plant or activities that could create more emissions.
- New receptors around the site are developed therefore changing the site setting.

Noise monitoring will be undertaken following the methodology detailed in this section.

[7.2.1] Noise Monitoring Instrumentation

Ambient noise levels would be monitored using an integrating-averaging sound level meter (SLM) or equivalent system of BS EN 61672-1 & 2 (or the equivalent UK adopted standard in force at the time of the monitoring). This would be set to monitor using the fast time weighted response as specified in BS EN 61672-1 & 2 (or the equivalent UK adopted standard in force at the time of the monitoring).

The SLM would be field calibrated before and at the end of each survey by applying the acoustic calibrator or pistonphone conforming to Type 1 of the current versions of BS EN 60942 (Electroacoustics – Sound Calibrators) or any subsequent update, to the microphone to check the sensitivity of the measuring equipment. Any drift in calibration levels would be noted and survey repeated where necessary in the event that the drift was outside of acceptable tolerances.

The equipment used for the noise monitoring should also have undergone more extensive independent laboratory test of performance within 2-year period as specified in BS EN 61672 (Electroacoustics. Sound level meters - Pattern evaluation tests) or any subsequent update, although 1 ear is advisable for acoustic calibrators.

Monitoring of meteorological parameters (including wind speed and direction) should be made by the use of a handheld anemometer or a site based meteorological station if available.

[7.2.2] Noise Survey Specification

If noise monitoring is required would only be undertaken by suitably experienced or qualified personnel.

The microphone height would be between 1.2 m and 1.5 m above ground level. To minimise the influence of reflections the microphone position would be at least 3.5 m from any reflecting surface other than the ground. In the event of monitoring having to be made within 3.5 m of reflecting facades, a correction of 3 dB would be made to all results to convert them to free-field levels.

To minimise the influence of extraneous sources of physical interference on monitored noise levels, the following would be adopted:

- Providing a suitable foam windshield is fitted to the microphone, monitoring would only be undertaken when wind speeds were below 5ms-^{1};
- No monitoring would be undertaken during periods of heavy precipitation; and
- No monitoring would be undertaken immediately adjacent to sources of electrical interference such as overhead power cables or radio transmitters.

At each monitoring location identified as requiring monitoring, noise levels would be measured in sample periods of not less than 15 minutes during the daytime. Sufficient sample periods would be accumulated to determine the site attributable LAeq, other additional noise parameters would also be simultaneously measured in order to more accurately define the acoustic environment. These would include LA90, LA10, T and LAFmax.

As part of any monitoring schedule, a note of the prevailing weather conditions during the monitoring period would be made. This would include details such as wind speed, wind direction, estimate of cloud cover, presence of precipitation or fog and details of any other factors such as conditions likely to lead to a temperature inversion.

A note of the type of instrumentation used for the surveys would be made including manufactures model and serial number and any calibration details.

Observations would be made regarding the audibility of the site and the items of plant operating at the time of the surveys. A detailed log of any extraneous events affecting noise levels would also be made. Any use of the 'pause' feature on the SLM to limit the influence of extraneous noise events on the monitoring results would be recorded.

[7.2.3] Noise Limit Criteria

The Noise Limit Criteria for occupational exposure monitoring in close proximity to working plant is 85 dBA.

Noise limits are applied within a Planning Permission for the site.

All operational noise emissions from the site shall be controlled using individual plot boundary noise emissions limits to provide overall compliance with the noise limits specified in Table 3.

[7.2.4] Noise Limit Criteria Exceedance Reaction Process

In the unlikely event that unacceptable noise emissions arise from the site, as indicated by a noise complaint, one or more of the following remedial actions will be undertaken:

- An investigation will be undertaken to identify the operations and/or plant that is causing the unacceptable noise emission;
- Operations identified as generating unacceptable noise will be reduced or suspended until effective remedial actions have been taken to limit the noise emissions from the site;
- Additional noise monitoring will be undertaken to determine whether the noise levels are exceeding the noise limit criteria;
- On site vehicle movement routes may be reconsidered with regard to location (i.e. relocating further from the receptor at risk), speed limits may be further reduced,
- Additional inspection of vehicles may be undertaken to ensure that all vehicular noise and vibration controls are being applied;
- Waste handling procedures may be altered to further limit placement to specific hours of operation; and
- Infrastructural changes if recommended by a noise and vibration expert, such as additional acoustic insulation / acoustic barriers for example.

A record of all complaints and / or exceedances will be kept by Enviroo, and it shall include a record of the investigation and the remedial measures taken. All communication will also be kept as a record.

[7.3] Complaint Process

Any complaints received at the site or via the regulatory bodies including the Environment Agency (Agency) and Local Authority, will be recorded using the Compliant Report Form contained in the Site Management System. This will instigate further monitoring at the location of the complaint and on site to determine the extent of the noise and / vibration and whether any of the actions outlined

in Section 7.2 should be employed. Where possible, as much information and detail about the complaint will be recorded, whether this is from the relevant authority or complaint direct to site. This information will assist in the investigation and determining the source of the noise and / or vibration e.g. differentiating between potential off-site sources.

All complaints and queries will be logged in accordance with the management system as soon as is practicably possible. All complaints logged will be subject to investigation and complainants responded to within 48 hours of receipt, where possible.

In the event that a substantiated noise complaint is received arising from the site, additional monitoring will be undertaken at the nearest sensitive receptors to determine any off-site noise emissions.

Complaints regarding noise and / or vibration from the site will be investigated in accordance with the protocol, and appropriate records maintained which may include:

- Complaints received including name and contact details of complainant (if known), and complaints description of the noise and / or vibration;
- Nature of problem including date, time, duration, prevailing weather conditions and cause of the problem;
- Onsite activities and operational condition at the time of the complaint;
- Records of the likely source of the emission even if it is clearly not from the site; and
- Details on the corrective action taken, and any subsequent changes to monitoring and operational procedures.

The Agency will be informed by Enviroo of the complaint and Enviroo will confirm to the best of its knowledge the information described above.

Enviroo will ensure that the complainant has all the relevant contact details of the site (i.e. the Site Manager) and the officer responsible at the Agency. Enviroo will be in regular contact with the complainant and the Agency whilst the cause of the emission is being investigated and remediated.

An evaluation of the effectiveness of the techniques used will be carried out on completion of any remedial measures or if the complaints persist. Records of the above will be retained by site for future reference.

[7.4] Means of Contact

Enviroo will be readily contactable to outside organisations and to members of the public. The site signage board (placed in a readily visible location) will contain the necessary contact details for both the site operations and Agency. The company website also contains the necessary contact details.

Any complaints received directly to site will be notified to the Agency. Should an off-site issue arise, therefore, the complainant has a readily available means of getting in touch with Enviroo.

[7.5] Complaints Investigation

As part of each complaint received, these will be objectively assessed against the wider environment to ensure that the source of the emission is traced back to the correct source. As discussed earlier, it is essential that the source is correctly identified in order that mitigating measures can be applied

effectively and correctly. The complaint will also be assessed against previous records to place the nature of the complaint into context.

[7.6] Records and Review

A daily record relating to the management and monitoring of noise and / vibration will be maintained. It will include the following details:

- The results of inspections and noise monitoring carried out by installation personnel;
- Weather conditions including atmospheric pressure, wind speed and wind direction;
- Problems including date, time, duration, prevailing weather conditions and cause of the problem;
- Complaints received including address of complainant; and
- Details of the corrective action taken, and any subsequent changes to operational procedures.

The NVMP will be reviewed on an annual basis with the scheduled review of the site management system or with every major increase, or alteration to the noise and / or vibration generated at site (i.e. a change to source term, pathways or receptors).

Appendix A – Drawings

A1

GENERAL NOTES

Notes

1. DO NOT SCALE
2. ANY ANOMALIES ON THIS DRAWING ARE TO BE BROUGHT TO THE ATTENTION OF BYRNE LOOBY LTD

Key

- SITE BOUNDARY
- BUFFER ZONE
- 22 RECEPTOR MARKER

Rev	Date	Description	By	Chk	App

BYRNELOOBY

WWW.BYRNELOOBY.COM

IRELAND | UK | UAE | BAHRAIN | KSA

CLIENT
ENVIROO

PROJECT
PROJECT NAME

DRAWING TITLE
SENSITIVE RECEPTOR PLAN

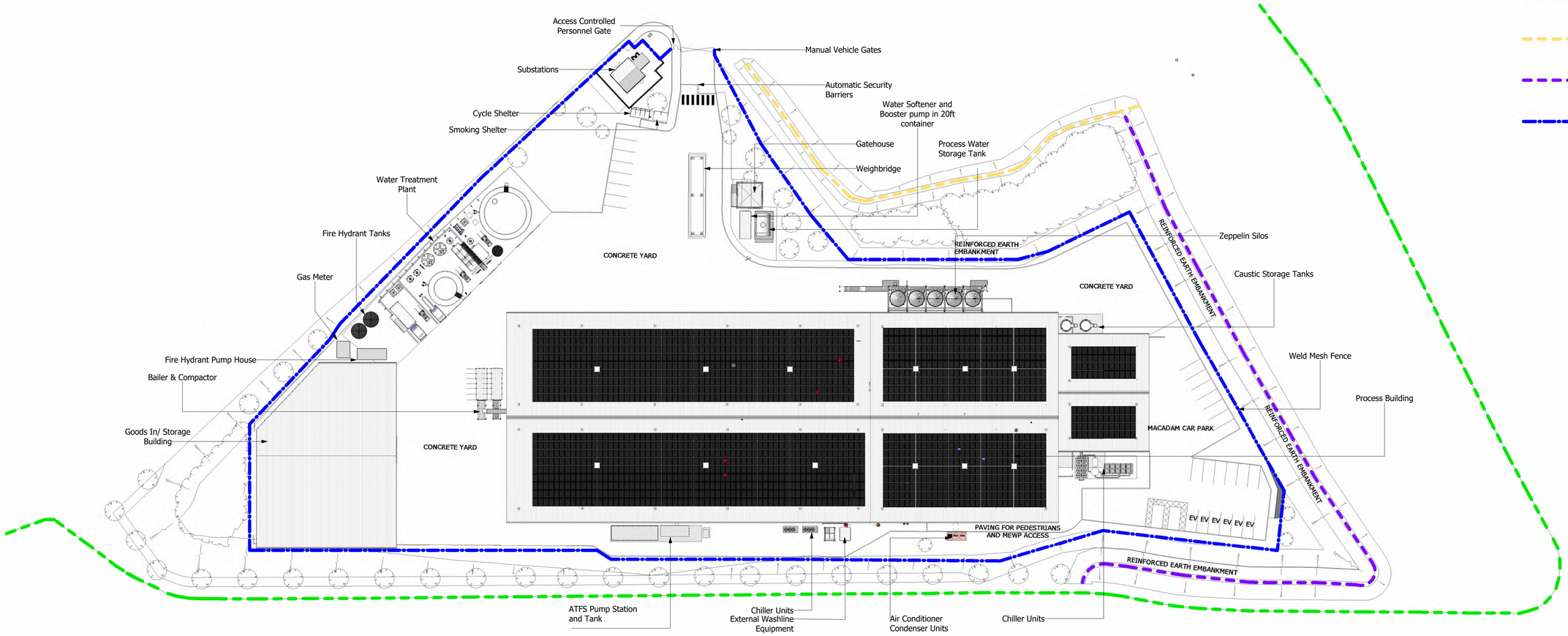
STATUS
FINAL

Date: 14/09/23	Scale: N/A	Drawn: JM	Chk: CF	App: JB

Project No:	Drg. No:	Rev:
K0419	K0419.1.002	00

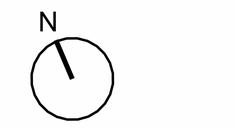
Notes

1. If in doubt, ask the Project Lead.
2. Do not scale this drawing.
3. All dimensions are in millimetres unless stated otherwise.
4. This drawing is to be read in conjunction with all other relevant drawings and specifications.
5. All Proprietary items to be installed in strict compliance with manufacturers instructions and recommendations.



Proposed Site Plan

1 : 500



Rev	Amendments	Rev'd By	Date
P04	PV Cells Added; Issued for Planning	JW	28.08.25
P03	External Stair Amended; Issued for Planning	JW	27.08.25
P02	Issued for Planning	JW	22.08.25
P01	Issued for Planning	JW	24.07.25

Client

enviroo

Project
Enviroo - Plastic Recycling Centre
Ellesmere Port

Title
Planning - Proposed Site Plan

Project	Originator	Functional Breakdown	Spatial Breakdown	Form	Discipline	Number
250064	- WDK	- XX	- XX	- D	- A	- 04000

Internal Project Reference
250064

Suitability | Suitable For
S2 - Suitable for Information

Scale	Created	Revision
1 : 500 @ A1	21.05.25	P04

Project Lead	Drawn	Checked	Reviewed	Approved for Issue
J.B	MYC	JW	ZP	JW

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Appendix B- Noise Impact Assessment

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Noise Impact Assessment:

Proposed Detailed Application For the Development of a Polyethylene Terephthalate (PET) Plastics Recycling Facility

at

Plot 13
Protos
Ince
Cheshire

For

Axis
Acting on behalf of Enviroo Project Co Ltd

Report No: R20.1001/R1/DRK
Date: 16th December 2025
Consultant: D.R. Kettlewell MSc MAE MIOA I.Eng

Noise & Vibration Consultants Ltd

Member of Institute of Acoustics
Member of Association of Noise Consultants
Member of Academy of Experts

Report prepared by:
D R Kettlewell MSc MIOA MAE I.Eng – Principal

Date: 16th December

Summary

1. Enviroo Project Co Ltd (`the Applicant') are proposing to construct and operate a Polyethylene Terephthalate (`PET') Plastics Recycling Facility on land at Plot 13, Protos, Ince, Cheshire.

2. At the request of Axis acting on behalf of the Applicant, Noise & Vibration Consultants Ltd (NVC) was originally commissioned to undertake a noise impact assessment to assess noise from the development at the nearest noise sensitive receptors ("NSRs"), as a result of the operation of the plant. Following planning permission for the Proposed Development (planning ref. 20/04396/FUL dated 12 May 2021) as a result of modifications to the scheme, a S73 planning application has been submitted and the Local Planning Authority has requested an update to the noise assessment.

3. Following a study of the local area to the proposed site and review of previous planning submissions on the Protos Site, the nearest NSRs were determined.

4. The operation of the PET Recycling Facility would operate 24hrs/day.

5. Site operational noise has been calculated using advice on noise levels from Technology Providers for the PET Recycling Facility. The assessment has used ISO9613-2 prediction methodology and CadnaA noise modelling software for producing noise contours of the highest likely generated noise with all plant operating.

6. An assessment of the resultant impacts has been undertaken by applying noise limits determined by appropriate standards for noise (i.e. BS4142: 2014+A1:2019, WHO night noise guidelines and BS8233: 2014) and existing Protos planning consent conditions.

Conclusions

7. Following analysis of noise survey results our conclusions are as follows:

   (i) The predicted noise contribution from the Proposed Development using ISO9613-2 methodology and CadnaA noise modelling software shows noise levels experienced at NSRs to range between 28dB and 36dB L_{Aeq} during maximum site operations.

   (ii) Based on measured background sound levels for a recent planning application for Plot 4 on the Protos Site, noise levels at the NSRs are shown to produce a **low impact** and therefore acceptable according to BS4142: 2014+A1:2019. Site rating noise levels were shown to be between **5dB and 19dB lower** than background sound levels and therefore not significant.

(iii) Predicted noise levels are well within the planning consent noise condition limits set out in condition 25 for the Proposed Development (planning ref. 20/04396/FUL). Noise levels are between **2dB and 20dB lower** at NSRs than the condition limits and are therefore not significant in terms of contribution.

(iv) In terms of predicted absolute noise levels, these are shown to be well below sleep disturbance criteria according to WHO guidelines where external levels should be below 40dB $L_{Aeq8hrs}$ and well below internal room design criteria according to BS8233: 2014 within a living room or bedroom with the window open (i.e. 30dB $L_{Aeq,8hrs}$).

8. This assessment concludes that the operation of the Proposed Development would generate noise levels well within relevant noise standards, guidance and existing planning consent noise condition limits at nearest NSRs and therefore noise would not be significant.

CONTENTS

1.0 INTRODUCTION

1.1 Enviroo Project Co Ltd (the Applicant) are proposing to construct and operate a Polyethylene Terephthalate ("PET") Plastics Recycling Facility ("PETPRF") on land at Plot 13, Protos, Ince, Cheshire.

1.2 At the request of Axis acting on behalf of the Applicant, Noise & Vibration Consultants Ltd ("NVC") was originally commissioned to undertake a noise impact assessment to assess noise from the development at the nearest noise sensitive receptors (NSRs), as a result of the operation of the plant and facilities. Following planning permission for the Proposed Development (planning ref. 20/04396/FUL dated 12 May 2021) as a result of modifications to the scheme, a S73 planning application has been submitted and the Local Planning Authority has requested an update to the noise assessment.

1.3 The Proposed Development would comprise a building which would be used for the reception, storage and processing of waste PET and the temporary storage and export of the recycled PET product. Additional associated plant would be located outside the building as indicated in Figure 2.

1.4 The recycling process would involve the following main processes:

- Baled PET Plastic Waste delivered to the site;
- Screening and de-labelling;
- Sorting and segregation by type and colour;
- Reduction in size of plastic waste and washing (multiple wash cycles);
- Flaking of the PET material and drying;
- Extrusion which involves the blending and heating of flakes to deliver pelletized recycled PET product.

1.5 The nearest NSRs have been determined and appropriate noise criteria referenced to determine the likely noise impact.

Sources of Information

1.6 Information used in this assessment has been obtained from the following sources:

- Ordnance Survey maps of the local area;
- Information relating to the site layout was provided by Axis;
- BS4142: 2014+A1:2019 `Methods for rating and assessing industrial and commercial sound';
- Guidelines for Community Noise – World Health Organisation: April 1999;
- BS8233: 2014 `Guidance on sound insulation and noise reduction for buildings';
- Noise Policy Statement for England (NPSE) – March 2010: Department for Communities and Local Government: National Planning Policy Framework: February 2019;
- BS5228-1:2009+A1:2014 `Code of practice for noise and vibration control on construction and open sites';
- National Planning Practice Guidance ("NPPG") December 2024;
- Planning submission for the development of a Bio SNG Renewable Fuels Facility at Plot 4 (Ref. 18/04671/WAS) by Enzygo Environmental Consultants; and

- Chester West and Chester Council Notice of Planning Permission (ref. 20/04396/FUL dated 12 May 2021).

Assessment Methodology

1.7 The aim of the assessment was to provide information and advice on the following:

- typical operating noise levels from the facility plant, based on information provided by Technology Providers;
- typical background and residual sound levels at nearest NSRs from noise monitoring data undertaken in November 2018 by Enzygo Environmental Consultants to support the Bio SNG Renewable Fuels Facility at Plot 4 to demonstrate compliance with the noise thresholds stipulated in Condition 34 of planning permission for the wider Protos Development (ref. 14/02277/S73);
- construction noise levels to demonstrate compliance with Condition 23 of existing planning permission for the Proposed Development (ref. 20/04396/FUL); and
- advise on any operations that are shown to exceed appropriate and relevant noise criteria and where appropriate provide recommendations for further mitigation.

1.8 Appendix 1 provides details of technical terms within the report, for ease of reference. There is also a chart showing typical everyday noise levels to assist in understanding the subjective level of noise in terms of decibels (dB).

2.0 SITE DESCRIPTION

2.1 Site Location and Context

2.1.1 The proposed site is circa 2.2 hectares located on Plot 13 of Protos. It is located within the administrative area of Cheshire West and Chester Council (CWACC), circa 1km to the east of the village of Ince and 1km to the north of the settlement of Elton. The Mersey Estuary is located circa 1km to the north of the Site and is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site.

2.1.2 There are a number of existing major industrial facilities in close proximity to the site. Encirc Glass Ltd, a bottle manufacturing plant, is located to west of the Site. This plant includes a 33m high building, 10 hectares in area. The CF Fertilizers UK plant is located circa 800m, to the east of the site and covers an area of circa 50 hectares and manufactures over 1 million tonnes of fertiliser per year.

2.1.3 Plot 13 is located centrally within Protos and lies to the north of the road leading to the CF Fertilizers UK plant, Plot 12 (Resource Recovery Facility) and Plot 9 (Biomass Facility). Plot 10b is immediately to the north of the site and was granted planning permission in March 2020 for the development of a waste plastics to hydrogen facility.

2.1.4 The location of the Site is shown on Figure 1.

Access

2.1.5 The Proposed Development would be accessed via an upgraded Marsh Lane which leads from the internal distributor road (“Road 2”) located to the north of the Site.

Site Noise Sources

2.1.6 In terms of noise generated by this type of development, the assessment has considered the following activities:

- Noise from the construction of the PET Recycling Facility
- Noise from the operation of the PET Recycling Facility

Site Operation Hours

2.1.7 The PET Recycling Facility would operate 24hrs/day.

2.2 Nearest Receptors

2.2.1 The nearest properties are as follows and are illustrated on Figure 3:

- Properties on Ince Orchards/Orchard Park Lane – circa 820m to 880m to the south-west of the Site.
- Properties on Station Road/Marsh Lane, Ince – circa 1,200m to 1,300m to the west of the Site.
- Holme Farm – circa 960m to the northwest of the Site.
- Redwood Drive – circa 920m south of the Site.

2.2.2 Figure 1 shows receptor locations and Figure 2 attached shows the layout of the site.

3.0 NOISE CRITERIA

3.1 Introduction

3.1.1 Noise has been defined as sound that is unwanted by the recipient. The effects of noise on the neighbourhood are varied and complicated, including such things as interference with speech communication, disturbance of work, leisure or sleep. A further complicating factor is that in any one neighbourhood some individuals will be more sensitive to noise than others.

3.2 General Planning Guidance

National Planning Policy Framework -December 2024 (NPPF)

3.2.1 Chapter 15 of the National Planning Policy Framework (NPPF) relates to `Conserving and enhancing the natural environment'.

Paragraph 180 e) refers directly to noise and states that:

"e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;"

3.2.2 Paragraph 191 also states:

"191. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

3.2.3 The Noise Policy Statement for England (NPSE) was published in March 2010. It specifies the following long-term vision in policy aims: *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life."*

3.2.4 The NPSE introduced three concepts to the assessment of noise, which includes:

NOEL – No Observed Effect Level
This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level
This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level
This is the level above which significant adverse effects on health and quality of life occur.

3.2.5 The above categories are however, undefined in terms of noise levels and for the SOAEL the NPSE indicates that the noise level will vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research is therefore required to establish what may represent an SOAEL. It is acknowledged in the NPSE that not stating specific SOAEL levels provides policy flexibility until there is further evidence and guidance.

3.2.6 The NPSE concludes how the LOAEL and SOAEL relate to the three aims listed in paragraph 3.2.4 above. The initial aim relates to avoiding significant adverse effects on health and quality of life, it then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when:

"all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development."

3.2.7 The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development.

National Planning Practice Guidance (NPPG)

3.2.8 On March 6th, 2014, the Government published the National Planning Practice Guidance ("NPPG") on noise, which provides further information in respect of new developments which may be sensitive to the prevailing noise environment. This was updated in July 2019.

3.2.9 The NPPG refers to the NPSE documents and under the heading 'How can noise impacts be determined?' it states:

"Plan-making and decision taking need to take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved."*

3.2.10 At paragraph 004 the NPPG includes a table summarising the noise exposure hierarchy, based on the likely response. Under the heading of 'example of outcome' the '*present and not intrusive*' assessment of noise is defined as '*noise can be heard, but does not cause any change in behaviour, attitude or physiological response. Can slight affect the acoustic character of the area but not such that there is a change in the quality of life*'. The increasing effect level under these conditions is deemed to be '*no observed adverse effect*' and '*no specific measures are required.*'

3.2.11 The NPPG explains this by stating:

"At the lowest extreme, when noise is not perceived to be present, there is by definition no effect. As the noise exposure increases, it will cross the 'no observed effect' level. However, the noise has no adverse effect so long as the exposure does not cause any change in behaviour, attitude or other physiological responses of those affected by it. The noise may slightly affect the acoustic character of an area but not to the extent there is a change in quality of life. If the noise exposure is at this level no specific measures are required to manage the acoustic environment.

As the exposure increases further, it crosses the 'lowest observed adverse effect' level boundary above which the noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise).

Increasing noise exposure will at some point cause the 'significant observed adverse effect' level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused.

At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided."

3.2.12 The NPPG includes a table summarising the noise exposure hierarchy, based on the likely average response. Table 3.1 below provides the perception, example of outcome, effect and action required relative to noise.

Table 3.1: Noise Exposure Hierarchy

Response	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect (NOEL)	No Specific Measures Required
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect (NOAEL)	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			

Response	Examples of Outcomes	Increasing Effect Level	Action
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Observed Adverse Effect	Prevent

Relevant Guidance & Standards – Fixed Industrial Noise

BS 4142: 2014+A1:2014 `Methods for rating and assessing industrial and commercial sound'

3.2.13 BS 4142: 2014+A1:2019 ` Methods for rating and assessing industrial and commercial sound' is based on the measurement of background sound using L_{A90} noise measurements, compared to source noise levels measured in L_{Aeq} units. The differential between the two measurements; once any corrections have been applied for source noise tonality, distinct impulses etc. (i.e. the `rating' level); determines the likelihood of complaints.

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.2.14 In terms of establishing the rating level, corrections for the noise character has to be taken into consideration. These include the following factors:

"Tonality
For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity
A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics
Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency
When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

3.2.15 The assessment of noise character from the plant at the nearest receptors is considered and our expert opinion is provided below with respect to the potential correction factors described in the preceding paragraph:

3.2.16 In terms of tonality, given the likely residual levels relative to predicted plant noise levels and the absolute noise level from the plant, we would not expect any tonal characteristics to be perceptible at the nearest receptor and therefore a tonal character correction is not deemed to be appropriate.

3.2.17 In terms of impulsivity, any impulsive noise generated by the Proposed Development would be contained within the Process Building and would therefore be imperceptible at the NSRs.

3.2.18 In terms of intermittency the plant would generally operate continuously. We would therefore not expect this character to be applicable at the nearest NSRs.

3.2.19 In conclusion, in view of the noise contribution from the site and likely residual sound levels, we do not expect any noise character to be relevant or appropriate.

BS8233:2014 `Guidance on sound insulation and noise reduction for buildings'

3.2.20 The British Standard BS8233 provides additional guidance on noise levels within buildings. These are based on the WHO recommendations and the criteria given in BS8233 for unoccupied spaces within residential properties.

3.2.21 The guidance provided in section 7.7 of BS8233 provides recommended internal ambient noise levels for resting, dining and sleeping within residential dwellings. Table 3.2 provides detail of the levels given in the standard.

Table 3.2: BS8233: 2014 Indoor ambient noise levels for dwellings

Activity	***Location***	***07:00 to 23:00***	***23:00 to 07:00***
Resting	Living Room	35 dB $L_{Aeq,16hours}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hours}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hours}$	30 dB $L_{Aeq,8hours}$
Study and work requiring concentration	Staff/Meeting Room, Training Room Executive Office	35-45dB $L_{Aeq8hours}$ 35-45dB $L_{Aeq8hours}$	

3.2.22 For a partially open window the standard refers to a reduction of approximately 15dB. This would therefore indicate a noise level outside the window of approximately 50dB $L_{Aeq,16hours}$ for living rooms during daytime and 45dB $L_{Aeq,8\ hours}$ during night-time outside bedrooms. For offices, the guideline levels would equate to a noise level range outside the office window of between 60dB to 70dB $L_{Aeq,8hours}$ based on a standard double-glazed window and 50dB to 60dB $L_{Aeq,8hours}$ based on an open window.

World Health Organisation (WHO) Guidelines for Community Noise: April 1999

3.2.23 This document provides further updated information on noise and its effects on the community. The document for noise `*In Dwellings'* states "*The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for single sound events. Lower noise levels may be disturbing depending upon the nature of the noise source."*

3.2.24 The WHO document also states "*To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35dB L_{Aeq}. To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development."*

3.2.25 In 2009, the WHO published: 'Night Noise Guidelines for Europe', which it describes as an extension to the WHO 'Guidelines for Community Noise' (1999). It concludes that: *"Considering the scientific evidence on the thresholds of night noise exposure indicated by $L_{night,outside}$ as defined in the Environmental Noise Directive (2002/48/EC), an $L_{night,outside}$ of 40dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. $L_{night,outside}$ value of 55dB is recommended as an interim target for those countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach."*

3.3 Existing Relevant Planning Conditions

3.3.1 Condition 25 of planning permission (ref. 20/04396/FUL dated 12th May 2021), provides following noise limits:

"25. All operational noise emissions from the facility shall be controlled using individual plot boundary noise emissions limits to provide overall compliance with the following noise control objectives:

Noise sensitive receptor locations / Daytime noise levels Laeq(1hour) 0700 - 2300 / Night time noise levels Laeq (5mins) 2300 - 0700

Holme Farm / 52 / 41
Station Road - North of Kemira Road / 48 / 41
Duke of Wellington / 40 / 35
Ince Orchards / 45 / 41
Redwoods Drive, Elton / 51 / 37

Reason: To limit the impact on the residential and local amenity and in the interest of protecting local amenity and to protect future amenity of other Plots."

3.3.2 The above limits relate to operational noise limits for development on the overarching Protos planning permission. Whilst the facility is for a standalone development within Protos, the cumulative effect of all plots in operation need to be able to work within these overall limits. The noise contribution from this facility must therefore achieve a noise contribution well below these levels.

3.4 Baseline Levels

3.4.1 The baseline sound levels in the area were undertaken by Enzygo in November 2018 to support the Bio SNG Renewable Fuels Facility at Plot 4 planning application (18/04671/WAS).

3.4.2 The monitoring positions as indicated on Figure 3 provide indicative background sound data of the existing sound climate at the NSRs.

3.4.3 The results of measurements taken at the fixed monitoring positions at site are presented below in Table 3.3. This is taken from the ES Chapter 7 and Table 7-6 `Summary of baseline survey results' and is provided below for ease of reference.

Summary of Baseline Survey Results

Table 3.3: Range of Baseline Sound Levels (Table 7-6 of noise chapter 7)

Location	Period	$L_{Aeq,T}$ dB	L_{AFmax} dB	L_{A90} dB	L_{A10} dB
Holme Farm	Day Night	61.0 47.2	85.0 73.7	42.6 42.5	54.7 45.8
Station Road – North of Kemira Road	Day Night	55.2 41.8	74.8 65.5	45.8 36.7	54.6 39.1
Station Road	Day Night	62.7 51.9	88.5 76.9	46.6 40.0	61.4 43.4
Redwoods Drive	Day Night	57.5 50.4	80.1 67.4	52.9 45.2	58.3 51.1
Ince Orchard	Day Night	51.5 43.1	74.1 64.3	42.5 40.6	50.7 42.9

3.5 Noise Criteria

3.5.1 In terms of relevant noise criteria, the site noise impact will be compared against the existing planning condition for the Proposed Development (as described in condition 25 in paragraph 3.2.1) and BS4142: 2014+A1:1019 relative to Site rating level compared against background sound levels (i.e. L_{A90}).

3.5.2 For residential receptors according to BS4142: 2014+A1:2019 where the `rating' level does not exceed the representative background sound level the impact would be low.

4.0 NOISE LEVEL PREDICTIONS

4.1 Introduction

4.1.1 Noise has been defined as sound, which is undesired by the recipient. The effects of noise on the neighbourhood are varied and complicated, including such things as interference with speech communication, disturbance of work, leisure or sleep. A further complicating factor is that in any one neighbourhood some individuals will be more sensitive to noise than others.

4.1.2 A measure that is in general use and is recommended internationally for the description of environmental noise is the equivalent continuous noise level or L_{Aeq} parameter.

4.1.3 In general, the level of noise in the local environs that arises from a development site will depend on a number of factors. The more significant of which are:-

- The sound power levels (SWL's) or sound pressure levels (SPL's) of the plant or equipment used on site.
- The periods of operation of the plant on site.
- The distance between the source noise and the receiving position.
- The presence or absence of screening effects due to barriers, or ground absorption.
- Any reflection effects due to the facades of buildings etc.

4.1.4 The technology providers have provided noise levels of the proposed plant to assist in determining the likely noise contribution at nearest sensitive receptors for comparison with the requirements of BS4142: 2014+A1:2019 for residential development.

4.2 Prediction Methodology

Operational Noise

4.2.1 For site operational noise the assessment uses ISO9613-2:2024 prediction modelling and CadnaA software for producing a noise map of the highest likely generated noise. The Input settings for the noise model include:

Ground factor (G) = 0 (hard ground) within the site boundary and G = 1 (absorbent ground) for intervening land between site and receptor.
Temperature = 10degC
Relative humidity = 70%
Receptor height = Assumed to be 4m above ground for operations (residential).

4.2.2 The methodology takes into account source position and distance to the nearest sensitive receptors. The noise modelling assumes that all plant associated with the PET Recycling Facility are in operation and therefore the noise predictions provide an indication of the highest likely noise level.

Source Noise Levels

4.2.3 The plant associated with the proposal is based on the noise levels given below, which are based on Technology Provider's noise data.

a) Process Building reverberant sound pressure level (SPL): 85dB L_{Aeq}
b) Goods In Building reverberant SPL: 80dB L_{Aeq}
c) Waste Water Treatment Plant:
Pumps (5): 70dB L_{Aeq} @ 1m
Blowers (2): 73dB L_{Aeq} @ 1m
DAF1 & DAF2: 85dB L_{Aeq} @ 1m
Mixer: 70dB L_{Aeq} @ 1m
Sludge thickening plant): 60dB L_{Aeq} @ 1m
d) Sub-station: Inside sub-station reverberant SPL 65dB L_{Aeq}.
e) Compactor: 86dB L_{Aeq} @ 1m
f) Process Water Pumps: 75dB L_{Aeq} @ 1m
g) Caustic Soda Tank Pumps: 85dB L_{Aeq} @ 1m
h) Air conditioning plant: 82dB L_{Aeq} @ 1m
i) Chiller Units: 62dB L_{Aeq} @ 10m (southern façade)
j) Chiller Units: 67dB L_{Aeq} @ 10m (eastern façade)
k) Zeppelin Silo conveyor: 92dB L_{Aeq} @ 10m
l) Booster Pump container: 75dB L_{Aeq} @ 1m
m) Pump Station: 80dB L_{Aeq} @ 1m

Proposed Mitigation

4.2.4 The proposed mitigation measures would include the following:

- PET process plant and Goods In facility would be fitted within a purpose-built building having cladding to a minimum weighted sound reduction index Rw of 24dB.
- The grinder mounted inside the process building used to flake the recycled plastic would be mounted within an acoustically treated enclosure.
- Acoustic screen mounted on two sides of the two DAF units to 4m height located on southern and western side of plant. Screen having a minimum mass of 13kg/m2 and an acoustic absorbent inside face (towards the plant) e.g. Tilon (TENB45A) or similar. Refer to Figure 4
- Acoustic screen mounted around the two sides of the Compactor/Bailer units to 5m height located on southern and western side of plant. Screen having a minimum mass of 13kg/m2 and an acoustic absorbent inside face (towards the plant) e.g. Tilon (TENB45A) or similar. Refer to Figure 4.

4.2.5 The results of the CadnaA software prediction modelling noise contours for site operations are provided in Appendix 2.

4.3 Results of Noise Predictions Site Plant Noise Assessment:

Noise Contribution Levels

4.3.1 The following table provides results of the Site predicted noise rating levels and compares the results against background sound levels in accordance with BS4142: 2014+A1:2019.

Table 4.1: Predicted Noise from Proposed Development Plant Operations (with mitigation) in terms of LAeq at residential NSRs

Receptor Position (Refer to Figure 1)	Period	Predicted external rating* noise level LAeq(dB)	Background LA90 (dB) [residual LAeq]	Level difference between rating level and background levels LA90 dB	Predicted internal** noise levels within living rooms & bedrooms of NSRs LAeq dB
R1. Holme Farm	Daytime Night-time	34 34	43 (61) 43 (47)	-9 -9	19 19
R2. Marsh Lane	Daytime Night-time	29 29	46 (55) 37 (42)	-17 -8	14 14
R3. Station Road	Daytime Night-time	28 28	47 (63) 40 (52)	-19 -12	13 13
R4. Redwood Drive	Daytime Night-time	35 35	53 (58) 45 (50)	-18 -10	20 20
R5. Ince Orchards	Daytime Night-time	31 31	43 (52) 41 (43)	-12 -10	16 16
R6. Orchard Park	Daytime Night-time	36 36	43 (52) 41 (43)	-7 -5	21 21

*Note: No noise character is predicted to be applicable due to masking of residual sound levels when comparing with absolute level from the Site.
**Note: This assumes an open window, which according to BS8233 is -15dB.

4.3.2 Table 4.1 shows the range of predicted noise levels from the plant associated with the plant. In terms of predicted rating noise levels compared with typical L_{A90} levels, these are shown to be between 5dB and 19dB lower than background sound levels.

4.3.3 The results show that site noise during daytime or night-time operations with the proposed noise mitigation measures the site noise would **not exceed** the noise limits in accordance with BS4142: 2014+A1:2019 to achieve a **low impact**.

4.3.4 The absolute noise levels predicted are well below sleep disturbance criteria according to WHO guidance where external levels should be below 40dB L_{Aeq} and well within internal room levels (with an open window) according to BS8233: 2014 (i.e. external level of 50dB $L_{Aeq16hrs}$ daytime & 45dB $L_{Aeq8hrs}$ night- time).

Condition 25 noise limits

4.3.5 The following table compares the Site noise contribution with the noise limits for the Proposed Development on the Protos site as defined in the table provided within paragraph 3.3.1.

Table 4.2: Predicted Noise from Proposed Development Plant Operations (with mitigation) in terms of L_{Aeq} at residential NSRs relative to condition 25

Receptor Position (Refer to Figure 1)	Period	Predicted external noise level L_{Aeq} (dB)	Condtion 25 noise limits L_{Aeq} dB (day 1hr) (night 5mins)	Level difference between Site noise and condition 25 levels L_{A90} dB
R1. Holme Farm	Daytime Night-time	34 34	52 41	-18 -7
R2. Marsh Lane	Daytime Night-time	29 29	40 35	-11 -6
R3. Station Road	Daytime Night-time	28 28	48 41	-20 -13
R4. Redwood Drive	Daytime Night-time	35 35	51 37	-16 -2

Receptor Position (Refer to Figure 1)	Period	Predicted external noise level L_{Aeq} (dB)	Condtion 25 noise limits L_{Aeq} dB (day 1hr) (night 5mins)	Level difference between Site noise and condition 25 levels L_{A90} dB
R5. Ince Orchards	Daytime Night-time	31 31	45 41	-14 -10
R6. Orchard Park	Daytime Night-time	36 36	45 43	-9 -7

4.3.6 In terms of the Site predicted noise levels, the results show these to be below the noise limits defined in condition 25 relating to the Protos Development. The level difference between Site noise and condition limits is between 2dB(A) and 20dB(A) lower than the limits.

5.0 CONSTRUCTION NOISE

5.1 In general, the level of noise in the local environs arising from the construction of a development site will depend on a number of factors.

The most significant of which are as follows:

- The sound power levels (SWL's) or sound pressure levels (SPL's) of the plant or equipment used on site;
- The periods of operation of the plant on site;
- The distance between the source noise and the receiving position;
- The presence or absence of screening effects due to barriers, or ground absorption; and,
- Any reflection effects due to the facades of buildings etc.

Noise Limits

5.2 The planning permission for the Proposed Development includes a condition relating to construction activities, which states:

"23. Noise arising from construction activities shall not exceed the following noise levels when measured at the residential receptors closest to the to the construction works or access route to those works or at any other residential receptors that may otherwise be agreed in writing by the local planning authority;

- *65dB LAeq,1hr for up to 24 weeks per calendar year*
- *60dB LAeq,1hr for general activity at all other time*

Unless otherwise agreed in writing by the Local Planning Authority."

Calculation Methodology

5.3 The calculation method used in this study for construction noise is based upon theoretical noise propagation theory, which considers source position, distance, direction and frequency content in relation to the nearest residential property boundary positions. British Standard BS5228-1: 2009+A1:2014 `Code of practice for noise control on construction and open sites' methodology has been used to estimate construction noise levels at the nearest existing dwellings including source noise levels for construction plant.

5.4 Noise levels emanating from the Site due to construction works associated with the proposed development will vary from day to day. In order to give an indication of the probable noise levels generated by the works, a worst-case scenario has been considered for several construction activities, namely soil movement and road construction.

Predicted Noise Levels: Construction

5.5 The highest likely noise levels for the proposed development in terms of construction noise are provided below. This is based on calculations for soil movement work, infrastructure, plant installation and general site activities at the closest approach to existing dwellings.

5.6 It is difficult to estimate how long this type of activity would last but typically in areas close to the site boundary (i.e. noisiest construction period assessed) this is normally completed in weeks rather than months.

5.7 The results of calculations (excluding mitigation measures) are shown below in Table 5.1 which applies the planning conditional limits.

Table 5.1: Noise Predictions for Highest Likely Construction Noise at Nearest Receptors

Receptor Position	Distance to receptor (m)	Activity	Noise Level, dB L_{Aeq1hr}	Planning Condition 23 Noise Limit Value L_{Aeq} dB (daytime)	Exceedance of planning condition 23 limits
R1. Holme Farm	960-1100 960-1100 960-1100 960-1100	Site Preparation General site activities Infrastructure Plant installation	38-40 36-37 35-41 37-39	60	None
R2. Marsh Lane	1340-1420 1340-1420 1340-1420 1340-1420	Site Preparation General site activities Infrastructure Plant installation	34-35 32-33 32-37 33-34	60	None
R3. Station Road	1180-1300 1180-1300 1180-1300 1180-1300	Site Preparation General site activities Infrastructure Plant installation	36-37 34-35 33-39 35-36	60	None
R4. Redwood Drive	920-1050 920-1050 920-1050 920-1050	Site Preparation General site activities Infrastructure Plant installation	38-40 36-38 36-42 37-39	60	None
R5. Ince Orchards	880-1050 880-1050 880-1050 880-1050	Site Preparation General site activities Infrastructure Plant installation	38-41 36-39 36-43 37-40	60	None

Note: Construction noise prediction levels given above do not allow for any site screening and highest levels predicted assumes that the plant equipment is at its closest approach.

5.8 The highest construction noise levels are likely to be created during any initial soil movement and the installation of plant and infrastructure. The results show that during the construction period noise levels at residential receptors would be well within noise limits. The implementation of best practice measures would assist in minimising noise radiating towards receptors and the threshold proposed by BS5228 would not be exceeded and within acceptable limits for this type of temporary activity.

Mitigation of Construction Period Effects

5.9 In accordance with BS 5228 best practical means would be employed to control the noise and vibration generation.

5.10 In consideration of the likely highest levels of construction noise, the following approach would be adopted:

- Restriction of construction hours (as per condition 24 of the existing planning consent to:
  All construction on the site shall be undertaken during the following hours, unless otherwise agreed in writing by the Local Planning Authority:
  Monday - Friday: 0730 - 1800
  Saturday: 0800 - 1330
  Sunday, Public and Bank Holidays: No construction activity.

- Community Relations – where there are significant noise levels likely to be generated, this is one of the most important aspects of mitigation as providing the nearest sensitive receptors with clear information about the activities that would be taking place and the length of time that any peak noise levels may occur will assist in allaying people's fears. BS 5228 states *"It is suggested that good relations can be developed by keeping people informed of progress and by treating complaints fairly and expeditiously. The person, company or organisation carrying out the work on site should appoint a responsible person to liaise with the public."*
- Use of broadband type reverse alarms for mobile plant (i.e. avoiding tonal `beeper' type alarms)
- Consider using a one-way system/turning circles and/or use of a banksman to avoid/reduce the need for reverse alarms.
- Sensible routing of the construction plant to minimise noise relative to the nearest residential properties.
- Careful choice of plant to minimise noise generation (e.g. hire of fixed plant with acoustic enclosures).
- Ensure all plant is regular maintained and correctly fitted with effective silencers / any relevant acoustic hoods etc.
- Plant switched off when not in use.

6.0 CONCLUSIONS

6.1 The Proposed Development at Plot 13 of Protos has been assessed in terms of noise impact during operational periods. This report has been updated and undertaken to provide technical support to the S73 planning application for the revised and proposed development.

6.2 Typical site operating noise levels have been established from data obtained from the technology providers to provide input data for the noise model.

6.3 The predicted noise contribution from the application site using ISO9613-2 methodology and CadnaA noise modelling software shows noise levels from Site at residential receptors to range between 28dB and 36dB L_{Aeq} during maximum site operations.

6.4 Based on measured background sound levels provided by Enzygo (for a recent planning application for Plot 4 on the Protos Site), noise levels at the nearest NSRs are shown to produce a **low impact** and therefore acceptable according to BS4142: 2014+A1:2019. Site rating noise levels were shown to be between 5dB and 19dB **lower** than background sound levels and therefore not significant.

6.5 Predicted noise levels are well within the existing planning consent noise condition limits set out in condition 25 of the Proposed Development. Noise levels are between 2dB and 20dB **lower** at nearest receptors than the condition limits and are therefore not significant in terms of contribution.

6.6 In terms of predicted absolute noise levels, these are shown to be well below sleep disturbance criteria according to WHO guidelines where external levels should be below 40dB $L_{Aeq8hrs}$ and well below internal room design criteria according to BS8233: 2014 within a living room or bedroom with the window open (i.e. 30dB $L_{Aeq,8hrs}$).

6.7 The assessment therefore concludes that operating the site would be acceptable and within all relevant guidance and standards for noise.

6.8 This assessment concludes that the proposed operation of the Site would generate noise levels well within relevant noise standards, guidance and existing planning consent noise condition limits at nearest NSRs and therefore noise would be **not significant**.

REFERENCES

BS 4142: 2014+A1:2019 ` Methods for rating and assessing industrial and commercial sound'

BS 8233:2014 `Guidance on sound insulation and noise reduction for buildings'

Guidelines for Community Noise – World Health Organisation: April 1999 Noise Policy

Statement for England (NPSE) – March 2010

Department for Communities and Local Government: National Planning Policy Framework: December 2024

National Planning Practice Guidance ("NPPG") July 2019

ISO 9613-2: 2024 `Acoustics – Attenuation of Sound During Propagation Outdoors'

Planning Consent Conditions (Planning Ref: 16/00771/FUL)

Planning submission for the development of a Bio SNG Renewable Fuels Facility at Plot 4 (Ref. 18/04671/WAS) by Enzygo Environmental Consultants.

Chester West and Chester Council Notice of Planning Permission (ref. 20/04396/FUL dated 12 May 2021).

FIGURES

Figure 1: Site Location

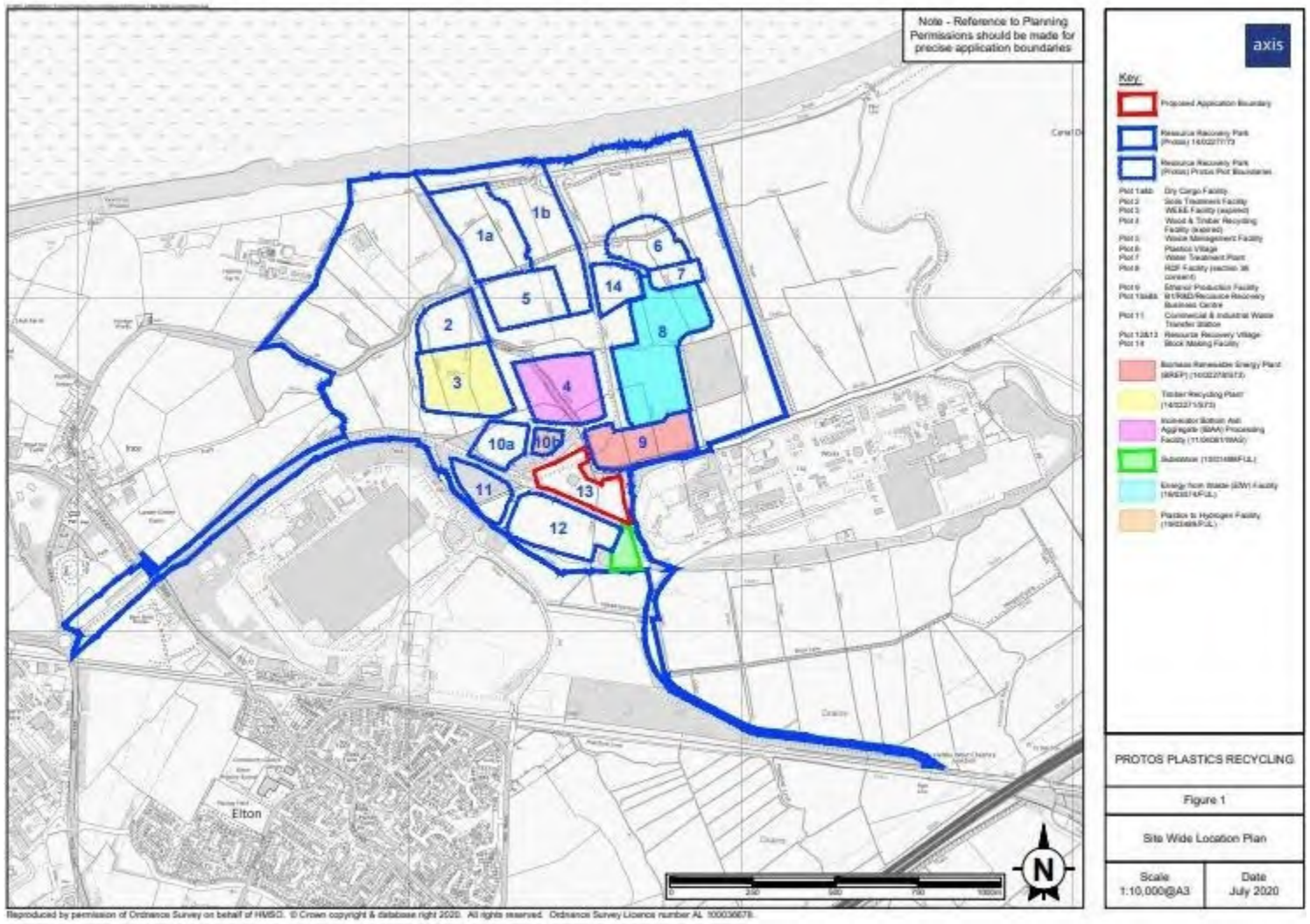


Figure 2: Site Layout

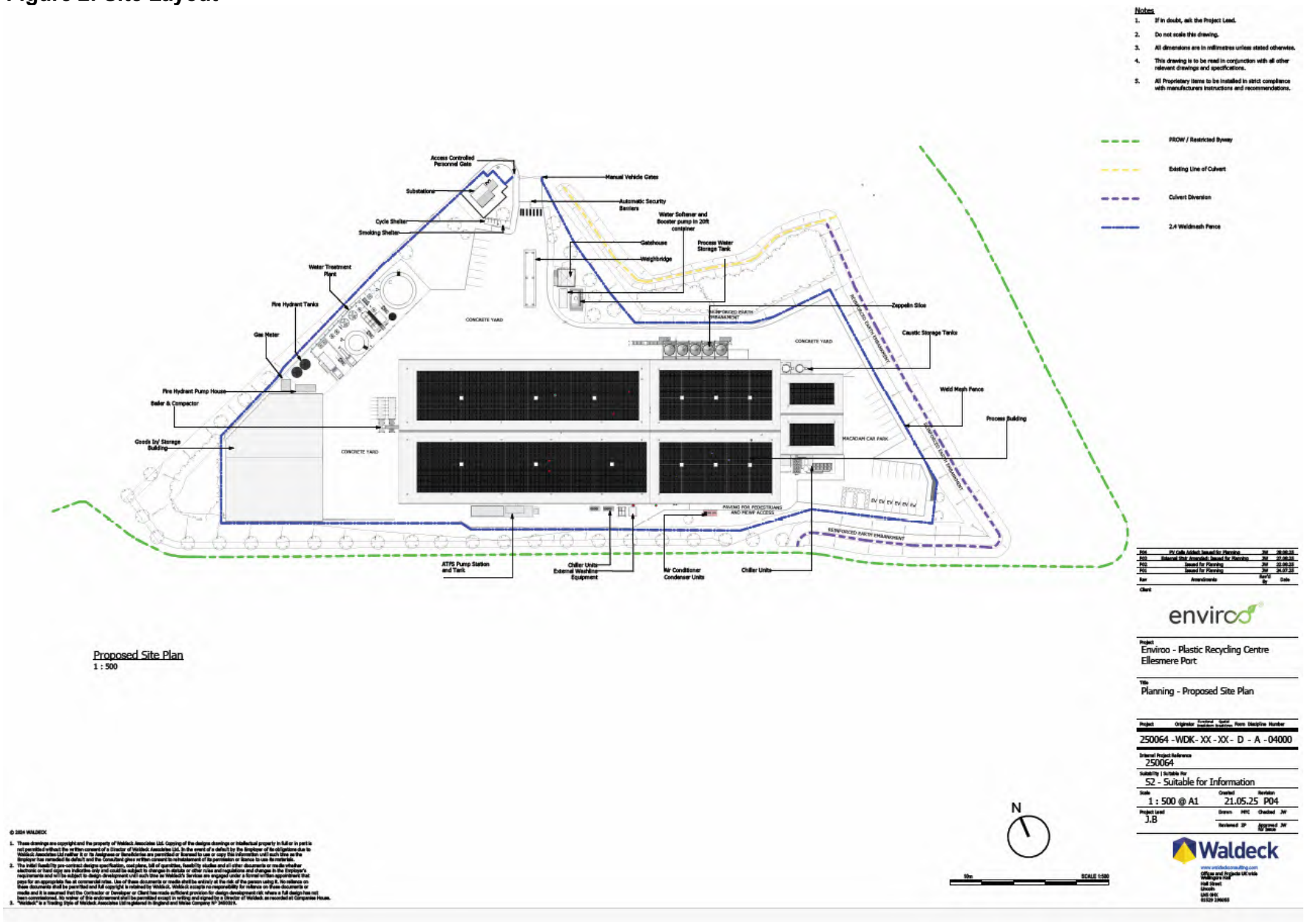
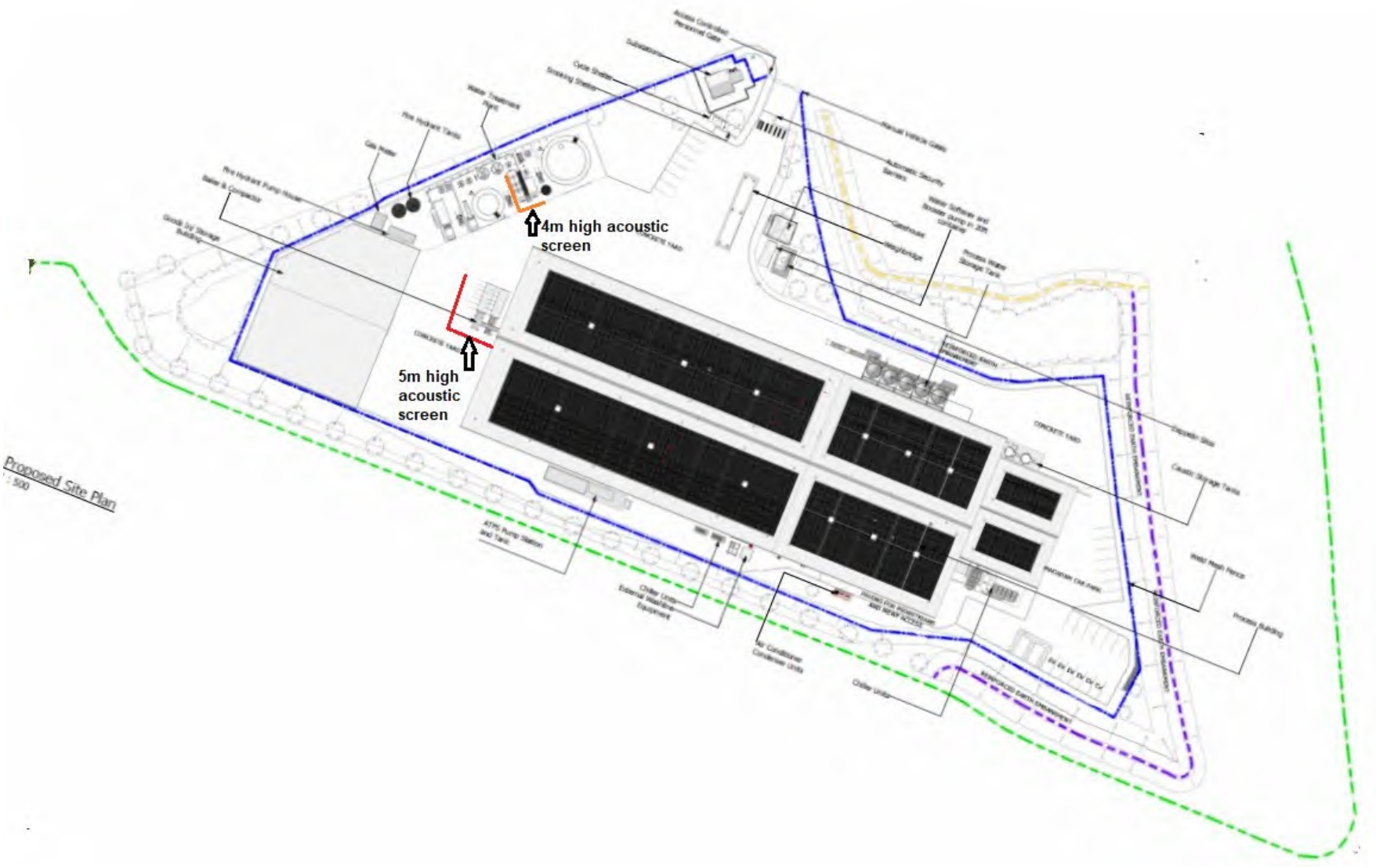


Figure 3: Baseline Monitoring & Receptor Positions

Figure 4: Proposed Acoustic Screening



Appendix 1

BASIC ACOUSTIC TERMINOLOGY

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air.

Sound Pressure Level is a measurement of the size of these pressure fluctuations. It is expressed in decibels (dB) on a logarithmic scale. Each 3 dB increase in sound pressure level represents a doubling of the sound energy. The threshold of hearing is approximately 0 dB.

The rate at which the pressure fluctuations occur determines the pitch or frequency of the sound. The frequency is expressed in Hertz (Hz), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hz to 20,000 Hz. Although sound can be of one discrete frequency - a 'pure tone' - most noises are made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same 'subjective' way. This is the basis of the A- weighted sound level dB(A), normally used to assess the effect of noise on people. The dB(A) weighting emphasises or reduces the importance of certain frequencies within the audible range.

Noise Measurement

The measurement of sound pressure level is only really meaningful where the level of noise is constant. In the typical industrial environment noise levels can vary widely and sometimes short duration high levels of noise are interspersed with periods of relative quiet. The most widely used means of 'averaging' the noise over a period of time is the Equivalent Continuous Sound Level. Normally written as L_{Aeq} this value takes into account both the level of noise and the length of time over which it occurs. There are many meters available which are capable of measuring L_{Aeq} by electronic integration over the measurement period.

The L_{Aeq} or A-weighted equivalent continuous noise level is a measure of the total noise energy over a stated time period and includes all the varying noise levels and re- expresses as an 'average', allowing for the length of time for which each noise level was presented.

The L_{An} parameters are defined as the noise levels which are exceeded for n% of the monitoring period, thus, for example, the L_{A90} parameter is the noise level exceeded for 90% of the 15-minute period, i.e. 13.5 minutes. The L_{A50} parameter is the noise level exceeded for 50% of the hourly period, i.e. 30 minutes, etc. The L_{max} parameter is the maximum RMS A-weighted noise level occurring during the measurement period.

The definition in layman's terms is given below for terminology used in the measurement and results obtained during the survey work.

A-weighting: Normal hearing covers the frequency (pitch) range from about 20Hz to 20,000 Hz but sensitivity of the ear is greatest between about 500Hz and 5000Hz. The "A-weighting" is an electrical circuit built into noise meters to mimic this characteristic of the human ear.

Ambient noise: The totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.

Attenuation: Noise reduction

Background noise: The general quiet periods of ambient noise when the noise source under investigation is not there.

Decibel (dB): The unit of measurement for sound based on a logarithmic scale. 0dB is the threshold of normal hearing; 140dB is the threshold of pain. A change of 1dB is only detectable under controlled laboratory conditions.

dB(A) [decibel A weighted]: Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) serves to distinguish sounds of different frequency (or pitch) in a similar way to how the human ear responds. Measurements in dB(A) broadly agrees with an individual's assessment of loudness. A change of 3dB(A) is the minimum perceptible under normal everyday conditions, and a change of 10dB(A) corresponds roughly to doubling or halving the loudness of sound.

dB(C): [decibel C weighted]: Frequency weighting which does not alter low frequency octave band levels by very much compared to `A' weighting. Similar to linear reading (i.e. linear does not alter frequency spectra at all)

Frequency (Hz): The number of sound waves to pass a point in one second.

L_{Aeq}: This is a noise index used to describe the "average" level of a noise that varies with time (T). It allows for the different sensitivities of the human ear to different frequencies (pitch), and averages fluctuating noise levels in a manner which correlates well with human perceptions of loudness.

$L_{A10,T}$: This noise index gives an indication of the upper limit or peak levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 10 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A10} reading was say 60dB, then this means that for 1 hour out of 10 the level went above 60dB.

$L_{A90,T}$: This noise index gives an indication of the lower limit or levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A90} reading was say 50dB, then this means that for 9 hours out of 10 the level went above 50dB.

L_{Amax}: This is the highest `A' weighted noise level recorded during a noise measurement period.

Residual noise: The ambient noise remaining at a given position in a given situation when the noise source under investigation is not there.

Specific noise: The noise source under investigation for assessing the likelihood of complaints

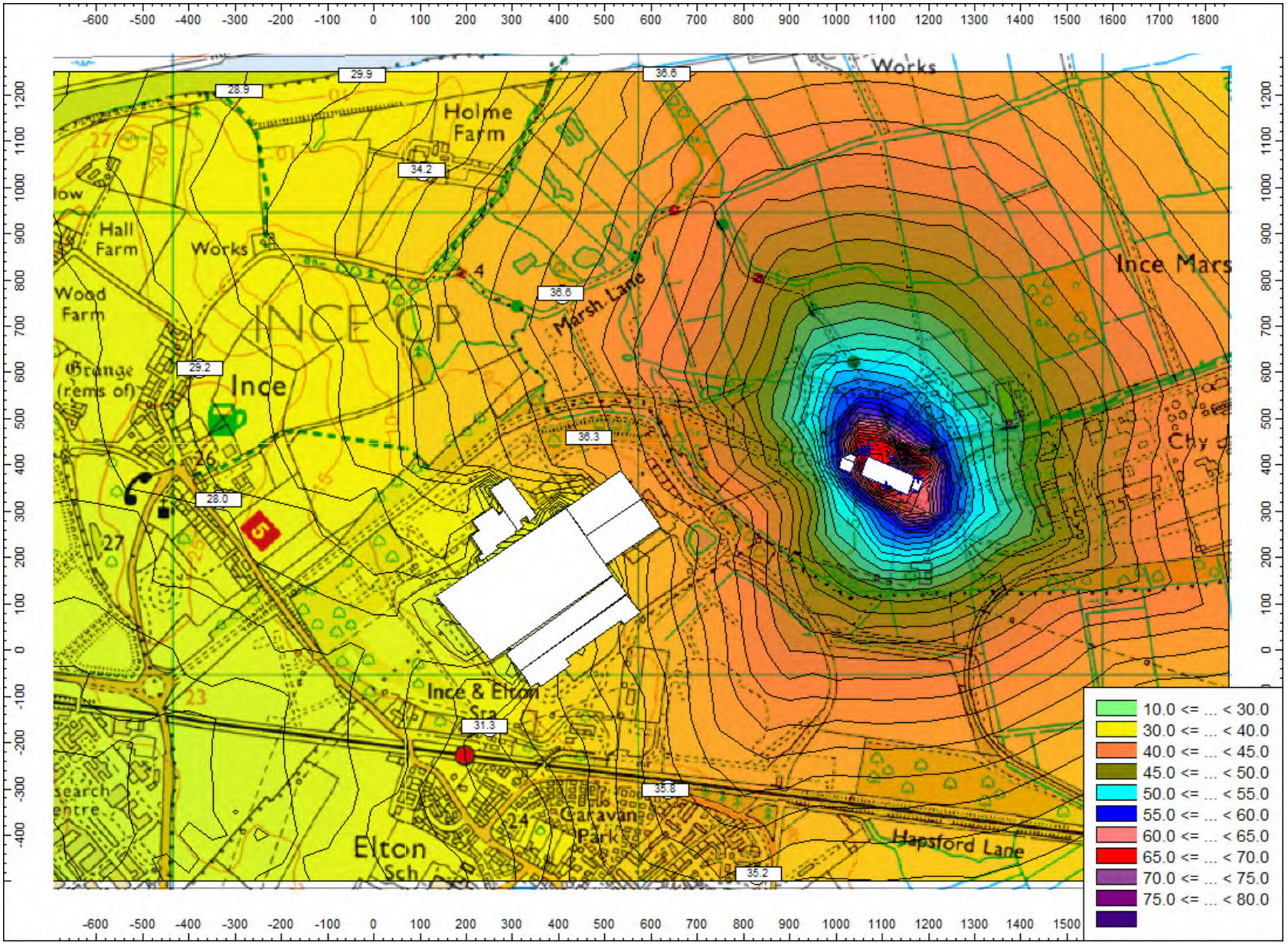
Examples of typical noise levels

Source/Activity	Indicative noise level [dB(A)]
Threshold of hearing	0
Rural night-time background	20-40
Quiet bedroom	35
Wind farm at 350m	35-45
Busy road at 5km	35-45
Car at 65km/h at 100m	55
Busy general office	60
Conversation	60
Truck at 50km/h at 100m	65
City Traffic at 5m	75-85
Pneumatic drill at 7m	95
Jet aircraft at 250m	105
Threshold of pain	140

Appendix 2

Noise Mapping Results

Noise Map 1: Noise from all Site Operations (4m above ground level)



Appendix 3

Consultant's Experience & Qualifications

Consultant: Dean Robert Kettlewell- MSc MIOA MAE I.Eng
(Director - Principal Acoustic Consultant)

Précis

As Director and Principal Acoustic Consultant with Noise & Vibration Consultants Ltd, Dean has over 40 years background experience in a wide range of issues relating to environmental, industrial and commercial noise and vibration assessment. He currently manages corporate and unit specific contracts for:

Assessment of Environmental & Industrial Noise
Environmental Noise Impact Assessments
Expert Witness representation for Planning Appeals & Hearings
Environmental Permitting Noise Impact Assessments
Industrial Noise Assessment and Control
Planning Issues for Residential and Commercial Development
Noise at Work Regulations Assessments
Building Acoustics and Sound Insulation Tests
Entertainment Noise Assessment and Control
Architectural Acoustics
Specialist knowledge in the Design of Noise Control Systems
Ground borne vibration measurement and assessment
Project Management of Noise Control Systems

Relevant Work Experience

Director & Principal Consultant - Noise & Vibration Consultants Ltd	2001- to date
Senior Acoustic Consultant - Vibrock Limited	1998 - 2001
Associate & Principal Acoustic Consultant - John Savidge & Associates	1994 - 1998
Technical Manager – LBJ Limited (Noise Control Division)	1990 - 1994
Technical Engineer/Technical Manager (1988) - Vibac (Noise Control) Ltd	1982 - 1990

Qualifications and Education

M.Sc. Applied Acoustics (Derby University – Distinction)
HNC Electrical & Electronic Engineering
IOA Diploma in Acoustics & Noise Control
IOA Certificate in Law and Administration
Certificate of Competence in Workplace Noise Assessment
Certificate of Competence in Ground Vibration Monitoring

Affiliations: Member of Institute of Acoustics (MIOA)
Member of Academy of Experts (MAE)
Member of Association of Noise Consultants (ANC)
Incorporated Engineer (I.Eng)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