Noise Impact Assessment and Noise Management Plan

Site: Dexter Plant, Tarbock Green
Reference: 51-228-R1-2
Date: May 24

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Report reference	51-228

REV REF:	DESCRIPTION	AUTHOR	CHECKED	AUTHORISED	DATE
R1-1	First issue	LF	SB	LF	22/05/24
R1-2	First issue	LF	SB	LF	29/05/24

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EXECUTIVE SUMMARY

Site Address	Village Yard, Netherley Road, Tarbock Green L35 1QG
National Grid Reference	E 346355, N 387695
Proposed Development	Variation of Environmental Permit for inert & excavation waste transfer/treatment (EPR/WP3698CA/V004).
Background	E3P were commissioned to undertake a Noise Impact Assessment in order to determine the noise impact associated with the proposed site activities and advise of any mitigation measures. This report also provides a Noise Management Plan for the site.
Surveys Completed	E3P undertook a full weekday and weekend background sound survey alongside an unattended weather station at a position representative of receptors in the vicinity of the development. Additionally, E3P attended an existing site to capture measurements of all plant and equipment to be used at the site.
Assessments Completed	E3P have undertaken hand calculations to determine the rating levels associated with the site at nearby receptors and compared this to the measured background sound levels in accordance with BS 4142.
Mitigation Recommendations	The assessment has found that mitigation measures are required in the form of acoustic barriers in order to ensure no adverse impact at surrounding receptors. Advice has been provided on Best Practicable Means and other measures to be implemented as part of the Noise Management Plan.
Conclusion and Discussion	This assessment has shown that no adverse impact is predicted at the receptors following installation of the mitigation measures and implementation of the Noise Management Plan.

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1. INTRODUCTION

1.1. BACKGROUND

E3P has been commissioned by Dexter Plant to provide a Noise Impact Assessment to support the Environmental Permit Application for the application to vary an existing Permit at Village Yard in Tarbock Green (EPR/WP3698CA/V004).

The proposals are to allow for inert & excavation waste transfer/treatment.

It is assumed that the development site will operate during daytime hours only between 07:00 to 18:00 weekdays and 08:00 to 16:00 weekends.

1.2. REPORT OBJECTIVES

The objectives of this report are as follows.

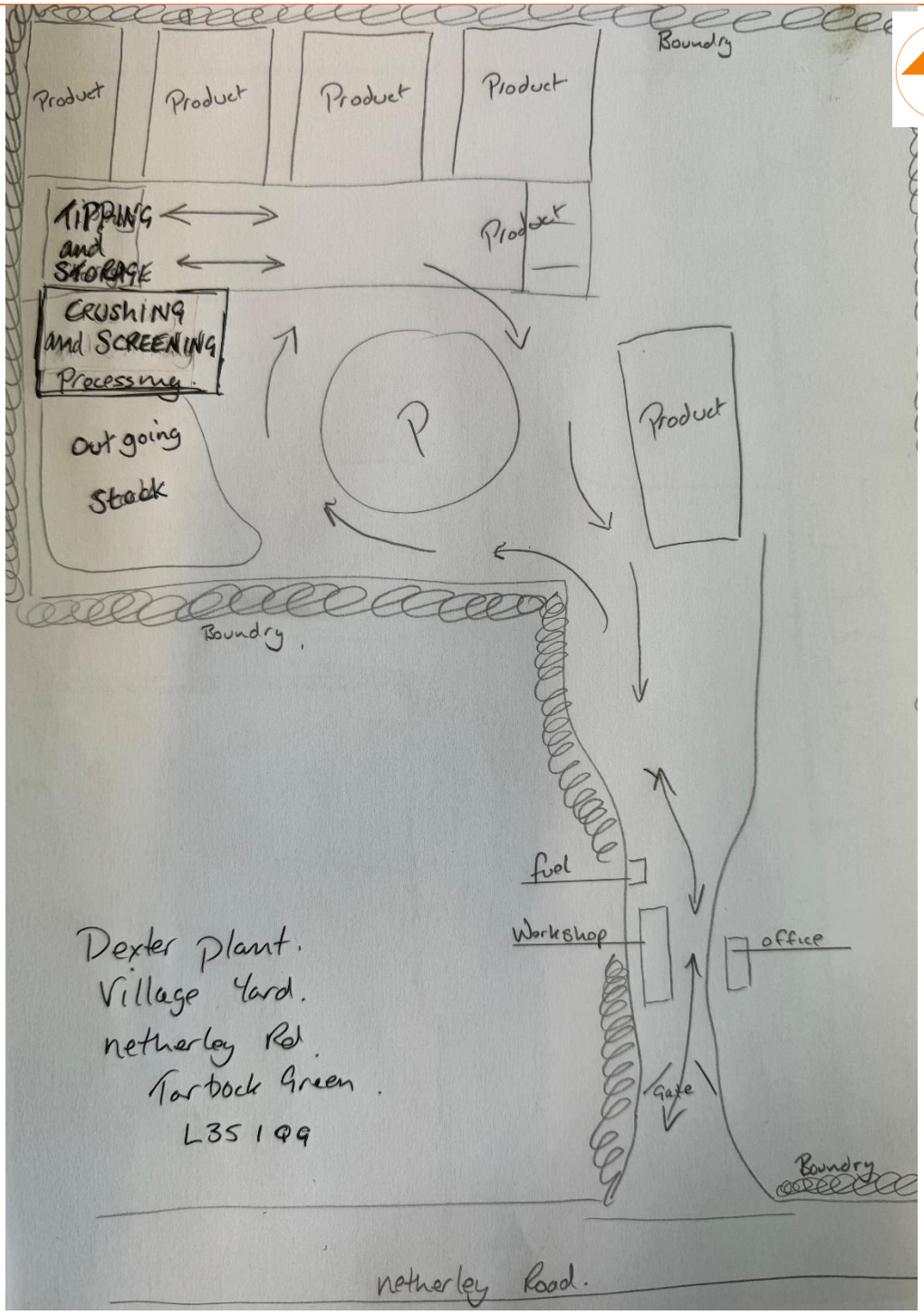
- Establish and measure the existing sound levels across the site, day and night.
- Consider the potential sources of sound impacting the site and to measure source sound levels of all applicable sources.
- Assess proposed industrial sound in accordance with BS 4142 and EA Guidance.
- Provide advice on mitigation measures, where required.
- Provide a Noise Management Plan.

1.3. PROPOSED DEVELOPMENT

E3P have been provided with a sketch of the proposed layout and operational areas of the site which includes several key areas where crushing/screening will take place and where material will be stored and moved from/to.

The site plan is indicated in Figure 1.

Figure 1 Site Plan



2. ASSESSMENT METHODOLOGY

2.1. ENVIRONMENT AGENCY (2022) NOISE AND VIBRATION MANAGEMENT: ENVIRONMENTAL PERMITS

Environmental permits have conditions that require operators to control pollution – this includes controlling noise and vibration. E3P note that the following are required competencies and standards required in relation to Noise Assessments submitted as part of an Environmental Permit Application:

> *Noise impact assessments should be carried out to an appropriate standard and by competent personnel, for example, holders of either an Institute of Acoustics:*
>
> - *Diploma in Acoustics and Noise Control*
> - *Certificate of Competence in Environmental Noise Measurement, with relevant experience*
>
> *Monitoring noise in the environment is a specialist field. Monitoring should be carried out by a qualified acoustician who can demonstrate competency in environmental work rather than, for example, occupational health and safety work.*
>
> *You must use 'BS 4142: Methods for rating and assessing industrial and commercial sound' to quantify the level of environmental noise impact from industrial processes. In rare circumstances, other methods may also be appropriate, for example, NANR45 for assessing existing low frequency sound inside a residential property.*
>
> *If you want to assess impact using another method, you should discuss and agree this with your regulator before you start the assessment.*
>
> *Where vibration is an issue, you should contact your regulator for specific advice.*

E3P note from the above and the guidance that the EA require a BS 4142 assessment to be conducted.

2.2. BS 4142: 2014+A1:2019 'METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes.
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted specific noise level from any of the above with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but to quantify what is typical.

The specific noise level also acknowledges the reference time intervals depending upon whether the noise source operates during daytime (1-hour) or night-time (15-minute) periods.

There are several 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows:

Tonality

- +2 dB: where the tonality is just perceptible.
- +4 dB: where the tonality is clearly perceptible; and
- +6 dB: where the tonality is highly perceptible.

Impulsivity

- +3 dB: where the impulsivity is just perceptible.
- +6 dB: where the impulsivity is clearly perceptible; and
- +9 dB: where the impulsivity is highly perceptible.

Intermittency

- +3 dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment. BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background sound level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

It is common that a Local Planning Authority (LPA) will specify their own criterion and, where this is the case, this criterion will usually take precedence over a simple comparison of the rating level against the background sound level.

3. DESCRIPTION OF WORKS AND SOURCES OF NOISE

The proposals are to add process inert and excavation waste for transfer or treatment at the village yard in Tarbock Green.

The proposed site layout is shown in the sketch provided by the client. It includes the provision for access routes for deliveries/collections, product areas, tipping and storage areas, crushing and screening processing and outgoing stock areas.

The plant and processes associated with the above are already operational at the clients farm to the east of the development site and, as such, E3P have conducted attended source measurements of all activity on site to inform this assessment.

There are three main sources of noise associated with the site and the measured sound pressure levels are shown in detail in section 4.0:

- Sorting and crushing of material using a Finlay screen and crusher.
- Front loader moving material.
- Delivery of material.

4. SURVEY RESULTS

Figure 2 details the Noise Measurement Position with google earth and adjacent site plan overlay.

Figure 2 Noise Measurement Position

4.1. SOURCE NOISE SURVEY – ON-SITE OPERATIONS

E3P has conducted attended measurements of existing operations at the client's farm which are to be moved to the new site. The main sources of sound were noise from the crushing and sorting of material.

The survey was carried out prior to the installation of the background sound position below.

Table 1 details the measured sound pressure levels for each operation.

Table 1 Source Noise Levels

Source	Measured Sound Pressure Level, $L_{Aeq,T}$ (dB)	Measurement distance (m)	Assumed On-time in hour period (seconds)
Crusher and Finlay screen running	93.1	1 m from crusher	2,700
	90.6	1 m from Finlay	2,700
Drive by loader	81.3	2 m	5
Reverse loader	82.3	2 m	5
Material tipping	73.6	10 m	15

4.2. UNATTENDED BACKGROUND AND AMBIENT SOUND SURVEY

E3P has conducted a full weekday and weekend ambient and background Sound Survey in order to quantify the existing levels of background and ambient sound at a position considered representative of the closest residential receptors.

The survey was carried out over the following period:

- 12:00 Friday 10th May to 11:00 Tuesday 14th May 2024.

The following noise measurement position was chosen for the Background Sound Survey:

- Noise Measurement Position 1 (NMP1): Located in the north east corner of the site adjacent to receptors to the east of the site and proposed receptors to the south west. The measurement position was under free-field conditions. The microphone of the sound level meter was attached to a tripod at a height of 1.5 m above ground level. Sound sources here were noted to be distant road traffic and birdsong.

A weather station was also installed, full hourly data is provided in Appendix III along with the sound pressure data. No notable weather events occurred with light rain showers noted between 17:00 and 21:00 on Sunday 12th May and 16:00 on Monday 13th May to 08:00 on Tuesday 14th May 2024. Upon review of the data, these events did not adversely affect the measured noise levels. Wind speeds were generally less than 5 m/s throughout the survey.

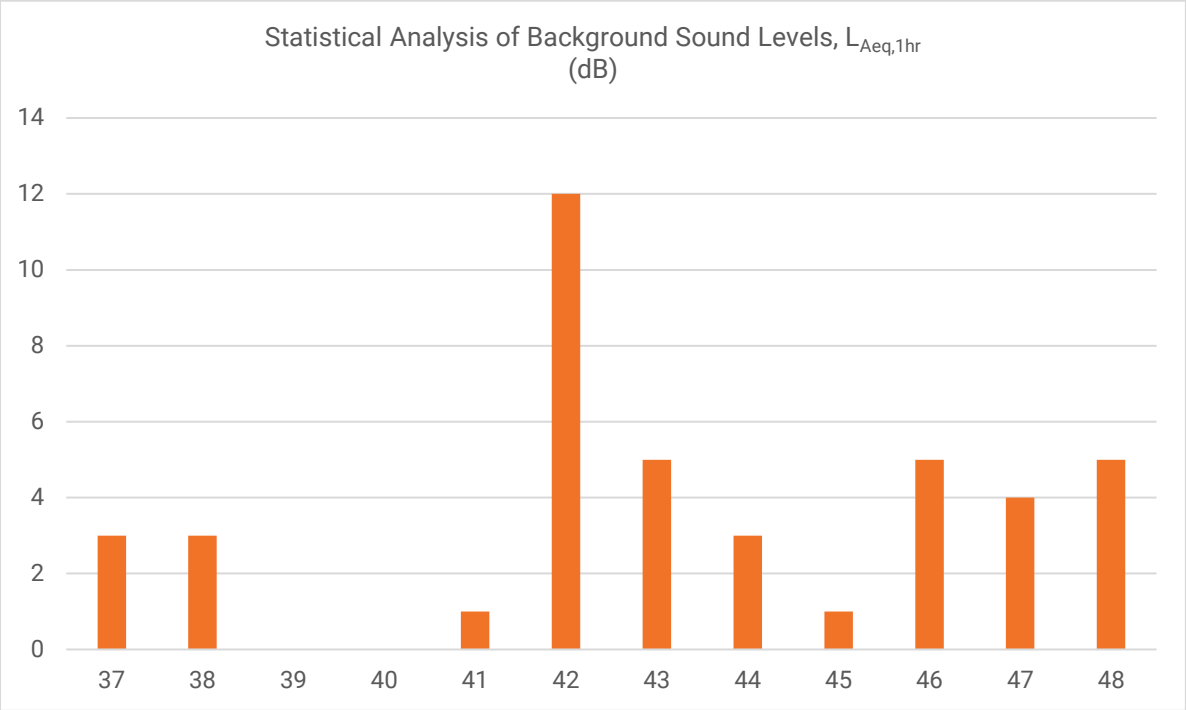
Table 22 details the range of measured background and ambient sound levels. The daytime levels correspond to the $L_{A90,1hr}$. As it is assumed the processing of waste will only take place between 07:00 to 18:00 weekdays and 08:00 to 16:00 weekends, only daytime periods are given.

Table 2 Background and Ambient Noise Levels – NMP1

Date	Assessment Period	Range of Measured Background Sound Levels, $L_{A90,1hr}$ (dB)	Range of Measured Ambient Sound Levels, $L_{Aeq,1hr}$ (dB)
Friday 10th May 2024	Daytime 12:00-18:00	36.9-38.2	41.8-46.4
Saturday 11th May 2024	Daytime 08:00-16:00	40.9-43.7	46.0-51.8
Sunday 12th May 2024	Daytime 08:00-16:00	41.6-43.9	47.5-53.0
Monday 15th May 2024	Daytime 08:00-18:00	44.8-48.4	48.5-55.4

The full hourly data set can be found in Appendix III of this report.

A statistical analysis of all the daytime data has been undertaken. See below graph.



As can be seen, the most commonly occurring background sound level during daytime periods is noted to be 42 dB. As such, this level will be used in the assessment.

The equipment outlined in 3 was used for the noise surveys.

Table 3 Noise Measurement Equipment and Calibration Dates

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	LAST CALIBRATION DATE
NMP1	Sound Level Meter	01dB Fusion	14146	7th September 2023
	Microphone	GRAS 40CD	556143	
	Calibrator	Cirrus CR 515	96168	21st February 2024

The sound level meter was field calibrated before and after measurements with no significant drift witnessed. A correction of +0.2 dB was noted at the start and end of the survey.

5. BS 4142 ASSESSMENT

This section considers the likely rating levels from the operations in accordance with BS 4142 and advice given in the Noise and Vibration Management guidance from the EA.

For the purposes of the assessments, E3P has undertaken detailed hand calculations for noise from the restoration operations to determine resultant noise at existing and proposed receptors.

The following assumptions have been made:

- Ground elevations around the site have been taken as existing with the assumption of no ground variation between source and receiver.
- It is assumed that intervening ground is 50% soft ground.
- The source heights of the equipment are taken from observations on site and attributed to the main source, i.e. engines.

For the BS 4142:2014+A1:2019 assessment, penalties are applied to the specific sound level to provide the rating level. These penalties relate to the acoustic features of the sound source.

E3P consider the following penalties are applicable:

- Tonality – no tonality detected via objective analysis for main sources of noise.
- Intermittency - +3 dB applied.
- Impulsivity - +3 dB just perceptible impulses from observations on site.

Accordingly, a total correction of +6 dB is applied to the specific noise level.

Table 4 details the BS 4142 assessment for each respective receptors. As receptors are at differing distances and angles from the operations, multiple receptor locations are used to ensure that where any barriers are required are bespoke for that boundary.

As noted in Section 4.2, the typical background sound level is noted to be 42 dB. This level of background is applicable to the receptors to the east. However, the position was further from the road than those to the south and south west. Indeed, a previous Noise Assessment, undertaken by E3P (under planning reference 22/00470/FUL) for the proposed residential development to the south west determined a typical background sound level of 47 dB median and 46 dB average between the hours of 05:00 and 16:00. Levels ranged between 40.4 dB and 52.1 dB with road traffic and birdsong noted.

These levels are taken between periods when no on-site activity was noted. As such, a background sound level of 46 dB is applied to the proposed receptors and the single dwelling to the south.

Following calculations of sound power levels from the data provided in Table 2, it is clear that noise from the crusher and Finlay is more than 15 dB higher than other sources of noise. Indeed, the combined sound power level of these two machines is 102 dB, allowing for time correction, and the next highest sound power is noted to be 84 dB for tipping of material. As such, all calculations will be based on the distances from the crushing/screening area based on a point source of 102 dB L_{wA}.

Table 4 BS 4142 Assessment

Calculation Step	Eastern Receptor	South Eastern Receptors	Southern Receptor	Proposed Residential SW
Combined plant, L_{wA}	102	102	102	102
Distance to receptor (m)	148	149	105	45
Adjust for distance (dB)	-51.4	-51.5	-48.4	-40.7
Adjust for ground correction (CRTN method) (dB)	-4.5	-4.5	-4.0	-2.6
Adjust for barrier att (dB)	-5[1]	0	0	-10[2]
Estimated $L_{Aeq,t}$ free-field (dB)	38.1	43.0	46.6	45.3
Acoustic feature correction (dB)	+6	+6	+6	+6
Rating level, $L_{A,r}$ (dB)	44	49	53	51
Background sound level, $L_{A90,t}$ (dB)	42	46	46	46
Difference, +/- (dB)	**+2**	**+3**	**+7**	**+5**

[1] This relates to the intervening buildings at the receptor and the relative height difference with the receptor some 7 m lower than the site.
[2] this relates to the proposed barrier (bund and fence combination) at the residential development which was recommended in order to remove line of sight to the development.

It is found that rating levels are expected to exceed the background sound level at all receptors. As such, mitigation measures are required in order to reduce rating levels at the receptors.

5.1. COMMERCIAL SOUND IMPACT CONTEXT AND UNCERTAINTY

In order to determine the final outcome of the assessment, the context must be considered, in accordance with BS 4142:2014+A1:2019, Section 11. The factors to be considered are discussed below:

THE ABSOLUTE LEVEL OF THE SOUND

Since the assessment relates to a future noise source, it is not possible at present to compare the Specific Noise Level with the residual sound, as discussed within the standard. However, the absolute noise level at the façade of the most affected residential receptor is 47 dB $L_{Aeq,1hr}$. Assuming 13 dB for attenuation provided by an open window, this would result in the internal noise level of 34 dB which is 1 dB below the internal criterion given in BS 8233:2014. As such, this would not cause adverse impact, notwithstanding the outcome of the above assessment. However, for such noise sources, a relaxation of the internal criterion is usually justified to 30 dB and the noise would exceed this.

However, garden noise levels would fall below the design range of 50-55 dB as outlined in BS 8233 for relaxation purposes.

THE CHARACTER AND LEVEL OF THE RESIDUAL SOUND COMPARED TO THE CHARACTER AND LEVEL OF THE SPECIFIC SOUND

As discussed above, this is not directly possible since the assessment relates to a proposed noise source rather than an existing noise source. However, there is similar operations present on site but without the operation of the main noise sources, i..e the crusher/screener and so industrial noise already forms part of the existing acoustic environment, albeit to a lesser extent that proposed. As such, little weight can be given to this beyond the outcome of the assessment.

THE SENSITIVITY OF THE RECEPTOR AND WHETHER DWELLINGS OR OTHER PREMISES USED FOR RESIDENTIAL PURPOSES WILL ALREADY INCORPORATE DESIGN MEASURES THAT SECURE GOOD INTERNAL AND/OR OUTDOOR ACOUSTIC CONDITIONS.

The receptors are residential and are therefore considered to be sensitive. Given that details of the existing receptors are not known, it is assumed that no design measures are incorporated, i.e. open windows rather than trickle vents are relied upon for ventilation. Based on the absolute noise levels at the façade, the internal noise levels would be below BS 8233:2014 criteria and would be acceptable when the windows are open or in gardens without barriers/fences.

Given the contextual factors discussed above in accordance with BS 4142:2014+A1:2019, it is concluded that the sound sources proposed are likely to have a low to adverse impact during the daytime periods.

6. MITIGATION MEASURES

The previous section determined an exceedance of the background sound level at all receptors. As such, mitigation measures in the form of acoustic barriers are proposed around the crushing/screening area in the form a 4.5 m high barrier. This is likely to be via the lego brick blocks that can be utilised on site and built to the required height. However, this could be a solid barrier or earth bund and fence combination.

Accordingly, the assessment is repeated below with the barrier in place.

Table 5 BS 4142 Assessment with Barrier around Crushing/Screening Area

Calculation Step	Eastern Receptor	South Eastern Receptors	Southern Receptor	Proposed Residential SW
Combined plant, L_{wA}	102	102	102	102
Distance to receptor (m)	148	149	105	45
Adjust for distance (dB)	-51.4	-51.5	-48.4	-40.7
Adjust for ground correction (CRTN method) (dB)	-4.5	-4.5	-4.0	-2.6
Adjust for barrier att (dB)	-5[1]	-5	-13.8	-14.1[2]
Estimated $L_{Aeq,t}$ free-field (dB)	38.1	38.0	32.8	41.2
Acoustic feature correction (dB)	+6	+6	+6	+6
Rating level, $L_{A,r}$ (dB)	44	44	39	48
Background sound level, $L_{A90,t}$ (dB)	42	46	46	46
Difference, +/- (dB)	**+2**	-2	-7	**+2**

[1] This relates to the intervening buildings at the receptor and the relative height difference with the receptor some 7 m lower than the site. The barrier proposed would be open to the east.
[2] this assumes attenuation by the proposed on-site barrier and not that provided by the off-site barrier.

As well as reducing noise from the crushing/screening area, this barrier will also remove line of sight from the tipping and storage area for receptors to the south and south west.

As can be seen, the exceedance is reduced to +2 dB at the eastern and south western receptors. BS 4142 provides the following advice:

> *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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.*

It is considered that these minor exceedances are not adverse. Indeed, specific noise levels in gardens are no more than 38 dB and noise levels in habitable rooms are likely not to exceed 30 dB with windows open.

As such and considering the height of the barriers and layout of the development, the above outcome is considered best case with little benefit available from increasing the height of the barrier.

However, in order to ensure noise levels are kept as low as possible and to protect the amenity of the residents, additional best practice measures are given in the next section. These measures are likely to reduce noise levels from the site by at least 2 dB.

7. NOISE MANAGEMENT PLAN

7.1. NOISE CONTROL MEASURES

7.1.1. GENERAL

The below details physical and management measures which can be included in on-site practices and procedures to control noise at the nearby receptors. These measures are in the form of best practicable means (BPM) with noise generating activities being limited to core working hours to minimise nuisance.

Within the constraints of efficient site working and the requirements of the relevant British Standards, the following noise control measures should be implemented, wherever practicable and considered necessary, during the construction period:

- General induction training for site operatives and specific training for staff having responsibility for particular aspects of controlling noise from the site.
- Use of most environmentally acceptable and quietly operating plant and equipment appropriate to the works with emission levels limited to relevant EC Directive/UK Statutory Instrument levels and levels quoted in BS 5228, wherever possible.
- Plant maintenance operations should be undertaken away from the nearest noise-sensitive properties at all times and wherever practicable.
- Plant not in operation should be shut down, i.e. not left idling.
- Avoid scraping of material using front loader to avoid high noise levels in the storage areas.
- Drivers should ensure that lorry tailgates are shut and locked before leaving tipping or drop off areas.

7.1.2. MANAGEMENT CONTROL MEASURES

A comprehensive range of management control measures could be implemented at the site including:

- All plant and equipment should be regularly maintained to ensure that no item will produce excessive noise.
- Traffic movements on Site should be kept within the core working hours to avoid disturbance for receptors along the local road network.
- A speed limit of 10 mph should be in place at the site access and within the site to limit the level of noise and vibration, especially from heavy goods vehicles; and
- Site staff should be made aware that they are working in the immediate vicinity of residential receptors and avoid all unnecessary noise and vibration due to misuse of tools and equipment, and unnecessary shouting and radios. To further enhance this, staff should be trained to operate the equipment and plant without causing excess noise and vibration including measures such as not dropping waste from a height.

If at any time it is necessary to undertake temporary actions that are likely to cause elevated levels of noise, the Site manager should liaise with the Environmental Health Officer (EHO) at the Local Planning Authority (LPA) and/or the Environment Agency and the closest affected dwellings to inform them of the works to take place and the duration the works will last.

7.2. PROGRAM OF NOISE MONITORING

Where required following complaints or at the request of the LPA/EA, it is recommended that a programme of noise monitoring is undertaken at a position representative of R1 to determine whether noise from the site is considered adverse.

The purpose of the noise monitoring programme is to facilitate data acquisition to demonstrate to the LPA/EA that the permitted development is operating as expected without elevated noise levels and in such a manner as to minimise the noise impacts at nearby noise-sensitive receptors.

If the guideline noise limits are breached, the noise monitoring scheme will prompt remedial actions to ensure on-going future compliance.

Noise levels shall be measured using a Sound Level Meter conforming to type 1 or better of the latest versions of British Standard EN 61672-1:2003 Electro-acoustics Sound Level Meters, Specifications. The Sound Level Meter shall be field-calibrated before and after monitoring using an acoustic calibrator conforming to the latest version of British Standard EN 60942:2003 Electro-acoustics, Sound Calibrators. The Sound Level Meter shall be calibrated to a traceable standard by a UKAS-accredited laboratory, or equivalent, within a 24-month period before the survey and all acoustic calibrators shall be calibrated to a traceable standard by a UKAS-accredited laboratory, or equivalent, within a 12 month period before the survey.

Noise measurements shall be undertaken by a suitably qualified person at the noise sensitive locations identified above. The noise measurements shall be undertaken during a normal working day, during typical working hours, avoiding meal breaks and times when plant and equipment within the site or on the access road are not operational.

Noise levels shall also be measured during a period when the Site is not operational, for example during a lunch break or shift change, to enable the noise levels attributable to works alone, be determined by decibel subtraction.

The sound level meter shall be positioned such that the microphone is located 1.2 to 1.5 m above local ground level in free-field conditions, i.e. at least 3.5 m from the nearest vertical, reflecting surface, at all survey locations. Noise levels shall be measured over a one-hour period during the normal working day. A note of the prevailing weather conditions shall be made at the time of the survey and the audibility of the site shall be noted at each measurement location during each measurement period. Noise measurements shall only be taken when the wind speed is less than 5 m/s and when there is no rain forecast.

On completion of each noise survey a technical report can be prepared on behalf of the contractor and held on record by the Environment Manager. This report should be suitable for submission to the LPA if requested or following noise complaints.

7.3. NOISE CONTINGENCY MEASURES

7.3.1. INTRODUCTION

Elevated levels of noise may be identified either by receipt of a complaint from a third party suggesting that there is excessive noise or by detection of a result of the noise monitoring.

This Section details the contingency measures in place to identify the source of elevated noise levels, bring levels back under control and minimise their impact.

7.3.2. NOISE COMPLAINT INVESTIGATION

A site diary, plus forms to record complaints, should be completed by the Site manager and input into the IMS, or similar.

All complaints from third parties should be forwarded to the Site manager.

The Site manager should ensure that:

- The complaint is investigated to identify the cause, if necessary, this may involve direct communication with the complainant.
- In the event of elevated levels of noise being detected, the presence of 'abnormal' onsite activity is assessed and if necessary preventative action is taken that will prevent a reoccurrence of the same problem. These actions must be documented.
- The Complainant should be contacted and given information on the investigations conducted and actions taken as appropriate.
- Complaints involving a location with Local Authority Contracts will be reported in line with specific Contract requirements and timescales. Local procedures may need to be in place to ensure these are adhered to.
- If the investigation indicates that the complaint has not been justified this should be clearly recorded on the report. All complaints must be logged.

7.3.3. ELEVATED NOISE LEVELS

Any elevated levels of noise identified will be mitigated as follows:

- The Site manager will investigate the source of the noise and carry out a range of checks at the identified source of the elevated levels if it is found to be originating from within the site. As part of these checks, the Site manager will consider the need for further monitoring.
- Any noise monitoring will be completed in accordance with BS 4142:2014+A1:2019. Monitoring locations will be agreed with the EHO prior to undertaking monitoring.
- The results of any noise monitoring will determine whether the site is causing an unacceptable impact at the receptor in question.
- The Site manager will then ensure the plant is being operated to the manufacturer's specification and ensure that any improvements required to minimise the noise levels are made.

To further mitigate the elevated levels, the following actions shall also be considered.

- The replacement of equipment identified as generating excess noise.
- Once the improvements identified by the Site manager have been completed, the manager will commission a further set of monitoring to ensure that the improvements have met the required standard. If the levels are still not being met then the manager will repeat the request for improvements and subsequent monitoring until the limits are met.

If operational failings are identified, the retraining of employees should take place to ensure that all employees operate to the required standards. If the failings are identified as part of the operating techniques, then the problem will be raised as part of the review of control measures.

The Site manager will ensure a close liaison with the LPA throughout all stages of the process following an identified elevated noise.

7.3.4. REPORTING MEASURES

In the event of elevated levels of noise and/or vibration being identified, the event should be reported into an appropriate management system by a member of operational staff. Upon notification of an Environmental Incident, the TCM (or designated responsible person) should complete an incident reporting form. The completed form should then be distributed throughout the company for review at operational, management and health and safety meetings.

The system should record any actions taken to rectify the issue, ensure that any necessary actions or review are recorded onto the system and ensure that the person reporting the incident is notified.

The Site manager will investigate the performance failure event within 2 hours and, if necessary, will report the event to the LPA. Once the issue has been resolved, the corrective action taken will be entered onto the system and the issue should be closed.

7.4. EMERGENCY PLANS

7.4.1. GENERAL

This Section considers the potential for accidents (or incidents) which would result in the loss of control of noise emissions and could have an unacceptable short-term impact at the closest receptors.

The measures in place to mitigate any emergency situations will generally be the same as the contingency measures identified in Section 7.

If the situation is considered to be an emergency by the Site manager then the mitigation measures will be immediately implemented, and the manager will consider limiting the hours of operation or immediately suspending the site operations creating the unacceptable levels of noise. These measures will be considered on a case by case basis.

7.4.2. BREAKDOWN OF EQUIPMENT AND PLANT

Elevated levels of noise may escape from the site due to the breakdown of any plant items or equipment. Machines not operating to the manufacturer's specification may create unacceptable levels of noise and the failure of control equipment such as damage to acoustic cladding or acoustic barriers may allow unacceptable levels of noise to escape from the site.

In the event of equipment breakdown, the mitigation measures to be undertaken are the same as the contingency mitigation measures detailed in Section 5.

8. CONCLUSIONS AND DISCUSSION

E3P were instructed to produce a Noise Impact Assessment and Noise Management Plant to accompany a Variation of Environmental Permit application for inert & excavation waste transfer/treatment (EPR/WP3698CA/V004).

E3P undertook a full weekday and weekend background sound survey alongside an unattended weather station at a position representative of receptors in the vicinity of the development.

Additionally, E3P attended an existing site to capture measurements of all plant and equipment to be used at the site.

E3P have undertaken hand calculations to determine the rating levels associated with the site at nearby receptors and compared this to the measured background sound levels in accordance with BS 4142.

The assessment has found that mitigation measures are required in the form of acoustic barriers in order to ensure no adverse impact at surrounding receptors.

Advice has been provided on Best Practicable Means and other measures to be implemented as part of the Noise Management Plan.

This assessment has shown that no adverse impact is predicted at the receptors following installation of the mitigation measures and implementation of the Noise Management Plan.

END OF REPORT

APPENDIX I
LIMITATIONS

GENERAL

1. This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P “Terms of Business” or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.
3. Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.
4. The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

NOISE AND VIBRATION IMPACT ASSESSMENTS

5. Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment.
6. Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance.
7. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walkover inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects’ responses may not have been received from all parties. E3P cannot be held responsible for any disclosures that are provided post-production of our report and will not automatically update our report.
8. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, E3P reserves the right to review such information and, if warranted, to modify the opinions accordingly.
9. E3P does not warrant work/data undertaken/provided by others.

APPENDIX II
GLOSSARY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the “A”-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or LAeq, LA90 etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 6 Typical Sound Pressure Levels

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20-30	Quiet bedroom at night
30-40	Living room during the day
40-50	Typical office
50-60	Inside a car
60-70	Typical high street
70-90	Inside a factory
100-110	Burglar alarm at 1 m away
110-130	Jet aircraft on take off
140	Threshold of pain

ACOUSTIC TERMINOLOGY

Table 7 Terminology

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
LAeq, T	LAeq is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
LAmax	LAmax is the maximum A-weighted sound pressure level recorded over the period stated. LAmax is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the "fast" sound level meter response.
L10 and L90	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L90 is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L10 index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

APPENDIX III
MEASUREMENT DATA

Table 8 Measured Background and Ambient Noise Levels

Measurement Start Time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Mean Temperature, °C	Mean Wind Speed m/s	Mean Rain Intensity mm/h
10/05/2024 12:00	44.9	37.3	21.8	1	0
10/05/2024 13:00	41.8	37.4	22.5	1	0
10/05/2024 14:00	43.0	36.9	23.5	1	0
10/05/2024 15:00	46.2	37.9	24	0.7	0
10/05/2024 16:00	46.4	37.6	24.1	0.8	0
10/05/2024 17:00	42.3	38.2	23.9	1	0
10/05/2024 18:00	42.2	37.7	23.3	1	0
10/05/2024 19:00	45.4	38.4	23.2	0.7	0
10/05/2024 20:00	46.0	40.3	19.8	0.3	0
10/05/2024 21:00	45.4	41.9	16.9	0.3	0
10/05/2024 22:00	44.3	40.1	15.3	0.3	0
10/05/2024 23:00	42.5	39.5	14.2	0.3	0
11/05/2024 00:00	40.9	37.3	13.8	0.4	0
11/05/2024 01:00	39.9	36.8	13.5	0.3	0
11/05/2024 02:00	40.3	35.2	13.2	0.2	0
11/05/2024 03:00	40.8	36.3	13	0.2	0
11/05/2024 04:00	53.5	41.8	12.6	0.2	0
11/05/2024 05:00	55.6	45.7	12.4	0.2	0
11/05/2024 06:00	52.5	45.2	13.2	0.2	0
11/05/2024 07:00	51.1	41.6	14.9	0.3	0
11/05/2024 08:00	50.5	41.8	16.9	0.5	0
11/05/2024 09:00	49.1	40.9	18.8	0.7	0
11/05/2024 10:00	46.1	41.7	20	1.3	0
11/05/2024 11:00	46.7	42.6	20.6	1.4	0
11/05/2024 12:00	46.0	41.6	21	1.1	0
11/05/2024 13:00	49.4	42.4	23.6	1	0
11/05/2024 14:00	51.8	42.1	24.7	1	0
11/05/2024 15:00	51.2	43.7	24.9	1	0
11/05/2024 16:00	47.7	42.6	24.2	1.4	0
11/05/2024 17:00	46.8	42.8	23.4	1.2	0
11/05/2024 18:00	44.8	41.5	22.6	1	0
11/05/2024 19:00	48.6	42.5	21.7	0.7	0
11/05/2024 20:00	45.3	42.1	20.4	0.4	0
11/05/2024 21:00	44.8	41.9	18.9	0.3	0
11/05/2024 22:00	44.9	42.1	18.2	0.5	0
11/05/2024 23:00	46.9	41.0	17.4	0.5	0
12/05/2024 00:00	41.5	38.3	16.7	0.5	0
12/05/2024 01:00	40.0	36.6	15.5	0.2	0
12/05/2024 02:00	39.6	35.2	14.7	0.2	0
12/05/2024 03:00	39.4	35.0	14.1	0.2	0
12/05/2024 04:00	53.0	38.2	14.4	0.2	0
12/05/2024 05:00	55.1	43.1	13.6	0.2	0
12/05/2024 06:00	51.4	43.5	13	0.1	0
12/05/2024 07:00	53.0	43.2	13.7	0.2	0
12/05/2024 08:00	48.8	41.8	16.1	0.4	0
12/05/2024 09:00	49.4	41.7	18.6	0.6	0

Measurement Start Time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Mean Temperature, °C	Mean Wind Speed m/s	Mean Rain Intensity mm/h
12/05/2024 10:00	49.7	41.6	19.8	1.2	0
12/05/2024 11:00	49.3	43.9	21.7	1.1	0
12/05/2024 12:00	48.3	43.9	23.1	1.1	0
12/05/2024 13:00	50.5	42.8	23.4	1.2	0
12/05/2024 14:00	47.5	41.9	23.4	1.4	0
12/05/2024 15:00	53.0	42.2	24.7	1.3	0
12/05/2024 16:00	47.1	42.2	24.5	1.1	0
12/05/2024 17:00	48.0	42.4	22.9	0.6	0.1
12/05/2024 18:00	47.0	43.3	19.9	0.7	0.3
12/05/2024 19:00	52.1	46.1	17.2	0.5	3.1
12/05/2024 20:00	49.2	42.1	15.9	0.3	0
12/05/2024 21:00	50.8	41.3	15.5	0.2	0
12/05/2024 22:00	48.0	37.1	15.5	0.3	0
12/05/2024 23:00	45.6	31.5	14.8	0.3	0
13/05/2024 00:00	37.7	32.2	13.6	0.2	0
13/05/2024 01:00	34.1	28.3	13.4	0.2	0
13/05/2024 02:00	30.3	27.3	13.8	0.2	0
13/05/2024 03:00	30.6	25.7	14.2	0.3	0
13/05/2024 04:00	53.1	31.6	13.8	0.5	0
13/05/2024 05:00	57.6	41.8	12.6	0.8	0
13/05/2024 06:00	56.0	43.4	12.2	0.6	0
13/05/2024 07:00	55.4	44.8	13.5	0.8	0
13/05/2024 08:00	48.5	45.5	14.3	1	0
13/05/2024 09:00	51.1	46.3	15.4	1.5	0
13/05/2024 10:00	51.7	47.7	15.7	1.8	0
13/05/2024 11:00	52.4	47.0	16.1	1.8	0
13/05/2024 12:00	52.2	46.2	16.8	1.6	0
13/05/2024 13:00	52.1	47.3	16.7	1.5	0
13/05/2024 14:00	53.0	47.1	17.4	1.5	0
13/05/2024 15:00	52.6	48.2	17.9	1.5	0
13/05/2024 16:00	52.4	48.4	17.4	1.3	0.1
13/05/2024 17:00	53.6	47.7	17	1.3	0
13/05/2024 18:00	48.9	46.4	16.8	1	0.1
13/05/2024 19:00	50.6	44.9	16.1	0.9	0
13/05/2024 20:00	50.1	45.0	15.4	1.2	0.2
13/05/2024 21:00	51.3	44.2	14.6	1.2	0.2
13/05/2024 22:00	46.3	44.0	14.3	1.1	0.4
13/05/2024 23:00	47.5	43.8	14.2	1	0.4
14/05/2024 00:00	43.4	40.4	14	0.6	0.1
14/05/2024 01:00	42.1	38.0	13.9	0.5	0
14/05/2024 02:00	41.4	37.3	13.9	0.5	0.1
14/05/2024 03:00	41.9	37.9	14	0.4	0
14/05/2024 04:00	52.6	42.3	14	0.5	0.2
14/05/2024 05:00	57.2	47.7	13.9	0.4	0.6
14/05/2024 06:00	52.1	48.7	13.9	0.4	0.6
14/05/2024 07:00	53.1	48.4	14.1	0.4	0.5
14/05/2024 08:00	51.9	46.6	14.5	0.3	0.1

Measurement Start Time	Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Measured Background Noise Level, $L_{A90,1hr}$ (dB)	Mean Temperature, °C	Mean Wind Speed m/s	Mean Rain Intensity mm/h
14/05/2024 09:00	51.1	46.0	14.8	0.6	0