POWERFUEL

Portland energy recovery facility

Noise impact assessment

September 2020

Powerfuel Portland

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Noise Impact Assessment

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Powerfuel Portland is applying for planning permission for a new energy recovery facility (ERF) for a site on the Isle of Portland, Dorset. During the environmental impact assessment process, noise and vibration was scoped out but a noise assessment is being submitted in support of the planning application, in accordance with local requirements. Dorset Council stated in its scoping opinion that the noise and vibration assessment must cover construction and operation, including noise from road traffic generated by the proposed scheme.

This report provides a noise impact assessment covering the issues requested by Dorset Council. This report considers:

- Construction noise and vibration, including construction traffic;
- Noise during operation of the plant, including the cumulative effects of other proposed developments on the Isle of Portland; and
- Noise from road traffic generated by use of the proposed development.

Due to restrictions and changes in noise level due to reduced economic activity during the coronavirus pandemic, it has not been possible to undertake a baseline noise survey. Data measured by others has therefore been used as a basis for the assessment, which has been undertaken to verify that a solution to delivery of the scheme, while achieving acceptable noise limits, would be viable. It is suggested that planning approval could be conditional on the baseline being confirmed by survey once lockdown restrictions are fully lifted and the design then reviewed against the actual data.

The conclusions to the assessment are:

- Construction noise will be controlled and best practicable means of working used such that there will be no significant effects on local residents and businesses;
- Additional road traffic during construction would lead to a temporary increase in noise but the duration and magnitude of effect are such that the effect is assessed as a not significant change in level;
- Similarly, during operation of the proposed scheme, the additional traffic movements would lead to a minor impact and are assessed as a not significant effect;
- Noise from operation of the proposed scheme can be controlled through the design of the building envelope such that noise emissions would not lead to a significant effect; and
- A noise survey is recommended following the coronavirus lockdown and when transport and commercial activity have returned to more normal conditions. The survey results would be used as a basis for confirming noise emission limits and designing the ERF accordingly.

1 Introduction

Powerfuel Portland is applying for planning permission for a new energy recovery facility for a site on the Isle of Portland, Dorset. During the environmental impact assessment process, noise and vibration was scoped out but a noise assessment is being submitted in support of the planning application, in accordance with local requirements. Dorset Council stated in its scoping opinion that the noise and vibration assessment must cover construction and operation, including noise from road traffic generated by the proposed scheme. This report provides a noise impact assessment covering these issues.

The structure of the report is:

Section 2 describes relevant national and local policy;

Section 3 describes the assessment methods, including the sources of information used and the assessment criteria;

Section 4 provides the baseline noise levels;

Section 5 considers the environmental noise impacts and the significance of their effects;

Section 6 discusses the provision of mitigation to reduce impacts where required.

Section 7 considers the cumulative effects associated with other developments on the Isle of Portland.

A glossary of acoustic terminology used in this report is included at Appendix A. Appendix B provides baseline noise data (from a third party) and Appendix C contains the assumptions made in calculating the construction noise levels. Traffic flows used for noise calculations during operation of the ERF are included in Appendix D.

The location of the proposed development is shown in Figure 1

Figure 1 Location of the proposed development

2 Planning Policy Context

2.1 National Planning Policy

The Government's noise policy is set out in the Noise Policy Statement for England[1] (NPSE). In legislative and policy terms, noise is taken to include vibration.

Government noise policy sets three aims, which are to be met within the context of the government policy on sustainable development:

- to avoid significant adverse impacts on health and quality of life;
- to mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

The same three aims are also reflected in:

- National Planning Policy Framework[2] (NPPF); and
- Planning Practice Guidance – Noise[3] (PPG-Noise).

PPG-Noise provides guidance on the application of Government noise policy. Thresholds for identifying adverse effect levels in terms of Government noise policy are not defined numerically in any Government document; rather they are to be established specifically for each scheme and context. The values adopted for this assessment are discussed later in this report. The thresholds adopted to identify noise policy adverse effect levels have been applied following precedent set on other recent schemes.

Environment Agency Horizontal Guidance for Noise[4] describes the principles of noise measurement and prediction and the control of noise by design, by operational and management techniques and using abatement technologies. The new facility will require a permit, issued by the Environment Agency (EA) under the Integrated Pollution Prevention and Control (IPPC) Directive Regulations Part A(1) Installations 2010[5] guidance, which accompany the Environmental Permitting (England and Wales) Regulations 2016. A more detailed study than is possible at this stage in the design process may be required to fulfil this obligation. For clarity, it is not intended that this noise impact assessment meets all the requirements for the IPPC permit.

[1] Department for Environment Food and Rural Affairs (2010) Noise Policy Statement for England
[2] Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework
[3] Ministry of Housing, Communities and Local Government (2019) Planning Practice Guidance – Noise
[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298126/LIT_8291_337647.pdf
[5] https://www.gov.uk/government/publications/environmental-permitting-guidance-integrated-pollution-prevention-and-control-ippc-directive-part-a-1-installations-and-part-a-1-mobile-plant

2.2 Local Planning Policy

Adopted Local Plans in the Dorset Council area are used to guide new development and determine planning applications. Despite the council now being unitary the plans remain relevant until the new Dorset Local Plan is adopted[6].

West Dorset, Weymouth and Portland Local Plan 2015[7] considers noise impacts in relation to amenity. It states '*While recognising that many developments will create some noise, the level of noise should not give rise to significant adverse impacts on health and quality of life. Acceptable noise levels will vary according to the noise source, receptor and time, and the policy is not intended to unduly restrict existing, established businesses that may need to develop. Planning conditions may be used to reduce adverse impacts*.'

On amenity, Policy ENV16 states that development proposals will only be permitted provided that '*…they do not generate a level of activity or noise that will detract significantly from the character and amenity of the area or the quiet enjoyment of residential properties*'. Policy COM11 also refers to noise in a similar context related to renewable energy.

Dorset Council Adopted Waste Plan[8] Policy 13, Amenity and Quality of Life, requires that '*Proposals for waste management facilities will be permitted where it is demonstrated that any potential adverse impacts on amenity arising from the operation of the facility and any associated transport can be satisfactorily avoided or mitigated to an acceptable level, having regard to sensitive receptors, specifically addressing all, but not limited to … noise and vibration*'.

2.3 Other Relevant Standards and Guidance

2.3.1 British Standards

BS 5228-1[9] provides guidance on the assessment and control of noise from construction operations and other works on open sites. Part 2 provides similar guidance on vibration. The Standard contains information on noise reduction measures and promotes the 'best practicable means' approach to control noise and vibration to minimise the impact on local residents. Methodologies for predicting construction noise and vibration and assessment criteria are also included.

British Standard BS 4142[10] provides a methodology for rating and assessing the likely impacts of sound of an industrial or commercial nature on residential receptors. The methodology is based on comparing the background noise level (measured as L_{A90}) at a receptor with the level of noise from the source being assessed, including penalties for characteristics such as tonality and impulsivity

[6] https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/adopted-local-plans.aspx

[7] https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/west-dorset-and-weymouth-portland/adopted-local-plan/pdfs/alp/west-dorset-weymouth-portland-local-plan-2015.pdf

[8] https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/dorset-county-council/pdfs/planning/adoption-final-plans-msp-waste/waste-plan-2019-part-2.pdf

[9] British Standards Institution (2014) BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Open Construction Sites

[10] British Standards Institution (2019) BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

(known as the rating level $L_{Ar,Tr}$). The following advice is provided for determining the significance of impacts:

- Typically, the greater the difference between the background noise level and the rating level, the greater the magnitude of the impact;
- A difference of +10 dB or more between the rating level and the background noise level is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB between the rating level and the background noise level is likely to be an indication of an adverse impact, depending on the context;
- The lower the rating level is relative to the measured background noise level, the less likely it is that the source being assessed will have an adverse or a significant adverse impact.

2.3.2 DMRB – Sustainability and Environment Appraisal LA 111, Noise and Vibration

Assessment of changes in noise from traffic using the public highway, that would be generated by the works, have been assessed using the Design Manual for Roads and Bridges. Specifically, LA 111[11] sets out the method for assessing noise and vibration associated with road traffic. The assessment presented in this noise impact assessment report has been based upon these procedures.

LA 111 requires that road traffic noise is calculated using the method described in Calculation of Road Traffic Noise[12] (CRTN). This describes a procedure for determining the level of noise from the highway based upon the traffic flow parameters, proportion of heavy vehicles and other parameters. CRTN defines the basic noise level (BNL) as the traffic noise level at a standard distance of 10 m. Calculation of changes in BNL can be used to establish whether a more detailed assessment is required.

3 Assessment Method

3.1 Consultation

Dorset Council Environmental Health Department has been consulted by telephone (which was followed up by email) in respect of the noise assessment. A summary of the issues discussed is given in Table 1.

[11] https://www.standardsforhighways.co.uk/prod/attachments/e5864018-9505-4828-b17a-08ede7388b04
[12] Department of Transport, Welsh Office (1988), Calculation of Road Traffic Noise, HMSO

Table 1: Consultation summary

Consultee and date	Issue raised	Summary of response
Ben Jones, Technical Officer, Environmental Health, Dorset Council, 4 May 2020	Baseline survey cannot currently be undertaken due to coronavirus lockdown. Available daytime measurements taken by others and the Defra Noise Incidence Study have been used to provide a baseline against which to assess the viability of the facility in terms of noise emission. A baseline survey will be carried out when possible after lockdown and the design checked to ensure compliance with the measured baseline.	Proposed approach is considered acceptable under current circumstances. Noise limits will be set according to BS4142 but the actual requirement relative to background could not be confirmed on the call.
DC Scoping Opinion, 1 October 2019	The scope and methodology for the noise and vibration assessment was set out in the Scoping Report.	Scoping Opinion states 'Noise & Vibration section of the submitted Scoping Report is acceptable.'

3.2 Study area

The construction noise study area would typically comprise noise-sensitive properties within approximately 300m of a proposed scheme. BS 5228 notes that the prediction results should be treated with caution at distances greater than this (as the prediction results may be less reliable). Due to the coastal location and topography, a much wider study area has been assessed for this proposed scheme.

For construction and operational traffic movements on public roads, the impacts are assessed on the affected routes on the Isle of Portland, the A354 across the causeway and on Buxton Road.

The assessment has considered the site of the ERF and the associated infrastructure, including the substations and facilities required to provide electricity for ships alongside at berth (see Figure 2).

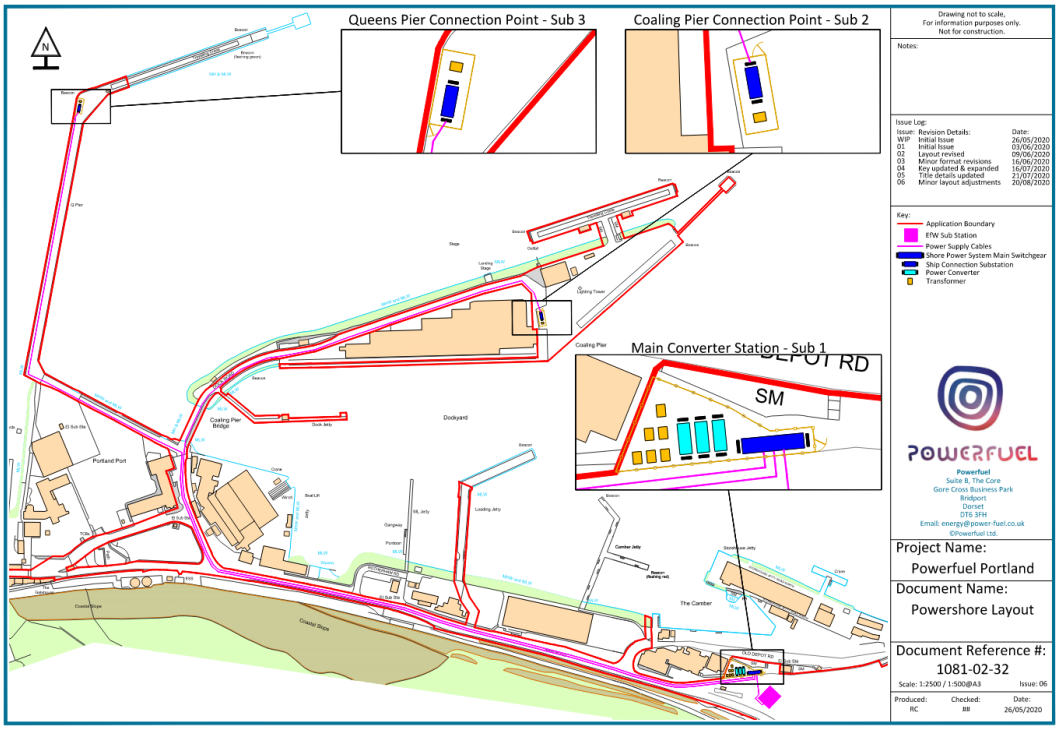


Figure 2 Proposed locations of infrastructure for provision of shoreside power including the converter stations and ship connection points

3.3 Impact Assessment and Significance Criteria

3.3.1 Sensitive receptors

Assessment of noise from the site has been carried out for:

- Dwellings to the west of the site, on Beel Close, Leet Close, East Weare Road and Ayton Drive;
- Her Majesty's Prison (HMP) The Verne;
- Dwellings and businesses on Castletown;
- Portland Castle
- Portland Harbour moorings; and
- Outside of the defined study area on the north west side of the harbour at Wyke Regis, Southlands and Rodswell[13].

[13] These locations are at such a distance from the site that the calculated levels can only be considered approximate but are considered since they have a direct line of sight to the site and the sound propagation path is almost entirely across water.

3.3.2 Approach to assessment of effects

The method for identifying likely significant effects of noise and vibration from the proposed Scheme draws on best practice from other projects and is aligned with Government noise policy.

Taking government noise policy (NPSE, Defra 2010[14]) and PPG-Noise (MHCLG, 2019[15]) together, they are based on the premise that once noise becomes perceptible, the effect on people in their homes (and elsewhere) increases as the total level of noise increases. Government policy and practice guidance defines four levels of effect on health and quality of life in increasing severity:

- no effect;
- adverse effect;
- significant adverse effect; and
- unacceptable adverse effect.

Government noise policy (NPSE and the supporting PPG-Noise) also notes that thresholds should be set to define the onset of these levels of effect, namely:

- Lowest Observed Adverse Effect Levels (LOAEL) to identify the onset of adverse impact on health and quality of life;
- Significant Observed Adverse Effect Levels (SOAEL) to identify the onset of significant impacts on health and quality of life; and
- Unacceptable Adverse Effect Levels (UAEL) to identify the onset of unacceptable impacts on health and quality of life.

Policy notes that these thresholds should reflect the nature of the noise source, the sensitivity of the receptor and the local context.

3.3.2.1 Significant adverse effect on health and quality of life

This noise impact assessment has considered the identification of 'likely significant effects'. Where the calculated noise or vibration indicates a significant adverse impact on health and quality of life (i.e. the noise level exceeds the relevant SOAEL threshold), then this is assessed as a likely significant observed adverse effect at each receptor. For example, such noise levels would disrupt activities indoors, as described in the assessment framework given in PPG-Noise.

3.3.2.2 Adverse effect on health and quality of life

This assessment also identifies likely significant effects where the calculated noise or vibration is only an adverse (i.e. not significant adverse) impact on health and

[14] Department for Environment, Food and Rural Affairs (2010) *Noise Policy Statement for England* (NPSE)
[15] Ministry of Housing, Communities and Local Government (2019) *Planning Practice Guidance - Noise*. https://www.gov.uk/guidance/noise--2

quality of life. Specifically, this describes a situation when the noise is greater than the relevant LOAEL but is less than the SOAEL.

In this case, the basis for the likely significant effect is the change in noise caused by the proposed scheme and the number of dwellings in a community that are subject to the change. With regard to PPG-Noise, such likely significant effects relate, for example, to a change in the outdoor 'acoustic character' of an area due to a noise increase or decrease as a result of the proposed Scheme. Table 2 summarises how noise levels in terms of Government noise policy and change in noise levels have been used to identify likely significant effects.

Table 2: Noise exposure hierarchy based on likely average response (based on PPG-N)

↓ Increasing noise level ↓	Perception	Examples of outcomes	Increasing effect level	Action
	Not noticeable	No effect	No observed effect	No specific measures required
	No Observed Effect Level (NOEL)			
	Noticeable 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	No specific measures required
	Lowest Observed Adverse Effect Level (LOAEL)			
	Noticeable 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; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported 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)			
	Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. 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
	Unacceptable Adverse Effect Level (UAEL)			
	Noticeable 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 Adverse Effect	Prevent

3.3.3 Assessment of Construction Noise

3.3.3.1 Magnitude of Construction Noise Impacts

Noise from the site works has been assessed using BS5228-1. Calculations of noise levels at selected receivers have been based on typical noise levels for construction processes taken from BS5228-1. Calculations also take account of propagation distance, details of the intervening ground cover, topography and screening.

Geographical Information Systems (GIS) have been used to construct a three-dimensional noise model. The model includes terrain data, types of ground cover and buildings and other structures that might screen or reflect noise.

The impacts of changes in noise levels due to construction traffic operating on the public highway have been considered with reference to DMRB. The magnitude of change has been assessed by calculating the change in basic noise level (BNL) during the works.

The principal stages of work that have been assumed for this assessment are:

- Breaking and removal of hard standings, including concrete crushing plant on site;
- Excavation for foundations and subsurface structures – expected to be achievable using backhoe excavators with no breakers required;
- Piling – ground conditions are suitable for continuous flight auger (CFA) piling;
- Super structure construction – using tower cranes, mobile crane, unloading/handling deliveries and materials, steel works.

3.3.3.2 Construction Noise Assessment Criteria

Potential adverse effect thresholds in terms of Government policy on health and wellbeing have been established based upon the ABC Method described in BS5228-1. These thresholds, shown in Table 3, have been used to establish construction noise assessment criteria.

Table 3: Thresholds of potential effects of construction noise at residential buildings in terms of Government policy

Effect threshold (residential)	Threshold value, 1 m from of the relevant façade
Lowest observed adverse effect level (LOAEL)	Day 65dB$L_{Aeq,daytime}$ Evening 55dB$L_{Aeq,1hr}$ Night 45dB$L_{Aeq,1hr}$
Significant observed adverse effect level (SOAEL)	Day 75dB$L_{Aeq,daytime}$ Evening 65dB$L_{Aeq,1hr}$ Night 55dB$L_{Aeq,1hr}$
Note: Day is typically 07:00 to 19:00, evening is 19:00 to 23:00 and night is 23:00 to 07:00	

Where the construction noise level at the receptor is predicted to be between the LOAEL and SOAEL, the threshold of potential adverse effect in terms of change to the overall sound level is evaluated in accordance with Table 4.

Table 4: Threshold of potential significant effect at dwellings according to ABC method in BS 5228–1:2009 + A1:2014

Assessment category and threshold value period	**Threshold value, dB(A)**		
	Category A	**Category B**	**Category C**
Night-time (23:00 – 07:00)	45	50	55
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Other: Weekday evenings (19:00 – 23:00) Saturdays (13:00 – 23:00) Sundays (07:00 – 23:00)	55	60	65
Category A: threshold value to use when ambient noise levels (rounded to the nearest 5 dB) are less than these values Category B: threshold value to use when ambient noise levels (rounded to the nearest 5 dB) are the same as Category A values Category C: threshold value to use when ambient noise levels (rounded to the nearest 5 dB) are higher than Category A values.			

The adverse impact threshold is determined at a dwelling using the existing ambient noise level, rounded to the nearest 5dB. The rounded level is then used to determine the assessment category: A, B or C, which defines the adverse noise impact threshold. The predicted construction noise level is then compared to the appropriate noise impact threshold level. If the L_{Aeq} construction noise level exceeds the appropriate noise impact threshold level shown in Table 4 then an adverse impact with the potential to cause a significant effect is identified.

Having established if there is a potentially significant effect using the ABC method, the final assessment of significance is made using professional judgement. This is evaluated by considering various other factors such as the expected duration of the activity.

For construction traffic operating on the public highway, the threshold criterion used for identifying a significant effect is a moderate or major magnitude of impact. This represents a change in BNL of 3dBL_{Aeq} or more, following the guidance in LA111.

3.3.4 Assessment of Operational Noise

3.3.4.1 Magnitude of Operational Noise Impacts

Noise from operation of the site has used the same GIS terrain model as used for the construction assessment. A three-dimensional noise model of the operational plant has been created with noise emission levels calculated from:

- Internal reverberant noise levels have been assumed to be 85dBL_{Aeq} in each of the main spaces of the facility;
- Calculated sound insulation performance of the relevant elements of the building envelope, based on the architect's drawings; and
- Latest architect's drawings of the building.

The impacts of changes in noise levels due to traffic that will serve the facility have been considered with reference to DMRB. The magnitude of change has been assessed by calculating the change in basic noise level (BNL) during the works.

3.3.4.2 Operational Noise Assessment Criteria

Assessment of the impacts of noise during operation has been based largely on World Health Organization (WHO)[16] [17] [18] guidelines for the onset of critical health effects. In dwellings, the relevant critical effects of noise are on sleep and annoyance. To avoid sleep disturbance, the recommended indoor guideline values for bedrooms are 30dBL_{Aeq} for continuous noise and 45dBL_{Amax} for single sound events. To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level in outdoor living areas should not exceed 55dBL_{Aeq} for a steady, continuous noise. This is reflected in BS8233:2014:

> *'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments'.*

The 2009 WHO Night Noise Guidelines for Europe suggest that a night-time level of 40dBL_{Aeq} or less outside bedrooms is the lowest level at which adverse effects are observed and recommend an interim target level of 55dB.

The WHO documents provide guidance on specific critical health effects, namely the lowest observed levels of noise that affect health outcomes, including annoyance and sleep disturbance. It follows that residual noise levels must be significantly above the Lowest Observed Adverse Effect Levels (LOAEL) before they might be considered to be a Significant Observed Adverse Effect Level (SOAEL). Table 5 defines the LOAELs and SOAELs applied to this scheme, which are consistent with those applied on other recent schemes.

[16] Guidelines for Community Noise, World Health Organization, 1999
[17] Night noise guidelines for Europe – World Health Organization, 2009
[18] Environmental Noise Guidelines for the European Region, World Health Organization, 2018

Table 5: Thresholds of potential effects during operation of noise at residential buildings in terms of government policy on health and wellbeing

Effect threshold (residential)	Threshold value, 1 m from of the relevant façade
Lowest observed adverse effect level (LOAEL)	Day 50dB$L_{Aeq,daytime}$ Night 40dB$L_{Aeq,1hr}$
Significant observed adverse effect level (SOAEL)	Day 65dB$L_{Aeq,daytime}$ Night 55dB$L_{Aeq,1hr}$
Note: Day is 07:00 to 23:00 and night is 23:00 to 07:00	

Operational noise assessment for an industrial facility also needs to consider the character of the noise, as well as the level and context in which it is experienced as set out in BS 4142:2014+A1:2019. This standard compares the noise emission from the source with the background (L_{A90}) sound level (see section 2.3.1).

3.3.4.3 Traffic noise assessment for operation

LA111 Table 3.58 defines a likely significant effect of traffic noise for impacts greater than 'minor'. This equates to a change in noise level greater than 2.9dBL_{Aeq} in the sort term and greater than 4.9dBL_{Aeq} in the long term.

3.3.5 Assessment of Construction Vibration

3.3.5.1 Magnitude of Vibration Impacts

Groundborne vibration during construction of the proposed scheme may potentially arise due to the use of compaction plant and/or rollers for reinstatement of fill, roads and hardstandings. Impacts at sensitive receptors will be dependent on their proximity to the works. There are no residential buildings within more than 200m of the proposed site so the impacts of vibration on people in their homes and any risk of building damage is not considered further in this assessment.

The effects on the industrial and commercial buildings within the port in terms of people's response are expected to be governed mainly by the type of activities undertaken although liaison with the occupants and prior notice of potential impacts are also important factors. Effects in terms of damage to buildings may also be of concern if buildings are exposed to levels of vibration much higher than the lowest perceptible levels.

BS5228-2:2009+A1:2014 provides a methodology for predicting typical levels of vibration from certain types of construction activities, based on case study data and empirical models. This has been used where appropriate to consider the likelihood that vibration from the works may exceed the thresholds for perception and disturbance within the port buildings.

3.3.5.2 Assessment Criteria

BS5228-2 indicates that the threshold of perception in residential environments corresponds with a peak particle velocity (PPV) of 0.3mm/s. The standard also

states that a complaint is likely where levels occur above 1.0mm/s PPV at residential properties but this exposure can be tolerated if prior warning and explanation has been given to residents. Levels of vibration of 10mm/s PPV and above are likely to be intolerable for any more than very brief exposure. These values have been used to provide a cautious assessment of impacts on the users of the adjacent port buildings.

The assessment has been made based on the types of plant and machinery that would be used. Vibration from the construction of the scheme has been assessed using the criteria presented in Table 6.

Table 6: Thresholds of likely effects of vibration for occupants of residential buildings

Threshold (residential)	**Impact classification**	**Vibration magnitude, PPV [1] (mm/s)**
Lowest observed adverse effect level (LOAEL)	Minor	0.3
-	Moderate	-
Significant observed adverse effect level (SOAEL)	Major	1.0
Note [1.]Determined at the worst location on a normally loaded floor (usually the centre of the floor).		

Risk of damage to buildings from groundborne vibration is assessed using the criteria in Table 7. The criteria are derived from British Standard BS7385-2. This ensures there is no risk of the lowest damage category (cosmetic[19]) being exceeded. However, effects in terms of even cosmetic damage to buildings would occur only for vibration exposures much higher than the lowest perceptible levels.

Table 7 Vibration impact criteria for damage to buildings (conservative criteria below which there is no risk of cosmetic damage)

Category of building	**Peak particle velocity[1] (mm/s)**	
	Transient[2] vibration	**Continuous[3] vibration**
Structurally sound buildings	12	6
Notes: 1 At the building foundation 2 Transient relative to building response e.g. from impulsive plant 3 Continuous relative to building response e.g. from vibrating rollers		

[19] Defined in BS ISO 4866:2010 *Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures* (BSI, 2010).

4 Baseline Conditions

This assessment has been undertaken during the Covid-19 lockdown period, which has prevented a baseline survey from being undertaken. In any case, it is likely that any survey undertaken during this period would be unrepresentative of more typical conditions due to the general reduction in economic and commercial activity. Consequently, the assessment is taken from baseline survey data collected around the port as part of on-going environmental monitoring. Figure 3 illustrates the locations at which measurements have been taken.

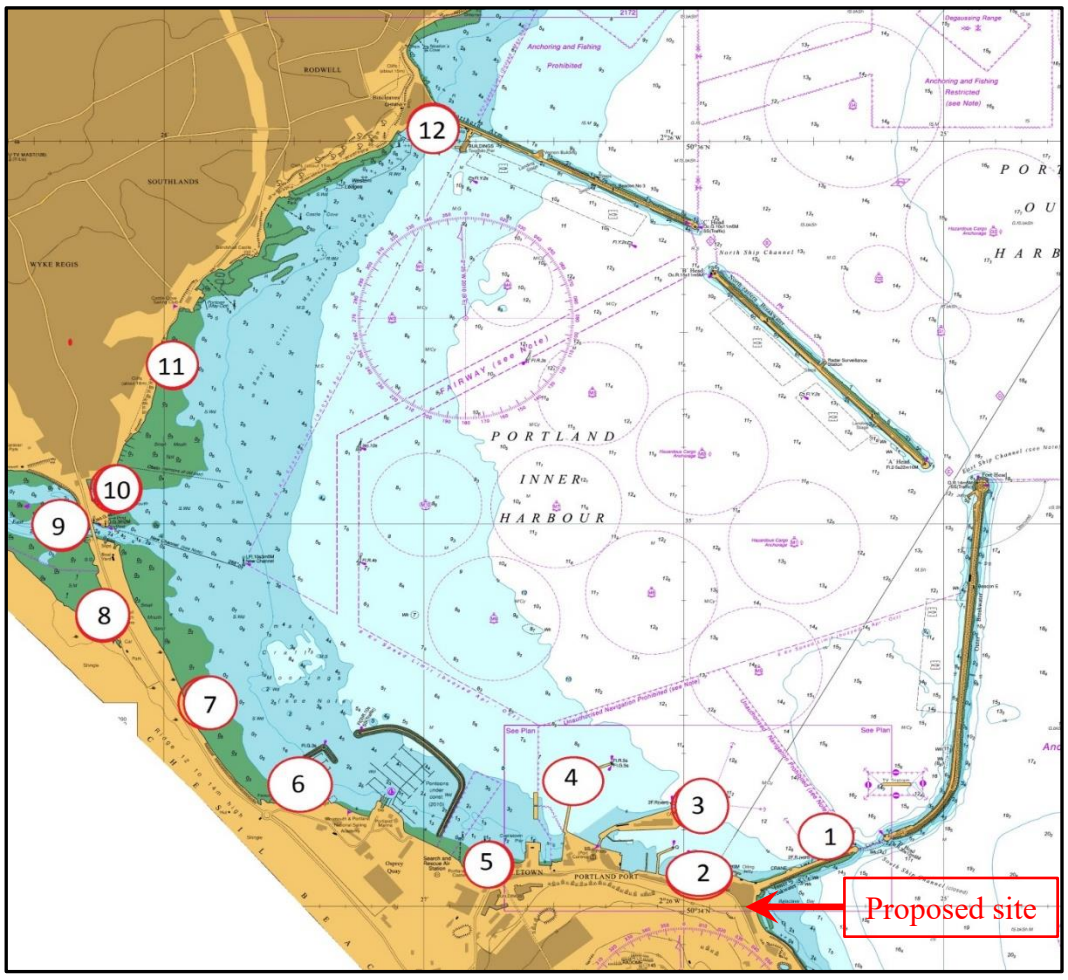


Figure 3 baseline noise measurement locations

Of particular relevance to this noise impact assessment are:

- Location 5 – representative of properties (dwellings and businesses) on Castletown and Portland castle
- Location 6 – Portland Harbour
- Locations 10, 11 and 12 – representative of the dwellings most exposed to the proposed development in the areas of Wyke Regis, Southlands and Rodwell.

Existing ambient sound levels for these locations are tabulated in Appendix B and summarised in Table 8.

Table 8 Summary of ambient noise measurement data ($dBL_{Aeq,5min}$)

Location	Weekday average	Weekend average
Loc 5 Castle-town and Portland Castle	55	48
Loc 6 Sailing Academy	57	50
Loc 10 Small-mouth	55	50
Loc 11 Castle Cove Sailing Club	51	49
Loc 12 Bincleaves	52	50

The measured data are only available as ambient (L_{Aeq}) values during the day. These are appropriate for the construction noise calculations but for operational noise assessment according to BS4142, the background (L_{A90}) levels are needed for day and night.

Since this assessment has been undertaken without any additional noise survey, the L_{A90} levels have been estimated by comparing the data in Table 8 with the results of Defra's National Noise Incidence Study[20] (NNIS). The weekday average L_{Aeq} levels reported in Table 8 are broadly consistent with the daytime $L_{Aeq,5min}$ levels reported in Figure 6 of NNIS, which is reproduced and annotated below in Figure 4. For the NNIS time histories, comparable levels for the background would be

- Day: $44dBL_{A90}$
- Night $32dBL_{A90}$

In addition to the locations for which baseline levels have been obtained, assessment positions are also required for HMP The Verne and dwellings to the west of the site on Beel Close, Leet Close, East Weare Road and Ayton Drive. For these there is no clear proxy measurement position so they have been assumed to have the same L_{A90} background levels as set out above and a daytime ambient level of $50dBL_{Aeq}$, to be lower than the lowest measured daytime ambient and consistent with WHO guidance for daytime levels outdoors.

For this noise impact assessment, these values have been used against which to assess the potential noise impacts and are considered appropriate at the planning stage. As noted in Section 2.1 above, the new facility will require a permit from the Environment Agency (EA) under the IPPC Regulations. A more detailed study than is possible at this stage in the design process may be required to fulfil this obligation, which may include a noise survey.

[20] http://sciencesearch.defra.gov.uk/Document.aspx?Document=10280_NIS1206344f.pdf

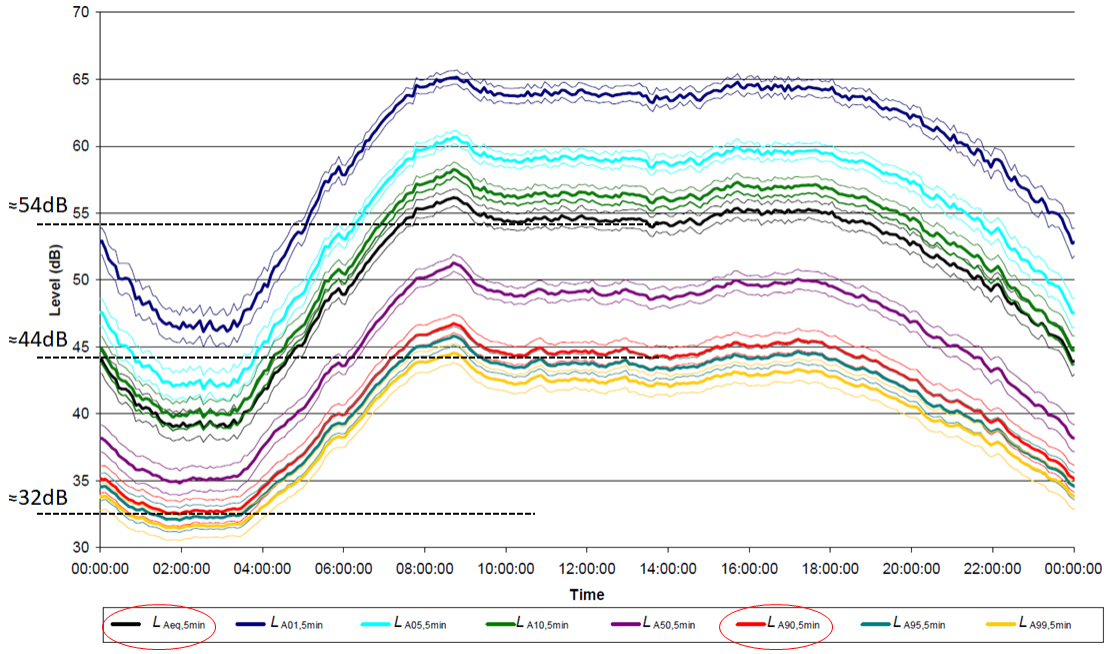


Figure 4 Use of NNIS noise profiles to estimate background noise assessment criteria from daytime ambient noise levels

5 Environmental Impacts and Significance of Effects

5.1 Construction noise

For the purposes of assessment, the principal activities have been considered and divided into the following assumed phases of work:

- site clearance, including breaking out of hardstandings;
- excavation, including handling and removal of arisings;
- foundations construction, including piling (assumed to be continuous flight auger – CFA); and
- superstructure construction, including steelwork.

These represent distinct activities with potentially different levels of noise impact. Details of the plant and assumptions for each phase used for noise modelling are described in Appendix C.

Table 9 identifies the daytime potential significance thresholds (based on the BS5228-1 ABC method and baseline noise levels given in Table 8) and presents predicted construction noise levels at each residential area.

Due to the large distances to most of the receptors, there is a degree of uncertainty about the predictions but they are all sufficiently below the ABC potential significance threshold to be confident that there would be no significant effect of

construction site noise. Working hours defined in the draft CEMP are assumed to be Monday to Friday 07:00 – 19:00; Saturday 08:00-13:00; and no noisy working on Sunday and Bank Holidays (other than special works subject to prior agreement with the local authority). These hours will need to be confirmed with Dorset Council.

Table 9: Construction noise assessment

Location[1]	**Ambient rounded to nearest 5dB (day)**	**ABC assessment criteria**	**Predicted daytime noise levels**[2] **$dBL_{Aeq, day}$**			
			Site clearance	**Excavation**	**Piling and foundations**	**Super-structure**
Loc 5 Castletown and Portland castle (Loc B Castletown)	55	65	43	38	35	36
Loc 6 Sailing Academy (Loc K Portland Marina)	60	65	35	31	28	28
Loc 10 Smallmouth (Loc M Smallmouth Coast)	55	65	27	22	19	20
Loc 11 Castle Cove Sailing Club (Loc E Dundee Road)	50	65	36	21	18	19
Loc 12 Bincleaves (Loc I Old Castle Row)	50	65	25	21	18	18
Loc A Ayton Drive	-	-	43	38	35	36
Loc C Coronation Road	-	-	41	36	33	34
Loc D Crabbers Wharf	-	-	41	37	34	34

Location[1]	Ambient rounded to nearest 5dB (day)	ABC assessment criteria	Predicted daytime noise levels[2] $dBL_{Aeq, day}$			
			Site clearance	Excavation	Piling and foundations	Super-structure
Loc F East Weare Road[3]	-	-	46	41	38	39
Loc G Grove Road	-	-	34	30	26	27
Loc H Jailhouse	-	-	48	43	40	40
Loc J Portland Hospital	-	-	40	36	32	33
Loc L Victoria Gardens	-	-	38	33	30	31

1. See Figure 2 for Locations 5, 6, 10, 11, 12, from where measured baselines are available. Other locations are illustrated in Appendix C

2. Noise level includes correction for façade acoustic reflection (i.e. noise level at 1 m from façade).

3. Also representative of Beel Close and Leet Close

In addition to the works on the main site, it will also be necessary to install cables to connect the ERF to the substation off Lerret Road. Methods and plant required would be similar to those used for other utilities works and therefore have not been assessed quantitatively. Impacts would be short duration and temporary. For reinstatement of trenches, consideration and control of vibration impacts from compaction plant would be required when working in close proximity to dwellings.

5.1.1 Construction Road Traffic Noise

For traffic operating on the public highway, the maximum number of additional movements is expected to be up to 74 two-way HGV movements per day. The greatest impact of these would be where dwellings are very close to the road, particularly along Castletown. The traffic flow here is below the levels of flows for which CRTN is validated so the calculation has used the method for vehicles on haul routes described in Appendix F.2.5 of BS5228-1.

The predicted worst case noise level from these vehicles would be $62dBL_{Aeq,12hr}$ which is well below the construction noise assessment criterion. Although individual vehicles passing would clearly be noticeable, this short term change in road traffic noise is assessed as a not significant effect.

5.2 Operation

Predicted levels of noise caused from operation of the proposed development are provided in Table 10 and illustrated in Figure 5.

Table 10: Predicted noise levels from operation of the proposed development

Receptor	Baseline noise level (see Section 4)			Predicted operating noise level dBL_{Aeq}
	Ambient dBL_{Aeq}	Background dBL_{A90}		
		Day	Night	
Loc 5 Castletown and Portland Castle	55	44	32	34
Loc 6 Sailing Academy	57	44	32	34
Loc 10 Smallmouth	55	44	32	<30
Loc 11 Castle Cove Sailing Club	51	44	32	<30
Loc 12 Bincleaves	52	44	32	<30
Closest residential receptors to the west of the site		44	32	33 - 39

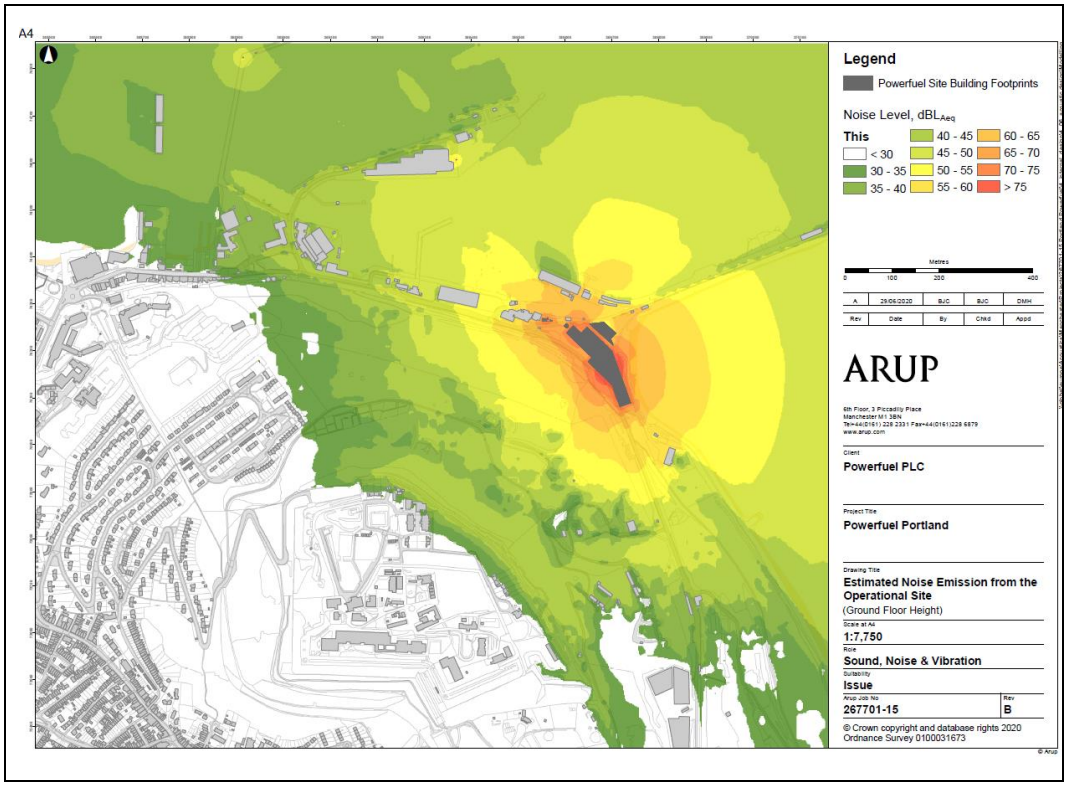


Figure 5 Noise map showing levels of noise during operation of the proposed development

Noise from the proposed development may from time to time be audible at some locations but at a level that is below the assessment criteria, including the night

time Lowest Adverse Effect Level. Operation of the plant is therefore assessed as a not significant effect.

Traffic noise impacts have been assessed from the traffic model data presented in Appendix D. Additional road traffic caused by operation of the development, primarily HGV movements, would lead to a maximum increase in traffic noise of around 1.6dBL_{Aeq}. This level of change is well below a level that would be assessed as a significant change according to LA111. Considering the change in the overall traffic noise level due to traffic generated by all committed developments, the contribution of the ERF to the total change in traffic noise level would be well below 1dB.

Some waste materials will arrive by ship and be unloaded at the harbour. There is expected to be a relatively small number of such deliveries and noise levels would be of similar level and character to existing ship movements at the port. These activities are therefore expected not to cause any significant effect from noise.

The proposal is to provide electricity for docked ships, which will require two 15MW transformers and containerised converters (to provide 60Hz AC) and include cooling fans. These will be designed such that the overall noise emission from the proposed scheme will comply with the environmental noise emission requirements.

6 Mitigation

6.1 Construction Noise

The construction noise and vibration assessment assume that the works would be undertaken following the principles and processes set out in the outline CEMP. Use of best practicable means (BPM) as required by the Control of Pollution Act 1974 is assumed as incorporated mitigation to control construction noise in the form of low noise emission plant and processes.

Section 8 of BS5228-1 describes methods for control of noise and Section 8.2 describes opportunities for control at source. These include:

- avoid unnecessary revving of engines and switch off equipment when not required;
- keep internal haul routes well maintained;
- use rubber linings in, for example, chutes and dumpers to reduce impact noise;
- minimize drop height of materials;
- start up plant and vehicles sequentially rather than all together;
- use of broadband reversing alarms rather than conventional beepers;
- specification and substitution: ensuring that the quietest practicable plant is used;
- enclosing significant sources of noise where practicable;

- using plant only in accordance with the manufacturer's instructions;
- siting equipment away from noise sensitive areas; and
- carrying out regular and effective maintenance.

Good relations with people living and working in the vicinity of site operations are of paramount importance. Early establishment and maintenance of these relations throughout the duration of the site operations will be beneficial in allaying concerns of those exposed to the works.

6.2 Construction Vibration

Vibrating rollers would generate vibration that would be below damage thresholds but could be clearly perceptible in nearby buildings. Consideration of non-vibratory compaction techniques will be required if vibratory compaction should cause disturbance at commercial buildings in the port.

No dwellings are sufficiently close to the site that vibration is likely to be a problem. Connection works in the highways may require plant similar to that used during routine utilities repairs and maintenance. Vibration effects could be mitigated, should this be necessary, by the use of non-vibratory plant.

With these mitigations in place, it is expected that no significant effect of vibration would remain.

6.3 Construction Traffic Noise

No significant adverse effect from construction traffic noise has been predicted and therefore no additional mitigation is proposed. As for all the construction works, public concerns can be minimised by ensuring local people are kept informed before and throughout the works.

6.4 Noise During Operation

The facility will be designed and include any mitigation to ensure that overall noise levels from operation of the whole development comply the required noise limits at sensitive receptors. Monitoring during commissioning of the plant can be undertaken to ensure noise limits are achieved.

6.5 Residual Effects

No residual effects of noise or vibration either during construction or operation of the proposed development.

7 Cumulative Effects

Figure 6 shows the locations of other projects in the planning process that Dorset Council has requested should be included in an assessment of cumulative effects.

During construction, for there to be any change in the construction noise impacts, the highest noise levels generated from the proposed site would need to coincide with noisy periods at another site. Furthermore, the noise levels at the receptor would need to be equal for the total noise level to be increased noticeably[21] above the level of just one of the sites. Due to the distance between the sites and the distance from the sites to the residential receptors, it is very improbable that a scenario could occur where there is a noticeable change in overall construction noise level, even if the sites were to be under construction concurrently.

For traffic noise assessments, the traffic generated by these additional developments, where available, is already included in the future year traffic flows used for the traffic noise assessment. Furthermore, a doubling of the total traffic flow is required to create a noticeable increase in traffic noise level, which none of the developments is on a sufficient scale to cause. Therefore, no further consideration of traffic noise is needed to assess the potential cumulative impacts.

During operation of the ERF, noise levels will be controlled to the required limits. Similar criteria would expect to apply to the committed developments. Due to the physical distance separating the ERF and the other developments, the combined noise levels from the ERF and other developments would be very unlikely to be additive to the extent that there would be a noticeable change in the overall noise level at any receptor.

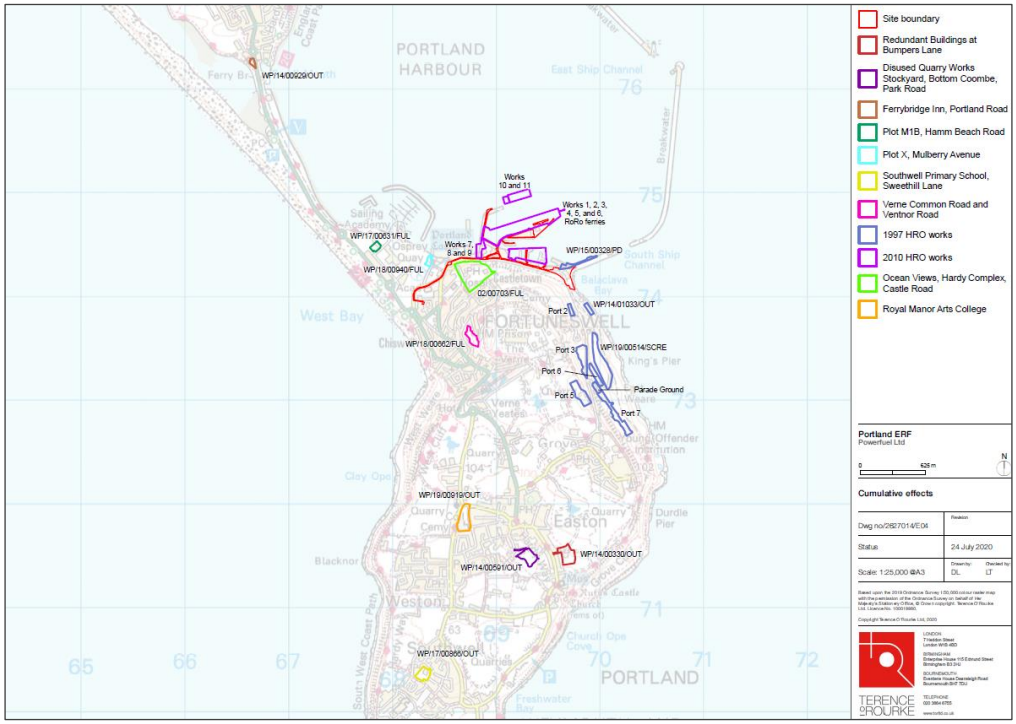


Figure 6 Locations considered for cumulative effects

[21] Paragraph 2.7 of the Institute of Environmental Management and Assessment Guidelines for Environmental Noise Impact Assessment (2014) says 'a change or difference in noise level of 1dB is just perceptible under laboratory conditions, 3dB is perceptible under most normal conditions'. A 3dB increase in sound level caused by two sources requires that the two levels are equal eg 65dB + 65dB = 68dB.

8 Conclusions

The conclusions to the assessment are:

- Construction noise will be controlled and best practicable means of working used such that there will be no significant effects on local residents and businesses;
- Additional road traffic during construction would lead to a temporary increase in noise but the duration and magnitude of impact are predicted to be such that the effect is assessed as a not significant change;
- Similarly, during operation of the proposed scheme, the additional traffic movements would lead to a minor impact and are assessed as a not significant effect;
- Noise from operation of the proposed scheme can be controlled through the design of the building envelope such that noise emissions would not lead to a significant effect; and
- A noise survey is recommended following the coronavirus lockdown and when transport and commercial activity have returned to more normal conditions. The survey results would be used as a basis for confirming noise emission limits to feedback into the design of the ERF.

Appendix A

Acoustic terminology

Decibel (dB)

The ratio of sound pressures which we can hear is a ratio of 10^6:1 (one million: one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.

dB(A)

The unit used to define a weighted sound pressure level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz.

In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{A10}, L_{A90}, and L_{Aeq} for the 'A' weighted equivalent continuous noise level.

Frequency

Frequency is the rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the hertz (Hz), which is identical to cycles per second. A 1000Hz is often denoted as 1kHz, e.g. 2kHz = 2000Hz. Human hearing ranges approximately from 20Hz to 20kHz. For design purposes, the octave bands between 63Hz to 8kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or narrow frequency bands.

Maximum noise level

The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125ms duration and fast time weighting (F) has an exponential time constant of 125ms which reflects the ear's response. Slow time weighting (S) has an exponential time constant of 1s and is used to allow more accurate estimation of the average sound level on a visual display.

The maximum level measured with fast time weighting is denoted as $L_{Amax,F}$. The maximum level measured with slow time weighting is denoted $L_{Amax,S}$.

Sound pressure level

The sound power emitted by a source results in pressure fluctuations in the air, which are heard as sound.

The sound pressure level (L) is ten times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of 2 x 10^{-5}Pa (the threshold of hearing).

Thus L (dB) = 10 log $(P1/P_{ref})^2$ where P_{ref}, the lowest pressure detectable by the ear, is 0.00002 pascals (i.e. $2x10^{-5}$ Pa).

The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dBL_A and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.

Statistical noise levels

For levels of noise that vary widely with time, it is necessary to employ an index which allows for this variation. The L_{p10} is the level exceeded for 10% of the time period under consideration. The L_{90} is the level exceeded for 90% of the time.

A weighted statistical noise levels are denoted L_{A10}, dBL_{A90} etc. The reference time period (T) is normally included, e.g. dB$L_{A10,\ 5min}$ or dB$L_{A90,\ 8hr}$.

Typical levels

Noise Level, dB(A)	Example
130	Threshold of pain
120	Jet aircraft take-off at 100m
110	Chain saw at 1m
100	Inside disco
90	Heavy lorries at 5m
80	Kerbside of busy street
70	Loud radio (in typical domestic room)
60	Office or restaurant
50	Domestic fan heater at 1m
40	Living room
30	Theatre

Appendix B

Noise measurement data

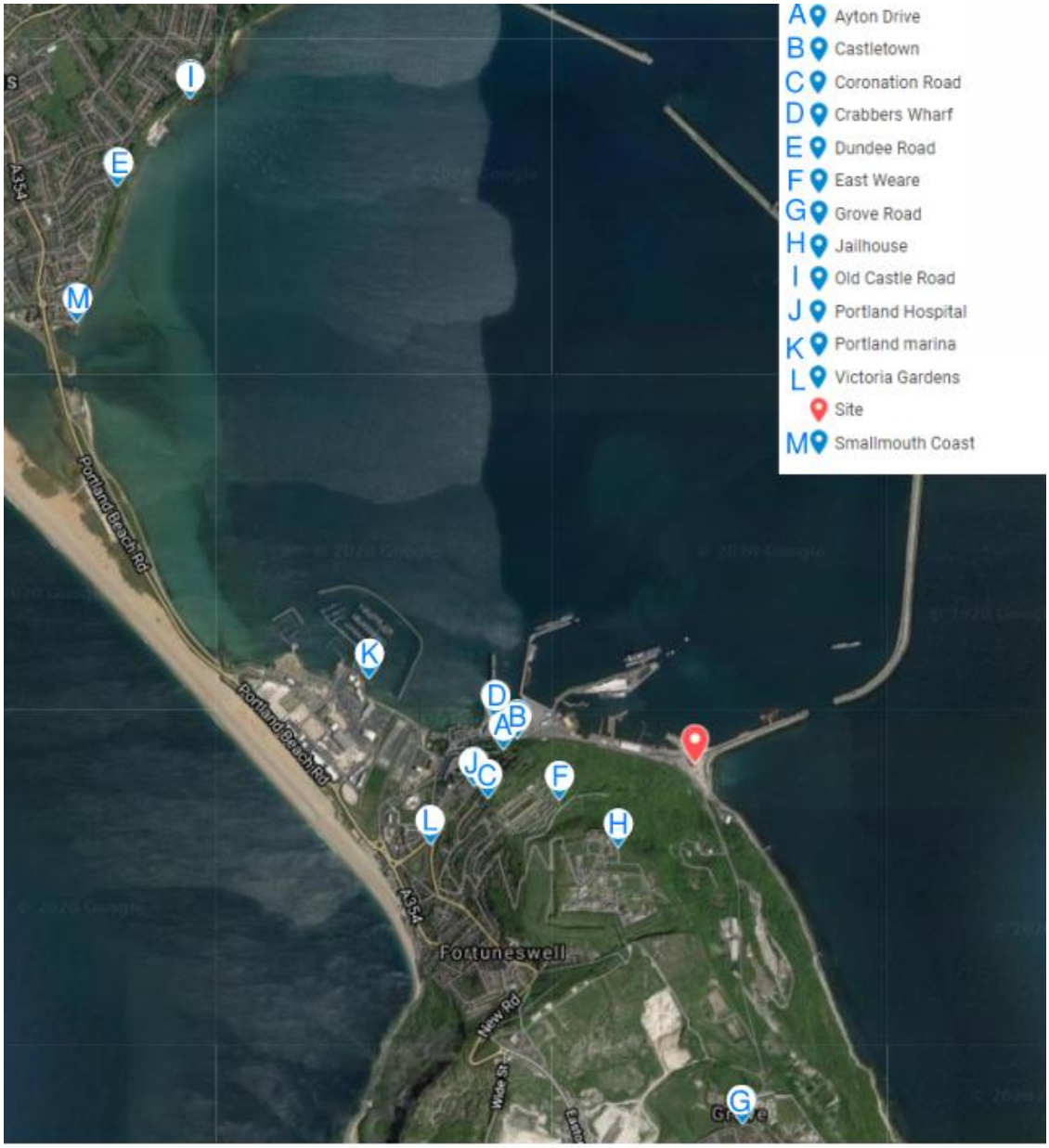
Date	Day	Metric	Loc 5 Castle-town	Loc 6 Sailing Academy	Loc 10 Small-mouth	Loc 11 Castle Cove Sailing Club	Loc 12 Bincleaves
25/07/2019	Thur	Min	44.8	45.9	45.9	43.2	43.3
		Max	76.1	80.7	63.8	63.9	53.1
		Average	54.2	67.4	50.5	46.2	45.3
20/08/2019	Tue	Min	44.5	44.5	45.8	43.4	43.6
		Max	63.6	82.2	64.3	60.2	58.4
		Average	51.7	66.5	51.7	48.5	46.0
29/08/2019	Thur	Min	43.3	48.7	49.1	44.7	44.8
		Max	60.7	85.8	76.6	74.3	78.5
		Average	46.7	68.7	58.9	53.3	55.9
15/09/2019	Sun	Min	44.8	46.6	43.4	43.4	43.2
		Max	54.6	59.1	57.1	60.9	78.7
		Average	46.9	51.0	50.1	47.5	55.1
23/09/2019	Mon	Min	45.4	45.0	45.4	47.7	50.3
		Max	57.1	77.1	79.6	62.5	96.0
		Average	48.5	61.1	56.6	50.9	80.5
30/09/2019	Mon	Min	58.4	48.7	48.1	45.6	45.1
		Max	83.6	59.5	67.6	64.4	62.4
		Average	72.8	52.1	56.8	51.6	49.7
15/10/2019	Tue	Min	43.9	45.3	44.2	43.5	43.4
		Max	52.0	59.2	75.5	59.4	57.5
		Average	45.3	49.6	55.1	48.1	46.7
21/10/2019	Mon	Min	45.9	45.9	46.8	44.5	45.3
		Max	63.6	59.3	82.2	56.2	56.0
		Average	49.4	50.6	61.6	46.8	47.8
28/10/2019	Mon	Min	47.2	46.3	45.1	44.8	46.7
		Max	79.3	58.7	62.8	79.1	61.8
		Average	63.2	49.7	47.9	57.9	51.8
18/11/2019	Mon	Min	46.7	45.2	45.3	43.8	44.0
		Max	77.5	66.4	76.1	62.4	65.8
		Average	60.6	55.0	57.4	46.6	49.9
24/11/2019	Sun	Min	45.1	44.5	45.6	44.1	43.8
		Max	53.2	61.2	55.9	61.8	53.2
		Average	46.4	50.0	48.9	49.3	44.9
01/12/2019	Sun	Min	46.8	45.3	45.9	45.0	43.5
		Max	61.0	57.0	61.6	58.6	66.8
		Average	51.2	48.6	50.2	50.3	50.9
13/12/2019	Fri	Min	47.0	48.4	46.0	45.0	45.6

Date	Day	Metric	Loc 5 Castle-town	Loc 6 Sailing Academy	Loc 10 Small-mouth	Loc 11 Castle Cove Sailing Club	Loc 12 Bincleaves
		Max	62.4	76.9	77.0	61.2	64.2
		Average	52.9	57.5	56.9	49.4	54.7
20/12/2019	Fri	Min	48.0	50.6	47.9	44.4	44.0
		Max	78.0	77.8	76.4	52.0	55.1
		Average	56.6	62.4	57.9	45.8	45.7
31/12/2019	Tue	Min	44.5	44.7	46.7	47.4	45.9
		Max	66.6	59.7	55.3	61.7	69.7
		Average	49.4	49.5	49.2	50.7	52.3
08/01/2020	Wed	Min	45.9	47.7	47.5	43.9	44.1
		Max	77.4	68.2	79.0	67.7	66.1
		Average	63.6	55.1	57.9	52.2	52.2
24/01/2020	Fri	Min	44.8	46.0	45.6	43.8	44.0
		Max	48.8	66.7	68.6	60.6	55.8
		Average	45.6	54.7	51.6	45.6	46.0
31/01/2020	Fri	Min	44.8	51.3	47.9	45.5	46.2
		Max	59.3	77.3	74.4	86.9	69.2
		Average	47.0	59.8	56.5	64.0	56.3
12/02/2020	Wed	Min	45.7	47.0	48.5	43.9	43.9
		Max	79.3	60.9	61.8	75.1	64.8
		Average	67.0	52.5	55.3	51.9	50.0
26/02/2020	Wed	Min	54.2	47.8	47.7	43.8	43.9
		Max	63.4	69.2	78.1	65.9	53.5
		Average	58.2	59.1	59.7	48.7	45.7
Weekday average average			54.9	57.1	55.4	50.5	51.6
Weekend average average			48.2	49.9	49.7	49.0	50.3
Weekday average minimum			46.8	47.0	46.7	44.6	44.9
Weekend average minimum			45.6	45.5	45.0	44.2	43.5

Appendix C

Construction noise calculation assumptions

C1 Receptors map for construction noise calculations



C2 Construction plant assumed for construction noise calculations

Construction activity	Equipment	BS:5228 reference number	Number	% on time
Site preparation and removal of hard standings	Backhoe Mounted Hydraulic Breaker	BS5228 Table C 5-1	2	75
	Tracked Excavator	BS5228 Table C 1-13	2	50
	Dump Truck	BS5228 Table C 6-14	2	30
	Diesel Generator	BS5228 Table C 4-84	1	100
	Tracked Crusher	BS5228 Table C 1-14	1	50
	Dozer	BS5228 Table C 2-1	2	20
	Articulated Dump Truck (Tipping Fill)	BS5228 Table C 2-32	2	30
Excavation	Dozer	BS5228 Table C 2-1	2	40
	Tracked Excavator	BS5228 Table C 2-3	2	80
	Wheeled Loader	BS5228 Table C 2-28	4	40
	Dump Truck	BS5228 Table C 6-14	2	30
	Articulated Dump Truck (Tipping Fill)	BS5228 Table C 2-32	2	30
Piling	Tracked Excavator	BS5228 Table C 3-23	3	50
	Lorry	BS5228 Table C 11-9	2	30
	Crawler Mounted Rig	BS5228 Table C 3-21	1	50
	Cement Mixer Truck (Idling)	BS5228 Table C 4-19	10	50
	Concrete Pump	BS5228 Table C 3-26	2	25
	Telescopic Handler	BS5228 Table C 2-35	2	50

Construction activity	Equipment	BS:5228 reference number	Number	% on time
	Tower Crane	BS5228 Table C 3-29	2	20
Superstructure construction	Lorry	BS5228 Table C 11-4	4	25
	Tower Crane	BS5228 Table C 4-49	2	25
	Pump Boom + Vibrating Poker	BS5228 Table C 4-36	4	25
	Concrete Pump	BS5228 Table C 3-25	2	25
	Concrete Mixer Truck	BS5228 Table C 4-20	4	25
	Telescopic Handler	BS5228 Table C 2-35	2	50

Appendix D

Traffic modelling data

Link	Location of Count		Development Traffic		Committed Traffic		Base Year - 2023						Future Year - 2028						Future Year - 2033					
							W/O Development		W Development		% Change		W/O Development		W Development		% Change		W/O Development		W Development		% Change	
	Northing	Easting	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV	Veh	HGV
Port - Castletown Entrance	074361	368844	126	80	5318	5318	5925	5458	6051	5538	2.13%	1.47%	5955	5464	6081	5544	2.12%	1.46%	5976	5469	6102	5549	2.11%	1.46%
Portland Beach Road	075307	367037	92	80	6261	5318	24951	7411	25043	7491	0.37%	1.08%	25866	7514	25958	7594	0.36%	1.06%	26527	7588	26619	7668	0.35%	1.05%
"Boot Hill" Buxton Road	078584	367534	46	40	3249	2659	25768	4686	25814	4726	0.18%	0.85%	26870	4785	26916	4825	0.17%	0.84%	27666	4857	27712	4897	0.17%	0.82%
NOT USED			0	0	0	0	0	0	0	0	0%	0%	0	0	0	0	0%	0%	0	0	0	0	0%	0%
NOT USED			0	0	0	0	0	0	0	0	0%	0%	0	0	0	0	0%	0%	0	0	0	0	0%	0%
NOT USED			0	0	0	0	0	0	0	0	0%	0%	0	0	0	0	0%	0%	0	0	0	0	0%	0%
NOT USED			0	0	0	0	0	0	0	0	0%	0%	0	0	0	0	0%	0%	0	0	0	0	0%	0%
NOT USED			0	0	0	0	0	0	0	0	0%	0%	0	0	0	0	0%	0%	0	0	0	0	0%	0%
NOT USED			0	0	0	0	0	0	0	0	0%	0%	0	0	0	0	0%	0%	0	0	0	0	0%	0%

		Baseline Data (without Committed or Development Traffic)							
		2019		2023		2028		2033	
		All Veh	HGV	All Veh	HGV	All Veh	HGV	All Veh	HGV
Port - Castletown Entrance		571	131	607	140	637	146	658	151
Portland Beach Road		17574	1968	18690	2093	19605	2196	20265	2270
"Boot Hill" Buxton Road		21175	1906	22519	2027	23622	2126	24418	2198

Notes

1. *Link 1 Data Provided by Portland Port*
2. *Link 2 Data Taken from DC Count Location 307. Average of two weeks*
3. *Link 3 Data Taken from DC Count Location 810. Average of two weeks.*
4. *All links shown in 18hr flows (0600-2400) as a proportion of AAWT*

BY	CHK	APP	REV	TITLE
SD	AJW	IDA	B	Portland Port Project Pete - Noise Flows
Job:	0979	Portland Port ERF		
DATE	13/05/2020			

awcockward partnership