



## **Aglish Substation & Grid Connection**

Noise Impact Assessment  
12 February 2026

**WDA240144RP\_B\_02**

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# Executive Summary

Wave Dynamics were engaged by Aglish Solar Farm Limited to undertake a noise impact assessment for the proposed Aglish Substation & Grid Connection, Co Cork.

The proposed development comprises of

1. A 110kV Air Insulated Switchgear (AIS) electricity substation with single-storey substation building, single-storey Independent Power Producer (IPP) control room building, High Voltage (HV) electrical equipment and associated infrastructure (to include transformer, lightning protection masts, back-up diesel generator, fire/blast wall, telecoms pole, perimeter security fencing, security lighting, water and drainage infrastructure, and temporary construction compound) to connect to and serve a solar farm;
2. Associated loop-in / loop out infrastructure to connect into an existing 110kV overhead transmission line (including underground 110kV cabling [lengths of ca.790 and 880m from proposed substation to interface towers, including HDD crossing of L2204 road], 2 No. new interface towers and decommissioning of ca. 75m of existing 110kV overhead line);
3. Construction and operational access from the public road L2204;
4. All ancillary site development, landscaping and earthworks. The development subject to this application forms part of grid connection and access arrangements which will facilitate the connection of the proposed Aglish Solar Farm (Cork County Council Reference 24/6157 / An Coimisiún Pleanála ACP-323402-25) to the national grid.

The operational lifetime of the solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and underground cable grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid.

This report outlines the project assessment criteria, survey results, assessment, and general guidance recommendations for:

- Construction noise and vibration from the construction of the proposed substation, grid connection and nearby Aglish solar farm.
- Operational noise from operation of the proposed substation, grid connection and nearby Aglish solar farm.

Based on the operational hours of the development there is potential for noise impact in both the day and night-time, therefore an assessment for both has been conducted. The noise impact assessment included attended and unattended baseline noise measurements on the proposed development lands. This included measurements of background noise at the noise sensitive locations. Appendix A outlines a glossary of the acoustic terminology used in this report.

## Construction Noise and Vibration

The construction noise and vibration from the development have been predicted to the nearest noise sensitive (NSLs) receptors of the substation, grid connection and adjacent solar farm. The construction predictions were based on the procedures outlined in BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise*. The construction noise from the development will be of a short-term nature. The works have been assessed on the basis that they will be sequential.

Consideration was given to the construction of the substation, grid connection and associated solar farm as well as cumulative noise and vibration impacts. **Based on the assessment outlined in this report it is predicted that the construction noise and vibration from the proposed substation, grid connection and associated solar farm will comply with the recognised best practice standards typically adopted for such projects in Ireland.**

## Operational Noise

The noise levels from the substation and grid connection were assessed using criteria set out by EPA NG4 and BS4142 2014 A1+ 2019 *Methods for rating and assessing industrial and commercial sound*, which predicted that there is no predicted adverse noise impact at all noise sensitive receptors for the daytime, evening and night-time periods based on the assessment including the solar farm mitigation measures outlined in the noise impact assessment undertaken at planning stage (Cork County Council reference 246157, ACP: 323402).

**Based on the assessment outlined in this report it is predicted that the operational noise levels from the proposed substation, grid connection and associated solar farm will comply with the project criteria and not produce an adverse noise impact. The cumulative noise impact from the development in combination with other nearby proposed developments has also been assessed and is predicted to comply with the project criteria.**

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# 1 Introduction

Wave Dynamics were engaged by Aglish Solar Farm Limited to undertake a noise impact assessment for the proposed Aglish Substation & Grid Connection, Co Cork.

## General

The proposed development comprises of

1. A 110kV Air Insulated Switchgear (AIS) electricity substation with single-storey substation building, single-storey Independent Power Producer (IPP) control room building, High Voltage (HV) electrical equipment and associated infrastructure (to include transformer, lightning protection masts, back-up diesel generator, fire/blast wall, telecoms pole, perimeter security fencing, security lighting, water and drainage infrastructure, and temporary construction compound) to connect to and serve a solar farm;
2. Associated loop-in / loop out infrastructure to connect into an existing 110kV overhead transmission line (including underground 110kV cabling [lengths of ca.790 and 880m from proposed substation to interface towers, including HDD crossing of L2204 road], 2 No. new interface towers and decommissioning of ca. 75m of existing 110kV overhead line);
3. Construction and operational access from the public road L2204;
4. All ancillary site development, landscaping and earthworks. The development subject to this application forms part of grid connection and access arrangements which will facilitate the connection of the proposed Aglish Solar Farm (Cork County Council Reference 24/6157 / An Coimisiún Pleanála ACP-323402-25) to the national grid.

The operational lifetime of the solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and underground cable grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid.

## Substation

The substation will be based on EirGrid design specifications. The substation compound will consist of a two-storey AIS substation building, single-storey IPP Control Room building, HV electrical equipment and associated infrastructure including palisade fences and concrete post and rail fences. The installation of HV electrical equipment will include a transformer with associated equipment along with:

- Cable Sealing End (CSE);
- Surge Arrestor (SA);
- Earth Disconnect (DA, DB, DL, DT);
- Current /Voltage Transformer (CT/VT);
- House Transformer (HoT);
- Circuit Breaker (CB);
- Lightning Masts (LM);
- Back-Up Diesel Generator;
- Harmonic filters if required by EirGrid;
- Capacitor Bank if required by EirGrid;
- Fire/Blast Wall;
- Telecoms Pole;
- 110kV underground cable which will connect into the existing Inniscarra Macrooom overhead line via 2 no. new Interface Towers

The substation compound has a total area of 11,996m<sup>2</sup>.

Earthworks will be undertaken so the compound is level, with a finish compound level of 123.2m.

### Site Access

The site will be accessed for both the construction and operational phases by means of two entrances from the L2204. These entrances will be subject to some upgrades, including removal of existing roadside sod and stone ditch to provide new gate as presented under Cork County Council Reference 24/6157. The entrances will be suitably splayed and have been subject to sight line and autotrack analysis, with the latter including modelling of abnormal load delivery for the transformer. Operational sightlines will be maintained by trimming back hedgerows with all necessary land within ownership.

A 4.5 metre wide compacted access track will extend from the entrance to the substation compound. The design includes a temporary construction track to cater for deliveries, which will be decommissioned post the construction phase (and land reinstated), as well as an operational access track. The track will include a geotextile base and filter membrane and 200 mm of Clause 804 sub-base.

### Connection to National Grid

In order to connect to the transmission network, it is proposed to connect the 110kV substation into the national grid via a 'loop-in / loop-out' underground 110kV cable grid connection which will connect into the existing 110kV Inniscarra-Macroom overhead transmission line.

Two new steel lattice interface towers of approximately 16 m in height will form part of the existing overhead line and both towers will connect to the proposed 110kV substation via underground 110kV cables. The interface towers are approximately 75 metres apart, therefore the same length of the existing 110kV Inniscarra-Macroom overhead line will need to be decommissioned. The underground cable is comprised of 3 no. power ducts, 2 no. telecom ducts and 1 no. earth continuity duct. The cables to each interface tower are ca.790 and 880m metres in length. The crossing of the L2204 will be by means of Horizontal Directional Drill (HDD).

This connection method will constitute a new node of the transmission network, connecting the proposed substation and associated solar farm generation to the national electricity grid. The construction method for the interface towers and decommissioning of 110kV overhead lines is set out in the Aglish Substation & Grid Connection Construction Methodology prepared by Aglish Solar Farm Limited.

All works will be carried out in accordance with international best practice and full compliance with health and safety requirements.

### Temporary Construction Compounds

As outlined in the submitted site layout plans, it is proposed to provide a temporary construction compound south of the proposed substation, accessed from the entrance from the L2204. The temporary compound will include the following facilities at a minimum:

- Adequate canteen space to allow for all workers during the peak period;
- Office space with lighting, heating and internet facilities;
- Toilets and adequate welfare facilities for construction staff in accordance with the relevant statutory Health & Welfare guidelines;
- Parking space for both light and heavy vehicles;

Designated skips and temporary storage areas.

### Surface Water Drainage and Water Services

Surface water drainage proposals for the development have been developed to mimic the natural drainage patterns of the site and thereby be in accordance with the best management practices of Sustainable Drainage Systems (SuDS) including those set out in the SuDS Manual (C753) published by CIRIA in 2015. Specifically, this includes the following:

- The compound construction is formed with permeable stone thus mimicking a soakaway scenario. ESB compound stone is single sized for the first 150mm for safety purposes. It then changes to a graded 6F2 material.

- The main areas to be drained include the roofs and the compound road. These equate to approximately 663m<sup>2</sup>. The compound road will be drained via series of road gullies.
- Assuming even the most basic of infiltration rates down through the permeable compound stone, the existing greenfield situation is easily maintained.

The surface water generated in the hardstanding and bunded areas will discharge to the soakaway via a Class 1 Full Retention Oil Separator. The electrical transformer in the substation is oil filled equipment and, as such, is protected with impermeable bunds. Surface water generated in this bund will be pumped out by an oil sensitive pump ensuring that only non-contaminated water enters the site drainage network.

In relation to wastewater, a 5m<sup>3</sup> foul holding tank is proposed as part of the operational development. These tanks are normally used in ESB substations. It will be emptied periodically, with the capacity in excess of modelled holding requirements.

It is proposed to provide the required potable water demand of the station with a bored well on site. The potable water demand within the site will be low as the proposed station is to be unmanned. To avoid issues like stagnation in the water supply line and problems resulting from this, there will be a continual water demand of 24 litres per week from automatically flushing WCs within the station.

### Site Restoration and Landscaping

This will involve the reinstatement of all other excavated materials and associated landscaping works. It will include the replacement of topsoil in disturbed ground areas such as access tracks and the removal of the construction compound and other temporary work areas.

The submitted Landscape Mitigation Plan identifies that c.31 no. metres of existing hedgerow and 2 no. trees will be removed to facilitate access to the fields that include the proposed substation and grid connection. These removal works are included in the wider solar farm application which provides for removal of a total of 86 no. linear metres of hedgerow and 3 trees, which will be offset by 872 linear metres of new hedgerow planting, as well as the bolstering of an additional 22,296 linear metres, where necessary, to fill any gaps in existing hedgerows.

### Other Planned Works

*Cork County Council Reference 24/6157 (ACP-323402-25)*

It is intended that the proposed 110kV substation and grid connection will service the Aglish Solar Farm, which is currently the subject of a planning application to Cork County Council. At the time of writing, the appeal is due for decision on the 5<sup>th</sup> March 2026.

The solar farm with a total area of circa 161 hectares. The solar farm will consist of solar panels on ground mounted frames, 23 no. single storey electrical inverter/transformer stations, 6 no. single storey spare parts containers, 3 no. Ring Main Units, 7 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L62031, L6203, R619, L6207, L22012 and L2204 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 4 no. stream/drain deck crossings, 6 no. horizontal directional drill crossings (under watercourses/drains/public road), temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 7 no. entrances from the L62031, L6203, L22012, L6398 and L2204 local roads. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration.

The solar farm will contribute directly to a carbon dioxide emission reduction of 28,657 tonnes per annum or the equivalent of approximately 1,146,298 tonnes of CO<sub>2</sub> over the 40 year lifetime of the project.

## 1.1 Statement of Competence

The attended and unattended measurements and report were completed by Wave Dynamics, an acoustic consultancy that specialises in noise and vibration. Our consultants have extensive experience in noise impact assessments.

The site survey was conducted by Daniel Cousins | Field Engineer, Daniel has on-site experience of numerous planning stage applications and construction stage sites.

The report was completed by Sean Rocks, Director | Senior Consultant, Sean has experience of numerous planning stage assessments. Sean's qualifications include; BEng (Hons) in Mechanical and Manufacturing Engineering, Diploma in Acoustics and Noise Control (Institute of Acoustics), IOA Certificate of Competence in Environmental Noise Measurement and SITRI certified sound insulation tester. Sean is a member of both Engineers Ireland and the Institute of Acoustics.

This peer review was completed by James Cousins, Managing Director | Principal Consultant with Wave Dynamics who has extensive experience in assessing noise impacts. James is an experienced acoustic consultant. His qualifications include; BSc (Hons) in Construction Management and Engineering, Pg Cert in Construction Law and Diploma in Acoustics and Noise Control (Institute of Acoustics) and an IOA Competence Cert in Building Acoustic Measurements. James is a member of both Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA) and is the current SITRI Chairman.

## 2 Site Description

The substation, grid connection and solar farm developments are spread across the townlands of Aglish, Currahaly, Farnanes, Farran, Knockavullig, Knocknagoul, Knockshanawee, Loughleigh, Mahallagh, Nettleville Demesne, Rathonoane, Rooves Beg, Rooves More and Shandangan East in County Cork. There are residential properties scattered around the lands as shown below in Figure 2. The development is generally surrounded by agricultural farmland with one off housing. The NSLs have been grouped together for the purpose of the assessment and the worst case NSL in each group has been assessed as representative of the group.

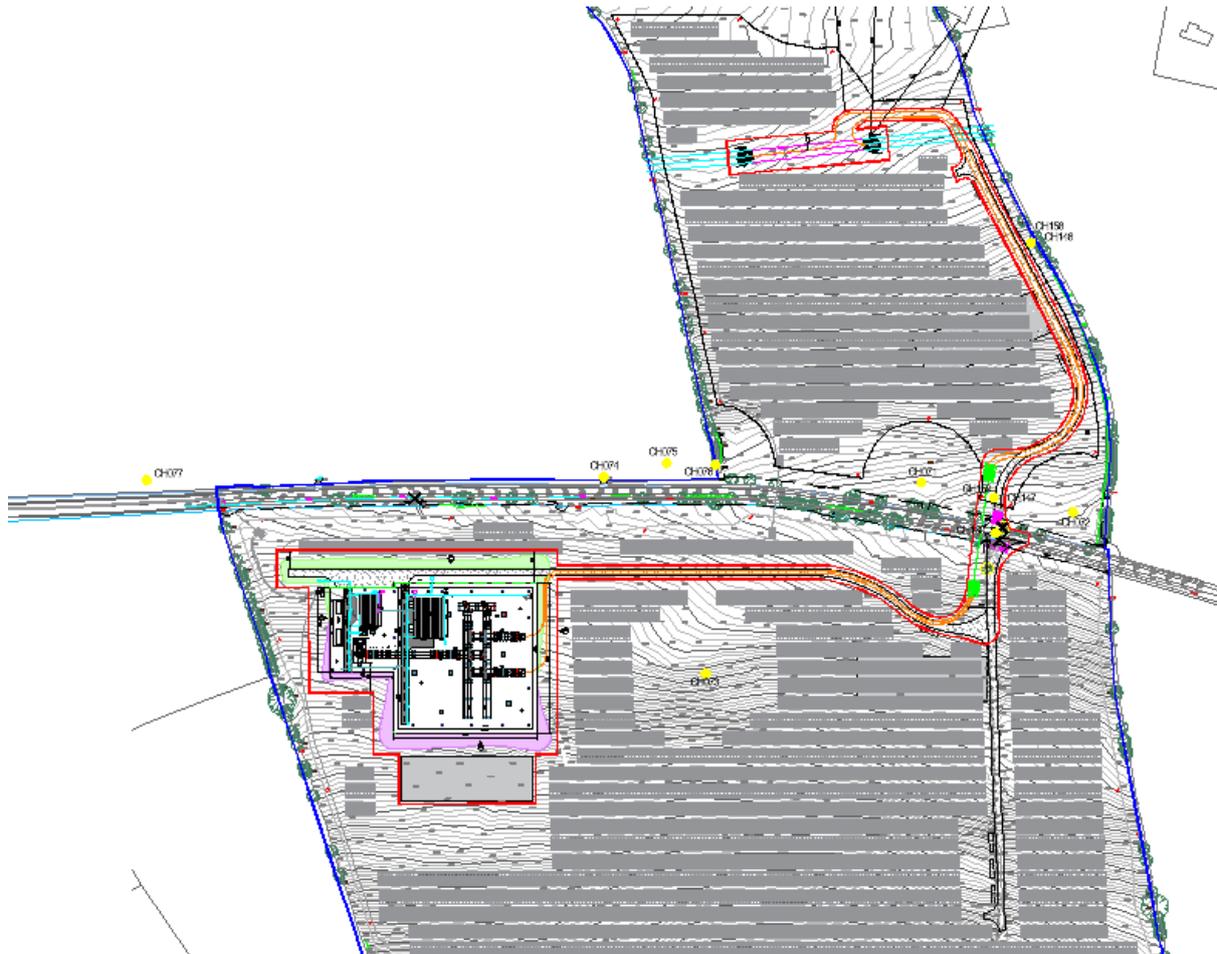


Figure 1: Proposed 110kV substation site layout plan.

Figure 2 illustrates the layout plan of the associated Aglish Solar Farm project.

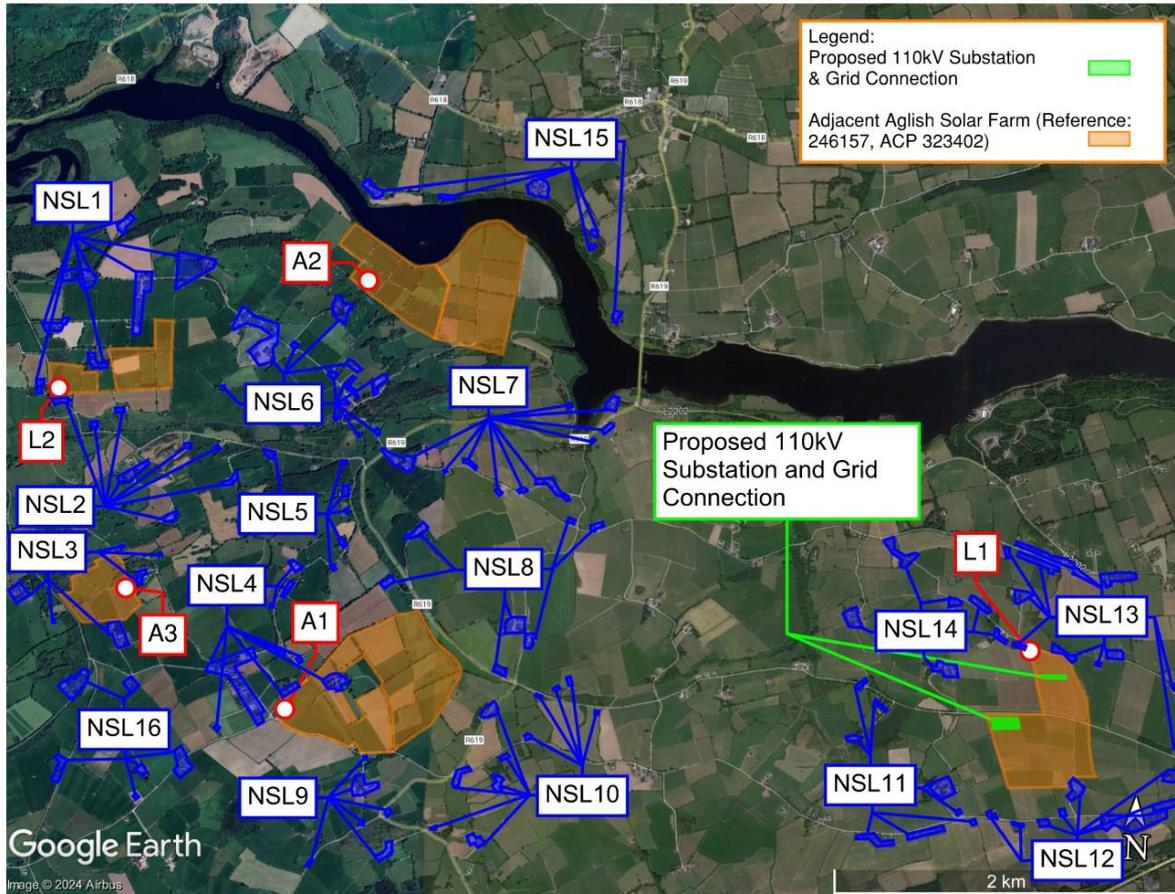


Figure 2: Aglish Solar Farm, Substation and Grid Connection with NSLs

Table 1 below shows the respective approximate distances between the closest dwelling of each noise sensitive location (NSL) subgroup and the proposed substation and grid connection. The noise sensitive locations are shown in Figure 3 and represent those NSLs in proximity to the wider Aglish Solar Farm, including the proposed substation and grid connection site which are located in Parcels 6 and 5 of the solar farm respectively.

Table 1: Distance between NSLs and proposed substation and grid connection.

Noise Sensitive Location	Approximate distance from closest façade of the NSL to the proposed substation / grid connection (m)
NSL1	> 3000
NSL2	> 3000
NSL3	> 3000
NSL4	> 3000
NSL5	> 3000
NSL6	> 3000
NSL7	> 2500
NSL8	> 2500
NSL9	> 3000

Noise Sensitive Location	Approximate distance from closest façade of the NSL to the proposed substation / grid connection (m)
NSL10	2347
NSL11	441
NSL12	508
NSL13	155
NSL14	363
NSL15	> 3000
NSL16	> 3000

## 3 Project Criteria

The acoustic assessment criteria for the project is set out in this section, the purpose of the criteria is to ensure consideration of:

- Construction noise from the construction of the proposed substation, grid connection and nearby Aglish Solar Farm.
- Operational noise from operation of the proposed substation, grid connection and nearby Aglish Solar Farm.

The Aglish Solar Farm is located on both immediately adjacent and nearby land parcels to the proposed substation and will be constructed and in operation at the same time. For that reason, this solar farm been assessed in this report alongside the substation and grid connection. This ensures a comprehensive whole project approach to the assessment has been completed. There will be no predicted operational noise from the underground cable elements of the wider project including both the grid connection cabling (which forms part of the solar farm planning application to Cork County Council). Therefore operational noise from the underground cable has been screened out.

Based on our understanding of the project there are no relevant sources of vibration from the operational phase of the development. Therefore, Wave Dynamics have developed the project assessment criteria for:

- Operational noise and construction noise and vibration.

### Acoustic Standards

The acoustic standards for assessing noise impact for the project have been developed from the following:

- ✓ Environmental Protection Agency NG4: Guidance note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.
- ✓ BS4142 2014 A1+ 2019 Methods for rating and assessing industrial and commercial sound.
- ✓ ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures.
- ✓ British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.
- ✓ British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- ✓ British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.
- ✓ Cork County Council Noise Action Plan 2024-2028.
- ✓ Previous experience on similar projects.

## 3.1 Noise Assessment Criteria

### 3.1.1 Construction Noise Assessment Criteria

There is currently no statutory Irish guidance for construction noise requirements from noise during the construction phase of a project.

In the absence of specific noise limits, the appropriate criteria for the allowable construction noise levels may be found in British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.

The standard (BS5228-1:2009+A1) provides examples of acceptable limits for construction and/or demolition noise in both subjective and objective form. For example, paragraph E.2 of the standard states:

*“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”*

Paragraph E.2 goes on to state:

*“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:*

- 70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;
- 75 decibels (dBA) in urban areas near main roads in heavy industrial areas”.

Typically, the planning authority refer to BS 5228 Part 1 as a method to control construction noise from sites on the local environment. This standard is therefore the de facto appropriate standard in the absence of regulatory guidance.

The criteria for this project will be based on the ABC method, the ABC method takes the background noise measured in the area and sets the appropriate construction noise limits for the project based on the background noise levels.

For the purpose of this assessment buildings other than dwellings which have a residential function will be considered for the lower noise limit, this includes Hotels, B&B’s, Student Accommodation, Co-Living and Assisted Living Developments etc. This is in line with the guidance and definition of noise sensitive residences of EPA NG4. Table 2 below outlines the project criteria in tabular form.

Table 2: BS 5228: 1:2009+A1 threshold levels.

Assessment category and threshold value period	Threshold value, in decibels (dB) (L <sub>Aeq</sub> )		
	Category A <sup>1</sup>	Category B <sup>2</sup>	Category C <sup>3</sup>
Daytime (07:00 – 19:00) and Saturdays (07:00 – 14:00)	65	70	75
Evenings and weekends <sup>4</sup>	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

- 1) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
- 2) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
- 3) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category B values.
- 4) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

### 3.1.2 Construction Vibration Criteria

Best practice guidance is taken from British Standard BS 5228:2009 + A1 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2 Vibration.

The standard recommends that for a soundly constructed residential property and similar structures (in good repair), the threshold for minor or cosmetic (i.e. non- structural) damage should be taken as a Peak Particle Velocity (PPV) (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:

Table 3: Likely Construction Noise Impact

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:			
Building Type	Less than 15Hz	15 to 40Hz	40Hz and above
Light framed structures/ residential buildings	15 mm/s	20 mm/s	50 mm/s

### 3.1.3 Operational Noise

Planning authorities can set noise limits from typical substation and solar farm developments pertaining to noise however there is currently no national policy for operational noise limits from either type of development for planning noise assessments. Noise limits for new developments are typically sought from the planning authority's Noise Action Plan, EPA NG4/BS 4142. On review of the Cork Noise Action Plan 2024-2028 no specific guidance has been outlined for noise limits from commercial premises and therefore the criteria from EPA NG4 and BS4142 have been adopted for the project.

#### EPA NG4

EPA NG4 outlines that noise attributable solely to onsite activities from a licenced premises should not exceed the following limits:

- Daytime (07:00hrs – 19:00hrs) – 55dB  $L_{Ar,T}$
- Evening (19:00hrs – 23:00hrs) – 50dB  $L_{Ar,T}$
- Night time (23:00hrs – 07:00hrs) – 45dB  $L_{Aeq,T}$

*During daytime and evening periods rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all sensitive locations. A penalty of 5dB for tonal and/or impulsive elements is to be applied to the daytime and evening measured  $L_{Aeq,T}$  values to determine the appropriate rating level ( $L_{Ar,T}$ ). In all cases, an assessment by a competent person will be required.*

*During the night-time period no tonal or impulsive noise from the facility should be clearly audible or measurable at any NSL.*

EPA NG4 also outlines more onerous criteria for areas which meet the background noise level threshold for "Areas of Low Background Noise" which are applicable to this development. The noise limits for these areas are as follows:

- Daytime (07:00hrs – 19:00hrs) – 45dB  $L_{Ar,T}$
- Evening (19:00hrs – 23:00hrs) – 40dB  $L_{Ar,T}$
- Night time (23:00hrs – 07:00hrs) – 35dB  $L_{Aeq,T}$

EPA NG4 outlines more onerous criteria for areas which meet the background noise level threshold for "Areas of Low Background Noise". The noise limits for these areas are as follows:

- Daytime (07:00hrs – 19:00hrs) – 45dB  $L_{Ar,T}$
- Evening (19:00hrs – 23:00hrs) – 40dB  $L_{Ar,T}$

- Night time (23:00hrs – 07:00hrs) – 35dB  $L_{Aeq,T}$

### BS 4142:2014+A1:2019

The standard describes a method for the assessment of commercial, industrial and background noise to quantify its impact on persons outside of a residential dwelling. BS 4142 has become the de facto standard for compliance investigation. In addition to the specified broadband sound levels the standards provide objective and subjective methods for the assessment of the impulsivity and tonality of the sound sources. This allows for a penalty/ correction to be applied to the measured sound level of the source ( $L_{Aeq}$ ) to give the rating level ( $L_{Ar,T}$ ).

It considers the likelihood of complaints by considering the margin by which the sound in source the background noise level.

BS 4142 states that an exceedance of the noise source of the background sound by:

- 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 or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context”*

BS4142 outlines guidance for penalty corrections to be applied to the sound sources in question should the noise source have one of the following characteristics:

- The sound contains a distinguishable, discreet, continuous tone (whine, or hum);
- The sound contains distinct impulses (i.e. bangs),
- The sound is intermittent or:
- The sound is irregular.

## 4 Baseline Noise Survey

### 4.1 Baseline Noise Survey

An attended and unattended baseline noise survey was conducted to assess the background noise levels and the typical noise sources in the area. Multiple locations were chosen to conduct the survey to establish the background noise across the full development. The attended measurements included measurements of background noise during both daytime (07:00hrs - 23:00hrs) and night-time hours (23:00hrs - 07:00hrs). The purpose of the attended and unattended measurements was to establish the background noise levels in the area, and to use these measurements for assessing the future noise impact from the substation, grid connection and associated solar farm.

#### 4.1.1 Site Description and Measurement Locations

The substation, grid connection and solar farm developments are spread across the townlands of Aglish, Currahaly, Farnanes, Farran, Knockavullig, Knocknagoul, Knockshanawee, Loughleigh, Mahallagh, Nettleville Demesne, Rathonoane, Rooves Beg, Rooves More and Shandangan East in County Cork. There are residential properties scattered around the lands as shown below.

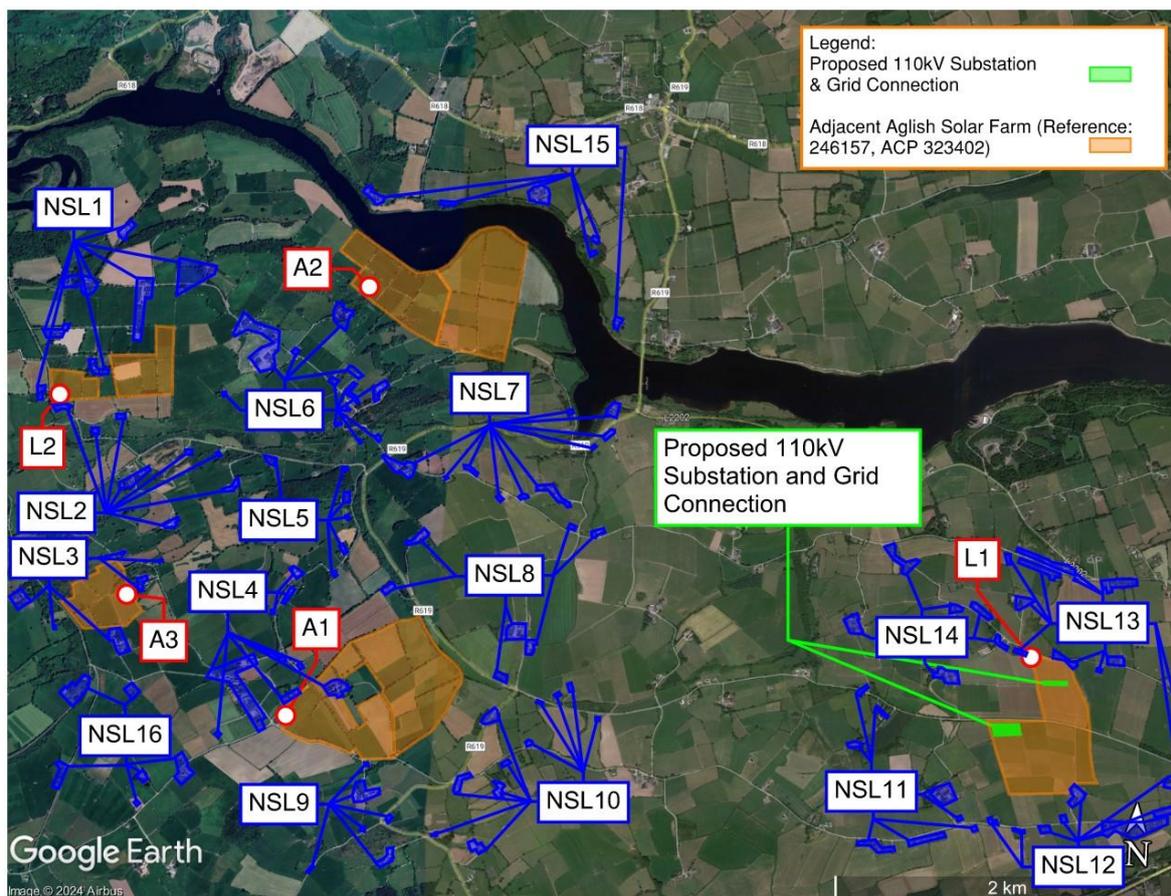


Figure 3: Site location, NSL locations and measurement locations for the substation, grid connection and wider solar farm area.

The noise monitoring locations undertaken for the survey of the entire Aglish Solar Fram including the 110kV substation and grid connection are shown in Figure 3 above. The purpose of all measurements undertaken at the site was to assess the existing background noise levels in the area and at the noise sensitive locations prior to the substation and solar farm development.

The background noise levels recorded are used to assess if the noise sensitive locations meet the EPA NG4 criteria for “areas of low background noise”, to set the project criteria. From the measurements it was determined that this is an area of low background noise therefore the EPA NG4 “Areas of Low Background Noise” criteria has been adopted for the operational phase of the project for all NSLs. The full descriptive details of the monitoring locations are outlined below.

- L1: This represents the unattended noise logger at measurement location L1, which was in a field within the site boundary of the Parcel 5 lands representative of NSLs 11-14 and is the closest measurement location to the proposed substation and grid connection. This is representative of the residual and background noise levels during the day, evening and nighttime periods at NSLs 11 – 14. The measurements recorded at L1 were dominated by distant road traffic noise.
- A1: This represents attended measurement location A1, which was in a field within the site boundary within the Parcel 4 lands representative of NSLs 4,5,8,9 and 10. The measurements were representative of the day and nighttime noise levels at NSLs 4, 5, 8, 9 and 10. These measurements have been used to verify the noise logger measurements across the site. The dominant noise source at this location was distant road traffic noise. Other audible noise sources included birdsong, and distant farm machinery.
- A2: This represents attended measurement location A2, which was located in a field within the site boundary within the Parcel 2 lands and was representative of the day and nighttime noise levels at NSLs 6, 7 and 15. These measurements have been used to verify the noise logger measurements across the site. The dominant noise source at this location was distant road traffic noise. Other audible noise sources included birdsong.
- A3: This represents attended measurement location A3, which was in a field within the site boundary within the Parcel 3 lands representative of NSLs 3 and 16. The measurements were representative of the day and nighttime noise levels at NSLs 3 and 16. These measurements have been used to verify the noise logger measurements across the site. The dominant noise source at this location was distant road traffic noise. Other audible noise sources included birdsong and farm machinery.
- L2: This represents the unattended noise logger at measurement location L2, which was in a field within the site boundary within the Parcel 1 lands representative of NSLs 1 and 2. This is representative of the residual and background noise levels during the day, evening and nighttime periods at NSLs 1 and 2. The measurements recorded at L2 were dominated by distant road traffic noise.

#### 4.1.2 Survey Methodology and Personnel

The attended and unattended surveys were completed by Daniel Cousins (Field Engineer).

##### Attended Noise Measurements

Noise measurements were undertaken in general accordance with ISO 1996-1:2016 using ISO Class 1 sound analysers. Attended measurements were taken for varying durations based on objective. Background noise measurements were taken over a 60-minute period for the daytime period and over 15 minutes for the night-time period. Care was taken to avoid any effect on the measurements, the sound level meter was positioned at approximately 1.2m above ground level.



Figure 4: Attended noise monitor setup.

### Unattended Noise Measurements

Noise measurements were undertaken in general accordance with ISO 1996-1:2016 using ISO Class 1 sound analysers. An unattended noise survey was undertaken from the 2<sup>nd</sup> of July 2024 to the 4<sup>th</sup> of July 2024 at location L1 and location L2. Care was taken to avoid any effect on the measurements, the sound level meter was positioned at approximately 1.2m above ground level and securely anchored in place for the duration of the unattended survey. The data from the unattended measurements was filtered for adverse or undesirable weather conditions.

#### 4.1.3 Survey Period

The attended noise measurements were undertaken on the 2<sup>nd</sup> and 4<sup>th</sup> of July 2024. The unattended surveys were started on the 2<sup>nd</sup> of May 2024 by Daniel Cousins (Field Engineer) and completed on the 4<sup>th</sup> of July 2024 by Daniel Cousins (Field Engineer).

#### 4.1.4 Noise Measurement Equipment

A Class 1 sound level meter/noise logger in general accordance with IEC 61672-1:2013 was used for the attended measurements. Table 4 below summarises the measurement equipment used.

Table 4: Noise Measurement Equipment

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Sound Level Meter	SLM1	Nor 140	1405554	U45343/U45344 /45342	17/09/2027
Sound Level Meter	SLM2	NOR140	1406532	UCRT25/2495	20/10/2027
Sound Level Meter	SLM3	Nor 140	1403082	50651/50650	13/04/2027
Calibrator	CAL3	Nor 1251	32096	AC250308	22/07/2026
Calibrator	CAL4	Larson Davis CAL200	21085	AC250309	22/07/2026

#### 4.1.5 Subjective Noise Environment

During the attended noise survey following noise sources were identified:

- Road noise,
- Birds chirping,
- Wind through foliage,
- Distant farm animals,
- Distant dogs barking.

## 4.2 Noise Measurement Results

This section outlines the results of the attended noise measurements.

### Attended Measurement Results

Table 5 outlines the results of the attended measurement survey.

Table 5: Attended Noise Measurement Results

Measurement				Measured Noise Levels (re 20µPa)		
Location	Date	Time (hrs)	Duration (mins)	L <sub>Aeq</sub> dB	L <sub>AFmax</sub> dB	L <sub>A90</sub> dB
A1	02/07/2024	10:22	60	34	59	25
A3	02/07/2024	10:53	60	34	56	27
A2	02/07/2024	11:22	60	33	55	27
L2	02/07/2024	13:20	15	46	81	28
L1	02/07/2024	14:36	15	43	69	31
A2	04/07/2024	05:00	15	39	59	30
A2	04/07/2024	05:16	15	40	56	31
A3	04/07/2024	05:45	15	36	55	26
A3	04/07/2024	06:01	15	34	55	27
A1	04/07/2024	06:29	15	36	60	28
A1	04/07/2024	06:45	15	38	65	30
L2	04/07/2024	13:27	15	45	61	39
L1	04/07/2024	14:15	15	45	73	34

### Unattended Measurement Results

This section contains the measurement results from the unattended noise monitoring. Table 6 displays the measurements taken from the 2<sup>nd</sup> of July 2024 to the 4<sup>th</sup> of July 2024 at location L1.

Table 6: Unattended measurement results at location L1

Start Date	L <sub>Aeq,16hour</sub> (07:00 - 23:00) dB	L <sub>night</sub> (L <sub>Aeq,8hour</sub> 23:00 - 07:00) dB	L <sub>den</sub> (00:00 - 00:00) dB	10th highest night-time L <sub>AFmax</sub>	L <sub>A90</sub> (23:00 - 07:00) dB	L <sub>A90</sub> (07:00 - 19:00)	L <sub>A90</sub> (19:00 - 23:00)
02/07/2024	46 <sup>1</sup>	40	49	54	29	35	32
03/07/2024	47	42	50	66	23	34	30

Start Date	L <sub>Aeq,16hour</sub> 07:00 - 23:00 dB	L <sub>night</sub> (L <sub>Aeq,8hour</sub> 23:00 - 07:00) dB	L <sub>den</sub> (00:00 - 00:00) dB	10th highest night-time L <sub>AFmax</sub>	L <sub>A90</sub> (23:00 - 07:00) dB	L <sub>A90</sub> (07:00 - 19:00)	L <sub>A90</sub> (19:00 - 23:00)
04/07/2024	47 <sup>1</sup>	N/A	N/A	N/A	N/A	34	N/A

- 1) Shortened measurement duration
- 2) Arithmetic average of LAF90.

Table 7 below outlines the measurement results from the unattended measurements taken at L2 from the 2<sup>nd</sup> of July 2024 to the 4<sup>th</sup> of July 2024.

Table 7: Unattended measurement results at Location L2

Start Date	L <sub>Aeq,16hour</sub> 07:00 - 23:00 dB	L <sub>night</sub> (L <sub>Aeq,8hour</sub> 23:00 - 07:00) dB	L <sub>den</sub> (00:00 - 00:00) dB	10th highest night-time L <sub>AFmax</sub>	L <sub>A90</sub> (23:00 - 07:00) dB	L <sub>A90</sub> (07:00 - 19:00)	L <sub>A90</sub> (19:00 - 23:00)
02/07/2024	45 <sup>1</sup>	44	47	63	25	31	29
03/07/2024	46	41	51	62	24	34	33
04/07/2024	47 <sup>1</sup>	N/A	N/A	N/A	N/A	35	N/A

- 1) Shortened measurement duration
- 2) Arithmetic average of LAF90.

### Discussion of Measurement Results

The attended background measurements were taken on a weekday to establish the existing background noise levels. Additionally, two logger positions were selected to record continuous data to establish the background noise levels across the full site. Attended measurements were taken during both daytime (07:00-23:00) and night-time (23:00-07:00) hours. From the measurements it can be determined that this is an area of low background noise therefore the EPA NG4 “Areas of Low Background Noise” criteria will be adopted for the operational phase of the project.

### EPA Quiet Area Screening

The development location does not meet the EPA definition of a “Quiet Area” as all NSLs are located < 5km from a national primary route (N22).

### EPA Areas of Low Background Noise

For all areas not identified as Quiet Areas, the existing background noise levels measured during the environmental noise survey should be examined to determine if they are located an area of low background noise, which would mean satisfying each of the following criteria:

- Average Daytime Background Noise Level ≤40dB L<sub>AF90</sub>, and;
- Average Evening Background Noise Level ≤35dB L<sub>AF90</sub>, and;
- Average Night-time Background Noise Level ≤30dB L<sub>AF90</sub>.

If all three of the above criteria are satisfied for any of the measurement locations, then those locations are deemed to be in areas of low background noise, and reduced noise limit criteria would apply.

Unattended noise monitoring results from location L1 is considered to be representative of the existing background noise levels at the NSLs surrounding the proposed substation and grid connection site and therefore have been used to assess against the “Area of Low Background Noise” criteria. Table 7 outlines the average daytime, evening and night-time noise levels at monitoring location L1.

Table 8: Average Daytime, Evening and Night-time Noise Levels at Monitoring Location L1

Noise Monitoring Location	Average Daytime $L_{AF90}$ (07:00 - 19:00)	Average Evening $L_{AF90}$ (19:00 – 23:00)	Average Night-time $L_{AF90}$ (23:00 - 07:00) dB
L1	34	31	26

Based on the noise measurement results from L1, it can be determined that the background noise levels meet the classification of “Area of Low Background Noise” according to EPA NG4 for daytime, evening and nighttime  $L_{AF90}$  measurements undertaken at the site. Therefore, the NG4 noise limit criteria for “Area of Low Background Noise” are applicable to the proposed development.

### 4.3 Weather Conditions for Monitoring Period

In general, good weather conditions were noted during the attended survey, with winds typically less than 5 m/s and no rain and clear skies. Noise measurements were filtered for any adverse weather conditions where required.

# 5 Noise Impact Assessment

## 5.1 Construction Noise Assessment

Based on the location of the site the following noise sensitive receptors have been identified. These noise sensitive receptors were chosen as they are the closest NSL's to the substation works and from each parcel land of the associated solar farm.

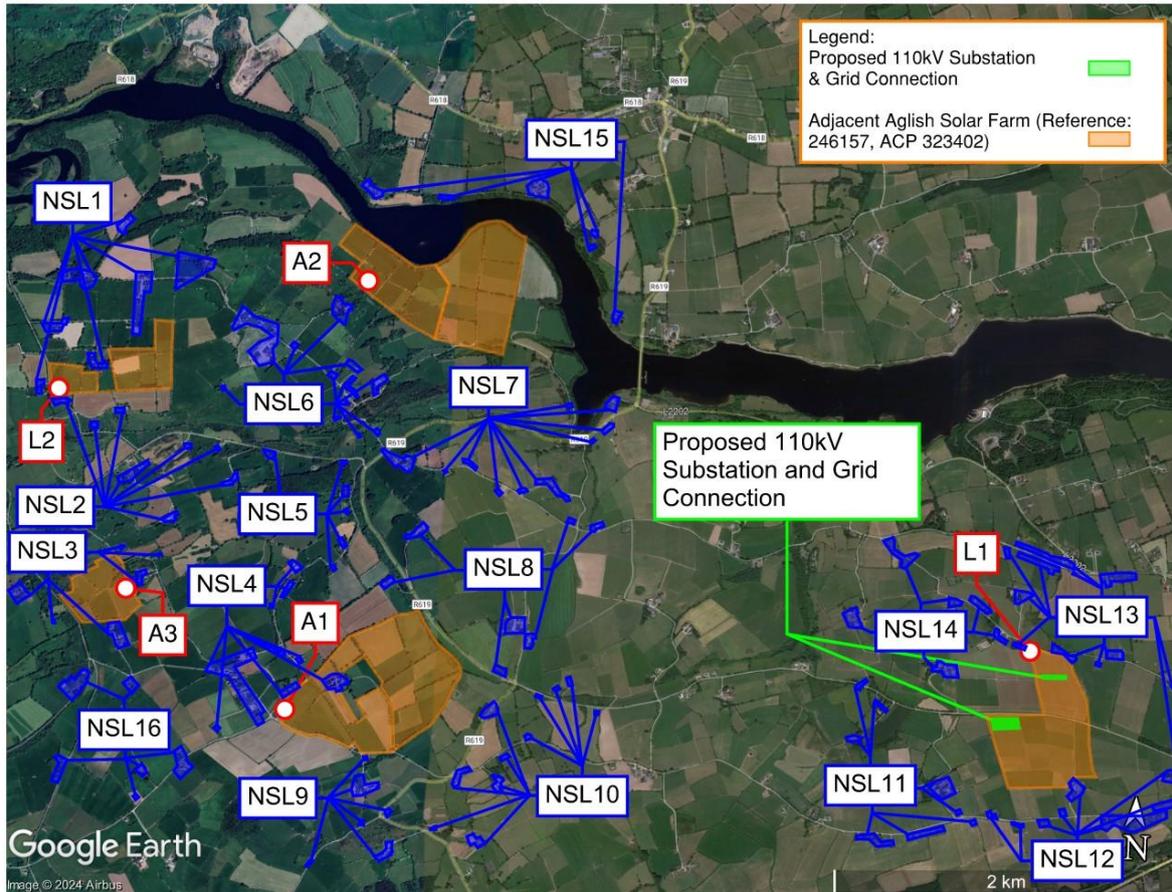


Figure 5: Site location, measurement location, noise sensitive locations for the substation, grid connection and wider solar farm.

### Noise Limits

The criteria for the project based on the criteria outlined in section 3 and the background noise in the area. The project criteria for construction noise is outlined below in Table 8. Reference to the baseline survey results and guidance contained in BS 5228 Part 1 for construction noise levels threshold for significance affect from construction activities is set as follows for the closest noise sensitive locations:

Table 9: Threshold of significant impact at dwellings

Assessment category and threshold Value Period (L <sub>Aeq</sub> )	Threshold value in decibels (dB)		
	Category A	Category B	Category C
Night-time (23:00-07:00)	45	50	55
Evening and Weekends	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75

- 1) A significant effect has been deemed to occur if the total  $L_{Aeq}$  noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.
- 2) If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total  $L_{Aeq}$  noise level for the period increases by more than 3 dB due to construction activity.
- 3) Applied to residential receptors only.

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5dB. If the noise generated by construction activities exceeds the appropriate category value, then a significant effect is deemed to occur. The appropriate category value for this project has been determined as Category A with a 65dBA threshold.

### 5.1.1 Construction Noise Predictions

Construction noise for the development works has been predicted based on the information provided by HW Planning. A summary of the expected equipment, durations and operating times are provided for all works. The assessment has taken into consideration that the works are dynamic and will be conducted at different locations across the individual solar farm land parcels as well as the 110kV substation and grid connection site. The prediction methodology in BS5228 has been used to calculate the noise level over a typical day for each of the main construction stages.

These predictions include the construction traffic from the site. Table 9 outlines the plant used for the construction noise impact from all works. It should be noted that construction noise is considered for both the substation and grid connection and the wider Aglish Solar Farm as it is envisaged that construction activities for both developments will occur at the same time.

Table 10: Construction noise assessment for solar farm

Construction Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Noise Level ( $L_{Aeq}$ at 10m dB(A))	On Time of 10 hr day
Enabling Works	Digger	77	3 Hours
	Dump Truck	79	2 Hours
	Power Tools	70	2 Hours
	Road Lorry	76	1 Hour
Civil & Electrical	Road Lorry	76	1 Hour
	Power Tools	70	3 Hours
	Hammer	69	1 Hour
	Telescopic Handler	71	3 Hours
	Piling	63	2 Hours
	Concrete Pump	74	2 Hours
External finishes	Hand Tools	70	5 hours
	Power Tools	70	2 hours
	Road Lorry	76	1 hour

The substation has also been considered in the context of the construction noise identified in Table 10. It is not expected based on the information assessed that any cable installation works or substation works will exceed the BS 5228-1 criteria for the project.

### Predicted Construction Noise at NSL's

Table 11 summarises the predicted construction noise level at the noise sensitive locations. Examination of the results indicate the construction noise without mitigation is predicted to be within the noise limits set out by BS 5228-1.

The calculations set out below are based on assumed site construction works and a combination of the plant operating at the same time i.e. worst-case scenario.

Distances were calculated from the façade of the nearest residential property within each NSL grouping, to the centre of the closet proposed development site (land parcel).

Table 11: Predicted noise levels without mitigation for each stage.

NSL	Criteria $L_{Aeq}$ , dB	Predicted noise level (construction noise + ambient)		
		with no mitigation		
		$L_{Aeq}$ , dB		
		Enabling Works	Civil & Electrical	External finishes
NSL1	65	62	60	57
NSL2	65	64	61	59
NSL3	65	63	60	57
NSL4	65	63	60	58
NSL5	65	57	57	52
NSL6	65	58	57	51
NSL7	65	56	54	51
NSL8	65	58	55	53
NSL9	65	59	57	54
NSL10	65	58	55	53
NSL11	65	58	55	52
NSL12	65	60	57	54
NSL13	65	60	57	55
NSL14	65	59	57	52
NSL15	65	58	55	50
NSL16	65	59	56	52

### 5.1.2 Predicted Cumulative Noise Impact

The predicted cumulative construction noise impact from other developments in the area where the proposed solar farm including the substation and grid connection has been considered.

Based on the information available and given the location of these other developments in relation to the NSLs for the proposed substation the cumulative noise impact is not expected to exceed the values outlined Table 11.

Table 12 below outlines the developments with planning in the area.

Table 12: Developments with existing planning within the wider area.

Ref. Number	Distance from the Subject Site	Status	Description
ABP: 323402	c.0km	Appeal Ongoing	A 10 year permission is sought for a solar farm with a total area of circa 161 hectares and all associated site works. 40 years planning permission is requested.
254354	c. 4.6km	Granted Permission – 10/11/2023	Permission to upgrade the existing floodlighting system to playing pitch number one (the old pitch), install a diesel-powered generator to operate the upgraded floodlighting system, upgrading the existing car park lighting and all associated site works.
234312	c.4.6km	Granted Permission – 14/11/2023	The demolition of the existing school buildings, the removal of existing pre-fabricated temporary accommodation and the construction of a new split level, part single storey, part two storey and part three storey 1000 pupil secondary school comprising a four classroom special education unit, a single storey multi-purpose hall, general purpose room, general classrooms, specialist classrooms, social areas, library, administration areas, service yards, external stores, covered storage areas for construction studies, toilet and changing facilities and associated ancillary accommodation. The development also includes the provision of new site entrances, car parking area, drop-off areas, new site boundary, new ball courts, playing pitch, landscaped external areas and all associated site works.
ABP: 313728	c. 2.9km	Granted Permission – 21/08/2023	The alteration of the permitted No.62 detached house type B (under planning permission 19/06613) to 2no. semi-detached 3 bedroom Type F houses on an extended site area and including 5no. new detached 4bedroom dwelling composed of; 2no. Type B and 3No. Type C, together with associated site development works.
ABP: 310214	c. 1km	Granted Permission – 18/01/2022	Development of a small scale quarry for rock extraction.
ABP: 309891	c.2.1km	Granted Permission – 23/09/2021	Extension of existing quarry excavation area (06/13499 and PL04.226347).
Reg. Ref. 22/4909	c. 6.6km	Granted Permission – 15/06/2022	Modification to the solar farm permitted under planning reg no. 15/6625 and extended under 21/4505. The modifications consist of changes to the dimensions of the permitted photovoltaic panels, replacement of the 2 transformer stations with 1 smaller transformer station and 1 smaller storage unit, changes to the design of the delivery station and associated layout changes. All modifications are within the boundary of the permitted development.

Ref. Number	Distance from the Subject Site	Status	Description
Reg. Ref. 20/4916	c. 3.6km	Extension of Duration Granted – 01/07/2020	A solar PV panel array consisting of up to 5400sqm of solar panels on ground mounted steel frames, electricity control room, power inverter unit, underground cable ducts, temporary laydown area, boundary security fence, site entrance, CCTV and all associated site works. Extension of Duration of permission granted under Planning Reference 14/06644 and (ABP 04.244539).

There is no predicted negative cumulative noise impact predicted from the development and other committed developments in the area.

### Other Considerations

Additional traffic noise from the construction works is not expected to increase the traffic noise from the roads to any significant impact. The Design Manual for Roads and Bridges (DMRB) states that a 25% increase in traffic flows leads to a 1dBA increase in traffic noise levels. Construction traffic flow increases associated with the proposed development will be significantly less than 25% and therefore the noise levels from construction traffic will not increase the existing noise levels at the noise sensitive locations by more than 1dBA.

It is generally accepted that it takes an approximate 3dBA increase in noise levels to be perceptible to the average person (Ref: Planning Policy Guidance Note 24 [PPG24 - Planning & Noise]). Construction traffic noise levels associated with the Proposed Development will not have a negative impact on nearby noise sensitive locations (NSLs).

### 5.1.3 General Recommendations

This section of the report sets out general recommendations for the control of noise from construction works. As stated in Section 5.1, no construction mitigation is required as all noise from construction works falls within the criteria set out by BS 5228-1. Notwithstanding, the following standard noise commitments will be adhered to.

#### Selection of Plant and Equipment

The noise impact of all plant and equipment should be assessed prior to selection of the plant for the project. Where an item of plant is identified as noisy with the potential to cause a negative noise impact it will be reviewed to check if there is an alternative quieter version of the same plant to undertake the same construction task.

#### Noise Control at Source

Where replacing a noisy item of plant is not viable or practical, consideration should be given to control that noise at source. This includes modifying the piece of plant or equipment to generate less noise, using dampening to control vibration induced noise or rattling. Example best practice mitigation measures to be considered are as follows:

- All plant and equipment to be switched off when idling.
- The use of white noise reversing alarms.
- Restriction on the dropping and loading of materials to less sensitive hours.
- The use of local screening for noisy activities or works with hand tools.
- Not dropping materials onto hard surfaces and using rubber mats etc for the dropping of materials.
- Ensure all plant and equipment is well maintained and cleaned, all lubrication should be in line with manufacturers guidelines.

## Screening

Screening when used correctly can be an effective method of reducing the construction noise impact on the NSL's. The use of site hoarding and careful selection of areas for noise works, using buildings on the site, site offices and the building being constructed to screen noise from the works.

Local screening of noisy works with the use of temporary acoustic barriers, examples are provided below:

- <https://ventac.com/acoustic-products/noisebreak-acoustic-barrier/>
- <https://echobarrier.com/>



Figure 6: Temporary Construction Noise Barrier © Ventac

## Construction Noise Monitoring

Construction noise monitoring will be undertaken at periodic sample periods on the boundary with the nearest noise sensitive receptors.

Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

## 5.2 Construction Vibration

Prediction of vibration levels at receptors is complex and dependent on several variables including the nature of the used equipment, the properties of the subsoil, the heterogeneity of the soil deposit, the distance to the receptor and the dynamic characteristic of the adjacent structures. Therefore, limits or threshold criteria as set out in BS5228-2 are applied for buildings and humans.

Based on our understanding of the project and the distances to the receptors it is not anticipated that there will be any negative vibration impact from the construction works.

## 5.3 Operational Phase

Following the survey, a model of the proposed development using SoundPLAN 9.1 modelling software was developed to establish the noise levels from the proposed development in operation in a worst-case scenario. The software implements the algorithms contained in ISO 9613-1 and ISO 9613-2. The noise model considers:

- Distance attenuation,
- Source and receptor locations,
- Barrier effects (buildings, walls etc)
- Topographical elevations,

- Ground effects and absorption,
- Source sound power levels,
- Directivity and orientation of the source,
- Atmospheric attenuation and meteorological effects.

The SoundPLAN 9.1 predictive model uses methodology via a ray tracing method, in principle the modelling follows the general principles of the following formula outlined in ISO 9613 Part 1 and Part 2: *Acoustics - Attenuation of sound during propagation outdoors*:

$$L_p = L_w - 20 \log_{10}(R) - 11 - A - B - G$$

Where:

- $L_p$  is the sound pressure level at a particular point.
- $L_w$  is the sound power level of the plant and equipment.
- $R$  is the distance from the noise source at which the sound pressure level is predicted.
- 11 is a constant based on a noise source with omnidirectional directivity.
- $A$  considers the correction reduction in noise levels via atmospheric conditions.
- $B$  considers the correction reduction in noise levels due to noise barriers.
- $G$  considers the correction reduction in noise levels due to ground absorption and topography.

The acoustic model for the proposed substation and associated solar farm development has been developed based on attended and unattended noise survey and the proposed site location and predicted noise sources. As the site has potential to create noise impact at both day and nighttime, a worst-case scenario has been developed for both predicting the noise impact at the nearest noise sensitive locations.

### 5.3.1 Operational Noise

From discussions with the design team, it has been confirmed that the external plant and equipment at the proposed substation and the wider Aglish solar farm with the potential to generate operational phase noise consists of the substation itself and inverter/transformer stations within the solar farm. A comprehensive whole project approach to the assessment has been completed.

Aglish Solar Farm Limited have provided the technical data for typical transformers/inverters. The noise levels from the substation have been assumed based on data from the WDA library.

Noise levels at the NSLs were assessed to the height of the worst-case façades (4m for two-storey NSLs), to predict the noise levels at the first-floor bedrooms of the nearest noise sensitive receptors. Noise levels were also checked at 2m to assess the external amenity noise levels on the NSLs, and grid noise contours have been provided in Figure 9 and Figure 10 at this height.

The sound power levels from the noise sources are based on the information from our library and previous planning applications for similar developments as outlined in Table 13. Equal or approved plant is suitable for the development.

Table 13: Assumed noise levels for plant and equipment proposed.

Item	Assumed Noise Level ( $L_{WA}$ )	Reference Source
Substation Assumed (Equal or approved)	92 dB	WDA Library
Inverter/Transformer Operating at Daytime @ 90%	95 dB	Manufacturer Data
Inverter/Transformer Operating at Night-time @60%	85 dB	Manufacturer Data

### 5.3.2 Daytime Operations

As the substation, grid connection and associated solar farm has the potential to generate noise with different characteristics for both the day and night-time, a model has been undertaken for both the day and nighttime operations of the proposed development. This section outlines the operational noise assessment for the daytime scenario.

The daytime situation assumes the following noise sources:

- Substation operating at full capacity continuously as per Table 13.
- Inverters/transformers operating for daylight hours (7am-10pm).
- Assumed noise level in ( $L_{WA}$ ) for inverter/transformers used in model as per Solar Farm application noise impact assessment (Cork County Council reference 246157, ACP: 323402),
- The noise model is inclusive of the inverter screening walls as per Solar Farm application noise impact assessment (Cork County Council reference 246157, ACP: 323402),
- Model calibrated using on-site measurements.
- Transformers/inverters operate at 90% during the daytime period as per client operational data.

The nearest noise sensitive receivers in each direction were taken as part of the assessment as identified in Figure 2 and Figure 3. This allows for a worst-case scenario assessment, NSLs further away from the development are expected to experience lower noise levels with typical conditions due to distance attenuation.

As the area is an area of Low Background Noise NG4 recommends a daytime criteria of (07:00hrs – 19:00hrs) 45dB  $L_{Ar,T}$ , the predicted noise emissions from the solar farm at each NSL for a height of 4m (worst-case i.e first floor bedrooms) have been outlined in Table 14. All values refer to the free field façade noise levels at 4m height.

Table 14: Model results for the noise impact from the solar farm and substation for daytime at 4m height.

NSL	Criteria dB $L_{Ar,T}$	Daytime Predicted Noise dB $L_{Ar,T}$ (7:00hrs to 23:00hrs)	Compliant/Non-Compliant
NSL1	45	29	Compliant
NSL2	45	28	Compliant
NSL3	45	30	Compliant
NSL4	45	37	Compliant
NSL5	45	33	Compliant
NSL6	45	31	Compliant
NSL7	45	26	Compliant
NSL8	45	37	Compliant
NSL9	45	32	Compliant
NSL10	45	31	Compliant
NSL11	45	29	Compliant
NSL12	45	32	Compliant
NSL13	45	33	Compliant
NSL14	45	30	Compliant
NSL15	45	35	Compliant
NSL16	45	25	Compliant

Figure 9 outlines the daytime predicted noise emissions from the proposed substation and Aglish solar farm in operation for the daytime period at 2m height in the external amenity spaces. As noted from the noise map all residential receptors are outside of the 45 dBA contour for daytime and therefore compliant with the NG4 project criteria.



Figure 7: Noise contours for the daytime noise impact at 2m  $L_{Aeq}$  dB.

All predicted noise the levels are below the NG4 project criteria and therefore within the project requirements.

### Evening Time Scenario

The noise levels for the evening time are predicted to be the same as the daytime noise levels however as per EPA NG4 criteria, a lower noise criteria of 40dB  $L_{A,T}$  is applicable. Based on the predicted noise levels outlined in Table 14 and shown in Figure 9, the evening time criteria is predicted to be achieved.

Consideration was also given to the BS4142 requirements, as the specific sound is below the background sound in most instances and all predictions within <5 dB of the background in the area therefore no adverse noise impact is predicted as all in accordance with BS 4142.

### 5.3.3 Night-time Operations

The proposed substation is understood to be operational continuously throughout the night time. As solar panels produce power only when the sun is shining, inverters within the solar farm lands will be virtually silent for the hours of darkness at night. However, this assessment is based on a worst-case scenario to include summer months where the sunrise may happen pre 7am where inverters and transformers may begin noise generating activities in addition to noise from the substation transformer.

The night-time situation assumes the following noise sources:

- Substation operating at full capacity continuously as per Table 13.
- Two hours of inverter use from 5am-7am (worst case scenario -summer).
- Assumed noise level in ( $L_{WA}$ ) for inverter/transformers used in model as per Solar Farm application noise impact assessment (Cork County Council reference 246157, ACP: 323402),
- The noise model is inclusive of the inverter screening walls as per Solar Farm application noise impact assessment (Cork County Council reference 246157, ACP: 323402),

- Model calibrated based off attended/unattended measurements.
- Transformers operate at a max operating capacity of 60% during the daytime hours of 5am-7am.

#### NG4

NG4 recommends a night-time criteria of 35dB  $L_{Aeq,T}$  for “Areas of Low Background Noise”, the predicted noise levels from the proposed substation and Aglish solar farm were compliant at all noise sensitive locations. All predicted values refer to the free field façade noise levels at 4m height.

Table 15: Model results for night-time at the NSLs at a height of 4m.

NSL	Criteria dB $L_{Aeq}$	Nighttime Predicted Noise dB $L_{Aeq}$ (23:00hrs to 07:00hrs)	Compliant/Non-Compliant
NSL1	35	13	Compliant
NSL2	35	12	Compliant
NSL3	35	15	Compliant
NSL4	35	21	Compliant
NSL5	35	16	Compliant
NSL6	35	15	Compliant
NSL7	35	11	Compliant
NSL8	35	21	Compliant
NSL9	35	16	Compliant
NSL10	35	15	Compliant
NSL11	35	26	Compliant
NSL12	35	21	Compliant
NSL13	35	26	Compliant
NSL14	35	27	Compliant
NSL15	35	19	Compliant
NSL16	35	8	Compliant

Figure 10 outlines the nighttime predicted noise emissions from the substation, grid connection and solar farm in operation for the night-time period at 2m height.

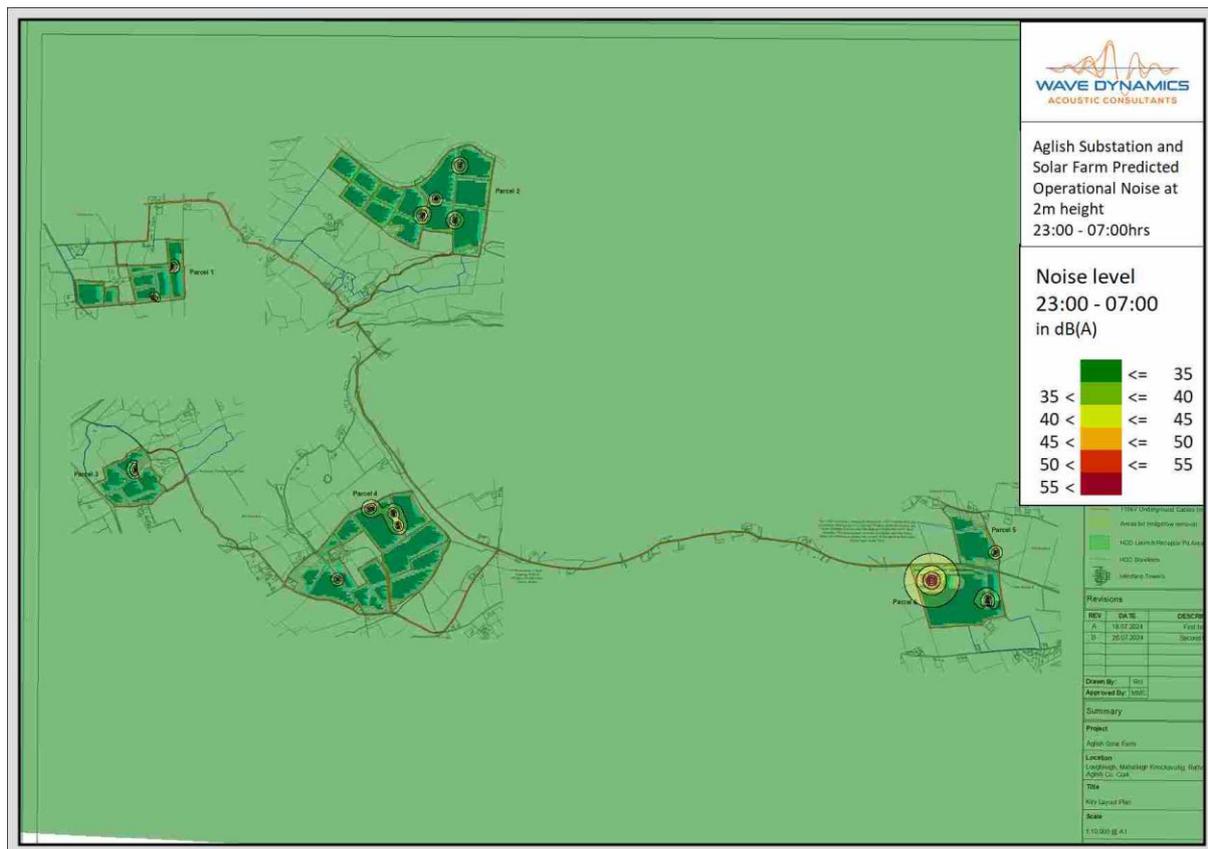


Figure 8: Noise contours for the night-time noise impact at 2m height  $L_{Aeq}$ .

As noted from the noise map and Table 15 all residential receptors are outside of the 35 dBA contour for night-time and therefore compliant with the NG4 project criteria. Consideration was also given to the BS4142 requirements, as the specific sound is below the background sound in most instances and all predictions within <5 dB of the background in the area therefore no adverse impact is predicted as all in accordance with BS 4142. Context was also considered in coming to this conclusion considering the predicted 'absolute level of sound' as well as the expectation that residual sound will also be higher than the specific sound.

### Modelling Assumptions

The following assumptions were made throughout the modelling and assessment:

- Assessment based on the noise measurements undertaken onsite.
- Noise source data for the assessment was based on the measurements undertaken onsite of the noise sources and information provided by the design team.
- Model assumes a worst-case operating scenario as outlined in Section 0 above.
- Predicted noise levels in this report are inclusive of noise screening of the inverters in Parcels 1, 3 and 6 lands as outlined in Wave Dynamics report *WDA240144RP\_B\_01\_Noise Impact Assessment*.
- Modelling based on the drawings, layouts and information provided.
- Assessment based on proposed solar farm and substation.
- Modelling tolerances apply +/- 3dB.

### 5.3.4 BS4142 Operational Noise Assessment

In addition to the assessment outlined above in line with EPA NG4 criteria, the proposed substation, grid connection and solar farm have been assessed using BS4142 criteria. The operational noise levels from the full development are predicted to be within 5 dB background noise levels in each area at the NSLs therefore it is not

predicted that an adverse sound impact will occur based on the information provided and the assumptions in this report. Context has also been considered.

### 5.3.5 Tonality & Impulsivity

Based on the noise levels at all of the noise sensitive locations, it is predicted there will be no audible tonal or impulsive characteristics to the noise levels. The operational noise of the proposed substation and solar farm will consist of mechanical plant and equipment noise from the inverter / transformer units in continuous operation during sunlight hours in addition to the continuous operation of the substation. The operation of the development does not include activity that could create impulsive noise. It will be ensured that the selected equipment will not have any impulsive characteristics. Plant and equipment shall be maintained to ensure it operates in its normal capacity.

A prediction of the octave band noise levels from the inverter / transformer units and the substation has been undertaken based on the proposed development which indicated no tonal characteristics of the noise. The predicted noise levels from the development were generally lower than the existing daytime ambient noise levels ( $L_{Aeq}$ ) measured at the site. The predicted nighttime noise levels from the development are generally lower than the background sound levels ( $L_{A90}$ ) measured across the site. Table 16 below highlights the predicted octave band noise levels at the worst case noise sensitive location (NSL13) during the daytime period. This shows that there is no predicted tonality from the proposed development.

Table 16: Predicted daytime octave band noise levels

Location	Predicted Daytime (07:00hrs – 23:00hrs) Octave Band Noise Levels (Leq dBA)						
	63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz
NSL 13	19	17	19	28	30	25	15

Based on the predicted noise levels at the noise sensitive locations from the proposed development in addition to the submitted noise impact assessments for the other developments in the area, no audible tonality is predicted at the noise sensitive locations. Context has also been considered given the existing residual sound level and predicted noise impact. As the predicted noise levels are considerably below the residual sound ( $L_{Aeq}$ ) no tones would be audible.

### 5.3.6 Operational Phase Conclusion

Based on the information provided, the site survey and the worst-case scenario predictions **it is predicted that noise emanating from the development will achieve the NG4 and BS4142 project criteria.**

## 6 Conclusion

Wave Dynamics were engaged by AGLISH Solar Farm Limited to undertake a noise impact assessment for the proposed AGLISH Substation & Grid Connection, Co Cork. This report outlines the project assessment criteria, survey results, assessment, and general guidance recommendations for:

- Construction noise and vibration from the construction of the proposed substation, grid connection and nearby AGLISH solar farm.
- Operational noise from operation of the proposed substation, grid connection and nearby AGLISH solar farm.

Assessment results are summarised below:

### Construction Noise and Vibration

Consideration was given to the construction of the substation, grid connection and associated solar farm as well as cumulative noise and vibration impacts. Based on the assessment outlined in this report it is predicted that the construction noise and vibration from the proposed substation, grid connection and associated solar farm will comply with the recognised best practice standards typically adopted for such projects in Ireland.

### Operational Noise

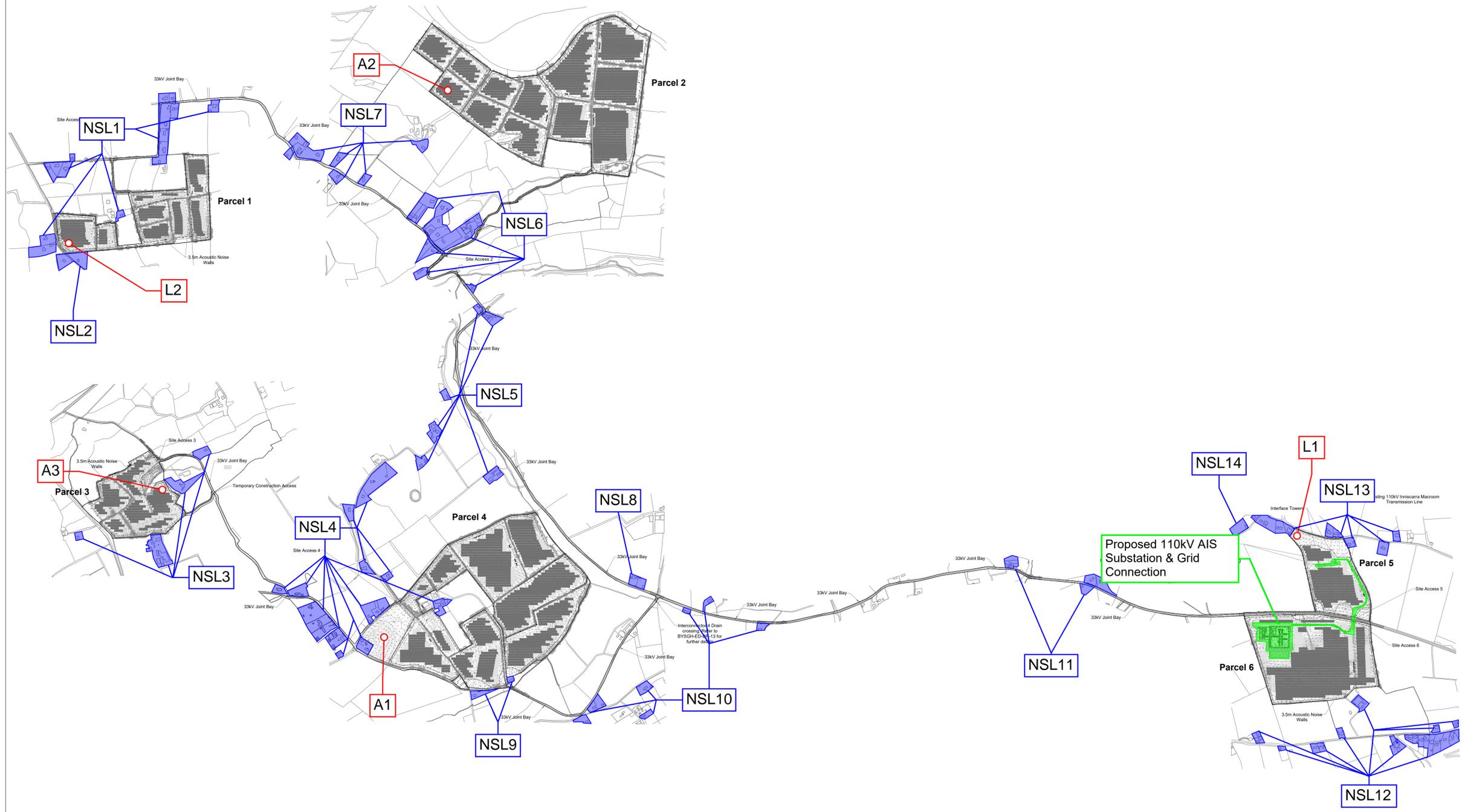
The noise levels from the substation and grid connection were assessed using criteria set out by EPA NG4 and BS4142 2014 A1+ 2019 Methods for rating and assessing industrial and commercial sound, which predicted that there is no predicted adverse impact at all noise sensitive receptors for the daytime, evening and night-time periods based on the assessment including the solar farm mitigation measures outlined in the noise impact assessment undertaken at planning stage (Cork County Council reference 246157, ACP: 323402).

Based on the assessment outlined in this report it is predicted that the operational noise levels from the proposed substation, grid connection and associated solar farm will comply with the project criteria and not produce a negative noise impact. The cumulative noise impact from the development in combination with other nearby proposed developments has also been assessed and is predicted to comply with the project criteria.

## Appendix A- Glossary of Terms

Ambient Noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from all the noise sources in the area.
Background Noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ( $L_{AF90,T}$ ).
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 $\mu$ Pa).
dB(A)	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'-weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Hertz	The unit of sound frequency in cycles per second.
$L_{A90}$	A-weighted, sound level just exceeded for 90% of the measurement period and calculated by statistical analysis. See also the background noise level.
$L_{Aeq}$	A-weighted, equivalent continuous sound level.
$L_{AFmax}$	A-weighted, maximum, sound level measured with a fast time-constant - maximum is not peak
$R_w$	Weighted sound reduction index - a single number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies, based on laboratory measurements

## Appendix B- Scaled Map



Scale as shown @A1  
Scale as half @A3

**Notes**

All dimensions in meters unless otherwise noted.  
Do not scale from drawings, use figured dimensions only.  
Drawings based on OSI digital vector mapping for the area. License No: CYAL50408714  
Site Location Reference: 547918, 569678 (ITM)

**Legend**

- Development Boundary
- Ownership Boundary
- 4m Wide Access Track
- Temporary Access Track
- Refurbished Access Track
- Combined Inverter & Transformer Station
- Spare Parts Container
- Perimeter Fence
- CCTV
- PV Table
- Weather Station
- Solar Farm Construction Compound
- Ring Main Unit (RMU)
- Stream and Drain Deck Crossing
- Interconnector 1 (1 x 33kV Circuit)
- Interconnector 2 (2 x 33kV Circuit)
- Interconnector 3 (1 x 33kV Circuits)
- Interconnector 4 (2 x 33kV Circuits)
- Interconnector 5 (1 x 33kV Circuits)
- Interconnector 6 (1 x 33kV Circuits)
- Interconnector 7 (6 x 33kV Circuits)
- 110kV Underground Cables (Info Only)
- Areas for hedgerow removal
- HDD Launch/Receptor Pit Areas
- HDD Borelines
- Interface Towers

**Revisions**

REV	DATE	DESCRIPTION
A	18.07.2024	First Issue
B	26.07.2024	Second Issue
C	02.10.2024	Third Issue
D	21.10.2024	Fourth Issue
E	06.03.2025	Fifth Issue (RFI)

Drawn By: RH  
Approved By: MMC

**Summary**

**Project**  
Aglish Solar Farm

**Location**  
Loughleigh, Mahallagh Knockavullig, Rathonoane and Aglish Co. Cork

**Title**  
Key Layout Plan

**Scale**  
1:10,000 @ A1

Aglish Solar Farm Limited  
191 Stepside Park,  
Stepaside,  
Dublin 18  
D18 X20F