Snowdonia Pumped Hydro

Glyn Rhonwy Pumped Storage Development Consent Order

Deadline 5 – Construction Noise Management Plan

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Contents

1 INTRODUCTION

1.1 Introduction

1.1.1 The objective of this Construction Noise Management Plan (CNMP) is to support the Code of Construction Practice (CoCP) in detailing the principles to be followed in the management of noise and vibration throughout the construction period.

1.1.2 The CNMP is designed to ensure that the requirements of legislation, the requirements of the Development Consent Order (DCO), the Environmental Statement (ES) and Snowdonia Pumped Hydro ("the Applicant") Environmental Policies are complied with. It shall be the policy of the Applicant to ensure the project is executed in a manner that demonstrates its commitment to the care and protection of the environment.

1.1.3 This draft CNMP has been developed by the Applicant and will be adopted and updated/refined by the Principal Contractor (PC) upon the award of the contract. All personnel and sub-contractors working on the project shall perform their duties in accordance with the requirements of the CNMP.

1.1.4 The CNMP will be in accordance with Requirement 6 of the DCO and sets out the framework for setting construction and vibration limits as agreed with Gwynedd Council (GC). This CNMP will cover control techniques for the management of noise and vibration that will be encountered during the construction of the Development.

1.1.5 This CNMP identifies mitigation measures to be adopted on the project and will be updated as necessary.

1.1.6 It is proposed that this CNMP will be finalised once the PC has been appointed, in line with the CoCP and submitted to Gwynedd Council for approval, as per the Requirement 6 of the DCO. The finalised CNMP must

be read in conjunction with the approved CoCP and Construction Traffic Management Plan (CTMP).

1.2 Noise and Vibration Guidance

1.2.1 The CNMP takes into account good practice guidance contained within, but not limited to, the following documents:

- BS 5228: Code of practice for Noise and Vibration Control on Construction and Open Sites (2009+A1:2014) Parts 1 and 2;
- BS 6472-1: 2008. 'Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting';
- BS 6472-2: 2008. 'Guide to evaluation of human exposure to vibration in buildings. Blast-induced vibration';
- Minerals Planning Guidance (MPG) 11: "The control of noise at surface mineral workings";
- Mineral Technical Advice Note (MTAN) 1: Aggregates
- BS 7385-2: 1993 ‘Evaluation and measurement for vibration in buildings’; and
- Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 HD 213/11 (revision 1) 'Noise and Vibration'.

2 METHODOLOGY TO ESTABLISH THE BASELINE POSITION

2.1 Introduction

2.1.1 The construction noise limits will be set in accordance with the guidance in MPG 11/MTAN1 and the existing baseline noise levels. Baseline noise surveys have been undertaken in July 2012 and April 2015 at representative sample noise sensitive receptors (NSRs) surrounding the development.

2.1.2 Due to the time elapsed between the existing surveys and construction commencing, updated baseline noise monitoring is likely to be required.

2.2 Proposed Monitoring Locations

2.2.1 The construction phase monitoring locations are likely to include those previously used for the ES assessment and a new location at Glyn Peris Guest House, which is the closest noise sensitive receptor to the proposed scheme.

2.2.2 The existing locations are:

- Tan Hafotty
- Ty Newydd
- Glan Llyn
- 4 Warden Street
- Ty-Du/ Ael y Glyn
- Lake View Hotel
- Llanberis Caravan Park
- Surf Lines

2.2.3 In total, 9 locations are proposed.

2.2.4 Prior to the surveys being undertaken, the locations will be reviewed and discussed with GC. The exact position of the monitoring instrumentation at each location will be selected to represent the facade most likely to be worst affected by construction of the Scheme.

2.2.5 Where necessary pre-construction vibration surveys will be undertaken. The locations will be reviewed and agreed with GC prior to the surveys being undertaken.

2.3 Survey Durations

2.3.1 It proposed that long term (minimum of 1 week) unattended monitoring will be undertaken prior to construction commencing, which will be supplemented by short term attended surveys to determine the main noise sources and their contributions to the prevailing noise climate.

2.3.2 During the surveys, meteorological data will be gathered at a minimum of one location to record wind speed, direction and rainfall.

3 CONSTRUCTION ELEMENTS AND TIMES

3.1 Introduction

3.1.1 This section describes the main construction elements of the Development, the proposed construction hours and the assessment work to be carried out once the Principal Contractor has been appointed.

3.2 Proposed Construction

3.2.1 The proposed construction will include:

- General construction activities and operation of construction compounds.
- Excavation of the penstock/ tailrace.
- Stabilisation works at Q1 and re-profiling at Q6. Blasting may also be required for the power house shaft to the underground turbine hall.
- Piling. There is the potential for piling at Llyn Padarn spillway infrastructure and the pumping station. The methods of piling will be confirmed during detailed design and once the PC has been appointed

3.3 Construction Working Hours

3.3.1 Normal construction hours will be 07:00-19:00 Monday to Friday and 07:00-13:00 Saturday although this may be extended to 19.00 at critical path construction phases and no working on Sundays and Bank Holidays.

3.3.2 Consent from GC will be required for works outside normal hours and noisy activities will be scheduled early in the week to avoid weekend overruns.

3.3.3 Prior consent under Section 61 of the Control of Pollution Act 1974 (CoPA) will be sought for any works that need to be undertaken outside of the normal construction hours.

3.3.4 As outlined in the CTMP no HGV or large load deliveries on any construction route to the Development before 8.30am or after 4.30pm Monday to Friday and 09.00-13.00 on Saturdays, with no working on Sundays or Public Bank Holidays. This includes the A4085 and A4086.

3.3.5 Blasting will only occur during daylight hours and will be restricted to set time periods in any one day, most likely one blast in the morning and one blast in the afternoon, although as the Development progresses a third blast may be introduced where noise limits allow. It is currently proposed that blasting will take place between 10:00 hrs to 11:00hrs and 15:00 to 16:00hrs during normal construction hours. These time periods will be shortened to a smaller blasting window once the blasting contractor has been appointed and agreed with GC.

3.3.6 Underground excavation works (apart from blasting) will be 24 hrs except from 13:00 Saturday to 07:00 Monday.

3.4 Prediction of Construction Impacts

3.4.1 Once the Principal Contractor has been appointed, a detailed construction noise and vibration assessment will be undertaken based on the proposed working methods, locations and durations. As part of the assessment, the noise and vibration sensitive receptors identified in the ES will be reviewed and any new NSRs will be identified. The predicted noise and vibration levels will be compared to the construction noise and vibration limits set out in section 4 of this document and, where necessary, mitigation measures will be implemented to ensure the noise limits are achieved.

4 CONSTRUCTION NOISE & VIBRATION LIMITS

4.1 Introduction

4.1.1 The Construction noise and vibration limits have been recommended in Chapter 13 of the submitted ES (Doc Ref: 6.02). The limits are based on relevant British Standards and guidance documents. As stated in Chapter 13 of the submitted ES, it is the preference of GC to use MPG 11 limits for construction noise as the majority of the construction works can be considered comparable to mineral working. The MPG 11 limits are more stringent than the limits in BS 5228-1:2009+A1:2014.

4.1.2 There will be ongoing consultation with GC to discuss and agree the construction noise and vibration limits as part of this plan, as required by Requirement 6 of the DCO.

4.1.3 Approval of these limits by GC will be required prior to the commencement of development.

4.1.4 The following provides an explanation of the various construction noise and vibration limits which will be set for the construction phase of the development providing reference to relevant guidance documents. The noise and vibration limits are set out in Appendix A.

4.2 Construction Noise and Vibration Limits

Construction Noise Limits

4.2.1 The construction noise limits recommended in Chapter 13 of the submitted ES were based on the noise limits detailed in MPG 11.

4.2.2 Paragraphs 31-43 of MPG 11 describe a recommended method for setting noise limit values. The recommendation is that daytime free-field noise limits should not be higher than $L_{Aeq,1h}$ 55 dB, and night time limits shall be set at $L_{Aeq,1h}$ 42 dB.

4.2.3 In quieter rural areas a lower daytime limit may be appropriate when a limit of $L_{Aeq,1h}$ 55 dB would exceed the existing background noise levels by more than 10 dB. In this case an $L_{Aeq,1h}$ noise limit of background noise level + 10 dB is proposed.

4.2.4 Where the daytime background noise level is below L_{A90} 35 dB(A), MPG 11 proposes a fixed lower criterion limit of $L_{Aeq,1h}$ 45 dB, to avoid unduly restrictive noise criteria being placed on the operator.

4.2.5 Within MPG 11, daytime working is defined as 07:00-19:00 hours and night-time as 19:00-07:00 hours.

4.2.6 Paragraph 61 of MPG 11 suggests that it may be necessary to increase the noise limit for an 8 week period (per year) that would allow potentially noisy activities to occur up to a level of $L_{Aeq,1h}$ 70 dB. This period may be required during the Development, at the start and end of the penstock and tailrace tunnel construction, or for other noisy activities such as the construction of earth/spoil bunds to provide noise screening.

4.2.7 As detailed in section 2, updated noise surveys will be undertaken at representative locations and the construction noise limits will be set following the above guidance and the updated background noise levels, with an increased limit of 70 dB $L_{Aeq,1hr}$ for short term day time construction works (maximum of 8 weeks per year).

4.2.8 GC will be notified at least 2 weeks in advance prior to commencement of works requiring the 70 dB dispensation. Local residents will also be informed via the ELO.

4.2.9 There will be a separate night time noise limit of 42 dB $L_{Aeq1,hr}$.

4.2.10 Both the day time and night time construction noise limits are free-field.

Construction Vibration Limits (excluding blasting)

4.2.11 Construction vibration limits at the nearest sensitive receptors have been derived from BS 5228-2:2009+A1:2014.

4.2.12 BS 5228-2:2009+A1:2014 states that 1 mm/s peak particle velocity (PPV) is 'likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation is given to residents.'

4.2.13 Therefore the maximum permitted vibration level is 1 mm/s ppv at NSRs. This limit is for human response, and significantly lower than that for cosmetic/structural damage.

Tunnelling works

4.2.14 The night construction noise limit of 42 dB $L_{Aeq,1hr}$ so would still apply to any activities on the surface associated with the tunnelling works at night, i.e the start of the tunnelling or any equipment associated with the below ground activities undertaken between the hours of 19:00 and 07:00.

4.2.15 In relation to ground borne noise, a limit of 35 dB $L_{Amax,s}$ within any of the residential properties in the vicinity of the scheme for tunnelling works, this limit will apply for both day and night time periods.

4.2.16 In relation to ground borne vibration from tunnelling, the BS 5228 construction vibration limit of 1 mm/s PPV can be used to control 'feelable' vibration from the tunnelling works.

Blasting.

4.2.17 BS 6472-2:2008 'Guide to evaluation of human exposure to vibration in buildings Part 2 Blast induced vibration, BS 5228- 2:2008 and MTAN 1 provide advice and guidance for blasting vibration and air over pressure.

4.2.18 As stated in Section 3, blasting will restricted to two blasts per day within set time periods, although as the Development progress a third blast may be introduced where noise limits allow. Once the blasting contractor has been appointed a detailed assessment will be undertaken and the blasting limits refined.

4.2.19 Based on the guidance in BS 6472-2 the recommended Blasting Air Over pressure limits is 120-150 dB(Lin). These limits are based on 3 blasts per day.

4.2.20 Based on the guidance in BS 6472-2, ground vibration as a result of any blasting operations shall not exceed 6 mm/s PPV in 95% of all blasts measured over any continuous 6 months period and no individual blast shall exceed a PPV of 10mm/s as measured at vibration sensitive property. The PPV measurement shall be taken to be the maximum of three mutually perpendicular directions taken at the ground surface.

4.2.21 Once the blasting contractor has been appointed a detailed assessment of the proposed blasting methods will be undertaken. The blasts will be monitored and blast designs shall be developed with the aid of regression lines determined from a logarithmic plot of Peak Particle Velocity against scaled distances. The regression lines shall be regularly updated using the blasting monitoring information.

4.2.22 The initial blasts will be monitored to check if the blasting limits are met, and if required the subsequent blasts will be modified/mitigated.

4.3 Piling Construction Statement

4.3.1 This Statement will be completed by the PC when the detailed design has been confirmed for the design of the above ground power house, pumping station and spillway infrastructure. Careful consideration will be given to selecting the most appropriate piling methods to minimise the adverse impact on Noise Sensitive Receptors (NSRs).

4.3.2 Piling noise and vibration limits need to be agreed once the detailed piling strategy including piling method, duration and estimates of effects have been determined.

4.3.3 If required, Section 61 COPA prior consent can be applied for piling works.

4.4 Construction Traffic Vibration Risk Assessment

4.4.1 This will be completed by the PC but will have due regard to the limits set out above.

4.4.2 All access roads should be kept in good condition as most vibration effects occur from irregularities of road surfaces – this will be part of the s278 agreement between the Applicant and GC for improvements on Ffordd Cefn

Du which will also provide for ongoing inspection and maintenance or repair works during construction. The finalised CTMP will determine a speed limit for HGVs which will be applied to this road given the short distance to NSRs. It is not considered that vibration effects will cause cosmetic or structural damage to the properties. Sources including Transport and Road Research Laboratory document "Traffic Induced Vibrations in Buildings" (1990) (TRL RR 246) have been consulted. A summary of findings from that document states research has shown that traffic induced ground borne do not cause vibrations with enough magnitude to cause significant damage to buildings. However due to local concerns and the location and condition of the road and properties currently, road vibration will be monitored as appropriate to further inform the adequacy of mitigation measures, as described below.

4.4.3 The assessment of potential vibration effects on properties along Ffordd Cefn Du will have a three step approach. A structural engineer will assess how far vibrations might travel along the road and across the surrounding area in relation to the ground conditions in order to identify which properties will be most vulnerable to vibration effects. A Chartered Building Surveyor will then conduct a Schedule of Condition of properties within the scope identified along Ffordd Cefn Du to record the existing conditions prior to the commencement of works. A Schedule of Condition is a photographic record which would provide a source of reference in the event of any perceived impact of the project on the property. Following the survey, the surveyor may recommend any further surveys which might be required. Those further surveys will then be undertaken as appropriate.

Prior to the Highway Improvements – Communication

4.4.4 Residents with properties which are deemed vulnerable by the structural engineer will be contacted to request permission and inform them that the Applicant will pay for their property to be surveyed in order to prepare a Schedule of Condition. The resident will be sent a reminder letter if no initial response is received. If a resident rejects access then they will not receive

a Schedule of Conditions survey and may find it harder to evidence any potential claim in the future for any damages to their property unless they have instructed their own surveys. The residents will be notified of this in writing.

Schedule of Condition

4.4.5 Recommended by the Royal Institution of Chartered Surveyors, Schedules of Condition, show the condition of a property at a set time and highlight any existing defects. The Schedule of Condition records what the existing conditions are before construction starts with photographic evidence and details of what is contained in the photos (crack, old beam, low foundation, etc).

4.4.6 A Chartered Building Surveyor will undertake a Schedule of Condition for buildings along Ffordd Cefn Du identified as being within the area of potential impact, prior to the start of the highway improvement works and construction of the Development. The Schedule will then be signed by the resident and the developer to say that everyone agrees that it shows a true representation of the existing conditions. The schedule would normally cover boundary walls, gardens, outhouses / ancillary buildings in the curtilage, front elevations and the first room of houses bordering the works but it may be prudent to survey the whole building based on its age, proximity to the works and condition.

4.4.7 It should be noted that the Schedule of Condition is not a structural survey but the surveyor will make comment on more prevalent defects.

Structural Survey

4.4.8 Structural surveys are not proposed in the first instance. These should be carried out by a qualified Structural Engineer where appropriate. The existing poor condition of Ffordd Cefn Du, may exacerbate any vibration effects from construction traffic. However, the Applicant will be upgrading the road to a new surface with the proposed highway improvement works which will make the risk of structural effects from construction traffic unlikely.

4.4.9 The Applicant acknowledges that full structural surveys can be intrusive to residents – there may be the need to dig up some areas to see foundations, take some core samples, or drill into walls, for example. Other preliminary surveys will also be required for the more intrusive work, such as testing for asbestos before drilling into any walls.

Remediation / Repair

4.4.10 The Schedule of Condition clarifies that the developer will not be liable to remediate or repair any existing issues during construction. The Applicant will only remediate or repair any damage which would be the result of the highway improvements or damage caused by construction traffic.

4.4.11 If vibration from construction traffic is causing concern to one of the residents then it is expected the ELO will be notified, the issue investigated and action taken to monitor and if appropriate, mitigate the cause of vibration. Mitigation may include but is not limited to further traffic speed controls, different vehicles, lighter loads, further road improvement of surface matting or other surface treatment, and where permitted and appropriate to do so, structural work to the affected property for example repointing, temporary scaffolding or other such structural treatment.

5 MITIGATION MEASURES

5.1 Mitigation

5.1.1 The best available construction methods shall be employed at all times, having regards to the principles of BATNEEC (the best available techniques not entailing excessive cost) to minimise noise and vibration impacts during the construction of the Development. The mitigation measures will be confirmed by the PC but will include the following as necessary and as a minimum:

- All work will be in accordance with the mitigation measures reported in ES Chapter 13, and summarised in ES Chapter 18 Summary of Mitigation (Doc. Ref: 6.02);
- Inherently quiet plant will be selected where appropriate and where possible use will be made of electrical items of plant instead of diesel, especially in sensitive locations;
- Construction activities will be planned for the beginning of the week where reasonably practicable so that any delays in construction do not result in particularly noisy activities being conducted on Saturdays:
- Vehicles and plant will be regularly maintained and fitted with exhaust silencers. Unless otherwise directed, items or plant in intermittent use will be shut down during idle periods;
- Audible warning systems, such as vehicle reversing sirens, will normally be set to as low a setting as is compatible with safety requirements; white noise alarms will be used where possible;
- Where plant has been designed to operate with engine covers to reduce noise, these will be used and remain closed while the plant is in operation.

- Plant and equipment liable to create noise and/or vibration whilst in operation will, as far as reasonably practicable, be located away from sensitive receptors or in locations where acoustic screening is provided by site cabins, buildings or barriers;
- On sites where a generator is required for prolonged periods of time or in close proximity to NSRs, consideration will be given to the use of a silent generator;
- All blasting will be carried out using BATNEEC where available, to ensure that the resultant noise, vibration and air overpressure are minimised in accordance with current British Standards and Mineral Guidelines;
- Blast designs shall be developed with the aid of regression lines determined from a logarithmic plot of Peak Particle Velocity against scaled distances. The regression lines shall be regularly updated using the blasting monitoring information. The regression lines will be made available for inspection upon request.
- No employees, subcontractors and persons employed on the site will cause unnecessary noise from their activities e.g. excessive 'revving' of vehicle engines, music from radios, shouting and general behaviour etc.
- Road surfaces will be properly maintained, paying particular attention to the filling of any 'potholes' as these are the main cause of vibration;
- Structural surveys will be undertaken of properties whose residents are concerned about vibration from construction traffic. This will be recorded and managed through the Environmental Liaison Officer (ELO) and any appropriate complaints dealt with accordingly.
- Contractors will be required to adhere to the codes of practice for construction working and piling set out in BS 5228 where appropriate;

- Plant that is not required to be mobile will be located and orientated away from NSRs and a localised barrier to provide attenuation if required.
- Site layouts and screening will follow good practice for minimising noise and noise reduction techniques will be included in staff inductions.
- Equipment will be maintained regularly to manufacturer's requirements and fitted with silencers or barriers to minimise noise and turned off when not in use;
- Where necessary acoustic bunds/barriers will be used at the construction compounds;
- No crushers or noisy activities within the construction compounds will be located near residential dwellings or sensitive receptors.

5.2 Community Consultation

5.2.1 The Applicant, the appointed PC and the Environmental Liaison Officer (ELO) will work with local communities and businesses within the villages of Waunfawr, Croesywaun, Brynrefail, Cwm-y-Glo, Fachwen, Dinorwig, Llanberis and Groeslon to ensure the phasing of the construction works is designed to minimise effects on the local community wherever reasonably practicable.

5.2.2 The ELO will be the main point of contact between the PC, the Applicant and also the public. They will be the focal point for any community liaison committees, project meetings, reporting and also communication on critical activities of the Development. This will include communicating when enabling works are likely to commence and then keeping the local communities aware of the continuing activities which will occur during the construction phase, such as blasting, delivery of equipment on abnormal loads and regular updates on progress.

5.2.3 Consultation and communication with the local community throughout the construction period also serves to publicise the works schedule, giving

warning to residents regarding periods when higher levels of noise may occur during specific operations, and providing them with lines of communication where complaints can be addressed.

5.2.4 Should any reasonable and specific complaint regarding noise and/ or vibration(Including ground borne vibration and noise) due to construction activities be received, reasonable endeavours will be undertaken to investigate the source, this will include:

- Identification of the activity that triggered the complaint, where possible;
- If an activity can be readily identified, identification and execution of any obvious remedial measures (e.g. filling potholes) to address the source of vibration within a reasonable timeframe (subject to Highway Authority where required);
- If the vibration is persistent and/or remedial measures cannot immediately be identified, reasonable further investigation will be undertaken to help identify the source; and
- Identification and execution of appropriate remedial measures, where required.

5.3 Training and Awareness

5.3.1 All project personnel, subcontractors and consultants attending site will be required to complete induction training which shall be arranged by the Principal Contractor. This will include a noise and vibration component to reinforce the important management issues and the measures that will be implemented to protect prevent adverse noise impacts. Ongoing toolbox talks will highlight specific environmental requirements associated with activities underway at the time.

5.3.2 Examples of topics that may be covered during project induction and toolbox talks include:

- Normal work hours;

- What activities can and can't take place outside of these working hours;
- The process for seeking approval for out of hours works, including consultation;
- Location of noise sensitive areas;
- The employment of high standards of working, reasonable and feasible noise mitigation measures; and
- Roles and responsibilities of the Project team related to noise and vibration.

6 MONITORING, AUDITING AND INCIDENT RESPONSE

6.1 Introduction

6.1.1 Monitoring of noise and vibration during construction will enable the effectiveness of environmental mitigation to be evaluated and also allow unforeseen problems to be identified and responses provided at an early stage.

6.1.2 The noise and vibration monitoring protocol will be refined and updated once the PC has been appointed.

6.1.3 This section also describes the actions to be taken in the event of a noise and/ or vibration incident and the method of reporting.

6.2 Noise & Vibration Monitoring

6.2.1 Monitoring of noise and vibration will be carried out as necessary and requirements for monitoring will be reviewed as further consents and licences are received and consultations completed.

Pre-Construction Baseline Monitoring

6.2.2 As stated in Section 2, before construction starts noise-sensitive locations shall be identified and pre-construction monitoring undertaken to re-assess the baseline noise environment. This will allow for appropriate construction noise limits and mitigation measures to be put in place. Monitoring will then be undertaken during construction to ensure compliance with the stated noise limits.

Monitoring During Construction (Pro-active Monitoring)

6.2.3 The Principal Contractor will carry out representative construction noise and vibration monitoring once construction works commence in order to: verify

construction noise predictions; ensure the effectiveness of attenuation measures; and/or demonstrate compliance with the noise threshold criteria.

6.2.4 All monitoring will be in accordance with the construction monitoring guidelines presented in BS 5228 Parts 1 and 2. Representative monitoring shall be carried out periodically e.g. at the start of new works phases or when works commence in new locations. *The schedule of monitoring will be agreed with GC once the construction programme is confirmed.*

6.2.5 Measurements shall be carried out by a suitably trained consultant or member of the construction works team on a nominal fortnightly basis. The frequency of measurements will vary, as measurement surveys will also be dependent on the construction schedule and the timing and location of specific noisy activities. It will be ensured that these potentially noisy activities are fully captured in the construction noise monitoring surveys.

6.2.6 Suitably trained is defined as someone who has attended a recognized course in environmental noise measurement and reporting.

6.2.7 *The monitoring locations are to be selected depending upon the phase of works and location of the construction works. The monitoring locations must be representative of the potentially worst affected NSRs. The locations will be agreed with GC.*

Construction Noise and Vibration Monitoring –Complaints (re-active monitoring)

6.2.8 If noise and/or vibration complaints are received during the construction phase, it may be necessary to undertake noise and/or vibration monitoring to determine if the construction noise and/or vibration limits are being exceeded. The monitoring will be undertaken at the complain*ant*'s *property* or a suitability *representative* location. *Further details about the complaint procedure can be found in section 6.4 and Appendix B.*

Construction Noise and Vibration Measurement Procedures

6.2.9 The following measurement procedure shall be adhered to:

- A Type 1 integrating sound level meter and calibrator shall be employed (the sound level meter shall have a calibration certificate dated within the previous 2 years and the calibrator shall have a calibration certificate dated within the previous year).
- The sound level meter shall be calibration checked prior to the measurement at the first receptor, and calibration checked following the measurement at the last receptor. The calibration levels shall be noted.
- At each location, noise levels shall be logged for a minimum of 30 minutes. This will give an indication of whether or not the approved maximum noise limits are being met.
- Logged noise parameters shall comprise $L_{Aeq,T}$ and L_{Amax} values.
- At each receptor, a note of the prevailing noise climate shall be made. This will include a brief description of construction works noise and the contribution of noise from other non-site sources.
- At each receptor, a note of the prevailing meteorological conditions shall be made. If conditions are unsuitable for noise monitoring, the measurements shall be postponed until the following day.
- Where necessary attended short term vibration monitoring will be undertaken at the same time as the construction noise monitoring and measure the PPV.

Reporting of Construction Noise and Vibration Monitoring

6.2.10 Prior to the start of the construction works, a noise and vibration monitoring reporting sheet template shall be produced and agreed with GC. A reporting sheet shall be completed for each receptor. The sheet can be partially completed during the noise measurements, and fully completed following the measurements.

6.2.11 The reporting sheets shall document the maximum permitted level of noise at the relevant receptor as documented within the final CNMP, and the measured noise levels at the relevant receptor.

6.2.12 The reporting sheets shall be examined immediately following their completion. If the data show that the approved noise or vibration limit is likely to be exceeded at any receptor, the actions outlined below in section 6.4 shall be followed.

6.2.13 The noise and vibration reports will:

- Verify whether all Best Practicable Means are being used to control noise and vibration levels;
- Compare measured noise levels against the noise limits set out in the CNMP;
- Compare the measured vibration against a PPV threshold of 1 mm/s;
- Log any noise or vibration nonconformities including nature, status, corrective and preventive actions and potential for statutory intervention;
- Provide information on any environmental noise and vibration complaints; and
- Adapt to changes in programme work requirements and likely associated noise and vibration impacts.

6.2.14 The reports will be submitted to GC and the ELO

Glyn Peris Property Management Plan

6.2.15 *A specific property management plan has been developed for Glyn Peris Guest House,* on the basis that it is the closest receptor to the Development (approximately 60m from the Order Limits) with the potential to experience temporary, construction related impacts as a result of the Development. As stated in the *Property Management plan, a* noise monitoring location will be located at Glyn Peris Guest House – the specification, duration and type of

monitoring will be *specified within this* Construction Noise Management Plan *following consultation with GC, PC and the occupiers of Glyn Peris.*

6.3 Nuisance Management

6.3.1 As outlined in the Statement in Respect of Statutory Nuisance (Document Ref: 5.02), it is considered that nuisance as a result of noise or vibration is unlikely to arise due to the implementation of the CNMP and overall CoCP. The Statement does, however, outline the procedure to be followed should a nuisance complaint be made or an event occur.

6.4 Non Compliance and Corrective Actions

6.4.1 Where complaints due to construction works noise and vibration are received, the cause/source of excessive noise/ vibration generation will be identified, the Principal Contractor will review the works in progress, and if it is identified that construction works are resulting in non-compliance or routine construction monitoring results shown the limits are exceeded, the infringement will be stopped immediately where possible. Any additional reasonable and feasible measures available shall be implemented to either reduce noise and vibration emissions, or reduce impacts on receivers.

6.4.2 An example Incident Procedure Flowchart is provided as Appendix B. This procedure will be implemented should there be any complaints due to construction works noise and vibration.

APPENDIX A: NOISE & VIBRATION LIMITS

This Appendix sets out the maximum limits which the Development will have to comply as set out in industry guidance, and also the methodology for setting Development-specific limits where these may be less than the industry maximum allowable. These limits will be reviewed and finalised as part of the approved CNMP at a later date.

A table confirming the construction noise limits at specific properties will be agreed with GC and will be included in the final agreed CNMP

General Construction Noise

1. Prior to finalising the construction noise levels, updated background noise surveys should be undertaken as detailed in Section 2 of the CNMP
2. The construction daytime noise limits ($L_{Aeq,1hr}$ freefield) shall be 10 dB above the existing background noise level. The maximum daytime construction noise limit is 55 dB $L_{Aeq,\ 1hr}$. Where the day time background noise levels are below 35 dB $L_{A90,1hr}$, there will be a fixed lower criterion limit of 45 dB $L_{Aeq,1hr}$. For construction noise limits, daytime working is defined as 07:00 to 19:00.
3. The night time construction noise limit is 42 dB $L_{Aeq,\ 1hr}$ freefield. For construction noise limits, night time working is defined as 19:00 to 07:00.
4. Within any 12 month period it is permitted to undertake construction work what will result in a level of up to 70 dB $L_{Aeq,1hr}$ under free field conditions during daytime construction working hours for up to 8 weeks. The applicant shall inform the GC of any works requiring such dispensation at least 2 weeks prior commencement. Local residents should also be informed via the ELO.

Construction Vibration Limits (excluding blasting)

5. The vibration generated by construction activities on site shall not exceed 1 mm/s PPV at Noise Sensitive Properties (NSRs)

Tunnelling Works

Limits 3 and 4 above will apply for tunnelling works.

6. The groundborne noise generated by the tunnelling work shall not exceed 35 dB $L_{Amax,s}$ within any of the residential properties in the vicinity if the Development. This limit will apply for both day and night time periods.
7. No tunnelling work is permitted between13:00 on any Saturday to 07:00 the following Monday morning. This condition will not apply should the applicant be able to demonstrate that noise generated by tunnelling during these times will not unduly affect local residents.

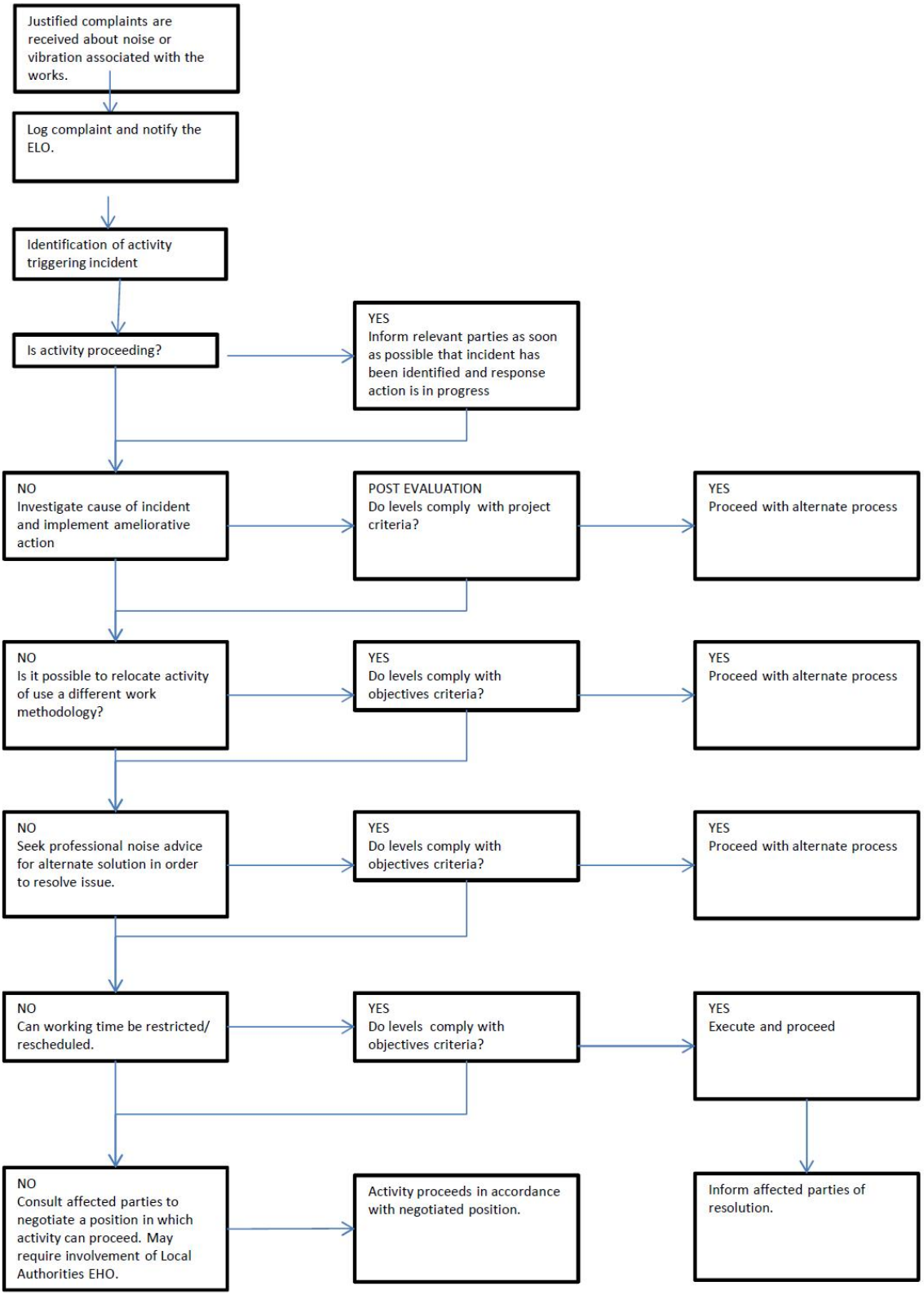
Blasting

8. Blasting will be restricted to 3 blasts per day between x and x am and x and x pm (time periods to be updated once blasting contractor has been appointed).
9. The Blasting Air Over Pressure limits shall not exceed 150 dB (Lin) (limit to be finalised once blasting contractor is appointed).
10. Ground vibration as a result of any blasting operations shall not exceed a peak particle velocity of 6mm/s (PPV) in 95% of all blasts measured over any 6 months period and no individual blast shall exceed a PPV of 10 mm/s as measured at vibration sensitive property. PPV measurements shall be taken to be maximum of three mutually perpendicular directions taken at the ground surface.

Piling

11. A piling risk assessment should be undertaken as detailed in the CNMP. Piling noise and limits to be submitted and agreed with GC once the piling strategy and predictions have been completed. The limits will be based on appropriate guidance including BS 5228 and relate to human response which is significantly lower than that for cosmetic/structural damage.

APPENDIX B: INCIDENT PROCEDURE FLOWCHART


Justified complaints are received about noise or vibration associated with the works.
Log complaint and notify the ELO.
Identification of activity triggering incident
Is activity proceeding?
YES
Inform relevant parties as soon as possible that incident has been identified and response action is in progress
NO
Investigate cause of incident and implement ameliorative action
POST EVALUATION
Do levels comply with project criteria?
YES
Proceed with alternate process
NO
Is it possible to relocate activity of use a different work methodology?
YES
Do levels comply with objectives criteria?
YES
Proceed with alternate process
NO
Seek professional noise advice for alternate solution in order to resolve issue.
YES
Do levels comply with objectives criteria?
YES
Proceed with alternate process
NO
Can working time be restricted/ rescheduled.
YES
Do levels comply with objectives criteria?
YES
Execute and proceed
NO
Consult affected parties to negotiate a position in which activity can proceed. May require involvement of Local Authorities EHO.
Activity proceeds in accordance with negotiated position.
Inform affected parties of resolution.