NOISE AND VIBRATION MANAGEMENT PLAN

Introduction

This Noise and Vibration Management Plan (NVMP) details the site specific monitoring and control procedures for the works at Abbotts Lane, Coventry.

Risk Assessment

A site specific detailed risk assessment of the potential occupational and environmental risks associated with the works is provided in Appendix A of the Environmental Monitoring Strategy (EMS).

Responsible Personnel

A dedicated site Environmental Engineer will be present on site at all times, who is suitably experienced and trained to implement the NVMP during the works. It will be the responsibility of the Environmental Engineer to carry out all monitoring requirements as the risk assessments and management plans dictate and collate, review and interpret all results to ensure that all works remain within the acceptable limits.

The Site Agent for the works will be responsible for overseeing the Engineer and also checking the results of the monitoring are within acceptable limits. The Site Agent and Site Foreman are also responsible for ensuring that the works being undertaken are done so in a manner as to cause minimal disturbance to potential receptors.

Method and Justification for Location of Monitoring Points

The Site Foreman will be responsible for deciding the location of the noise and vibration monitors on a daily basis and will convey the location to the Environmental Engineer. Each morning the Environmental Engineer will discuss with the Site Foreman the site activities that will be taking place that day, identifying those which have the greatest potential to give rise to significant noise and/ or vibration levels and where they will be located that day. Taking this into account the Environmental Engineer will be instructed by the Foreman upon the monitoring point(s) for that day giving consideration to the location of the nearest or most sensitive receptor(s).

The monitors will be placed at the closest point to any sensitive receptor along the site boundary, or where possible, within 1m of the façade of the nearest occupied building. The location of the monitors will be recorded within the Daily Environmental Monitoring Log (discussed below).

Should there be more than one area of site activities that may have the potential for significant noise and/ or vibration levels occurring at any point during that day, then the engineer will consider which

are the most sensitive receptors to these works and place the monitors accordingly. This may require moving the monitors part way through the day. Where this happens monitoring will be paused whilst they are moved and this will be recorded on the Daily Environmental Monitoring Log.

Monitoring Records and Reporting

The Environmental Engineer will be responsible for collating data on a daily and weekly basis. A Daily Environmental Monitoring Log will be completed each day as part of the site walkover. The Daily Environmental Monitoring Log for the site is provided in Appendix C of the EMS.

All data logged within monitors will be downloaded daily and assessed against the appropriate limits to ensure that any exceedances are recognised quickly and mitigation measures can be actioned as appropriate.

Weekly reporting to the Supervisor will be carried out and will contain as a minimum:

- Details of the time and date of each monitoring event,
- Details of the person undertaking the assessment,
- Details of the instrumentation used including serial numbers and calibration details,
- Details of monitoring locations,
- Details of the monitoring techniques including microphone position and microphone height,
- Details of the site activities occurring during the noise and vibration monitoring including accurate measurement of the distances from the activities to the monitoring point,
- An accurate measurement of distances from the monitoring point to potential receptors,
- A statement as to the audibility of the work activities at each monitoring location (if measured noise levels are considered to be dominated by sources other than the site then this will be clearly stated),
- Details of extraneous, non-site related noise events affecting the results,
- The results of all noise and vibration measurements,
- Details of the meteorological conditions prevailing during the surveys,
- The type and frequency of any events paused from the measurements,
- The results of all measurements,
- Details of any corrections made to the noise measurements, and
- A comparison of the measured noise and vibration levels against the agreed guideline limits.

CONTROL OF NOISE AND VIBRATION LEVELS

In the first instance VHE will undertake all available means to reduce the likelihood of elevated levels of noise and vibration from the works. Where levels may be exceeded VHE will take appropriate action to prevent or adequately control exposure according to principles of best practice. VHE will have a place a hierarchy of control measures, where control at the source is implemented in the first instance and control by PPE is considered a last resort.

Firstly the risk assessment identifies that emissions of noise and vibration may arise from vehicles and machinery associated with the works. VHE will ensure all vehicles and mechanical plant used for the purpose of the works will comply with current legislation regarding noise and vibration emissions.

Throughout the works VHE will comply with the following requirements as stipulated by NGPH:

- All vehicles and mechanical plant used during the works will be fitted with effective exhaust silencers and will be maintained in good and efficient working order,
- All generators and compressors will be ‘sound reduced’ models, fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use,
- All pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers,
- All airlines will be maintained and checked regularly to prevent leaks,
- Plant and equipment in intermittent use will be shut-down, or throttled down to a minimum, in the intervening period between work activities,
- All pumps will be fitted with effective exhaust silencers and will be maintained in good and efficient working order. All dewatering pumps will be ‘sound reduced’ models fitted with properly lined and sealed acoustic covers,
- All stationary plant will be screened, where reasonably practicable,
- VHE will avoid the over-night operation of generators and/ or compressors, using mains power instead, where reasonably practicable to do so. Where the use of generators cannot be avoided, measures will be taken to avoid noise transmission beyond the site boundaries, particularly where residential property adjoins the site. Silenced generators will be used in this instance.

The location and nature of off-site receptors will be taken into account when arranging and/or managing site activities in order to minimise noise at the site boundaries, as far as reasonably practicable and will include the following:

- Selective location of generators and other stationary plant and equipment,
- Use of mobile noise screens where impacts of noise may occur,
- Limiting the amount of working plant at any time, and
- Silencing plant.

VHE will consider the location of works associated with high levels of vibration in relation to identified receptors to prevent damage to adjacent and other properties.

NOISE MONITORING

Routine noise monitoring will be carried out on a daily basis at the site boundaries adjacent to sensitive receptors and during periods of activity in accordance with the details provided in the following paragraphs.

Noise Monitoring Equipment

The noise monitoring equipment will comprise a portable Type 1 integrating sound level meter (SLM) with an external microphone, tripod and full weather proofing in accordance with BS 6698 (Cirrus CR811B or similar). It will be supplied with all recent calibration certificates and a Class 1 acoustic calibration device for daily on site calibration. It will be capable of measuring sound levels in the range 40 to 140 dB (A), recording percentile levels, L_{Aeq}, LA_{max} and L_{Amin}, and have a memory sufficient to store results for a period of one week with a sample interval of 5 minutes. All necessary software and cables will be supplied and the data will be downloaded and converted into a Microsoft Excel compatible format.

The microphone height should be between 1.2 m and 1.5 m above ground level. To minimize the influence of reflections, the microphone position should be at least 3.5 m from any reflecting surface other than the ground. In the event of measurements having to be made close to a wall or building a suitable ‘correction factor’ should be applied to the results to convert them to free- field levels.

The type of instrumentation used for the survey will be recorded and will include the monitor serial number. The VHE SLMs undergo extensive calibration tests every two years and details of the calibration, including copies of the test certificates will be kept with the noise monitor and provided to the Supervisor.

The SLM will be field calibrated before and at the end of each survey by applying an acoustic calibrator or pistonphone conforming to the latest versions of BS EN 60942:2003 (Electroacoustics – Sound Calibrators), to the microphone to check the sensitivity of the measuring equipment. Details of the calibration will be recorded in the Daily Environmental Monitoring Log including any drift in calibration levels.

Baseline Monitoring

To quantify any impact that may arise from the site activities, baseline monitoring of noise shall be undertaken at the site boundary and adjacent to sensitive receptors prior to the commencement of the works. These results will be used to supplement the noise guideline limit where results from the monitoring exceed this limit.

The methodology for baseline monitoring will follow those procedures outlined below for all monitoring to ensure collected data is comparable.

Furthermore, prior to the start of the site works, VHE will undertake an assessment of the expected levels of noise from the works in accordance with BS 5228:2007: Part 1 'Code of Practice for Noise and Vibration Control on Construction and Open Sites. Noise'. These findings will be submitted to the AOC a minimum of two weeks before the start of the site works.

Personal Noise Monitoring Procedures

VHE will undertake personal exposure monitoring with regards to noise and will be compliant with the Control of Noise at Work Regulations 2005.

Prior to the commencement of works the vehicles and machinery to be used on site will be identified and the suppliers will provide information as to which processes may lead to significant levels of noise, such a breakers and screens. Where ear defender protection is necessary when working in the vicinity of these site activities, associated personnel will be provided with such equipment and required to wear this. Details of such exposure and PPE will be provided to the site personnel within the site induction and subsequent Tool Box Talks.

Daily Noise Environmental Monitoring Procedures

Monitoring will take place on a daily basis and will involve the measurement of noise levels over each day that site activities are being carried out.

Recorded observations will be made regarding the audibility of the works including details of plant operating during each monitoring period. A detailed log of any extraneous events affecting noise levels will also be recorded.

Impacts from Extraneous Sources

To minimize the influence on the noise readings from extraneous sources of physical interference, the following will be adopted:

- Provided a suitable foam windshield is fitted to the microphone, measurements should only be done and taken into consideration when wind speeds are below 5 ms^{-1} (11 mph).
- No measurements should be undertaken during periods of heavy precipitation (or discarded if taken).
- No measurements should be undertaken immediately adjacent to sources of electrical interference, such as over- head power cables or radio transmitters.
- Wherever possible, and in order to comply with recommendations made in the relevant Standards, noise measurements should be made during calm conditions or at locations with a positive wind component from the site operations. However, due to the vagaries of the British climate this may not always be possible.

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

Noise Monitoring Assessment

Action levels for personal exposure to noise are defined in the Control of Noise at Work Regulation 2005 and include:

- Lower exposure action values:
    - Daily or weekly exposure of 80 dB,
    - Peak sound pressure of 135 dB.
- Upper exposure action values:
    - Daily or weekly exposure of 85 dB,
    - Peak sound pressure of 137 dB.

VHE will work in compliance of the regulations where hearing protection will be made available to all personnel working in the vicinity of any activities identified as having noise levels that exceed the lower exposure action values. In this case personnel may decide whether to wear the protection, however where activities are identified as having noise levels that exceed the upper exposure action values, then it will be a requirement for personnel to wear ear protection.

The results from the environmental noise monitoring will be assessed against the guideline limit of LAeq. 10h hour: 75dB over a period of 08:00 to 18:00 hours on weekdays. This will be discussed and agreed with the Local Environmental Health Officer. Noise monitoring data will be assessed against these levels on a daily basis.

Where the measured noise levels are not in compliance with the guideline limits the data will be assessed further to identify the nature of the non-compliance. This will include investigation of the weather conditions of that day and any off-site noise potential as recorded within the Daily Environmental Monitoring Log.

Should the investigation suggest an extraneous noise impact then a comparison with the baseline noise survey results will be undertaken and/ or additional monitoring of background noise during times when the site is not operational may be required. Alternatively, it may be more appropriate to choose an alternative monitoring location, which may be closer to site activities, where noise from off-site sources is less significant. This data would then be used to predict site attributable noise at the receptor location.

If the noise level is found to be associated with the site activities and the monitor is not located within 1m of the identified sensitive receptor then, if possible, the sound meter will be moved to the receptor and the survey repeated. If the noise still exceeds the acceptable limits proposed then action will be taken to reduce the nuisance.

Mitigation Measures

Should levels associated with site activities be found to be above the acceptable limits then the Site Agent will be informed. The Site Agent will then decide what course of action is necessary to reduce the noise nuisance, as discussed earlier in the *Control of Noise and Vibration Levels* section. This may include altering or suspending the operation until a suitable method is adopted or further noise reducing measures are put in place such as screens or bunds.

Should any complaints be received regarding excessive noise levels, then these shall be dealt with as outline in the complaints procedures section of the EMS.

VIBRATION MONITORING

Routine vibration monitoring will be carried out on a daily basis at the site boundaries adjacent to sensitive receptors and during periods of activity in accordance with the details provided in the following paragraphs.

Vibration Monitoring Equipment

Vibration monitoring will be undertaken on a daily basis using a ground borne vibration monitor. This will comprise a portable weather-proof seismic recording instrument such as the Vibrock V901 or similar. It shall be set to run in continuous mode and able to digitally record vibration levels up to 20mm/s peak particle velocity, for frequencies between 5Hz and 250Hz, in compliance with BS EN ISO 8041:2005. All necessary software and cables will be supplied to enable data to be downloaded and converted into a Microsoft compatible format.

The vibration monitor is calibrated by an approved laboratory on an [annual] basis and the appropriate certificates will be provided with the relevant monitor.

Baseline Monitoring

To quantify any impact that may arise from the site activities, baseline monitoring of vibration shall be undertaken at the site boundary and adjacent to sensitive receptors prior to the main works been undertaken. These results will be used to supplement the vibration guideline limit where results from the monitoring exceed this limit.

The methodology for baseline monitoring will follow those procedures outlined below for all monitoring to ensure collected data is comparable.

Personal Exposure Vibration Monitoring

VHE will undertake personal exposure monitoring with regards to vibration and will be compliant with the Control of Vibration at Work Regulations 2005.

Prior to the commencement of works the vehicles and machinery to be used on site will be identified and the suppliers will provide information as to which processes may lead to significant levels of vibration, such a breakers and screens. Where vibration is identified to be at levels of unacceptable risk to site personnel, then the site agent will review procedures and take necessary action. Details of such exposure and PPE will be provided to the site personnel within the site induction and subsequent Tool Box Talks.

Environmental Vibration Monitoring

Monitoring will take place on a daily basis and will involve the measurement of vibration levels over each day that site activities are being carried out.

Recorded observations will be made regarding the type of site activities occurring that day including details of plant operating during each monitoring period.

Vibration Monitoring Assessment

Personal exposure vibration monitoring will be assessed using the guidelines provided in BS 6472-1:2008 ‘Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration’.

Ground borne vibration will be assessed using guidelines provided in BRE Digest 403, ‘Damage to Structures from Ground Bourne Vibration’. The acceptable maximum limits for vibration at the receptor is 10mm/s peak particle velocity over the frequency range of 1Hz to 80Hz. At this limit the probability of damage tends towards zero. These levels will be agreed with NGPH, other sensitive equipment operators and the Local Environmental Officer.

Should these limits be exceeded at the identified receptors those associated works will ceased immediately.

Should complaints arise from offsite receptors due to the vibration levels they are experiencing within neighbouring properties, monitoring will be undertaken at that property and assessed according with the complaints procedures identified in the EMS.