ABP Southampton

Environmental Statement for Port of Southampton: Berth 201/202 Works

Appendix I

Environmental Noise and Vibration Assessment (Bureau Veritas UK Limited, 2008)

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Associated British Ports

Environmental Noise and Vibration Assessment Development of Proposed Deepwater Berths 201 & 202 at Port of Southampton

NSOX0549/1 Rev 2

8th December 2008

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Document Control Sheet

Report number:	NSOX0549/1	NSOX0549/1	NSOX0549/1
Issue/Revision:	Rev 0	Rev 1	Rev 2
Remarks:	Issued	Revised	Revised
Date:	6th August 2008	28th October 2008	8th December 2008
Submitted to:	Sue Simmonite		
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Summary

It is being planned to deepen Berths 201 & 202 at DP World Southampton in order to allow the current generation of large container ships to be berthed here at their loaded draught. The construction of the new quay wall, which will be required to allow the berths to be deepened, will give rise to potential noise and vibration impacts on local residential areas. Key project drivers have been identified as environmental concerns from noise and vibration, including the impact of underwater piling noise on fish, and in particular migrating salmon. This report, prepared by the Acoustics and Vibration Group of Bureau Veritas UK Ltd on behalf of Associated British Ports, considers the impact of noise and vibration from construction activities on human receptors and is a supporting document to the Environmental Statement for the planned development. Consideration of the noise impact on marine life is given in a separate supporting report prepared by Subacoustech Ltd.

The most sensitive residential location to the development is considered to be represented by the apartment complexes at Admiralty Quay, Marchwood, which has a direct line of sight to Berth 202 and the container terminal, with many of the apartments having water facing balconies. There are also large residential areas on the Southampton side of the container terminal although these are further away.

Whilst an inherently quiet method of construction of the main wall was given consideration (the press-in Giken piling method) this was identified as being unsuitable for Berths 201 & 202 and it is most likely that a traditional combi-wall method of construction will be used. This employs a combination of tubular steel and sheet steel piles. The concern over the impact of underwater noise on migrating salmon has dictated that the piling activity can only take place over a limited time period. This was initially assumed to be from the beginning of December to the middle of March. In order to complete the pile driving in this period, it has been determined that four piling rigs will be required, two to drive the main tubes and two to drive the infill sheets. Following further discussions with the Environment Agency an extended timeframe may be permitted from mid September to the end of the following March, subject to certain safeguards. This might modify the number and configuration of the piling rigs compared to the initial assumptions although this would depend on the chosen contractor's preferred method of working.

Excluding the noise impact on migrating salmon, which has been considered in a separate study, the main issues relate to local residents being annoyed by construction noise and the general diminution of the amenity of the locality whilst construction is taking place and also potential annoyance from groundborne vibration. Without the proposed mitigation measures for the tubular piling there could be a small, albeit finite, hearing damage risk to members of the public. Cosmetic or structural damage from groundborne vibration is considered unlikely.

Standards and guidance relating to the assessment of noise have been reviewed and criteria developed which allow the assessments of noise and vibration impacts to be defined as negligible, of minor adverse significance, of moderate adverse significance, or of major adverse significance. These criteria relate, in part, to existing ambient noise levels at the potentially affected locations.

Detailed ambient noise surveys have therefore been undertaken in the vicinity of the River Test and Southampton Water using a combination of attended and unattended noise measurements. The surveys were planned in conjunction with representatives of the environmental health departments of Southampton City Council, New Forest District Council and Eastleigh Borough Council. The results of the surveys show that the ambient noise levels vary from day to day and time of day by differing degrees, depending on the proximity to one or more dominant sources of noise. Noise from the container terminal keeps ambient levels fairly constant throughout the day and night at those residential areas in its immediate vicinity (e.g. Admiralty Quay). At other locations affected predominantly by traffic noise, there is a distinct day-night variation in noise levels.

Detailed computer modelling of the planned construction activities has enabled a noise time history to be developed for each of the residential locations considered, over the typical 14 month construction period. This has shown that the highest noise levels will occur if all four percussive piling rigs were to be in use simultaneously and at their closest proximity to Admiralty Quay – a worst case assessment as, on average, some vibratory piling is likely to occur with the percussive piling. Without mitigation measures the impact would be considered to be of major adverse significance during this period of pile driving. The most significant mitigation measure will be to fit shrouds to the tubular piling rigs. This is proven technology and the results of noise tests undertaken by Bureau Veritas on a similar size rig to that being planned for Berths 201 & 202 indicate that a significant reduction in noise level can be achieved from tubular piling using a percussive hammer as long as attention is given to sealing the shroud to the water level or gate structure. With the tubular piles shrouded, the noise impact is reduced to one of moderate adverse significance during the pile driving activity. Outside this period, the noise impact is only of minor adverse significance at the nearest properties to the site, and of negligible impact elsewhere.

If the longer allowable pile driving period is adopted, the received noise level time profile will change depending on the configuration of the piling rigs actually adopted. This could include slightly higher overall noise levels during the initial few weeks of piling but reduced levels of piling noise in later weeks, compared to those forecast for the shorter pile driving period. The configuration of the rigs preferred by the chosen piling contractor would be reviewed prior to construction work commencing, and the local authorities consulted on its noise implications.

Apart from the use of shrouds on the main tubular rigs, other mitigation measures include the adoption of a British Standard code of practice to control noise, in general, from the construction site, regular noise monitoring to ensure that reasonable levels of noise are not being exceeded and maintaining good community relations at all times.

ABP Southampton is also planning another major project to deepen and widen the main channel to the docks. It is possible that a significant in-combination noise impact could arise if a backhoe dredger is working on the part of the main channel nearest to Admiralty Quay whilst percussive pile driving is taking place at Berths 201 & 202. Depending on the noise emission levels of the backhoe dredger, this type of activity should be avoided close to Admiralty Quay whilst percussive piling is occurring.

It is possible that vibration from tubular pile driving, using a percussive hammer, may be felt at the Admiralty Quay properties although it is considered unlikely that the vibration levels will be sufficiently high to give rise to any risk of cosmetic or structural damage. Vibration surveys will be undertaken during pile driving to ascertain actual levels of vibration, and further actions then adopted as a consequence of the monitoring, if vibration levels prove higher than expected.

The fact that the pile driving activity has to take place in a period which encompasses the winter time is of benefit in reducing its potential noise impact on neighbouring residential areas. With appropriate mitigation measures in the form of shrouding of the main tubular piles, the impact can be further reduced, although will remain of moderate adverse significance during the piling period. At other times, the noise impact is only likely to be of minor adverse or negligible significance. For much of the time, vibration from percussive piling will only be of negligible or minor adverse significance, possibly increasing to moderate adverse significance at pile refusal, but unlikely to be of major adverse significance. It is therefore concluded that the development of Berths 201 & 202 can proceed in the knowledge that the noise and vibration impact from the associated construction activities will, at the most, only be of moderate adverse significance.

Contents

1 Introduction

Associated British Ports (ABP) Southampton is proposing to deepen Berths 201 & 202 in the western docks fronting DP World Southampton (formerly known as Southampton Container Terminals - SCT) and reconstruct the quay alongside these berths. The purpose of this work is to allow the current and new generation of large container ships to be berthed here at their loaded draught. This report reviews the potential noise and vibration effects associated with the construction of the proposed development on local areas of population, and considers mitigation measures to minimise their impact. The report has been prepared by Bureau Veritas UK Ltd (BV) as a supporting technical document to the Environmental Statement for the development. This report also considers the potential in-combination noise effects of a separate proposal to widen and deepen the main channel in Southampton Water (Southampton Approach Channel Dredge Project) to increase the access time to the port. Consideration of the noise impact on marine life from the proposed construction activities is given in a separate supporting report prepared by Subacoustech Ltd.

Throughout this report, all sound pressure levels are quoted in dB ref. 20 μPa and all sound power levels in dB ref. 10^{-12} W.

2 Consultation and Workshops

Regular consultation meetings have been held with representatives of the three local authorities who have an interest in this and the main channel deepening and widening projects, namely Southampton City Council, New Forest District Council and Eastleigh Borough Council. The purpose of the consultation meetings was to keep the local authorities fully informed of the projects as they developed, and allow their input into the planning of the baseline noise surveys, which form a necessary feature of the environmental noise impact assessment of any planned development.

The design concepts for the Berth 201 & 202 scheme have evolved from a series of workshop meetings run by Jacobs UK Ltd and attended by ABP, DP World Southampton and consultants engaged in the EIA process. The purpose of these was to allow all attendees to gain a shared understanding of the key project drivers and then to review the initial options for the proposed quay wall that had been developed by Jacobs. The design of the scheme is simple in concept. This involves the construction of a sufficiently deep retaining wall to allow new berthing pockets to be dredged to the required depth, and the construction of quay topside facilities including the installation of new crane rails. Various demolition activities will also be required with respect to the existing quay. The main cluster of project drivers were identified as being environmental matters, in particular the impact of underwater piling noise on migrating salmon during the quay wall construction and the effects of airborne piling noise on local areas of population.

Various construction options were considered and these are discussed in detail in the Environmental Statement. Although a scheme involving hydraulically installed “press-in” piles (using a Giken pile driver) would have been the preferred environmental option, were it to be a realistic possibility, this method of construction is unsuitable for the size of piles required for the Berth 201 & 202 quay wall construction. The design has progressed with the consideration of the traditional steel combi-piled wall as being the most likely method of construction for the quay wall. This involves a combination of tubular steel piles and infill sheet steel piles and it is this method of construction which has been considered in the noise and vibration impact assessment.

3 Site Location and Environs

DP World Southampton is located at the most westerly part of the western docks. Berths 201 & 202 are aligned in an approximate north-east south-west direction and face down the River Test towards Southampton Water and the Solent beyond. The existing quay wall of Berths 201 & 202 is approximately 575 m in length. Although DP World Southampton is located in the City of Southampton, the riverside (south-western) edge of the container terminal is relatively close to the boundary with New Forest District. Immediately to the north of DP World Southampton is an industrial area and trading estate with the A33, Millbrook Road, forming the boundary to the main residential areas of Freemantle, Regents Park, Millbrook and Redbridge, with Shirley and Shirley Park further to the north. The shortest distance between the nearest properties in Regents Park and Berth 201 is about 600 m. Within the confines of the docks, and adjacent to DP World Southampton, is a sewage works, with two associated residential cottages. These are located at a minimum distance of approximately 400 m from Berth 201.

Immediately to the south of Berth 202 is a prestigious residential development known as Admiralty Quay. This consists of a variety of apartment complexes of different sizes and heights, some utilising the original defence buildings which used to form this site. Many of the properties facing towards the River Test have balconies which overlook the water and DP World Southampton beyond. The nearest of these properties is approximately 250 m from the south-west corner of Berth 202. These properties are anticipated to be the most potentially affected locations with respect to the noise and vibration impact from the proposed development. South of Admiralty Quay is the residential area of Marchwood.

To the south-west of DP World Southampton is the village of Eling. Although it has views of the container terminal it is considerably nearer to Berth 207 (about 800 m) than to Berth 202 (2.3 km). To the north-west of Eling is the residential area of Totton, with its centre over 3 km from Berths 201 & 202.

Southampton city centre is to the east of Berths 201 & 202. There is a complex of hotels at distances of between 2 to 2.5 km from the berths and mixed apartment and housing development beyond this.

A plan showing the location of Berths 201 & 202 and the various neighbouring residential areas is given in Figure 1.

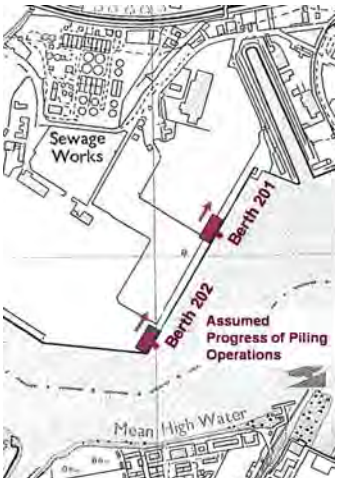
4 Proposed Works

Costain Limited, a leading UK marine civil engineering contractor, has prepared an indicative construction method on which this assessment is based. One of the key drivers behind the scheme is the need to complete the piling operations in a limited period of time in order to avoid disturbance to migrating salmon in Southampton Water and the River Test. The initial consideration was to complete the piling in the period from the beginning of December to the middle of the following March. To be certain of completing the piling operation in this period necessitates four percussive piling rigs, two to drive the main tubes and two to drive the infill sheets. Noise levels for this concentrated time period have been considered in detail in this report. Following further discussions with the Environment Agency, an extended time frame may be permitted from mid September to the end of the following March, subject to certain safeguards on stopping piling for limited periods if migrating salmon are identified. This might

modify the number and configuration of the piling rigs compared to the initial assumptions, although this would depend on the chosen contractor's preferred method of working.

A pre-cast concrete (PCC) production area will be established, probably at the north end of Berth 201. This will be used to manufacture the various PCC units required for the fenders and deck. Some of the initial works will involve removing the existing pavement in order to allow the installation of piles for the rear crane rail. It is anticipated that these piles can be of the CFA type (continuous flight auger), which are relatively quiet to install compared to driven piles. An anchor wall, to tie in to the front quay wall, may also be constructed during these initial works. Alternatively, the anchor wall may be formed from steel piles, which it is anticipated could be driven using vibratory techniques.

It is anticipated that the tubular piles for the quay wall will be 1820 mm diameter driven at 3.68 m centres. They will be in excess of 30 m long. These will be driven some 17 m into the existing river bed. Use will initially be made of a vibratory technique to drive the piles, such as an ICE 1412 vibratory hammer. When the piles cannot be installed any further in this way, use will be made of a hydraulic percussive hammer, such as an IHC S200. It is not known precisely how long it will take to drive each pile using the percussive hammer as this will depend on a number of factors such as the compaction of the ground and the extent to which the pile can initially be installed using the vibratory hammer, but previous experience suggests that a tubular pile can be driven 10 m in some 30 minutes. Thus it is thought unlikely that driving each main tube will take more than one hour using the percussive hammer. On the assumption that driving the main tubular piles for the quay wall will take place over a 10 week period (to allow for the Christmas and New Year holidays), this will require each rig to install 2 tubular piles, per day, on average. This assumes a nominal 5½ day working week. Thus, typically, there is unlikely to be any more than 4 hours per day of main tubular pile driving activity.



With two main tubular piling rigs, there are four obvious ways in which the work could proceed. The rigs could start at opposite ends of Berths 201 & 202 and work towards each other; they could start in the centre of Berths 201 & 202 and work away from each other; or they could start a set distance apart and work either in a direction towards Southampton (NE) or a direction towards Admiralty Quay and Marchwood (SW). For the purposes of the environmental noise assessment, and for the purposes of minimising the environmental noise impact, it has been assumed that the rigs will start spaced apart and work in a north-easterly direction towards Southampton as shown in the adjacent diagram. In this way, the noise level at the nearest noise sensitive location to the site, from driving the tubular piles, will be greatest at the start of this part of the construction programme, and will decrease as the rigs move further away.

After the main tubular rigs have been working for approximately two weeks, the infill steel sheet piles will start to be installed. This will also use a combination of vibratory and percussive techniques, although less powerful hammers will be needed than for the tubular piles. It is anticipated that three sheet piles will be installed between each pair of tubes.

If an extended allowable piling period were to be adopted (mid September to the end of the following March), an alternative configuration for the quaywall piling could still be to have two pairs of rigs initially working together, reducing to one pair after a period of time. In this situation the pairs of rigs might start closer together, and Costain has suggested that could mean that the tubular rigs would start spaced apart by about 125 m. When the first rig has "caught up" with the inserted piles for the second rig (after about 4 weeks), the first tubular rig

would be demobilised, followed by the first sheet piling rig. Thereafter the remainder of the quaywall would be piled by one pair of rigs.

There will be various other activities taking place concurrently with the front wall pile driving. This includes the removing of the existing capping beams; work to the pile heads; the excavation and installation of tie bars; backfilling and the construction of the rear crane rail beam; the installation of the pre-cast fender and deck units; and concrete works to the capping beams. The final tasks, after the front wall piling has been completed, involve the installation of fender units and deck furniture; paving between the capping beams and the rear crane rail beam; and the installation of the crane rails.

The resource schedule for these various tasks, as provided by Costain, is given in Appendix 1. Apart from the percussive piling rigs other relatively noisy plant includes concrete breakers and concrete crushing plant. Excluding the procurement and delivery phases, the construction period is scheduled to last for some 14 months.

5 Overview of Potential Noise and Vibration Impacts

Whilst the construction activity is of a finite duration it will, in total, last for more than a year. No night time construction activity is envisaged, therefore the concern is not generally related to sleep disturbance although there is still a potential concern in this respect for any shift workers who may live in the vicinity of Berths 201 & 202. The major issue is one of annoyance and the diminution of the amenity of the local areas for the period when construction activity is taking place, on account of heightened levels of noise, and also the character of the noise. The potentially most significant noise impact will occur during the periods of tubular and steel sheet driving. With appropriate mitigation measures there is no off-site concern envisaged with respect to hearing damage, although a relatively high level of risk of this type will occur close to some of the construction plant and equipment. This is a health and safety issue which will need to be addressed by ABP and its contractors under the Control of Noise at Regulations 2005 (Reference 1).

Percussive pile driving will impart vibratory pulses of energy into the ground which will then propagate away from the source of excitation and dissipate with increasing distance. High levels of groundborne vibration have the potential to give rise to structural damage to properties. However, as the nearest properties to the pile driving are at least 250 m away, it is thought unlikely that vibration levels from the piling operations associated with the construction of Berths 201 & 202 will be sufficiently high to give rise to any structural damage to nearby properties. It is possible, however, that vibration will be perceived in nearby properties, potentially giving rise to annoyance.

6 Noise and Vibration Assessment Criteria

6.1 Construction Noise

PPG 24

In the formulation of policies on planning developments which have issues relating to noise, local Planning Authorities are advised by the Department of the Environment in Planning Policy Guidance PPG 24 “Planning and Noise” (Reference 2). The aim of this guidance is to provide advice on how the planning system can be used to minimise the adverse impact of

noise without placing unreasonable restrictions on developments or adding unduly to the costs and administrative burdens of business. It includes some of the main considerations that should be taken into account when determining planning applications for development, which will generate noise.

BS 5228

With respect to construction sites, PPG 24 states that detailed guidance on assessing noise from construction sites can be found in British Standard BS 5228, "Noise and Vibration Control on Construction and Open Sites" Parts 1 – 4. Of these, Part 1 (Reference 3) and Part 4 (Reference 4) are of most significance to the construction of Berths 201 & 202. Part 1 is a code of practice for basic information and procedures for noise and vibration control; Part 4 is a code of practice for noise and vibration control applicable to piling operations. PPG 24 refers to the 1984 version of the standard, whereas the current versions are dated 1997 for Part 1, and 1992 for Part 4. The whole standard is now in the course of revision and drafts for public comment have recently been issued (References 5 and 6). Whilst these are drafts and must not be used as a British Standard, they do contain useful summaries of current practice with respect to the assessment of noise from construction sites.

The factors which BS 5228 include as likely to affect considerations of the acceptability of site noise and the degree of control necessary include:

- Site location;
- Existing ambient noise levels;
- Hours of work;
- Attitude of local residents to the site operator;
- Noise characteristics.

The nearer the site is to sensitive premises the more stringent should be the restrictions on noise emanating from the site. Although ambient noise levels may have some bearing on the acceptability of construction noise, the standard recognises that the relationship between response and the noise level difference between the level of construction noise and the background noise may well be different. A greater difference may be tolerated when it is known that the operations are of short duration. The standard does not define "short duration" however. The total construction period for Berth 201 & 202 is some 14 months, but piling for the quay wall will only occur for less than half of this time. The fact that much of the piling activity, by necessity, will take place during the winter period, when most people would want to keep their windows shut in any case, is a positive factor in the minimisation of the noise impact of the development.

For any noise sensitive premises, some periods of the day will be more sensitive than others. The standard states that for dwellings, any proposed site operation outside normal weekday working hours will need special consideration. Noise from a site will tend to be more readily accepted by local residents if they consider that the site operator is doing all he can to avoid unnecessary noise. The acceptability of the project may also be a factor in determining community reaction.

BS 8233

PPG 24 also cites British Standard BS 8233 1987 "Code of Practice for Sound Insulation and Noise Reduction for Buildings" (Reference 7) which gives general guidance on acceptable noise levels within buildings. For living rooms, a reasonable standard of internal noise is given as 40 dB $L_{Aeq,\,T}$ and a good standard is given as a level of 30 dB L_{Aeq}. For properties with closed thermal double glazing, and with the spectrum of the noise biased to mid to high frequencies (as is found in tubular or sheet steel piling noise), the typical noise reduction from

the outside façade to inside is 35 dBA. Thus the BS 8233 "reasonable" standard of internal noise should still just be achievable with an outside façade level of 75 dB L_{Aeq} (as long as windows remain shut and on the assumption they are thermally double glazed).

Advisory Leaflet 72

Guidance on absolute levels of noise has previously been given by the government, and this has recently been cited in Reference 5 (the draft revision to BS 5228). This refers to Advisory Leaflet 72 (Reference 8) which has never been withdrawn, although is now out of print. This suggests that the maximum desirable noise level caused by construction noise, outside the nearest window of the occupied room closest to the site boundary, is 75 dBA in urban areas near main roads in heavy industrial areas between 07:00 and 19:00. For rural, suburban and urban areas away from main road traffic and industrial noise, the maximum desirable noise level is 70 dBA. For any work in the evening, both AL 72 and British Standard BS 5228 suggest that a level 10 dBA below the daytime limit may be appropriate.

Given that this leaflet was first published in 1968 and then reprinted in 1976, the interpretation of "dBA" is open to question as it does not constitute an explicit noise index as would be expected to be seen in modern standards or guidance. Nowadays it is often taken to be $L_{Aeq,T}$, where L_{Aeq} is termed the A-weighted equivalent continuous noise level, the energy averaged value of the instantaneous noise level over the measurement time period, T. Sometimes the value of T is taken as the whole working day (e.g. 07:00 to 19:00), but stricter control on short term high noise levels is achieved if T is referred to a shorter time period, e.g. 1 hour. The intent of the advice given in AL72 is that noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with windows shut.

Other Major Construction Projects

For projects of a significant size such as the construction of a new railway, trunk road or container terminal, historically there have been two approaches to determine whether construction noise levels were significant or not. The older and more simplistic approach is based on the exceedance of fixed noise limits, such as those cited above. An alternative and/or additional method to determine the significance of construction noise levels is to consider the change in the ambient noise level with the construction noise. This reflects more conventional EIA methodologies for noise.

This approach has been adopted for the London's new Crossrail project, for example, and is also summarised in Reference 5 (the draft revision to BS 5228). In this, construction activities are deemed to be significant if the total noise (pre-existing ambient plus airborne construction noise) exceeds the pre-existing ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,Period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively. This approach applies when the duration of construction activity is for a period of one month or more. Higher levels of noise, and defined exposure durations, determine eligibility for noise insulation grants; and even higher levels of noise and defined exposure durations determine eligibility for temporary re-housing.

Proposed Assessment Thresholds for Berths 201 & 202 Construction Project

A similar noise assessment concept as used for the Crossrail project has been adopted in this report for the construction of Berths 201 & 202. However for Berths 201 & 202, the term "significant" has been taken to mean of "moderate adverse significance". A lower layer of significance has then been added where the construction noise causes an increase of 3 dB in the ambient noise level, at any level of ambient noise. For this situation, the construction noise level will be equal to the ambient noise level. This has been termed the threshold of

"minor adverse significance". If construction noise levels are less than the ambient noise level then the noise impact is considered to be negligible.

An upper level of significance has then been assumed, which in other major construction projects triggers eligibility for sound insulation, subject to conditions on length of noise exposure at or above this level. For Berths 201 & 202 this has been termed the threshold of "major adverse significance". This "major adverse significance" trigger is only related to ambient noise levels at very high levels of ambient noise. Beyond the trigger for sound insulation considerations and at construction noise levels 6 to 10 dB higher than the sound insulation criteria, is another trigger, which in other major construction projects, has been used to assess qualification for temporary re-housing. (In these other projects noise insulation grants or temporary re-housing was offered to eligible properties where the predicted noise level due to construction exceeds the trigger levels for more than 10 out of 15 consecutive working days or for a total of days exceeding 40 in any six month period).

The threshold levels and construction noise levels are all based on the $L_{Aeq, T}$ noise index, and are considered as façade levels.

Tables 6.1 to 6.3 give trigger levels for significance of noise impact for different times of the day and days of the week as proposed for the Berths 201 & 202 construction project. In these tables, the values for T, the time averaging period, are assumed to be as follows:

Daytime: T = core hours (e.g. 0800 – 1800 Monday to Fridays, 0800 – 1300 Saturdays)

Saturday afternoon T = 5 hours

Evenings: T = 5 hours (18:00 – 23:00)

Sundays & night-time: T = 1 hour

Activity	**Trigger for Core Daytime Periods**													**Significance:**
Ambient noise level dB $L_{Aeq, T}$	<60	60	61	62	63	64	65	66	67	68	69	70	71	
Construction noise only, dB $L_{Aeq, T}$	<60	60	61	62	63	64	65	66	67	68	69	70	71	**Minor adverse significance** (equal to ambient level)
Construction noise only, dB $L_{Aeq, T}$	65	65	65	65	66	67	68	69	70	71	72	73	74	**Moderate adverse significance**
Construction noise only, dB $L_{Aeq, T}$	75	75	75	75	75	75	75	75	75	75	75	75	75	**Major adverse significance**

Table 6.1: Construction Noise Level Significance Triggers: Core Daytime Periods

Activity	**Trigger for Evenings, Saturday Afternoons, Sundays**													**Significance:**
Ambient noise level dB $L_{Aeq, T}$	<50	50	51	52	53	54	55	56	57	58	59	60	61	
Construction noise only, dB $L_{Aeq, T}$	<50	50	51	52	53	54	55	56	57	58	59	60	61	**Minor adverse significance** (equal to ambient level)
Construction noise only, dB $L_{Aeq, T}$	55	55	55	55	56	57	58	59	60	61	62	63	64	**Moderate adverse significance**
Construction noise only, dB $L_{Aeq, T}$	65	65	65	65	65	65	65	65	65	65	65	65	65	**Major adverse significance**

Table 6.2: Construction Noise Level Significance Triggers: Evenings, Saturday Afternoons & Sundays

Activity	Trigger for Night-time													Significance:
Ambient noise level dB $L_{Aeq,\,T}$	<40	40	41	42	43	44	45	46	47	48	49	50	51	
Construction noise only, dB $L_{Aeq,\,T}$	<40	40	41	42	43	44	45	46	47	48	49	50	51	**Minor adverse significance** (equal to ambient level)
Construction noise only, dB $L_{Aeq,\,T}$	45	45	45	45	46	47	48	49	50	51	52	53	54	**Moderate adverse significance**
Construction noise only, dB $L_{Aeq,\,T}$	55	55	55	55	55	55	55	55	55	55	55	55	55	**Major adverse significance**

Table 6.3: Construction Noise Level Significance Triggers: Night-time

6.2 Construction Vibration

Human Perception

Vibrations, even of very low magnitude, can be perceptible to people. Vibration nuisance is frequently associated with the assumption that, if vibrations can be felt, then damage is inevitable; however, considerable greater levels of vibration are required to cause damage to buildings and structures, or to cause computers and similar electronic equipment to malfunction. Vibration transmitted from site construction activities to the neighbourhood can, therefore, cause anxiety as well as annoyance.

There are two basic approaches to the quantification of vibration effects. The more detailed approach uses the term “vibration dose value” as defined in BS 6472 Part 1 2008. This gives a range of values averaged over the daytime and night-time for which there is (i) “Low probability of adverse comment”; (ii) “Adverse comment possible”; and (iii) “Adverse comment probable” and as measured within a building. The vibration dose value is measured or computed from a frequency weighted acceleration level, with the vibration dose value computed from the root mean quad of the time varying weighted acceleration level, or number of discrete events that occur over the course of the assessment period. The “root mean quad” concept puts considerably greater emphasis on the maximum levels of vibration than on the number of events.

The alternative, simpler, approach is to use the concept of peak particle velocity (PPV) as measured outside the building. Reference 6 (draft BS 5228 Part 2), suggests that for construction activities, it is considered more appropriate to provide guidance in terms of the PPV, since this parameter is likely to be more routinely measured based upon the more usual concerns over potential building damage.

Guidance on the interpretation of the effects of vibration levels in terms of human perception and disturbance, is given in Reference 6 and reproduced in Table 6.4.

Vibration Level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for vibration frequencies between 8 and 80 Hz. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration likely to be intolerable for any more than a very brief exposure to this level.

Table 6.4: Guidance on Effects of Vibration Levels

With respect the assessment of severity of vibration impact it is proposed to use the following trigger levels for different degrees of significance of vibration from construction activities, as measured on the outside of the building:

Vibration Level	**Significance**
< 0.3 mm/s PPV	Negligible;
0.3 - < 1.0 mm/s PPV	Minor adverse significance;
1.0 - < 5 mm/s PPV	Moderate adverse significance;
≥ 5 mm/s PPV	Major adverse significance.

Building Damage

Extensive studies carried out in the UK and overseas have shown that documented proof of actual damage to structures or their finishes resulting solely from well-controlled construction and demolition activities is rare. There are many other mechanisms which cause damage, especially in decorative finishes, and it is often incorrectly concluded that vibrations from construction and demolition are to blame.

Guidance on the susceptibility of buildings to damage from vibration is given in BS 7385 Part 2: 1993 (Reference 10) and also in Reference 4. This recommends that for soundly constructed residential properties in a good state of repair, a conservative threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a value of 10 mm/s PPV for intermittent vibration. Thus humans perceive vibration well before any damage is likely to be caused by it. Where there are existing significant defects then this value should be halved.

7 Ambient Noise Environment

7.1 Survey Planning

A detailed ambient noise survey has been undertaken at various locations in the vicinity of DP World Southampton on both sides of the River Test and on both sides of Southampton Water. The surveys were undertaken in relation to the construction project for Berths 201 & 202 and the main channel deepening and widening project. The surveys were planned in full consultation with representatives from the environmental health departments of Southampton City Council, New Forest District Council, and Eastleigh Borough Council.

It was agreed that there would be three types of surveys. These were (i) attended (observed) monitoring during daytime, evening and night-time periods; (ii) continuous unattended noise

monitoring over a minimum period of six weeks and (iii) 24 hour unattended noise monitoring. A survey protocol was issued for comment by BV, and this is included in Appendix 2. Following agreement on the protocol, BV sourced actual measurement locations for the ambient noise survey and these are included in Appendix 3.

In addition to the measurement locations given in Appendix 3, Southampton City Council requested three additional locations for 24 hour noise monitoring: these were

Upper floors of Redbridge Towers, adjacent to the Redbridge flyover;
Upper floors of Cleasby Close, near the Millbrook flyover;
Upper floors of Canberra Towers, Weston.

With respect to the Berth 201 & 202 construction project, only the results of the ambient noise surveys within 5 km of Berths 201 and 202 have been included in this report. This includes the following measurement locations, together with their approximate distances to the nearest part of Berth 201 or 202:

RO3: Waldegrave Close, Woolston Southampton (4900 m);
RO4: Town Quay, Southampton (2900 m);
RO5: Cottages, Western Avenue, Western Docks, Southampton (400 m);
LT2: 5 Creighton Road, Regents Park, Southampton (700 m);
(Also "roving" measurements taken here: **LT2RO**);
RO6: Cleasby Close, Millbrook, Southampton (1400 m);
(Also 24 hour survey undertaken here **MT2**);
MT1: 110 Redbridge Towers, Redbridge, Southampton – 19th floor (2500 m);
RO7: The Vicarage, Eling Hill, Totton (2350 m);
RO8: Marchwood Road, Marchwood (1200 m);
LT3: 25 Skippers House, Portside Close, Marchwood (250 m);
(Also **LT3RO** at Marchwood Yatch Club foreshore);
RO9: Hythe Marina**,** Hythe (4600 m).

All measurements were made over 5 minute (5m) sample periods. The following noise parameters have been reported for all locations: $L_{Aeq,\ 5m}$; $L_{A90,\ F,\ 5m}$; $L_{Amax,\ F,\ 5m}$.

The L_{Aeq} index is termed the equivalent continuous sound pressure level and is the energy averaged value of the actual time varying A-weighted sound pressure level over the monitoring period; it is a commonly used noise parameter in the assessment of the impact of noise levels. The term "A-weighted" means that the measurements have been made using a standardised electronic filter that approximates to the frequency response of the human ear, which, for normally encountered environmental noise levels, is more sensitive to high frequency sounds than low frequency sounds of the same magnitude. This parameter is used as a measure of the "ambient" noise level i.e. the all encompassing sound at a particular location.

The L_{A90} index represents the A-weighted sound pressure level that has been exceeded for 90% of the measurement period. It is commonly termed the "background noise level" and is a measure of the underlying noise level in the absence of higher peaks of noise that may periodically occur.

The L_{Amax} is the maximum short term sound pressure level that occurred within the measurement sample and is a description of the "peakiness" of the time varying noise signal.

The subscript F implies that the measurements were made using the standardised time weighting "Fast" which is an indication as to how quickly the meter responds to the time varying noise signal. This time weighting only affects the results of the statistical noise level

measurements and not the L_{Aeq} value. Most standards require the use of the "F" time weighting, although sometimes the slow "S" is used.

In addition to these three main parameters, the $L_{A50,\ 5m,\ F}$, $L_{A10,\ 5m,\ F}$, and $L_{A1,\ 5m,\ F}$ noise indices have also been reported for all the attended noise monitoring locations. These represent the A-weighted sound pressure levels that have been exceeded for 50%, 10% and 1% of the time respectively, and help to give a more complete picture of the time varying nature of the ambient noise environment.

Further ambient noise data is also available from the surveys including octave band sound pressure levels at all locations, for the L_{Aeq}, L_{A90} and L_{Amax} parameters.

As will be seen from the noise measurement protocol given in Appendix 2, the timing of the attended noise surveys was selected, wherever possible, to ensure that there was a light downwind component from the direction of Berth 201/2 to the measurement location. This would then allow a fair comparison to be made of predicted levels of construction noise (which assume downwind conditions) with the measured ambient noise levels. For those locations which were predominantly affected by localised road traffic noise, this was not so important.

7.2 Survey Results

The detailed results of the attended noise surveys are given in Appendix 4.

The detailed results of the 24 hour monitoring at Cleasby Close and Redbridge Towers are given in Appendix 5.

The detailed results of the long-term unattended noise monitoring at Creighton Road, Regents Park, Southampton and Skippers House, Portside Close, Marchwood, are given in Appendix 6. The wind speed and direction data for the long-term noise measurements have been obtained from Meteorological Office records for the Solent MRSC weather station correcting from a recorded height of 25 m at the weather station to 1.5 m above the ground.

The detailed results of the noise surveys show that the ambient noise levels vary from day to day and time of day by differing degrees, depending on the proximity to one or more dominant sources of noise. A summary of the measured ambient daytime noise levels is given in Table 7.1 and Table 7.2 gives a summary of the evening average noise levels. These also indicate whether the measurement location was considered to be at a façade (FC) or "free field" (FF). The averages at LT2 and LT3 have been adjusted to delete any obvious extraneous noise events immediately adjacent to the microphone (normally indicated by abnormally high L_{Amax} levels). The daytime averages at LT2, LT3, MT1 and MT2 have been taken between the hours of 08:00 to 18:00. The daytime levels for RO3 are for a Sunday as this location was intended to be used primarily to assess the impact of main channel dredging. In general, weekday noise levels would be expected to be higher than Sunday noise levels thus this data may still be used to assess the likelihood of any concerns at RO3 with respect to construction noise at Berths 201 and 202.

Location	Average, dB			Maximum, dB			Minimum, dB		
	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$
RO3 (FF)	65	**52**	39	67	54	41	63	49	38
RO4 (FF)	71	**60**	55	76	63	58	66	58	50
RO5 (FF)	69	**57**	50	72	60	54	66	55	42
LT2 (FF)	67	**56**	52	88	66	61	54	49	46
LT2RO (FF)	63	**53**	50	72	58	52	58	50	46
RO6 (FC)	72	**64**	61	77	67	64	68	62	57
MT2 (FC)	80	**69**	66	98	75	67	71	66	63
MT1 (FC)	79	**73**	71	92	76	74	75	71	68
RO7 (FF)	65	**52**	48	75	55	51	59	49	42
RO8 (FF)	-	**-**	-	-	-	-	-	-	-
LT3 (FC)	67	**55**	52	89	75	65	51	42	40
LT3RO (FF)	64	**54**	52	72	58	56	58	52	50
RO9 (FF)	62	**50**	45	73	58	49	53	45	40

Table 7.1: Summary of Measured Daytime Noise Levels

Location	Average, dB			Maximum, dB			Minimum, dB		
	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$
RO3 (FF)	56	**44**	41	60	48	44	52	41	38
RO4 (FF)	70	**58**	53	74	61	55	65	56	50
RO5 (FF)	68	**55**	50	71	57	51	64	52	48
LT2 (FF)	64	**53**	50	87	69	61	51	45	40
LT2RO (FF)	61	**54**	50	68	57	53	56	50	48
RO6 (FC)	-	**-**	-	-	-	-	-	-	-
MT2 (FC)	78	**65**	60	89	71	63	71	62	56
MT1 (FC)	77	**70**	67	90	73	70	71	66	61
RO7 (FF)	59	**49**	48	61	51	50	56	48	47
RO8 (FF)	-	**-**	-	-	-	-	-	-	-
LT3 (FC)	64	**53**	50	91	73	63	50	39	37
LT3RO (FF)	63	**51**	50	65	54	53	60	50	48
RO9 (FF)	54	**43**	39	60	47	40	46	39	38

Table 7.2: Summary of Measured Evening Noise Levels (19:00 to 23:00 hrs)

Table 7.3 gives a summary of measured night-time noise levels. It should be noted, however, that no night-time activities are anticipated for reconstruction of the quay wall associated with Berths 201 & 202. The period is described here as a “short night” (00:00 to 04:00) and is intended to capture what is normally considered to be the quietest part of the night, and hence exclude any increased early morning noise levels from dawn chorus effects, for example. All the attended measurements were, as a matter of course, made between 00:00 to 04:00 hours.

Location	Average, dB			Maximum, dB			Minimum, dB		
	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$	$L_{Amax\ F}$	$L_{Aeq\ 5m}$	$L_{A90\ F}$
RO3 (FF)	54	**39**	38	67	44	41	47	37	34
RO4 (FF)	63	**51**	44	67	55	46	59	50	43
RO5 (FF)	66	**53**	46	71	56	49	60	50	43
LT2 (FF)	58	**48**	44	82	65	54	48	37	33
LT2RO (FF)	56	**47**	44	63	51	49	51	43	41
RO6 (FC)	70	**57**	51	79	65	57	63	53	48
MT2 (FC)	73	**59**	49	83	63	54	67	55	45
MT1 (FC)	74	**63**	54	80	66	60	69	61	46
RO7 (FF)	58	**49**	48	66	51	50	52	46	44
RO8 (FF)	60	**51**	49	64	54	52	52	45	44
LT3 (FC)	64	**53**	50	87	70	67	50	42	40
LT3RO (FF)	61	**50**	48	68	54	50	53	46	45
RO9 (FF)	53	**42**	40	57	48	45	47	39	38

Table 7.3: Summary of Night-time Noise Levels (00:00 to 04:00 hrs)

For the long-term noise monitoring locations L2 and L3, it is also useful to review the standard deviation of the measured noise samples in each of the different periods of the day. The standard deviation gives an indication of the consistency of the measured 5 minute sample values over the defined time periods. Table 7.4 gives a summary of this data for Locations L2 and L3.

	dB $L_{Amax\ F}$		dB L_{Aeq}		dB $L_{A90\ F}$	
	Average	**Std Dev**	**Average**	**Std Dev**	**Average**	**Std Dev**
Location L2						
Daytime	67	± 5	56	± 3	52	± 3
Evening	64	± 6	53	± 3	50	± 3
Night	59	± 5	50	± 4	46	± 4
Short night	58	± 5	48	± 4	44	± 4
Location L3						
Daytime	67	± 7	55	± 4	52	± 4
Evening	64	± 6	53	± 4	50	± 4
Night	64	± 6	53	± 4	50	± 4
Short night	64	± 6	53	± 4	50	± 4

Table 7.4: Average and Standard Deviation of 5 min Noise Level Samples at L2 and L3

Location L2 (5 Creighton Road, Southampton) is at the end of a cul-de-sac and the local noise environment is not affected significantly by frequent passing traffic. The dominant source of noise is more distant traffic on Millbrook Road. At night the docks become more audible. It can be seen that the average daytime $L_{Aeq\ 5m}$ level is 56 dB, decreasing to 48 dB between 00.00 and 04.00 hours. Location LT3 (Admiralty Quay) experiences daytime noise

levels similar to those at LT2, but at night the average noise level only decreases slightly. At location LT3 the ambient noise environment was affected more by noise from the docks both during the daytime and at night, and this keeps the ambient noise level from decreasing significantly at night.

During the survey period, Berth 204 of the container terminal, which is the closest main berth to Admiralty Quay, was not in use on account of work being undertaken to replace two quayside cranes. A further unattended noise survey was taken over a two week interval in October 2008 when the new cranes were operational. During this time Berth 204 was in periodic use. Slightly *lower* average noise levels were recorded (1 to 2 dB less) than before for the different day and night-time periods. It is possible that this may be due to different prevailing weather conditions as compared to those in the previous period of unattended noise monitoring. The additional ambient measurements serve to indicate that the original data set was sufficiently representative of the normal situation at the container terminal.

Detailed subjective impressions of factors contributing to the sampled noise environment can be found in Appendix 4. Most of the locations used for the attended noise measurements are affected, during the daytime, primarily by road traffic noise. However at location RO7 (The Vicarage, Eling), noise from the docks is more prominent. Also at location RO9 (Hythe Marina), the daytime ambient noise environment is more affected by noise from passing ships, the docks and local marine activity.

8 Calculation of Construction Noise Levels

8.1 Approach

The preliminary construction programme prepared by Costain has been subdivided by Bureau Veritas into seventeen discrete “grouped” tasks based around the changes in the extent of activity occurring at any one time. The grouping of the tasks has been chosen to give an indication of the expected variation in received noise levels during the whole of the 14 month construction period (not including the procurement phase). It should be noted that the predicted noise levels are always for meteorological conditions favourable for sound propagation. For much of the time, noise levels will be less than predicted when the receiver is upwind of the noise source, for example.

The locations of the various noise sources have been then been assumed based on the defined tasks; in particular the progress (and hence locations) of the piling rigs has been modelled in the manner described in Section 4.

BV has used the schedule of main plant and equipment and allotted octave band sound power level values and percentage “on-times” for these various plant items. The sound power levels have been derived from databases such as the 2005 Defra report (Reference 11 – also cited in Reference 5) and BV’s own database of construction noise levels, including piling noise. In particular, noise levels for the percussive piling operations are based on the results of noise tests undertaken by BV during the driving of 1800 mm tubular piles using an IHC Hydrohammer S-200 free suspended from a crawler crane located on a barge adjacent to the piles. This is a similar hammer to that which is likely to be used in the works. For most of the survey the hammer was working at an energy delivered per blow of between 170 – 190 kJ and about 48 blows per minute.

To predict resultant noise levels, use has been made of the noise modelling package CadnaA. The sound propagation algorithms given in ISO 9613 Part 2 (Reference 12) have been used in the model. The noise model has been used to calculate resultant noise levels at discrete receiver locations corresponding to the locations used for the ambient noise surveys.

In addition, noise contours have been produced at a fixed receiver height of 10 m above local ground level.

8.2 Construction Tasks and Resourcing

For the purposes of the noise calculations the preliminary construction programme was initially divided into 5 main grouped tasks, and some of these were then further sub-divided to provide more detailed analysis. The grouped tasks finally used for the construction noise calculations are given in Table 8.1. The numbers after the individual tasks are the Costain reference ID. The Costain resource schedule, which relate to these individual ID numbers, is given in Appendix 1.

	Group Task No.	Description	Duration Weeks
Pre-pile driving	1A	Make PCC units (12)	2
	1B	As 1A plus demolish existing paving to install RCR piles etc (20)	4
	1C	As 1B plus install CFA piles for RCR beam (21)	2
	1D	As 1C plus cast anchor wall (22)	3
	1E	As 1A, plus install CFA piles for RCR beam (21) and cast anchor wall* (22)	4
	1F	As 1A, plus cast anchor wall (22)	2
Pile driving period**	2A	As 1A plus drive tubes Berth 201 (14) and drive tubes for Berth 202 (15)	2
	2B	As 2A plus infill sheets Berth 201 (16), infill sheets for Berth 202 (17) and works to pile heads (24)	4
	2C	As 2B plus concrete backing to sheet piles (19), demolish existing capping beam and fin walls (23), excavate for and install tie bars (25) – Task 1A now complete	4
	2D	As 2C plus backfill & construct RCR beam (26) and install pre-cast fenders and deck units (27)	1
	2E	As 2D but tubular piling for main berths now complete	1
	2F	As 2E plus end detail return to Berth 202 (18) and concrete works to capping beams (28)	3
Post pile driving construction tasks	3A	Concrete backing to sheet piles (19), demolish existing capping beam and fin walls (23), works to pile heads (24), excavate for and install tie bars (25), backfill and construct RCR beam (26), install pre-cast fender and deck units (29) and concrete works to capping beams (28)	4
	3B	Excavate for and install tie bars (25), backfill and construct RCR beam (26), install pre-cast fender and deck units (27) and concrete works to capping beams (28)	5
	4	Install pre-cast fender and deck units (27), concrete works to capping beams (28) and install fender units and deck furniture (29)	7
	5A	Concrete works to capping beams (28), install fender units and deck furniture (29), paving between capping beams and RCR (30) and install crane rails (31)	6
	5B	Install fender units and deck furniture (29), paving between capping beams and RCR (30) and install crane rails (31)	4

Table 8.1: Grouping of Tasks for Construction Noise Calculations

* The anchor wall may, alternatively, be formed from steel piles which, it is anticipated, could be driven using vibratory techniques. The scheduling of the anchor wall would then most likely be towards the end of the main quay wall piling period.

** Pile driving period may be longer, if the extended allowable activity period is used by the contractor – overall noise levels will vary slightly as a consequence.

8.3 Plant Item Noise Emission Levels

Table 8.2 gives the noise emission levels and assumed percentage "on-times" for the various plant items used in the noise calculations. The more static plant items (e.g. cranes, concrete crusher) have been modelled as point sources with the source height between 1 m and 3m above local ground level. Some of the mobile plant items have been modelled as horizontal line sources (e.g. dumper truck). The most significant noise sources, the piling rigs have been modelled as vertical line sources 10 m high. The reason for this is that it is the pile itself which is the main radiator of noise, and not the hammer. 10 m is considered to represent an average exposed length of pile during the percussive element of the pile driving.

In addition to the noise from a bare tubular pile, data has been included in Table 8.2 which represents the sound power levels calculated by BV from noise tests on a pile fitted with a purpose made "concertina" shroud. This was made from a polyethylene material and was attached to the hammer via a clamping ring and rubber block arrangement. There was a pulley system attached to a frame which allowed the shroud to be raised or lowered. The effective noise reduction obtained from the shroud, as may be inferred from Table 8.2 represents the average reduction in noise levels achieved over a full working cycle. It is possible that a greater reduction in noise levels may be achieved from this type of shroud, particularly during the initial driving phase.

Description	L_{wA} dB	% on time	Activity Sound Power Levels dB re 10^{-12} W								
			A	63	125	250	500	1k	2k	4k	8k
Crawler crane	105	100	105	103	101	96	97	104	96	88	79
IHC S200 piling hammer	140	70	138	109	119	116	128	138	126	115	99
IHC S200 piling hammer (shrouded)	127	70	125	105	115	110	116	124	112	103	87
ICE 1412 vibrating piling hammer	116	100	116	111	110	107	110	112	110	105	95
IHC S90 piling hammer	128	70	126	97	107	104	116	126	114	103	87
Tractor and trailer	108	50	105	104	96	103	100	103	95	86	80
Concrete mixer and pumping	108	100	108	111	105	103	103	102	103	95	91
Excavator and breaker	120	100	120	107	110	109	110	114	114	114	113
Artic dump truck	109	50	106	110	112	102	100	101	98	94	87
Excavator loading dump truck	113	50	110	107	103	107	106	106	103	97	89
Concrete crusher	115	100	115	121	115	112	110	111	108	102	94
Bomag vibratory roller	109	100	109	120	111	103	107	105	98	95	89
JCB	104	50	101	103	95	97	93	92	91	98	90
5t Dumper	106	50	103	115	111	97	96	96	96	91	84
Blaw Knox asphalt paver	105	100	105	100	105	102	100	99	98	95	88
Block paver	100	100	110	105	110	107	105	104	103	100	93
CFA rig	108	100	108	107	107	106	106	103	99	94	84
Loadall	104	50	101	100	92	99	96	99	91	82	76

Table 8.2: Noise Emission Values Used for Construction Noise Calculations

8.4 Construction Noise Model

The individual noise sources have been entered into the CadnaA model at defined x, y and z co-ordinates. For the extended line sources, the activity sound power level has been averaged over the length of the line to give a distributed noise source. The surrounding ground contours have been included in the model and all terrain identified as either acoustically hard or soft, or some intermediate value. Water and concrete surfaces are considered as acoustically hard, whereas grassland is considered as acoustically soft.

The model considers attenuation of sound by geometrical spreading, additional attenuation from ground interaction effects, additional attenuation by discrete barriers or topographical features acting as barriers and direct sound absorption by the atmosphere. For the purposes of the initial calculations the only buildings included in the noise model were two large warehouses to the north-east and north-west of Berths 201 & 202. More detailed modelling was subsequently undertaken for the Admiralty Quay properties immediately to the south of Berth 202, where the individual buildings and estimated heights of these buildings have been included in the noise model.

Separate calculations have been performed for the different scenarios detailed in Table 8.1. Each separate calculation considers different assumed locations for the various noise sources except where the activity will be static throughout the construction period (e.g. PCC unit production). Group Task 2A (driving tubes for Berth 201 & 202) was initially modelled assuming no noise mitigation measures. The results suggested that the resultant noise levels would be excessive so the model was re-run assuming shrouded rigs. All subsequent scenarios assume that the main tubular piling rigs are fitted with shrouds.

8.5 Results of Noise Modelling

The CadnaA model has been run to give sound pressure levels (effectively as $L_{Aeq\ 1h}$ free field levels, in dB, for meteorological conditions favourable for sound propagation) at the following locations and assumed receiver heights.

LT2: 5 Creighton Road, Southampton – **1.5 m**

LT3: Skippers House, Portside Close, Marchwood – **11.5 m**;

LT3A: 180 m west of LT3 – **11.5 m**;

MT1: 105 Canberra Towers, Southampton – **49 m**;

RO3: Waldegrave Close, Woolston, Southampton **1.5 m**;

RO4: Town Quay (Bugle Street), Southampton – **4 m**;

RO5: Cottages, Western Avenue, Western Docks, Southampton – **1.5** m;

RO6: Cleasby Close, Millbrook, Southampton (also **MT2**) – **9 m**;

RO7: The Vicarage, Eling Hill, Totton – **1.5 m**;

RO8: Marchwood Road, Marchwood – **1.5 m**;

RO9: Hythe Marina, Hythe – **1.5 m**.

The results are given in Table 8.3 as dB $L_{Aeq\ 1h}$ free field sound pressure levels. These have been rounded to the nearest whole dB. Group Task 2A is without shrouds on the tubular piling rigs and Group Task 2AQ assumes shrouds as do all subsequent Group Tasks.

Group Task	Duration Weeks	Receiver Location and Assumed Receiver Height (m)										
		LT3A	LT3	RO8	RO7	MT1	RO6	LT2	RO5	RO4	RO3	RO9
		11.5	11.5	1.5	1.5	49	9	1.5	1.5	4	1.5	1.5
1A	2	43	44	23	25	28	27	40	38	28	19	9
1B	4	60	59	34	35	37	44	48	51	35	28	19
1C	2	60	60	36	37	39	47	48	53	35	31	21
1D	3	58	59	35	37	39	44	50	53	38	31	21
1E	4	56	56	34	36	38	46	47	51	31	30	20
1F	2	49	49	28	30	31	40	43	43	30	24	14
2A	2	81	81	55	57	57	65	65	71	56	45	36
2AQ	2	68	67	42	43	43	52	51	57	42	32	23
2BQ	4	71	71	45	47	47	53	55	62	46	36	27
2CQ	4	69	70	45	48	48	56	57	64	47	37	28
2DQ	1	68	68	45	47	49	55	58	61	48	38	30
2EQ	1	66	67	43	45	47	54	56	60	46	36	28
2FQ	3	69	69	45	47	48	53	58	61	47	37	29
3A	4	60	61	38	39	42	50	55	60	41	33	24
3B	5	59	59	36	38	41	49	52	58	38	31	22
4	7	55	55	31	33	34	43	44	53	30	25	15
5A	6	58	58	34	35	37	45	47	54	35	28	19
5B	4	52	53	31	32	35	43	47	54	32	24	16

Table 8.3: Calculated Noise Levels, Berth 201 & 202 Construction, dB $L_{Aeq\ 1h\ (free\ field)}$

The predicted noise levels do not take into account the reduced noise levels which will occur during the pile driving phase when vibro-piling is being used either for the main tubes or the sheet piles. It is considered probable, that on average, not all four piling rigs will be undertaking percussive piling at the same time, thus the predicted noise levels given in Table 8.3 are likely to be worst estimates.

Example noise contour plots for different phases of the Berth 201 & 2 construction activities are given in Figures 2 to 9. These give noise level contours, shown as progressive colours, for a fixed receiver height of 10 m above local ground level. The construction activities illustrated by the noise contours are:

Figure 2: Group Task 1B;
Figure 3: Group Task 2A (bare tubular piles);
Figure 4: Group Task 2AQ (shrouded tubular piles);
Figure 5: Group Task 2BQ (shrouded tubular piles);
Figure 6: Group Task 2DQ (shrouded tubular piles);
Figure 7: Group Task 3A;
Figure 8: Group Task 4;
Figure 9: Group Task 5A.

Of particular relevance is the difference between Figure 3 and Figure 4 where the beneficial effect of a shroud on each of the two tubular piling rigs is immediately obvious.

Figure 10 gives the time history of construction noise levels over the whole of the construction period assuming shrouds to the tubular piling rigs. The noisier period during the pile driving

activities is clearly identified. The highest predicted noise level is 71 dB $L_{Aeq\ 1h}$ (free field) at the Marchwood Admiralty Quay properties. This equates to a façade level of 74 dB $L_{Aeq\ 1h}$. This occurs when all four rigs are in percussive mode and at the nearest possible distance to these properties. (Note: period daytime L_{Aeq} levels are likely to be less than the 1 hour values depending on the extent of piling on any day). At all other times, noise levels at the Admiralty Quay properties are predicted to be 70 dB $L_{Aeq\ 1h\ (free\ field)}$ or less and are 60 dB $L_{Aeq\ 1h\ (free\ field)}$ or less outside the piling phase of the construction programme.

The nearest properties on the Southampton side of the construction site are the two cottages within the Western Docks (Location RO5). These cottages are partially shielded from construction noise by an intervening large building which has been included in the noise model. Construction noise levels do not exceed 65 dB $L_{Aeq\ 1h\ (free\ field)}$ at this location.

At the nearest main residential area of Southampton, as represented by Location LT2, predicted levels of construction noise are less than 60 dB $L_{Aeq\ 1h\ (free\ field)}$ at all times.

At the village of Eling (as represented by Location RO7), predicted levels of construction noise are less than 50 dB $L_{Aeq\ 1h\ (free\ field)}$ at all times. At Hythe Marina, predicted levels of construction noise are less than 35 dB $L_{Aeq\ 1h\ (free\ field)}$ at all times.

A more detailed noise model has been constructed of the Admiralty Quay properties immediately opposite Berth 202. Individual apartment blocks have been modelled and treated as barriers and reflectors. One order of reflection has been used and noise contours computed for the case of two shrouded tubular percussive piling rigs in operation (Group Task 2BQ). The results are shown in Figure 11 as noise contours at a height of 10 m above the ground using the same colour coding as for the wider contours in Figures 2 to 9. For clarity, the colour code has been changed in Figure 12 to indicate the variation in noise level in 1 dB steps (progressive colours based on the 2 dB step colour code key given in this figure).

It can be seen from Figure 12 that some of the apartment blocks offer a partial shield to the piling noise at this height, whilst other blocks are too low to offer any shielding benefits. In general, piling noise is reduced by the order of 10 dB between the water facing and the land facing sides of the taller blocks. The figure serves to illustrate the complex effects of geometry on resultant noise levels and how the major impact will be felt at the water facing facades of these properties. The construction noise will, however, penetrate to the area of Admiralty Quay behind the water facing properties by differing degrees depending on the building heights and receiver position.

The construction activities will be restricted to daytime only (Mondays to Fridays and Saturday mornings, excluding Bank Holidays). However, given the restricted time period in which the quay wall piling operations can only take place (on account of the potential to impact on migrating salmon), it is probable that the contractor would want to be in a position where he is able to “pitch” piles during the evening to have them ready to start piling operations the following day. This pitching operation would involve the use of a crawler crane and probably the vibro-hammer to leave the piles in a safe condition. No percussive piling activity is planned to take place during this evening period. For the nearest location to Admiralty Quay (250 m) the resultant noise level from the use of a crawler crane and vibro-hammer would be typically 58 dB $L_{Aeq\ (free\ field)}$ under meteorological conditions favourable for sound propagation.

If the more extended piling period were adopted (mid September to the end of March) in the manner described in Section 4, this could increase overall predicted noise levels at Admiralty Quay (Location LT3) by just under 1 dB in the first four weeks of piling. Thereafter noise levels would be as predicted above for the next two weeks and then decrease by 4 dB in the subsequent 4 weeks. Due to the extended piling period there would then be a nominal increase in overall construction noise levels of about 3 dB, but from a lower base level. Given the possible alternative rig configurations, and the implication of this on received noise levels,

the local authorities would be consulted prior to any piling activity commencing, with a view to minimising the overall noise impact of piling operations.

9 Assessment of Construction Noise Levels

Based on the results of the ambient noise survey and the assessment methodology given in Section 6.1, the significance of the predicted levels of daytime construction noise for the various receiver locations is given in Figure 13.

This figure shows that, with the main tubular rigs shrouded, the maximum noise impact is of **moderate adverse significance**. Without the shrouds the impact would have been of **major adverse significance** during the period of percussive piling. Outside the period for the percussive piling operations, the noise impact is of **minor adverse significance** for receiver locations in the vicinity of Berths 201 & 202, and of **negligible impact** at more distant receiver locations.

Without the main tubular piles being shrouded, predicted noise levels in front of the façades of the nearest residential properties could potentially exceed the lower exposure action level of the Control of Noise at Work Regulations 2005, for percussive piling operations lasting some 4 hours or more per day. This would present a small, but finite hearing damage risk to members of the public, and is a further reason why shrouds need to be used during percussive piling operations on the main tubes.

If pitching of piles is required during the evening, then in a worst case scenario, the noise impact will be of **moderate adverse significance** at Admiralty Quay if some vibro piling needs to take place to get the piles in a safe condition, but of **negligible impact** if only the crawler crane is required.

10 Mitigation

The potentially most significant noise impact of Berth 201 & 202 construction will occur during the pile driving operation for the quay wall. An alternative inherently quiet form of piling has been considered but rejected for the reasons given in the Environmental Statement.

The main mitigation measure will be to ensure that shrouds are used during percussive piling operations for the main tubes. It is essential that the shroud is fully sealed with no air gaps. The preferred methodology would be to have a shroud which is hung from the hammer around the pile and is then sealed by entering the water. This is shown in the adjoining illustration where the shroud and cage can be seen, with the end of the shroud well into the water.

However, during piling, use is always made of a “gate” system to ensure the correct spacing and alignment of the piles. This adds a complication as to how the shroud is sealed. A system will be used that seals the shroud to the top of the gate with an additional shroud located around the sides of the gate and section of pile beneath the gate and the shroud extended into the water. As a further precaution, to avoid re-radiated noise from the gate structure, it may be

necessary to ensure no metal to metal contact between the pile and the gate through the use of a resilient lining on the inner faces of the gate.

Percussive piling operations will be confined to the hours 08:00 to 18:00 Mondays to Fridays and 08:00 to 13:00 on Saturdays. During the week it is considered reasonable to allow vibro-piling operations to extend to 22:00 in order to pitch piles for pile driving the following or subsequent days.

The latest version of British Standard BS 5228 will be adopted as the basic code of practice on controlling the noise from construction activities and contractual arrangements will be put in place to delegate noise management requirements to all contractors and subcontractors. Regular noise monitoring of the noise levels, to an approved scheme, will be undertaken, to ensure that reasonable levels of noise are not being exceeded.

All plant and equipment will be fitted with effective silencers. Plant will not be left running unnecessarily. Plant and equipment will comply with the requirements of EC Directive 2000/14/EC (Reference 13) as amended by EC Directive 2005/88/EC (Reference 14).

Good community relations will be maintained at all times and local residents kept fully informed of particular noisy activities and the efforts being made to minimise noise levels. A complaints contact line will be established and any complaint received responded to promptly.

Given that the piling operations will, by necessity, take place in a period that encompasses the winter time, is an added mitigation consideration, as people will be less likely to want to have windows open or to use balconies during this time.

The residual noise impact at the nearest residential locations to the construction site will remain as **moderate adverse significance** when percussive piling is taking place.

It is possible that a slightly larger percussive hammer may be required, for at least part of the piling operations, such as the IHC S280. It is anticipated that radiated noise levels would be some 1 to 2 dB greater than for the IHC S200 hammer. A precautionary mitigation measure would be to use this hammer on Berth 201 and only by necessity on Berth 202 unless actual noise levels for shrouded tubular percussive pile driving turned out to be less than predicted.
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11 In-Combination Effects

It is possible that the Southampton Approach Channel Dredge project will occur concurrently with the Berths 201 & 202 construction project. Full details of this main channel improvement project are given in a separate Environment Statement. The dredging operations for this project will most likely require a large backhoe dredger and a large trailer suction hopper dredger to be used.

The dredging operations will occur 24 hours per day, 7 days per week. During the night-time, some operational restrictions are likely to be placed on the use of the backhoe dredger where the main channel is close to residential property. This applies especially to the Admiralty Quay area where the southern boundary of the main channel runs within 50 m of the properties on this estate. There will be no in-combination night-time environmental noise impact as a consequence of this exclusion zone and also the fact that no night-time construction activities are envisaged for Berths 201 & 202. During the daytime, however, a significant in-combination environmental impact may be experienced depending on the phasing of the construction activities, the type of dredger working in the vicinity of Admiralty Quay, and the actual location of this dredger.

The maximum noise level predicted from Berths 201 & 202 construction activities is 71 dB $L_{Aeq\ 1h\ (free\ field)}$. Depending on which backhoe dredger is used, the maximum noise level from this could be 70 dB $L_{Aeq\ 1h\ (free\ field)}$ at the nearest Admiralty Quay property (based on noise data for the Manu Pekka dredger). As a consequence, the total noise level could rise to over 73 dB $L_{Aeq\ 1h\ (free\ field)}$ which would be of **major adverse significance** (76 dB $L_{Aeq\ façade}$).

To avoid this, backhoe dredging should be avoided in the vicinity of Admiralty Quay during periods of percussive piling operations for Berths 201 and 202 if the Manu Pekka or a dredger with a similar noise characteristic is used. If a quieter backhoe dredger is used (e.g. the Vitruvius), the northern half of the main channel in the vicinity of Admiralty Quay could be dredged whilst percussive piling is taking place without increasing the severity of the noise impact. No in-combination impact of significance is predicted from the use of the trailer suction hopper dredger in the vicinity of Admiralty Quay during percussive piling.

By avoiding daytime operations using a backhoe dredger close to Admiralty Quay during the percussive piling phase of the construction of Berths 201 & 202, the in-combination noise impact remains one of **moderate adverse significance**.

12 Environmental Vibration

12.1 Predicted Vibration Levels

Some vibration may be perceived at the Admiralty Quay properties to the south of Berth 202 particularly when the largest percussive hammer is in use. The level of vibration experienced will depend on a number of factors which include ground conditions, the stage reached in driving the pile, the energy per blow imparted and the distance from the toe of the pile to the receiver. The intervening ground profile may also have an effect particularly if there are large discontinuities between the source of impact and the receiver.

A generalised method of prediction is given in BS 5228 Part 4 (Reference 4). This relates the resultant PPV from percussive piling as being proportional to the square root of the energy per blow and inversely proportional to the distance from the pile. However the standard acknowledges that in many cases the predicted values deduced from the relationship given will be found to over-estimate those found in practice. With respect to the properties at Admiralty Quay, and for the IHC 200 hammer at the nearest point on Berth 202 to these properties, the predicted level of vibration is 1.3 mm/s PPV.

TRL Report 429 (Reference 15) which is cited in Reference 6 gives more refined empirical predictors for groundborne vibration arising from construction works. An expression is given for percussive piling although it should be noted that the relevant parameters for Berths 201 & 202 piling are outside the range for which the empirical expression has been calibrated, therefore these results need to be viewed with caution. The authors of the report do state, however, that extrapolation beyond the calibrated range will generally provide a conservative estimate.

At a distance of 250 m, and for an impact force of 200 kJ per blow, the following levels are calculated using Reference 15:

Loose granular soils, soft cohesive soils:	0.3 mm/s PPV;
Medium dense granular soils, stiff cohesive soils:	0.7 mm/s PPV;
Dense granular soils, very stiff cohesive soils:	1.0 mm/s PPV;
Pile driven to refusal:	1.7 mm/s PPV.

Comparing the predicted vibration levels from References 4 and 15, it can be seen that the predicted level from Reference 4 lies between the predicted level for "dense granular or very stiff cohesive soils" and the pile driven to refusal.

12.2 Assessment

It would be expected that for most of the time vibration levels from percussive piling would be less that 1 mm/s PPV and therefore be either of **negligible** or **minor adverse significance** at the nearest properties to any piling activity. If a pile is being driven to refusal, the vibration level may be sufficiently high to be considered to be of **moderate adverse significance**. Whilst not sufficiently high to give rise to any concerns over structural damage, it is possible that complaints may arise, unless prior warning and an explanation about the effects of vibration has been given to residents.

12.3 Mitigation

A vibration survey will be undertaken during the initial stages of percussive piling to identify actual received levels. Actions to be taken would then depend on the level of vibration measured. If the level of vibration exceeded 2 mm/s PPV, it is recommended that the piling contractor should be required to review the pile driving practice and to seek a modified way of driving the piles to reduce levels of vibration. This may require a smaller energy per blow or a modified dolly on the pile head. If vibration levels greater than 5 mm/s PPV occur, the pile driving activity should be halted whilst structural surveys are undertaken on all potentially affected properties (or representative samples of the properties). At the end of the pile driving, the properties should be resurveyed with a view to making good any cosmetic or structural damage which is identified as having occurred as a consequence of the pile driving.

If the vibration levels at the footings of the buildings equal or exceed 1 mm/s externally to any particular residential property, it is recommended that a detailed vibration survey should be offered to residents to be undertaken within their properties using the concept of vibration dose values. This will also give the further opportunity to explain to residents the effect of vibration on buildings and human perception.

13 Conclusions

The deepening of Berths 201 & 202 at DP World Southampton will allow the current and new generation of large container ships to be berthed here at their loaded draught, which will have a positive benefit to the Port of Southampton. The construction of the new quay wall, which will be required to allow the berths to be deepened, will give rise to potential noise and vibration impacts on local residential areas. Key project drivers have been identified as environmental concerns from noise and vibration, including the impact of underwater piling noise on fish, and in particular migrating salmon.

The most sensitive residential location to the development is considered to be represented by the apartment complexes at Admiral Quay, Marchwood, which have a direct line of sight to Berth 202 and the container terminal, with many water facing balconies associated with the apartments. There are also large residential areas on the Southampton side of the container terminal although these are further away.

Whilst construction of the main quay wall using the inherently quiet Giken pile driver system was given consideration, this method was not considered suitable for Berths 201 & 202 and it is most likely that a traditional combi-wall method of construction will be used. This employs a combination of tubular steel and sheet steel piles. The concern over the impact of underwater noise on migrating salmon has dictated that the piling activity is limited to a specific time frame, which encompasses the winter time. In order to complete the pile driving in the designated period, it has been determined that up to four piling rigs will be required, two to drive the main tubes and two to drive the infill sheets.

Excluding the noise impact on migrating salmon, which has been considered in a separate study, the main issues relate to local residents being annoyed by construction noise and the general diminution of the amenity of the locality whilst construction is taking place, and also potential annoyance from groundborne vibration. Cosmetic or structural damage from vibration is considered unlikely.

Standards and guidance relating to the assessment of noise have been reviewed and criteria developed which allow the assessments of noise and vibration impacts to be defined as negligible, of minor adverse significance, of moderate adverse significance, or of major adverse significance. These criteria relate, in part, to existing ambient noise levels at the potentially affected locations.

Detailed ambient noise surveys have been undertaken in the vicinity of the River Test and Southampton Water using a combination of attended and unattended noise measurements. The results of the surveys show that the ambient noise levels vary from day to day and time of day by differing degrees, depending on the proximity to one or more dominant sources of noise. Noise from the container terminal keeps ambient levels fairly constant throughout the day and night at those residential areas in its immediate vicinity (e.g. Admiralty Quay). At other locations affected predominantly by traffic noise, there is a distinct day-night variation in noise levels.

Detailed computer modelling of the planned construction activities has enabled a noise time history to be developed for each of the residential locations considered over the typical 14 month construction period. This has shown that the highest noise levels will occur when all four percussive piling rigs are in use and at their closest proximity to Admiralty Quay. Without mitigation measures, the impact would be considered to be of major adverse significance during this period of pile driving.

The most significant mitigation measure will be to fit shrouds to the tubular piling rigs. This is proven technology and the results of noise tests undertaken by Bureau Veritas on a similar size rig to that being planned for Berths 201 & 202 indicated that a significant reduction in noise level can be achieved from tubular piling using a percussive hammer as long as attention is given to sealing the shroud to the water level or gate structure. With the tubular piles shrouded, the noise impact is reduced to one of moderate adverse significance during the pile driving activity. Outside this period, the noise impact is only of minor adverse significance at the nearest properties to the site, and of negligible impact elsewhere.

Apart from the use of shrouds on the main tubular rigs, other mitigation measures include the adoption of a British Standard code of practice to control noise from the construction site in general, regular noise monitoring to ensure that reasonable levels of noise are not being exceeded and maintaining good community relations at all times.

ABP Southampton is also planning another major project to deepen and widen the main channel to the docks. It is possible that a significant in-combination noise impact could arise if a backhoe dredger is working on the part of the main channel nearest to Admiralty Quay whilst percussive pile driving is taking place. Depending on the noise emission levels of the

backhoe dredger, this type of activity should be avoided close to Admiralty Quay whilst percussive piling is taking place.

It is possible that vibration from tubular pile driving, using a percussive hammer, may be felt at the Admiralty Quay properties although it is considered unlikely that the vibration levels will be high enough to give rise to any risk of cosmetic or structural damage. Vibration surveys will be undertaken during pile driving to ascertain actual levels of vibration and further actions then taken as a consequence of the monitoring, if vibration levels prove higher than expected.

The fact that the pile driving activity has to take place in a period which encompasses the wintertime is of benefit in reducing its potential noise impact on neighbouring residential areas. With appropriate mitigation measures in the form of shrouding of the main tubular piles, the impact can be further reduced, although will remain of moderate adverse significance during the piling period. At other times the noise impact is only likely to be of minor adverse or negligible significance. For much of the time, vibration from percussive piling will only be of negligible or minor adverse significance, possibly increasing to moderate adverse significance at pile refusal, but unlikely to be of major adverse significance. It is therefore concluded that the development of Berths 201 & 202 can proceed to the positive benefit of the Port of Southampton in the knowledge that the noise and vibration impact from the associated construction activities will, at the most, only be of moderate adverse significance.

References

1 Statutory Instrument 2005 No 1643, Health and Safety, The Control of Noise at Work Regulations 2005.

2 Department of the Environment, Planning Policy Guidance PPG 24, Planning and Noise.

3 British Standard BS 5228: Part 1: 1997 Noise and vibration control on construction and open sites, Part 1 - Code of practice for basic information and procedures for noise and vibration control.

4 British Standard BS 5228: Part 4: 1992 Noise control on construction and open sites, Part 4 – Code of practice for noise and vibration control applicable to piling operations.

5 Draft BS 5228-1 Code of practice for noise and vibration control on construction and open sites Part 1: Noise (April 2008)

6 Draft BS 5228-2 Code of practice for noise and vibration control on construction and open sites Part 2: Vibration (April 2008)

7 British Standard BS 8233: 1999 Sound insulation and noise reduction for buildings – Code of practice.

8 Department of the Environment, Noise control on building sites, Advisory Leaflet 72.

9 British Standard BS 6472-1 2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting.

10 British Standard BS 7385: Part 2: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from groundborne vibration.

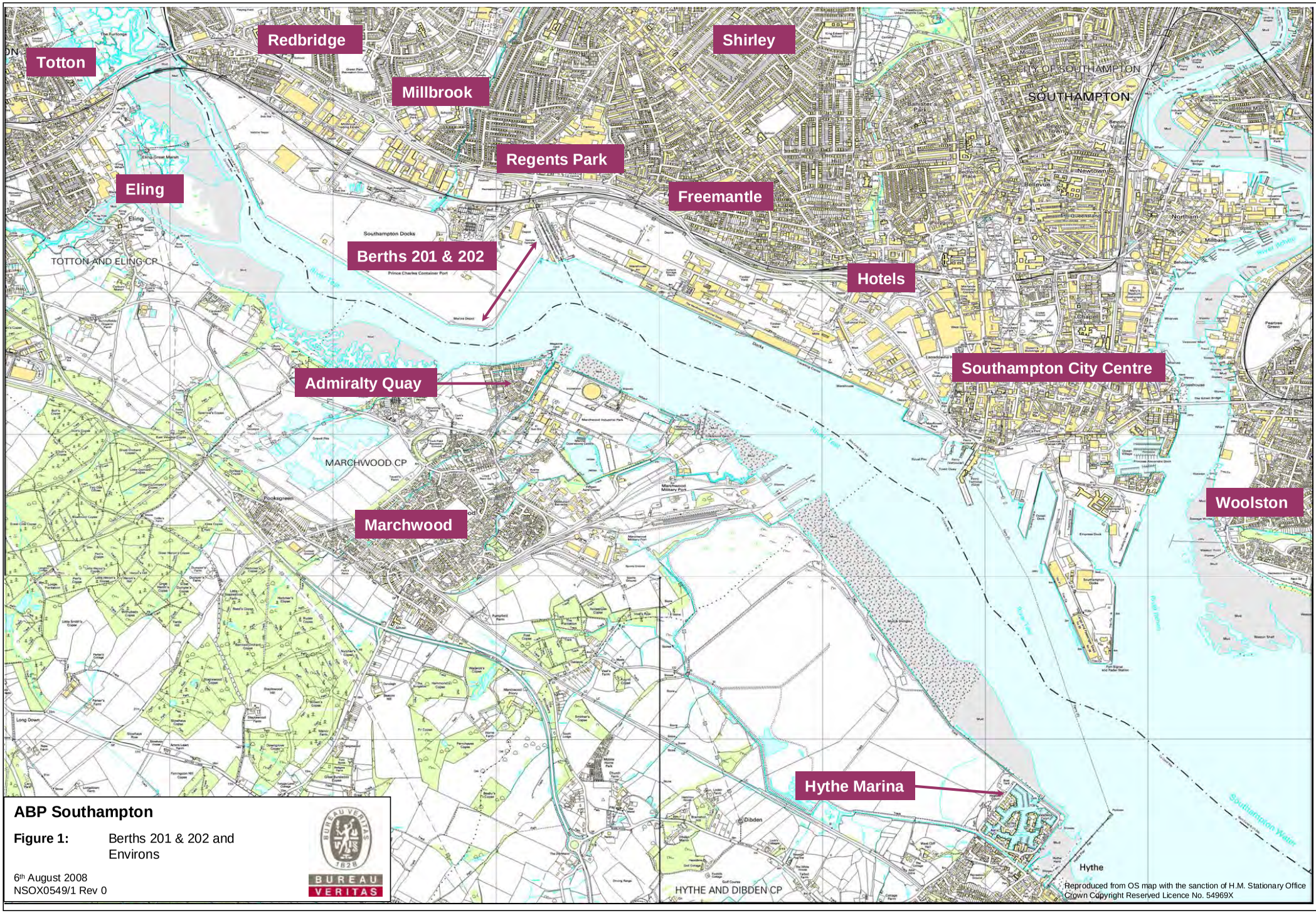
11 Defra Report 2005: Update of noise database for prediction of noise on construction and open sites.

12 International Standard ISO 9613-2 “Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

13 EC Directive 2000/14/EC Noise Emission in the Environment by Equipment for Use Outdoors, implemented into UK law by Statutory Instrument SI 2001//1701 as amended by SI 2001/3958.

14 EC Directive 2005/88/EC amending Directive 2000/14/EC Noise Emission in the Environment by Equipment for Use Outdoors, implemented into UK law by Statutory Instrument SI 2005/3525.

15 Groundborne vibration caused by mechanised construction works, D M Hillier and G I Crabb, TRL Report 429 prepared for Highways Agency.

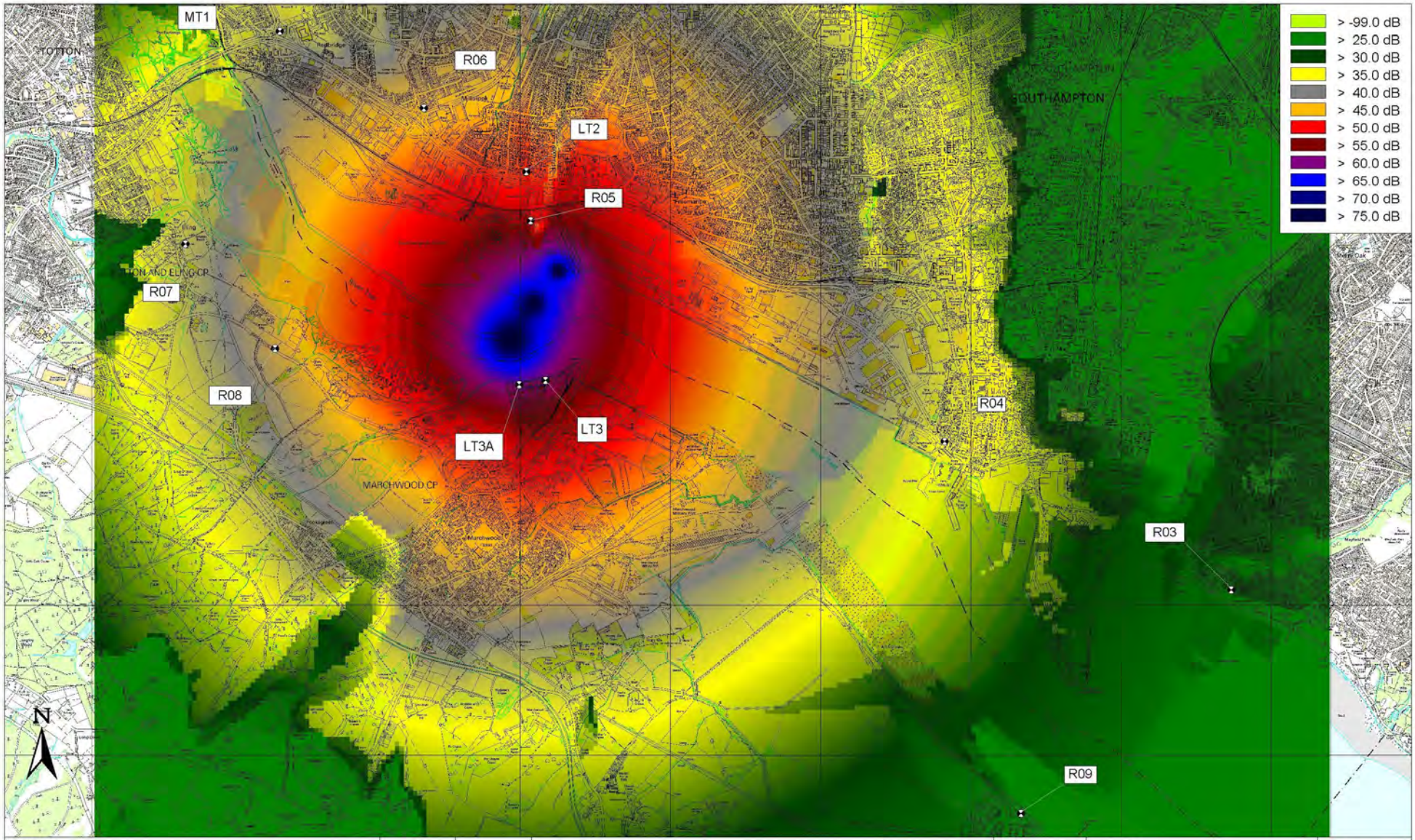


ABP Southampton

Figure 1: Berths 201 & 202 and Environs

6th August 2008
NSOX0549/1 Rev 0

BUREAU VERITAS



NOTES:

Author	CSA
Checked by	BCP
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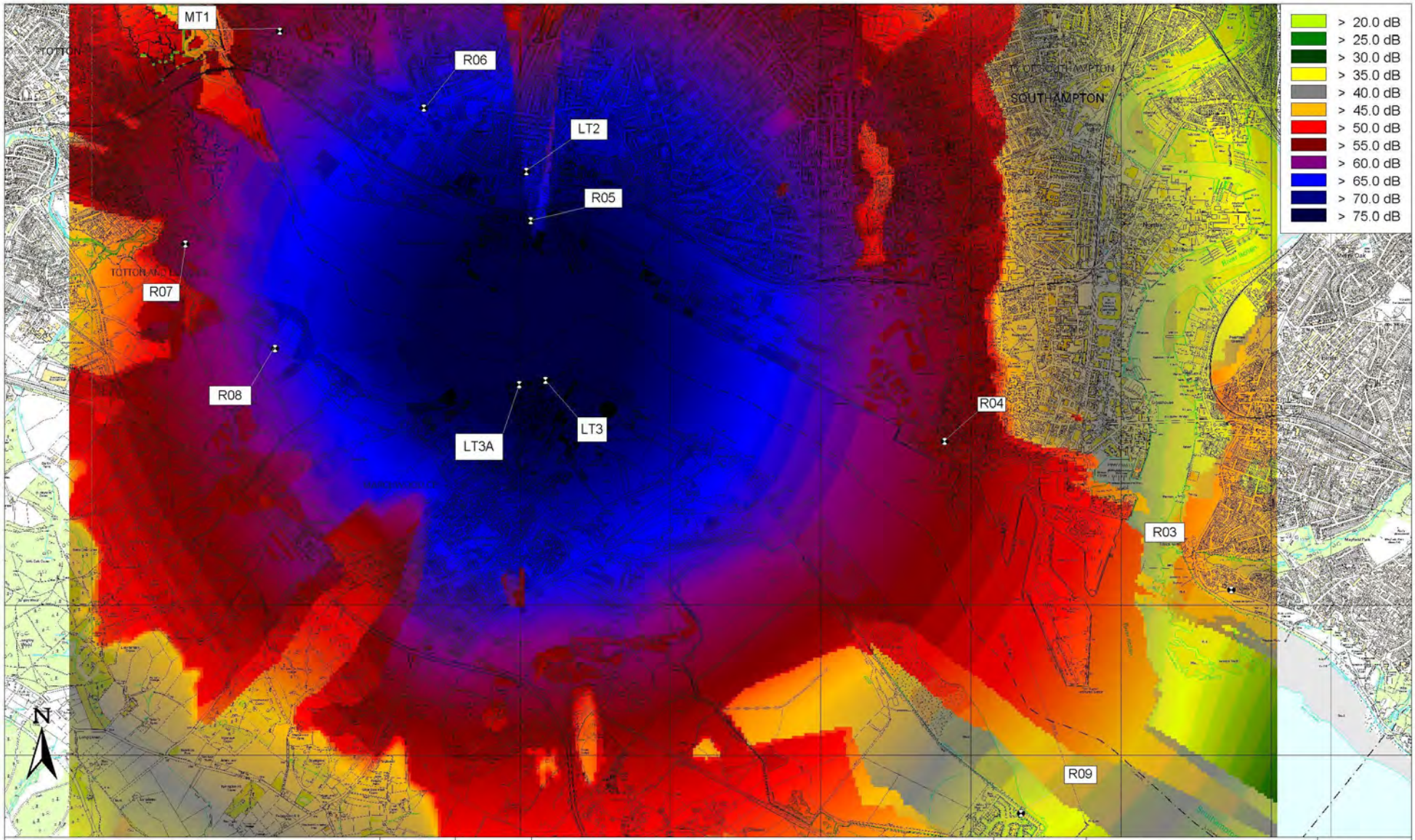
Predicted Noise Levels LAeq,T from Berth 201/2
Construction Operations - Group Task 1B

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 2
Date	18.07.08

BUREAU VERITAS



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Checked by	BCP
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Predicted Noise Levels LAeq,T from Berth 201/2
Construction Operations - Group Task 2A

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 3
Date	18.07.08

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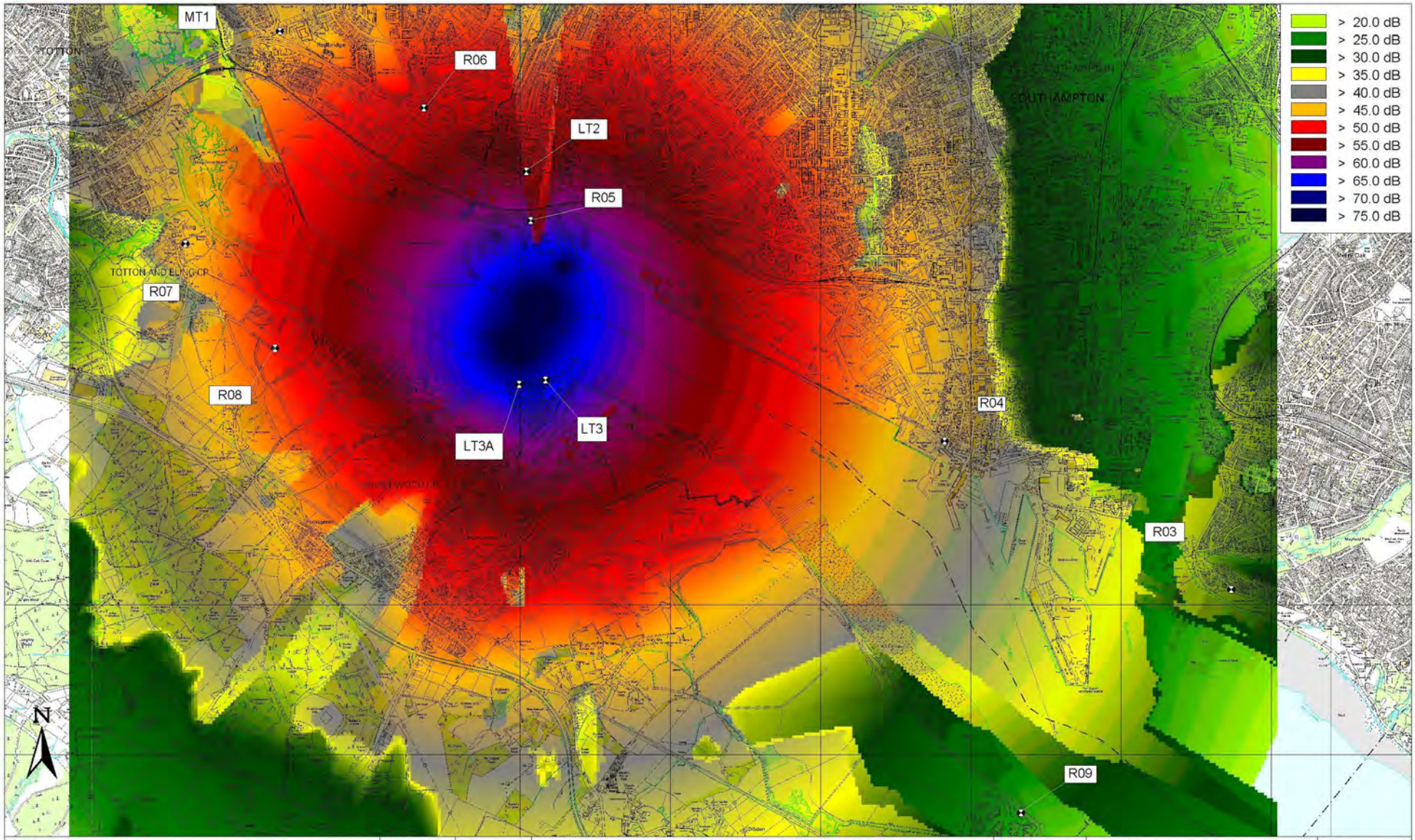

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Predicted Noise Levels LAeq,T from Berth 201/2 Construction Operations - Group Task 2AQ

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Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 4
Date	18.07.08

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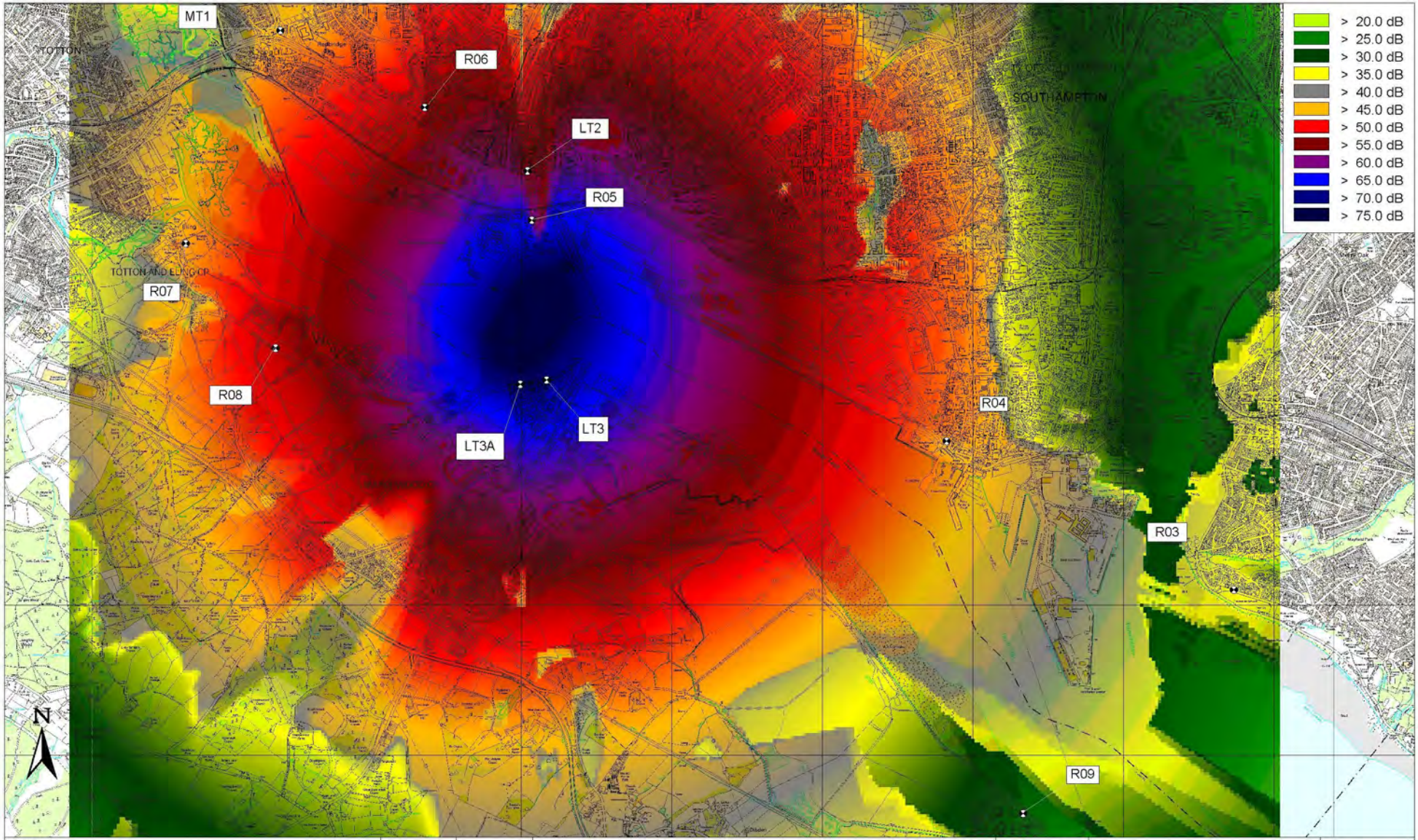

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Predicted Noise Levels LAeq,T from Berth 201/2 Construction Operations - Group Task 2BQ

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 5
Date	18.07.08

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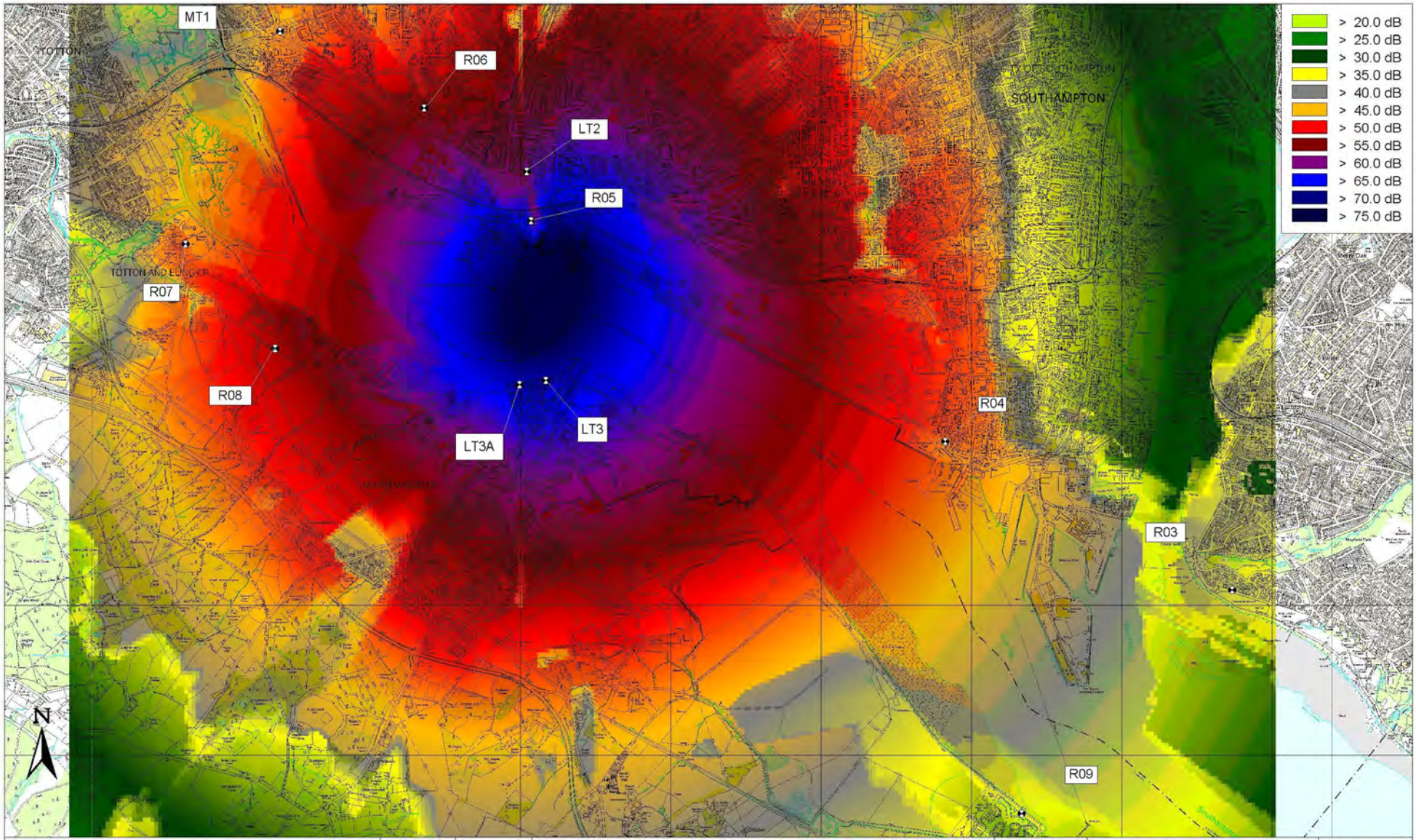

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Predicted Noise Levels LAeq,T from Berth 201/2 Construction Operations - Group Task 2DQ

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 6
Date	18.07.08

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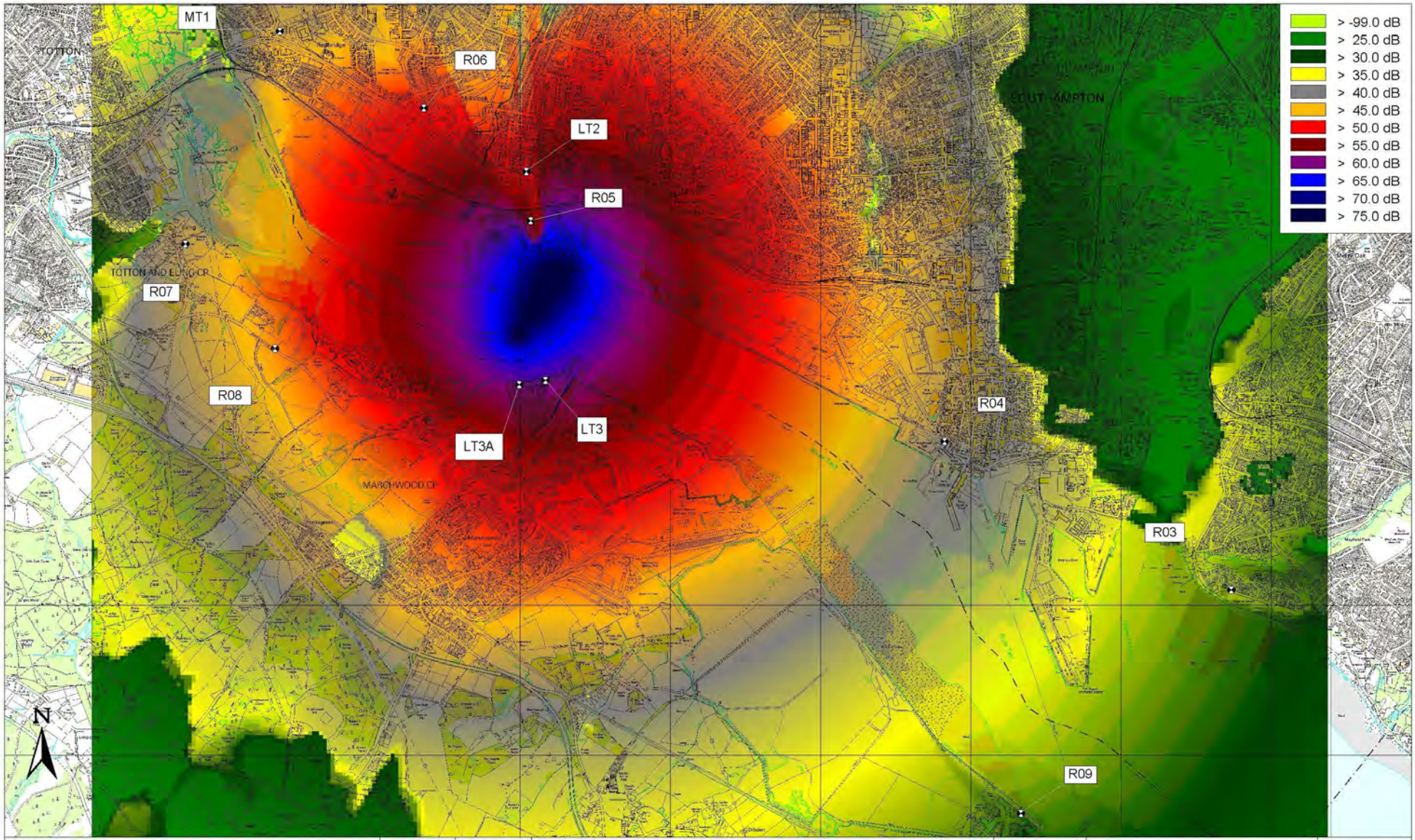

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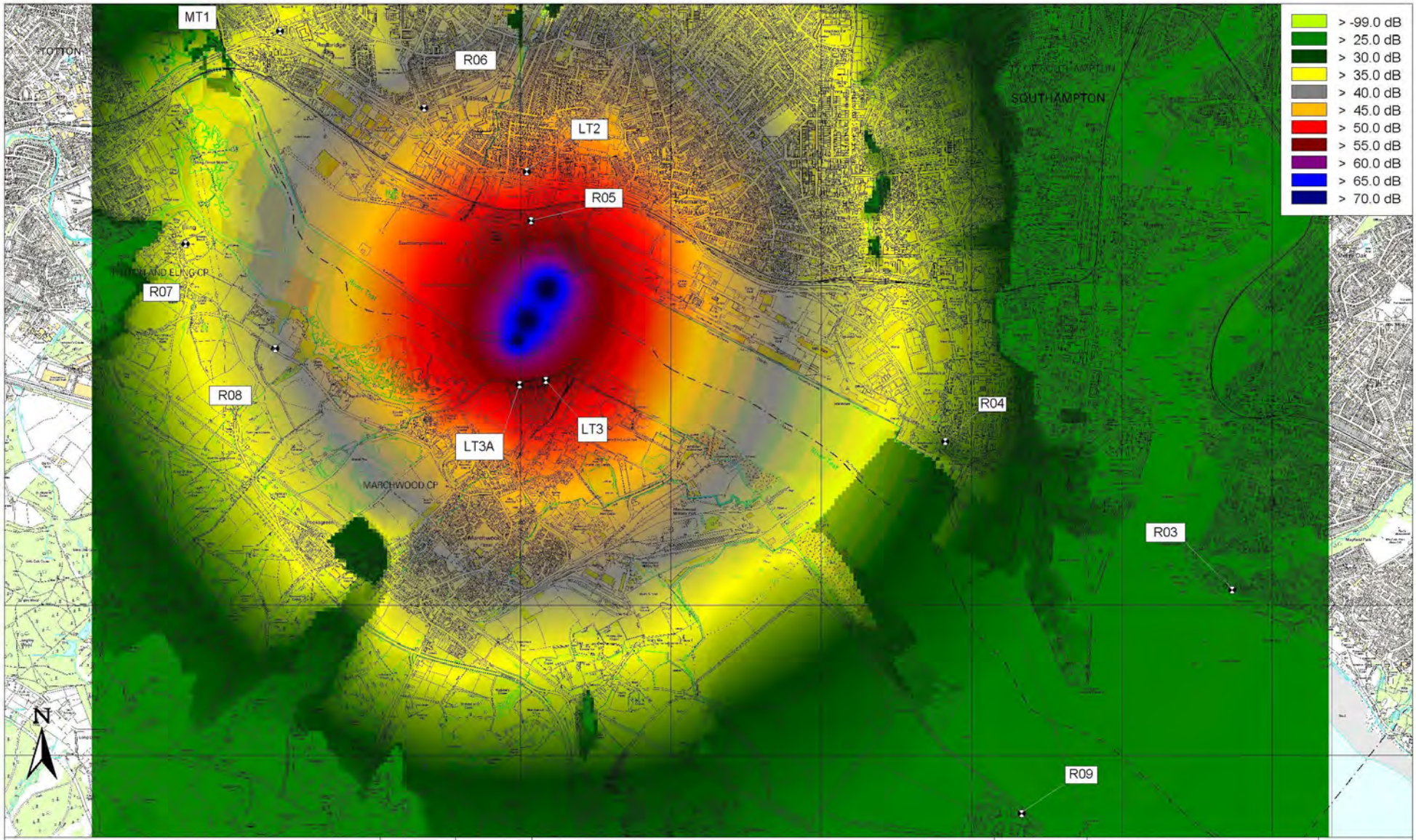
Predicted Noise Levels LAeq,T from Berth 201/2
Construction Operations - Group Task 3A

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 7
Date	18.07.08

BUREAU VERITAS



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Predicted Noise Levels LAeq,T from Berth 201/2
Construction Operations - Group Task 4

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 8
Date	18.07.08

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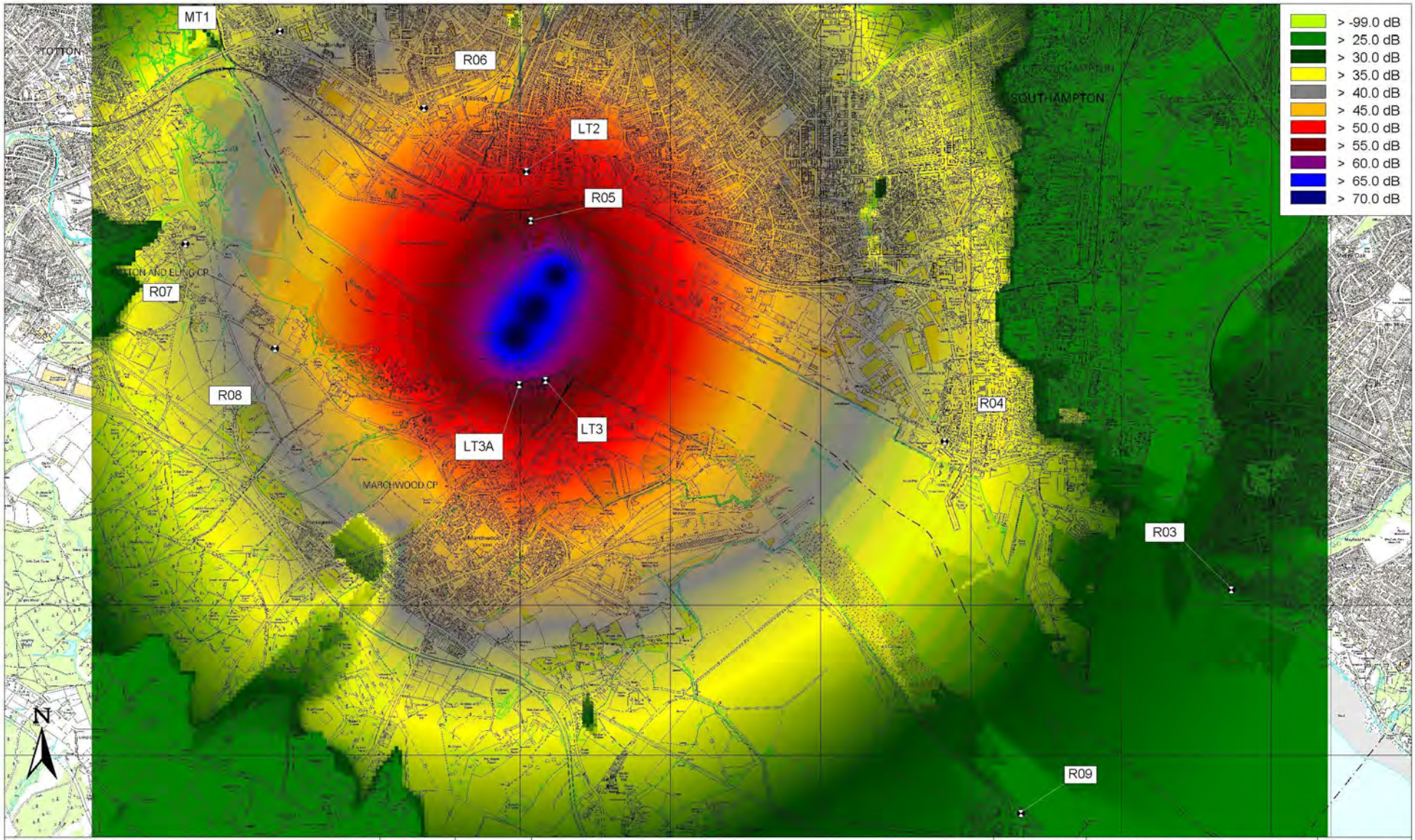

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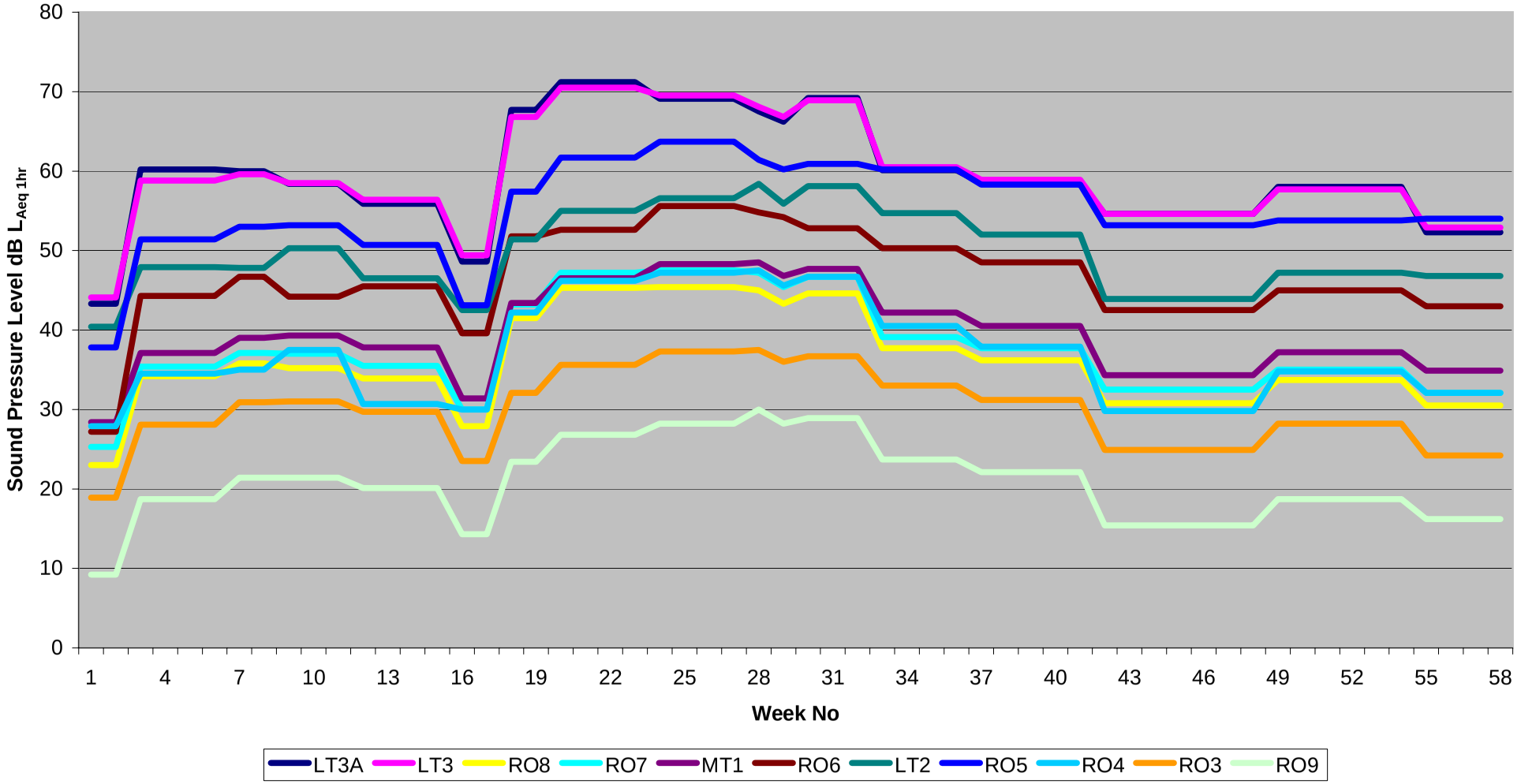
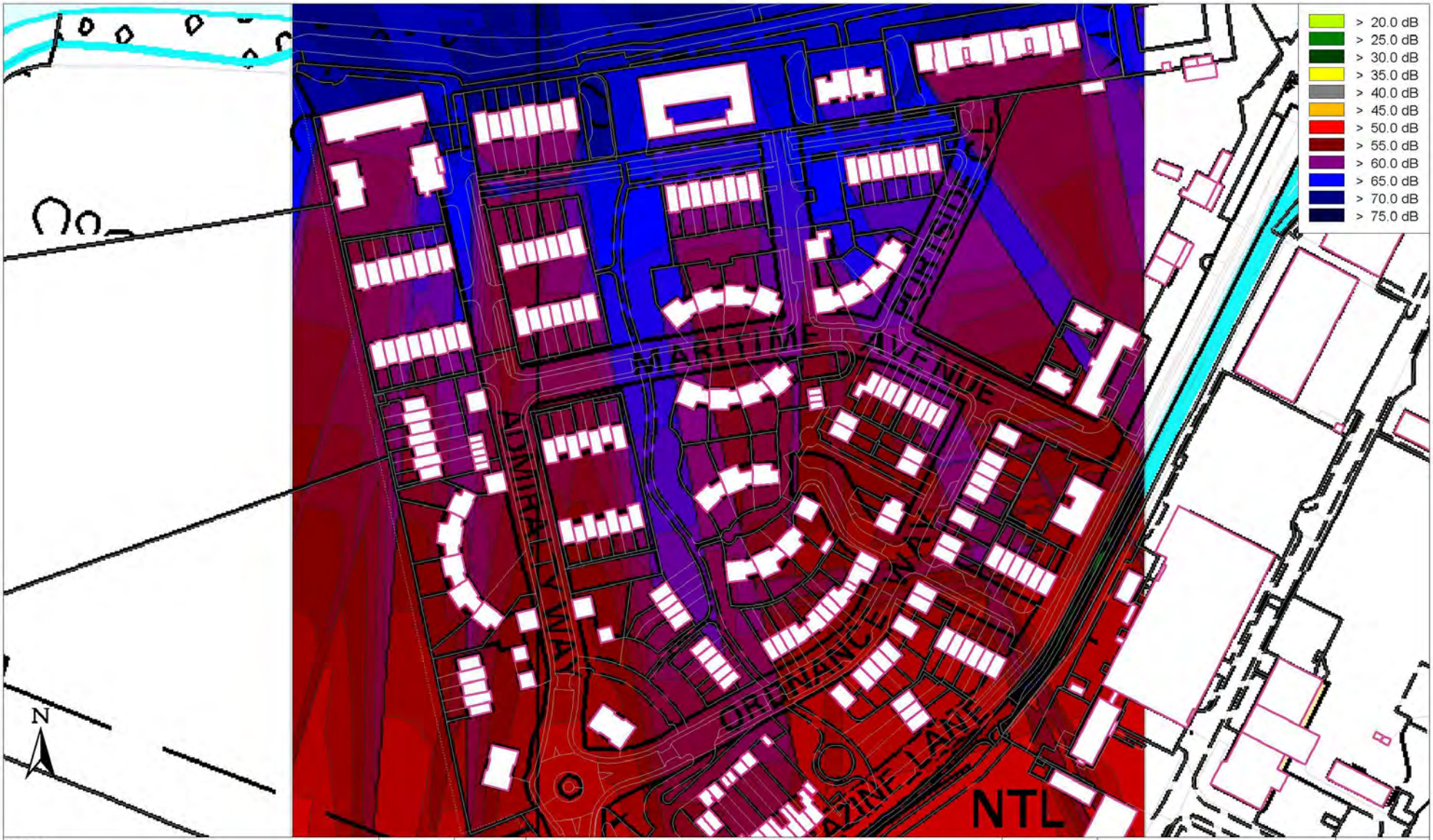
Predicted Noise Levels LAeq,T from Berth 201/2 Construction Operations - Group Task 5A

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 9
Date	18.07.08

BUREAU VERITAS 1828

Figure 10: Berth 201/2 Predicted Freefield Daytime Downwind Construction Noise Levels (Shrouded Tubular Piling Rigs)





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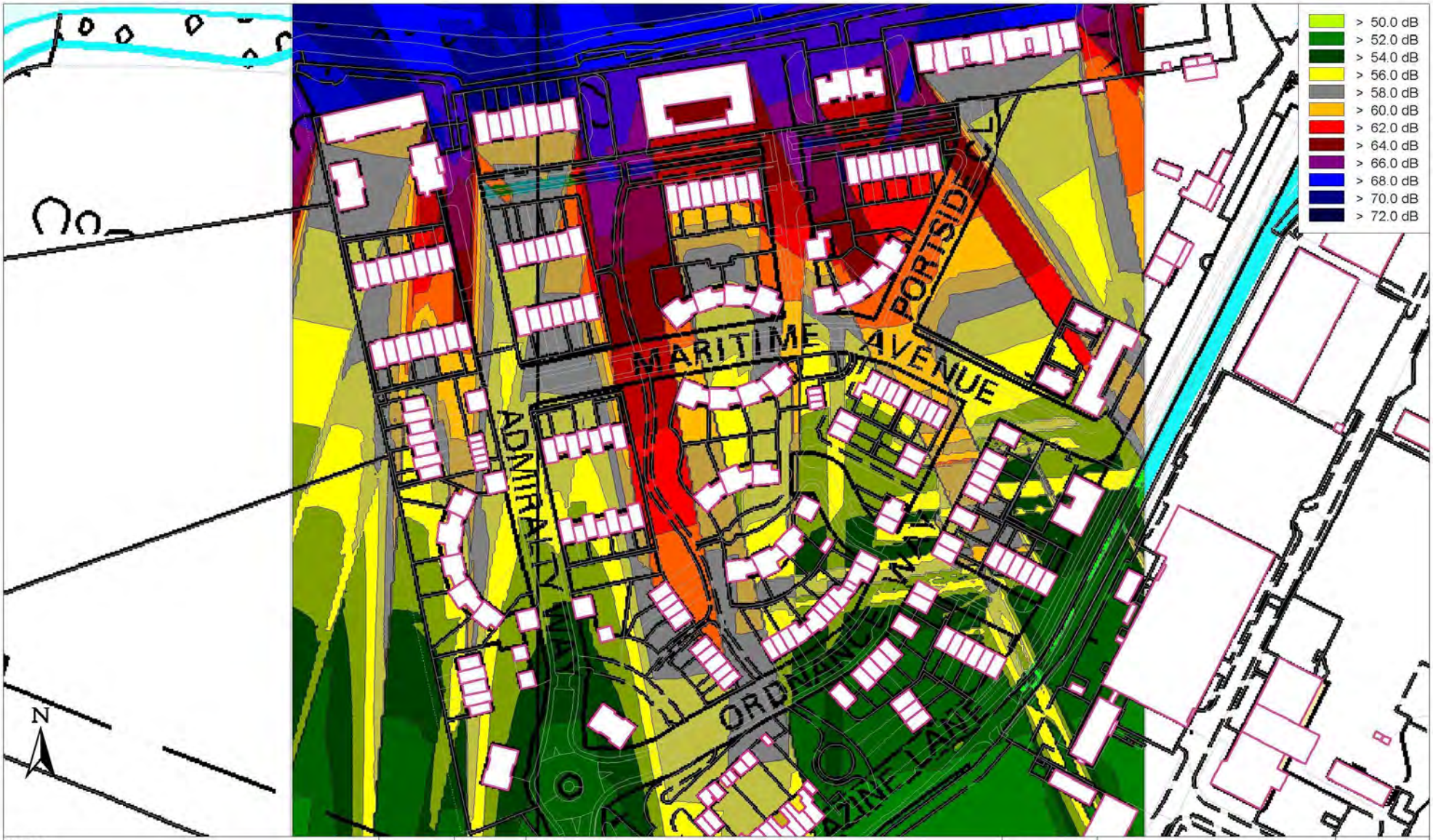
Predicted Noise Levels LAeq,T from Berth 201/2
Construction Operations - Group Task 2BQ

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 11
Date	18.07.08

BUREAU VERITAS



NOTES:

Author	CSA
Checked by	BCP
Scale	1:1500

Predicted Noise Levels LAeq,T from Berth 201/2
Construction Operations - Group Task 2BQ

Project No.	NSOX0549/1
Project Title	ABP Southampton Construction Noise Prediction
Drawing No.	Figure 12
Date	18.07.08

BUREAU VERITAS

Figure 13: Noise Assessment Severity - Construction of Berths 201 & 202 with Shrouded Tubular Piling Rigs

Week	LT3A	LT3	RO5	LT2	RO7	MT1	RO6	RO4	RO9
1	N	N	N	N	N	N	N	N	N
2	N	N	N	N	N	N	N	N	N
3	Min	Min	N	N	N	N	N	N	N
4	Min	Min	N	N	N	N	N	N	N
5	Min	Min	N	N	N	N	N	N	N
6	Min	Min	N	N	N	N	N	N	N
7	Min	Min	N	N	N	N	N	N	N
8	Min	Min	N	N	N	N	N	N	N
9	Min	Min	N	N	N	N	N	N	N
10	Min	Min	N	N	N	N	N	N	N
11	Min	Min	N	N	N	N	N	N	N
12	Min	Min	N	N	N	N	N	N	N
13	Min	Min	N	N	N	N	N	N	N
14	Min	Min	N	N	N	N	N	N	N
15	Min	Min	N	N	N	N	N	N	N
16	N	N	N	N	N	N	N	N	N
17	N	N	N	N	N	N	N	N	N
18	Mod	Mod	Min	N	N	N	N	N	N
19	Mod	Mod	Min	N	N	N	N	N	N
20	Mod	Mod	Min	Min	N	N	N	N	N
21	Mod	Mod	Min	Min	N	N	N	N	N
22	Mod	Mod	Min	Min	N	N	N	N	N
23	Mod	Mod	Min	Min	N	N	N	N	N
24	Mod	Mod	Mod	Min	N	N	N	N	N
25	Mod	Mod	Mod	Min	N	N	N	N	N
26	Mod	Mod	Mod	Min	N	N	N	N	N
27	Mod	Mod	Mod	Min	N	N	N	N	N
28	Mod	Mod	Min	Min	N	N	N	N	N
29	Mod	Mod	Min	Min	N	N	N	N	N
30	Mod	Mod	Min	Min	N	N	N	N	N
31	Mod	Mod	Min	Min	N	N	N	N	N
32	Mod	Mod	Min	Min	N	N	N	N	N
33	Min	Min	Min	Min	N	N	N	N	N
34	Min	Min	Min	Min	N	N	N	N	N
35	Min	Min	Min	Min	N	N	N	N	N
36	Min	Min	Min	Min	N	N	N	N	N
37	Min	Min	Min	N	N	N	N	N	N
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43	Min	Min	N	N	N	N	N	N	N
44	Min	Min	N	N	N	N	N	N	N
45	Min	Min	N	N	N	N	N	N	N
46	Min	Min	N	N	N	N	N	N	N
47	Min	Min	N	N	N	N	N	N	N
48	Min	Min	N	N	N	N	N	N	N
49	Min	Min	N	N	N	N	N	N	N
50	Min	Min	N	N	N	N	N	N	N
51	Min	Min	N	N	N	N	N	N	N
52	Min	Min	N	N	N	N	N	N	N
53	Min	Min	N	N	N	N	N	N	N
54	Min	Min	N	N	N	N	N	N	N
55	N	N	Min	N	N	N	N	N	N
56	N	N	Min	N	N	N	N	N	N
57	N	N	Min	N	N	N	N	N	N
58	N	N	Min	N	N	N	N	N	N

No noise impact

Minor adverse noise impact

Moderate adverse noise impact

Appendix 1

Costain Resource Schedule

COSTAIN

BERTHS 201 AND 202
OUTLINE RESOURCE SCHEDULE OF MAJOR PLANT ITEMS

I.D. No		Resource
12	P.C.C. Unit Production	80t Crawler Crane Concrete Pump Tractor & Trailer Unit Loadall
14	Drive Tubes – Berths 201	150t Crawler Crane IHC S200 Piling Hammer ICE 1412 Vibratory Piling Hammer 80t Crawler Crane
15	Drive Tubes – Berths 202	150t Crawler Crane IHC S200 Piling Hammer ICE 1412 Vibratory Piling Hammer 80t Crawler Crane
16	Infill Sheets – Berth 201	80t Crawler Crane ICE 815 Vibratory Piling Hammer ICE S90 Piling Hammer Tractor & Trailer Unit
17	Infill Sheets – Berth 202	80t Crawler Crane ICE 815 Vibratory Piling Hammer ICE S90 Piling Hammer Tractor & Trailer Unit
18	End Detail/Return Berth 202	150t Crawler Crane IHC S200 Piling Hammer ICE 1412 Vibratory Piling Hammer 80t Crawler Crane
19	Concrete Backing to Steel Sheet Piles	Concrete Pump Ready Mix Trucks 50t Mobile
20	Demolition	45t 360° Backhoe excavator complete with Montabert Breaker and/or Shearers 25 t excavator 2 No. Articulated Dump Trucks Concrete Crushing Plant

COSTAIN

BERTHS 201 AND 202
OUTLINE RESOURCE SCHEDULE OF MAJOR PLANT ITEMS

I.D. No		Resource
21	Install CFA piles	CFA Rigs 60t Crawler Crane Concrete Pump Ready Mix Trucks 25t Excavator 5t Dumpers Muckaway Lorries
22	Cast Anchor Wall	60t Crawler Crane Tractor & Trailer Unit 5t Dumper Concrete Pump Ready Mix Trucks
23	Demolition of Existing Capping Beams, etc	45t Excavator complete with Montabert Breaker 2 No. Articulated Dump Trucks 25t Excavator Concrete Crushing Plant
24	Work to pile heads	35t mobile 5t Dumper Concrete pump
25	Excavate & Install Tie Bars	80t Crawler Crane Tractor & Trailer Unit 45t Excavator Articulated dump trucks Bomag Vibratory Roller
26	Backfill & Construct RCR beam	80t Crawler Crane Concrete Pump Ready Mix Concrete Trucks JCB
27	Install P.C.C. Fender & Deck Units	120t Crawler Crane Tractor & Trailer Unit
28	Concrete Works	80t Crawler Crane Tractor & Trailer Unit Concrete Pump Ready Mix Concrete Trucks

MKT/Da/123/695
6 May 2008

COSTAIN

BERTHS 201 AND 202
OUTLINE RESOURCE SCHEDULE OF MAJOR PLANT ITEMS

I.D. No		Resource
29	Install Fender Units etc	80t Crawler Crane Tractor & Trailer Unit
30	Paving	Tractor & Trailer Unit Block Pavers (Bobcat Mounted) JCB Paver (Blaw Knox) Tractor Units
31	Crane Rails	Loadall Tractor & Trailer Unit

For all operations
Safety Boats – 2 No.
Storage Pontoons – 2 No.
Tug & Workboat

Appendix 2

Baseline Noise Survey Protocol

Associated British Ports Southampton
Noise Impact Assessments of Proposed Projects

Baseline Noise Level Determination - Proposed Methodology

1 Introduction

This document details the proposed methodology to be adopted by Bureau Veritas to determine representative baseline noise levels in connection with the proposed deepening of Berths 201/2 and quay reconstruction, and with the improvement of vessel accessibility to the Port of Southampton through dredging operations in Southampton Water. The baseline noise levels will be used in the assessment of the potential noise impact associated with these projects.

The preparation of this proposed methodology has been undertaken following an initial meeting with representatives of New Forest District Council (NFDC), Southampton City Council (SCC) and Eastleigh Borough Council (EBC) at a meeting at ABP's offices on 5th February 2008. It includes measurement location suggestions provided by NFDC subsequent to this meeting.

2 General Concepts

The representative baseline noise levels will be obtained from a combination of continuous unattended noise monitors and from roving attended noise monitoring undertaken on a sampling basis. Wherever possible the noise measurements will be undertake for a range of different weather conditions, which will include one or more periods of relatively calm weather. Periods of high winds (over 5 m/s) and rain will be avoided for the attended noise monitoring.

The unattended noise monitors will record statistical values of the A-weighted sound pressure level. The attended noise monitors will record statistical values of the A-weighted sound pressure level and also representative octave band sound pressure levels.

For locations more likely to be affected by dredging noise, the attended noise monitoring will be biased to the night-time period, to include the period from 00:00 to 04:00 hours. For locations in the vicinity of Berths 201/2, attended noise monitoring will be biased to the daytime period. Some attended weekend noise monitoring will be undertaken, particular on a Sunday in relation to areas potentially affected by dredging activities.

During the attended monitoring, field notes will be made of activities and events contributing to the ambient noise environment. Local wind speed and direction data will be obtained, together with the degree of cloud cover and temperature. More comprehensive wind speed and direction data during the course of the monitoring period will be supplied by ABP.

For the attended noise monitoring, the principle of pausing the meter will be adopted for particular noise events, where by the judgement of the surveyor, measured noise levels are not representative of the typical noise environment. This could include, for example, vehicles passing close to the microphone when the measurement location is at a proxy location for a nearby residential property located further from the road; or unusually high impact noise levels not representative of the normal situation. Normally, pausing the meter in this way has no effect on measured background noise levels (L_{A90}) but will result in more representative L_{Aeq} and L_{Amax} levels.

3 Unattended Noise Monitoring Locations

Four unattended "long term" noise monitors will be established in the following areas:

LT1: **Netley Abbey:** A suitable location will be determined at the Southampton Water side of one of the properties to the south-west of Victoria Road (Eastleigh Borough Council area).

LT2: **Regents Park, Southampton:** A suitable location will be determined in the Regents Park or Freemantle areas of Southampton, away from the immediate vicinity of the A33, Millbrook Road (Southampton City Council area).

LT3: **Admiralty Walk Estate, Marchwood:** A suitable location will be sought at the residential properties which overlook the Container Terminal, and Berths 201/202 in particular. Alternatively, if access is not possible, Marchwood sailing club may be an alternative surrogate location (New Forest District Council area)

LT4: **Hythe:** A suitable location will be sought at the Southampton Water facing side of the residential properties to the south-east of Hythe Pier. A possible location is The Lantern Building, Davison Close (New Forest District Council area).

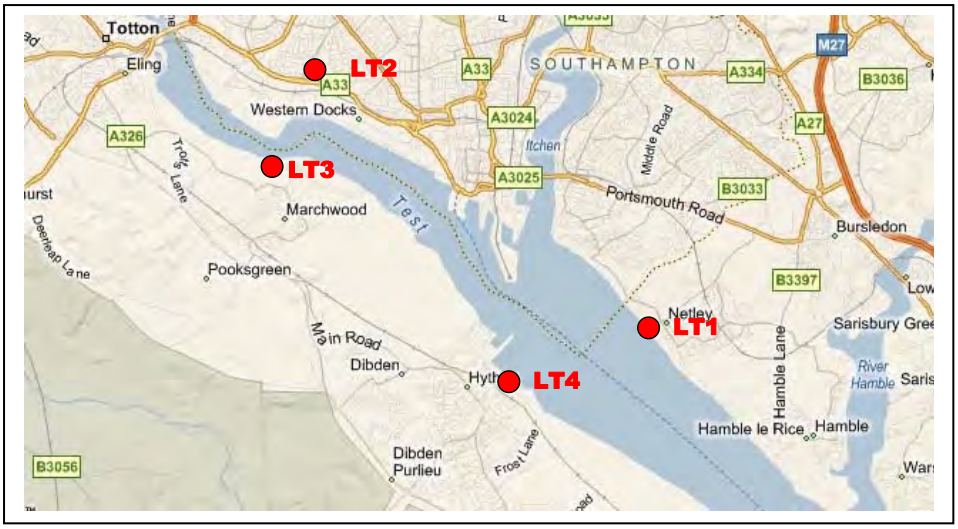

Figure 1: Approximate Proposed Locations for Long Term Noise Monitors

The exact location of the noise monitor will depend on the access which can be obtained for the various properties. In principle, the microphone of each monitor will be set on a mast or other structure, at least 4 m above the ground.

4 Attended Roving Noise Monitoring Locations

The following attended roving locations, as shown in Figure 2, are provisionally planned:

RO1: Westerfield Common area of Hamble-le-rice.

RO2: Weston Estate – possibly attempt 24 hour survey from an upper floor of one of the tower blocks as well as roving measurements at ground level – assistance from Southampton City Council is sought for this site.

RO3: Victoria Road area of Woolston – measurements possibly from recreation ground to the south of Waldegrave Close.

RO4: Town Quay/Bugle Street, Southampton – measurement location possibly on elevated public access by Mayflower memorial.

RO5: Cottages near sewer works, Western Avenue.

RO6: Millbrook – residential properties to the north of the roundabout (24 hour survey?).

RO7: Eling Hill, Eling – in the vicinity of the Vicarage.

RO8: Bury Road, Marchwood – use layby as a proxy location.

RO9: Hythe Marina – measurements above line of protective sea wall.

RO10: Frost Lane, Hythe (assess requirement for this during a site visit).

RO11: Ashlett Road, Ashlett

RO12: Solent View or Calshot Close, Calshot.

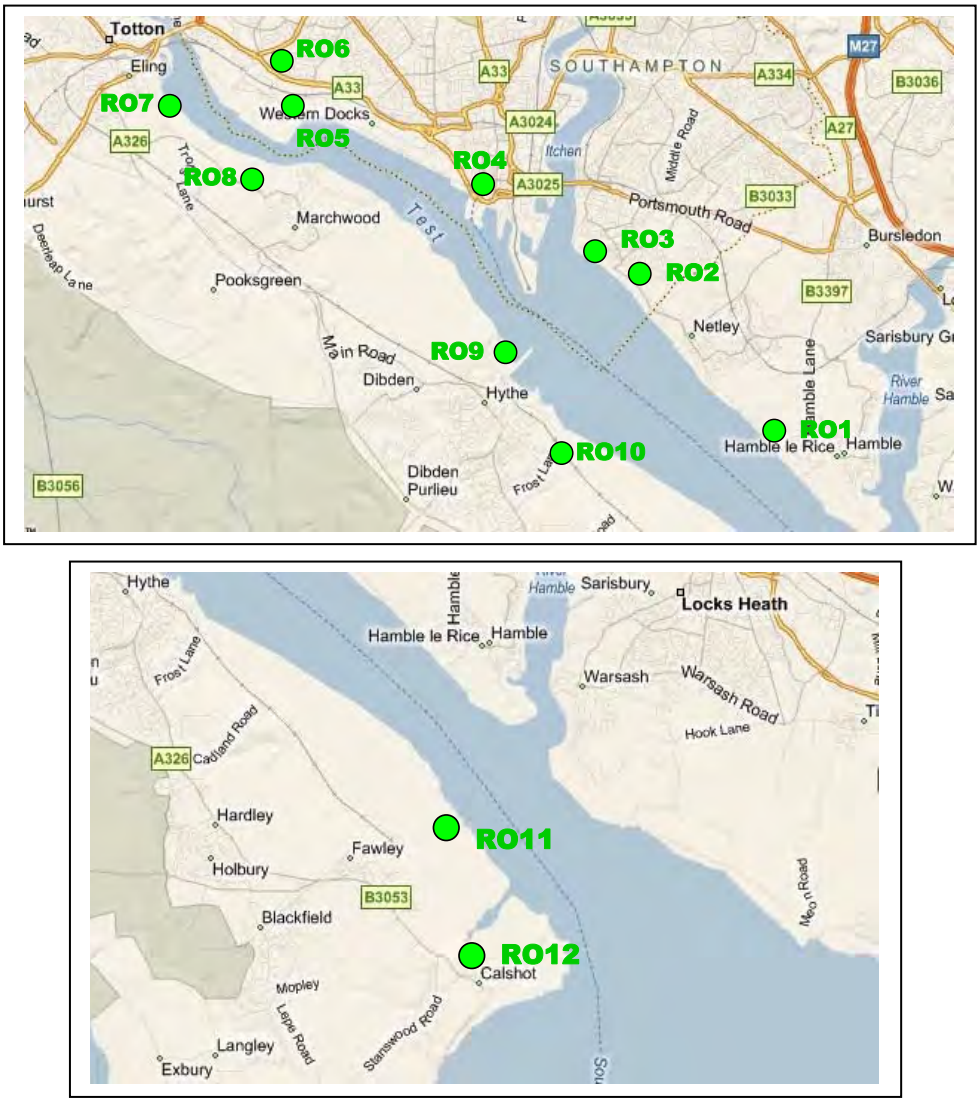

Figure 2: Approximate Proposed Locations for Roving Noise Monitoring

5 Survey Protocol

5.1 All sound meters used will comply with Type 1 accuracy of BS EN 60651: 1994 and BS EN 60804 1994 or Class 1 accuracy of BS EN 61672. The meter will have been fully tested within a period of 2 years from the date of use by a recognised national laboratory. The meters will also be field calibrated for every period of use.

5.2 The long term monitors will be set to monitor noise levels over consecutive 5 minute periods. These will record the following A-weighted noise indices: L_{Aeq}, $L_{A90\ F}$, $L_{A50\ F}$, $L_{A10\ F}$, $L_{A1\ F}$, and $L_{Amax\ F}$. Monitoring will take place over a period of up to six weeks.

5.3 Roving noise monitoring will be undertaken at the locations designated as RO1 to RO12 and also at LT1 to LT4. Measurement circuits will be established normally consisting of 3 to 4 locations.

5.4 The roving noise monitors will be set to monitor noise levels over 5 minute periods, with 2 consecutive five minute samples being recorded at each location, prior to moving to the next location in the measurement circuit. For locations RO1 and LT1, one 10 minute sample will be recorded at each of these locations for each measurement circuit (methodology to be confirmed by EBC).

5.5 The roving noise monitors will measure the same set of A-weighted indices as in 5.2 and will also record linear octave band sound pressure levels of the following indices: L_{eq}, $L_{90\ F}$ and $L_{max\ F}$ from 31.5 Hz to 8 kHz.

5.6 Night-time will encompass the period 00:00 to 04:00. A minimum of three nights of measurements will be undertaken at each location and at least one daytime and one evening set of measurements. The daytime periods will include a Sunday for those locations potentially affected by the dredging project. For those locations potentially affected by daytime construction activities of Berths 201/202, at least three sets of daytime measurements will be undertaken.

5.7 A windshield will be used on each microphone at all times. The roving noise monitor will normally take place with the microphone at a height of 1.2 m to 1.5 m above the ground, unless the microphone would otherwise be obstructed, in which a more elevated measurement position will be used.

5.8 If access can be obtained to a suitable location, at least one 24 hour period of monitoring will be undertaken at an elevated floor at Location RO2 (assistance to be provided by SCC) and also possibly RO6.

5.8 Wherever practicable, the roving measurements will be paused for any discrete event not considered by the surveyor to be representative of the noise environment at the particular location. This will include pausing for passing traffic at location RO8, for example. The back-erase facility of the meter will be used to remove such events from the recording.

5.9 During each roving measurement, the local wind speed will be measured at head height. Wind direction will be estimated from direct observation and the degree of cloud cover (in octants) also estimated from direct observation. Values of temperature will be recorded every hour.

5.10 A log will be kept of all audible continuous and intermittent events affecting the ambient noise environment.

5.11 Wind speed and direction data will also be obtained from ABP to assist in the interpretation of the long term noise monitoring results.

5.12 All three authorities will be kept informed by email, if so requested, as to when the noise monitoring is being planned to take place, to allow joint monitoring to be undertaken, if so desired.

5.13 The results of the noise monitoring will be tabulated and used in the assessments of the potential noise impacts of the two ABP projects.

6 Further Actions

The three local authorities are requested to review this protocol and respond to Bureau Veritas with any comments or suggested changes. Bureau Veritas will then source exact measurement locations and inform the local authorities accordingly. No noise monitoring will commence until agreement has been reached from the local authorities on the measurement protocol to be adopted.

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Appendix 3

Baseline Noise Survey Measurement Locations

Associated British Ports Southampton
Noise Impact Assessments of Proposed Projects

Baseline Noise Measurement Locations – New Forest District

1 Introduction

The proposed methodology for the baseline noise level determination (document NSOX0549/25433 dated 8th February 2008) gave approximate locations for the noise measurement locations which were issued and agreed with New Forest District Council, Southampton City Council and Eastleigh Borough Council. Bureau Veritas has now completed a site investigation and identified the following proposed exact noise measurement locations for the New Forest District area. These are designated as RO7 to RO12, LT3, LT4, LT3RO and LT4RO. An alternative location is also shown for RO10 and is designated as RO10A. They are illustrated below, together with explanatory comments. The New Forest District Council is requested to review these proposed locations and confirm their agreement to Bureau Veritas.

2 Proposed Measurement Locations

2.1 Fixed Long-term Measurement Location

Location LT3: 25 Skippers House, Portside Close, Marchwood	
	
Comments:	
This fixed monitoring location is on the balcony of one of the upper floor apartments in Skippers House, Portside Close, Admiralty Quay Estate. It directly overlooks the River Test and the container terminal and Berths 201/202 beyond. The microphone will be set-up at 1.5 m above the floor level of the balcony. The distance from the façade will approximately 1 m but will be accurately defined when the measurement system is installed. For comparison purposes, attended noise measurements will be undertaken from the foreshore adjacent to Marchwood Yacht Club. This is illustrated overleaf.	

Location LT3RO: Marchwood Yacht Club, Marchwood	
	
Comments:	

This monitoring location will be used in conjunction with the fixed location LT3 in Skippers House, Portside Close. It will be used for short-term attended noise measurements and observations. The measurements will be made from the gravelled area of Marchwood Yacht Club, approximately in line with the facade of the Admiralty Walk Estate properties nearest the waterfront. The measurements will be made with the microphone 1.5 m above local grade.

Location LT4: Lantern Building, Davidson Close, Hythe	
	
Comments:	

This fixed monitoring location is on the balcony of 25 Lantern Building, Davidson Close, Hythe. This is a second floor apartment and has direct line of sight to Southampton Water and Western Shore beyond. The microphone will be set up at approximately 1.5 - 2 m above the balcony using a short mast arrangement tied to the balcony railings. The exact distance from the façade of the building will depend on the positioning of the mast, but would be expected to be approximately 1 m. The mast will be positioned on the more northerly side of the balcony to reduce the effects of wind at this elevated location. For comparison purposes, attended roving measurements will be made at grade, in the vicinity of the sea wall adjacent to the Lantern Building. This is illustrated overleaf.

Location LT4RO: Lantern Building, Davidson Close, Hythe	
	
Comments:	
This monitoring location will be used in conjunction with the fixed location LT4 on the balcony of 25 Lantern Building, Davidson Close. It will be used for short-term attended noise measurements and observations. The measurements will be made from the car park area by the side of the Lantern Building overlooking the waterfront. The measurements will be made with the microphone 1.5 m above local grade and in line with the facades of the adjacent buildings. The measurements would be paused for any local events such as a car manoeuvring nearby.	

2.2 Roving Noise Measurement Locations

Location RO7: The Vicarage, Eling Hill, Totton	
	
Comments:	
This attended noise measurement location will be in the side garden of The Vicarage, in line with the northerly façade of the house. The microphone will be located 1.5 m above local ground level.	

Location RO8 Marchwood Road, Marchwood	
	
Comments:	
This attended noise measurement location will be in a new lay-by on Marchwood Road, created during the construction of new overhead electricity pylons. This location will be particularly affected by busy traffic on the Marchwood Road; therefore it will only be used for night-time noise surveys, with the meter being paused for passing road traffic. The location will not be used if, on any survey nights, the overhead electricity lines are found to be "buzzing". This usually only happens in damp weather. The microphone will be positioned 1.5 m above local grade.	

Location RO9 Hythe Marina, Hythe	
	
Comments:	
The attended noise measurements will be taken from the car park area on the north side of Hythe Marina in the vicinity of the "lifeboat" feature. The microphone will be above the line of the sea wall (nominally at a height of 1.5 m above grade) and the microphone location will be set back from the immediate vicinity of the seawall, approximately in-line with the lifeboat.	

Location RO10: Frost Lane, Hythe	
	
Comments:	
This attended noise measurement location is intended to be a proxy position for properties in Cormorant Drive and other isolated nearby properties in Frost Lane. The measurements will be taken from the east side of Frost Lane just to the north of the railway level crossing. The microphone will be positioned at 1.5 m above local grade, and measurements will be paused for any passing traffic. It is possible that an alternative location may be required and this is shown below.	

Location RO10 (Alternative) Shore Road, Hythe	
	
Comments:	
This alternative attended noise measurement location will be at the entrance to a public recreation ground off of Shore Road, immediately opposite Southampton Water. The measurements would be taken to the side of the entrance way to the recreation ground with the microphone at a height of 1.5 m above local grade. The measurements would be paused for passing traffic.	

Location RO11: Copthorne Lane, Ashlett	
	
Comments:	
This attended noise measurement location will be at a field gate on the corner of Copthorne Lane, just to the north of the property "Leafy Corner". This location is elevated and has a clear line of sight to Southampton Water. The measurements would be taken with the microphone at a height of 1.5 m above local grade. The measurements would be paused for any passing traffic. This location is a proxy position for nearby individual properties in Ashlett.	

Location RO12: Calshot Close, Calshot	
	
Comments:	
This attended noise measurement location will be on the grassed area at the north side of the car park in Calshot Close, between Nos 48 and 49. This location has a clear line of sight to Southampton Water. The measurements would be taken with the microphone at a height of 1.5 m above local grade. The measurements would be paused for any local activity e.g. car parking.	

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Associated British Ports Southampton
Noise Impact Assessments of Proposed Projects

Baseline Noise Measurement Locations - Southampton

1 Introduction

The proposed methodology for the baseline noise level determination (document NSOX0549/25433 dated 8th February 2008) gave approximate locations for the noise measurement locations which were issued and agreed with New Forest District Council, Southampton City Council and Eastleigh Borough Council. Bureau Veritas has now completed a site investigation and identified the following proposed exact noise measurement locations for the Southampton area. These are designated as RO2 to RO6 and LT2. They are illustrated below, together with explanatory comments. Southampton City Council is requested to review these proposed locations and confirm agreement about them to Bureau Veritas.

2 Proposed Measurement Locations

2.1 Fixed Long-term Measurement Location

Location LT2: 5 Creighton Road, Regents Park, Southampton	
	
Comments:	
This fixed monitoring location is at the east end of Creighton Road, in a cul-de-sac. It would be expected to experience very little passing traffic. It has a partially unobstructed view in the direction of King George V Dock and Berths 201/2. The microphone will be set up on a mast at a height of 4 m above local grade in the corner of the side garden, which is to the south of the front of the house. The measured levels obtained would be expected to be representative of those experienced at properties relatively close to Southampton Docks but not immediately alongside the A33, Millbrook Road.	

2.2 Roving Noise Measurement Locations

Location RO2 Weston Estate, Weston, Southampton	
	
Comments:	
This attended noise measurement location will be on the grassed area adjacent to the side of No 1 Hurstbourne Place, which is opposite Rotterdam Towers. The microphone will be 1.5 m above local grade. This location has an unobstructed view to Southampton Water and is not shielded by the adjacent tower block. It is also relatively easily accessible by a vehicle. This measurement location will be supplemented by a 24 hour survey on the balcony of one of the tower blocks, if access to a suitable apartment can be arranged by Southampton City Council.	

Location RO3 Waldegrave Close, Woolston, Southampton	
	
Comments:	
This attended noise measurement location will be at the end of Waldegrave Close with the microphone by the open railings above the line of the brickwork (nominal height 1.5 m above local grade). This location has a clear line of sight to Southampton Water and is easily accessible by a vehicle.	

Location RO4 Town Quay, Southampton	
	
Comments:	
This attended noise measurement location will be in the public gardens near the Mayflower Memorial, Town Quay, in the vicinity of the rear of the properties in Bugle Lane with balconies overlooking Town Quay, and Southampton Water beyond. The microphone will be at a height of 1.5 m above local grade.	

Location RO5 Cottages, Western Avenue, Western Docks, Southampton	
	
Comments:	
This attended noise measurement location will be taken on the pavement in front of No 1 Cottage, Western Avenue, Western Docks (near the Sewage Works) with the microphone at a height of 1.5 m above local grade. This is the nearest residential location to Berths 201/202.	

Location RO6 Cleasby Close, Millbrook, Southampton	
	
Comments:	
This attended noise measurement location will be on the grassed area between blocks 25-30 and 19-24 Cleasby Close, Millbrook, with the microphone at a height of 1.5 m above local grade and at least 3.5 m from the façade of the building. This location is on the north side of Millbrook Roundabout and does not experience any immediate passing road traffic. It also has only a partially obstructed view towards Southampton Docks. If the opportunity arises during the course of the attended noise monitoring, arrangements will be made to undertake a 24 hour survey from a second storey balcony of this block.	

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Associated British Ports Southampton
Noise Impact Assessments of Proposed Projects

Baseline Noise Measurement Locations – Hamble and Netley Abbey

1 Introduction

The proposed methodology for the baseline noise level determination (document NSOX0549/25433 dated 8th February 2008) gave approximate locations for the noise measurement locations which were issued and agreed with New Forest District Council, Southampton City Council and Eastleigh Borough Council. Bureau Veritas has now completed a site investigation and identified the following proposed exact noise measurement locations for the Hamble and Netley Abbey areas. These are designated as RO1, LT1 and LT1RO. They are illustrated below, together with explanatory comments. Eastleigh Borough Council is requested to review these proposed locations and confirm their agreement with Bureau Veritas.

2 Proposed Measurement Locations

2.1 Fixed Long-term Measurement Location

Location LT1: Malmesbury Court, Victoria Road, Netley Abbey

Comments:

This fixed monitoring location is on the west side of Malmesbury Court, Victoria Road, Netley Abbey. It is shielded from passing road traffic in Victoria Road, and has a clear line of sight to Southampton Water. The microphone will be set up on a mast at a height of 4 m above local grade in the garden area to the west of the buildings. Although there are trees nearby, these are not currently in leaf. Nevertheless, most of the properties in this area have trees adjacent to them, thus under breezy conditions, and when the trees are in leaf, some additional ambient noise may be created by the presence of the trees. This measurement location will be used in conjunction with measurements at location LT1RO (see overleaf).

2.2 Roving Noise Measurement Locations

Location LT1RO: Recreation Ground Victoria Road, Netley Abbey	
	
Comments:	
This monitoring location will be used in conjunction with the fixed location LT1 at Malmesbury Court, Victoria Road. It will be used for short-term attended noise measurements and observations. The measurements will be made from the Abbey Hall recreation ground, approximately in line with the facade of the nearby properties fronting Southampton Water. The measurements will be made with the microphone 1.5 m above local grade. The measurements will be paused for passing traffic on Victoria Road, or any other local events. This measurement location will be mainly used at night. Daytime measurements may not be practicable here due to the usage of the recreation ground by members of the public. Daytime attended noise measurements may be possible at location LT1 itself.	

Location RO1: Westfield Common, Hamble	
	
Comments:	
This attended noise measurement location will be on the grassed area in front of No 4 Westfield Common. This has line of sight to Southampton Water. The microphone will be 1.5 m above local grade. The measurements will be paused for any local passing road traffic.	

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Appendix 4

Attended Noise Survey Results

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	Dan Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	NOR140
SLM Serial No:	1403290

			Local Weather					Subjective Audibility (1 – 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
RO3	8/6/2008 Day	09.30	1	N W	22	39	1	0	2	1	0	1	3	52	66	57	47	39	Distant banging; bird noise (high L_{Amax}); wind in trees; distant road noise; rope hitting masts of boats moored on Southampton Water; activity on adjacent properties; distant aircraft; distant shouting	
		09.35						0	2	1	0	1	3	53	64	58	48	39	Bird noise (high L_{Amax}); wind in trees; distant road noise; distant shouting; rope hitting masts of boats moored on Southampton Water; distant banging; talking on adjacent ground; distant aircraft	
		10.40	1	N W	22	39	1	0	2	1	0	0	3	53	66	58	48	41	Bird noise (high L_{Amax}); wind in trees; distant road noise; distant lawnmower; passing aircraft; activity on adjacent properties; passing commercial vessels (inaudible)	2 car doors slamming
		10.45						0	2	1	0	0	3	54	67	59	46	38	Bird noise (high L_{Amax}); wind in trees; distant road noise; distant aircraft; distant lawnmower; distant banging; talking on adjacent property; distant church bells; ropes hitting masts of boats moored on Southampton Water	
		12.05	1	N W	26	33	1	0	2	1	0	0	3	52	64	56	47	39	Bird noise (high L_{Amax}); wind in trees; distant aircraft; distant road noise; distant alarm.	
		12.10						0	2	0	0	1	3	49	63	53	43	38	Distant aircraft; talking on adjacent property; distant emergency vehicle siren; rope hitting masts of boats moored on Southampton Water; bird noise (high L_{Amax})	1 passer by

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	R Ditchburn

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2305223

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds/Sea	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Birds audible**	(Give number of, and reasons for pauses)
RO3	31/3/08 - E	19.29	0		9	40	8	1	1	2	3	4	2	48	59	52	43	40	Boat in Soton water, gulls, distant impulsive noise (from docks?)	
		19.35	0		9	52	8	1	1	3	2	4	2	44	56	46	44	42	Local kids in waste ground between location and water, large container vessel	
		21.33	<1	S W	7	43	8	1	1	2	1	4	2	47	52	48	46	44	Boats – large container ship + smaller vessels	
		21.41	<1	S W	6	43	8	1	1	1	1	3	2	43	57	43	42	41	Boats less obtrusive	
		23.33	<1	S W	8	81	8	1	1	2	1	3	4	42	60	45	40	38	'Cat' ferry, gulls, distant motorbike	
		23.38	0		7	91	8	1	1	2	1	2	4	41	53	42	40	39	Distant motorbike, sea, bird call	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	R Ditchburn

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Sea	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
RO3	1/4/08 – N	00.26	1	S W	9	92	8	1	2	1	1	2	3	42	52	43	42	41	Pause for dog walker, wind blowing chair?	1
		00.32	3	S W	8	95	8	1	3	1	1	3	2	44	64	47	42	40	Ferry passing, wind ‘whistling’ round house	
		02.38	2	S W	9	91	8	1	2	1	2	1	2	40	51	41	39	38	High pitch screech from docks direction	
		02.43	2	S W	8	94	8	1	2	1	2	1	2	40	57	41	40	39	Bell or chain in the wind, gulls	
		03.12	2	S W	9	92	8	1	3	1	1	1	3	41	54	42	41	40		
		03.17	2	S W	9	94	8	1	3	1	1	1	3	40	52	42	40	39		

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	R Ditchburn

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Lf noise coming from direction of docks Reasonably constant**	(Give number of, and reasons for pauses)
RO3	8/4/08 – N	00.48			2	73	0	1	1	3	2	2	2	39	56	39	38	37	Car door, LF (from docks) , car on Weston Lane	
		00.54			1	90	0	1	1	3	2	2	2	38	47	38	37	37		
		01.31			1	79	0	1	1	3	2	1	4	39	49	40	38	37	Bird calls constant	
		01.37			1	84	0	1	1	3	3	1	4	40		41	39	38	Road traffic audible	
		03.42			1	81	0	2	1	2	1	1	3	40	53	41	40	39	Bird call, Fawley audible, *heating (?) greenhouse	
		03.49			0	90	0	2	1	2	1	1	4	39	49	39	38	38	Bird call, “heating” noise stopped, * docks not audible	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	E English

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
RO3	16-04-2008 Night	01:42	0	/	6	50	4	3	/	3	2	/	/	37	54	38	35	34	Industry; engine (boat) noise; house boiler; road, noise; seagulls & birds	
		01.48	0	/	6	57	/	3	/	2	1	/	/	37	53	38	36	36	Industry; boat engine noise; road noise; seagulls; random banging from docks.	
		03:52	0	/		72	4	3	/	2	4	3	/	38	58	40	37	36	Seagulls; jet; boat engine noise from docks; cars on road; house boiler	Jet
		03:59	0	/	4	75	3	2	/	/	4	/	/	39	67	39	38	37	House boiler; industry; boat engine; seagulls	
		04:32	0	/	3	75	2	7	/	0	2	3	/	38	54	37	37	36	Boat engine; hum from industry; birds; seagulls; random cat cry; aircraft	
		04:38	0	/	3	75	1	2	/	/	2	3	/	39	50	40	38	37	Aircraft; birds; boat engine noise; seagulls; industry hum.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO4	10-04-2008 Day	0700	0	-	4	80	3	1	0	3	0	0	3	58	73	61	58	52	Banging from passing HGV traffic. Reversing siren audible from Red Funnel yard. Passing traffic. Bird noise. Distant aircraft.	None
		0705	-	-	-	-	-	0	0	3	0	0	3	59	75	61	57	50	Banging from passing HGV traffic (responsible for high L_{Amax}). Departing Red Funnel car ferry (inaudible). Passing traffic. Bird noise. Distant aircraft. Distant vehicle horn.	None
		0845	0	-	7	71	3	1	0	4	0	0	3	58	66	61	58	54	Banging from passing HGV traffic. Reversing siren intermittently audible from Red Funnel yard. Passing traffic. Bird noise. Distant car door slamming.	None
		0850	-	-	-	-	-	0	0	3	0	0	2	58	69	61	57	53	Banging from passing HGV traffic. Passing traffic. Bird noise. Children shouting in play area SW of location.	None
		1020	0	-	14	39	1	0	0	2	0	1	1	59	73	62	58	53	Banging from passing HGV traffic. Passing traffic. Engine noise from passing commercial vessel. Distant emergency vehicle siren. Bird noise. Distant aircraft. Leaf-blower operating in Mayflower Park W of location. Children shouting in play area SW of location. Leaf-blower subjective audibility: 3	None
		1025	-	-	-	-	-	0	0	2	0	1	0	58	68	60	57	52	Passing traffic. Engine noise from arriving Red Funnel car ferry. Ships horn audible W of location. Bird noise. Distant vehicle horn. Children shouting in play area SW of location.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO4	10-04-2008 Day	1250	1	S W	12	45	7	0	1	3	0	0	3	60	75	62	58	55	Banging from passing HGV traffic (responsible for high L_{Amax}). Passing traffic. Gate slamming and children shouting in play area SW of location. Bird noise. Vehicle horn. Bird noise subjective audibility: 2	None
		1255	-	-	-	-	-	1	0	3	0	0	3	60	70	61	59	56	Banging from passing HGV traffic. Passing traffic. Gate slamming and children shouting in play area SW of location. Bird noise. Reversing siren audible from Red Funnel yard. Bird noise subjective audibility: 1	None
		1455	1	S W	11	46	5	0	1	3	0	0	0	60	67	62	59	55	Banging from passing HGV traffic. Passing traffic. Gate slamming and children shouting in play area SW of location. Bird noise. Distant aircraft. Bird noise subjective audibility: 1	None
		1500	-	-	-	-	-	1	1	3	0	1	0	60	70	62	58	54	Banging from passing HGV traffic. Passing traffic. Gate slamming and children shouting in play area SW of location. Bird noise. Distant aircraft. Intermittent alarm audible from Red Funnel yard. Distant train and vehicle horns. Public address announcement audible from departing Red Funnel car ferry. Bird noise subjective audibility: 1	None
		1620	1	S W	12	46	5	0	0	3	0	0	3	59	71	62	59	54	Banging from passing HGV traffic. Passing traffic. Gate slamming and children shouting in play area SW of location. Distant aircraft. Vehicle horn. Passing vessel (inaudible). Aircraft subjective audibility: 1	None
		1625	-	-	-	-	-	0	1	3	0	0	2	60	68	62	59	55	Banging from passing HGV traffic. Passing traffic. Gate slamming and children shouting in play area SW of location. Distant aircraft. Passing vessel (inaudible). Aircraft subjective audibility: 1	Passing vehicle x1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	R. Ditchburn

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	B&K 2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	People	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO4	15-04-2008 Day	10:38	<1	S	11	33	1	1	1	4	1	1		63	72	65	62	58	Completey dominated by road noise	None
		10:45	<1	S	13	29	1	1	1	4	1	1		62	71	65	61	58	Car horn, revering alarm audible	None
		13:13	/	/	13	21	2	1	1	4	1	1	1	61	73	64	60	56	Road noise, children in Mayflower Park	None
		13:19	/	/	13	21	2	1	1	4	1	1	2	63	76	65	61	58	Road noise, (inc. HGVs); children	None
		15:14	2	S	14	35	1	1	1	4	1	1	2	61	70	64	60	56	Road noise, aeroplane, traffic slower	None
		15:20	2	S	13	36	1	1	1	4	1	1	2	61	76	63	60	57	Aeroplane, traffic, children	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO4	24-04-2008 Evening	1900	1	W	14	65	6	0	1	4	0	0	2	59	68	62	59	55	Banging and engine noise from passing HGV traffic. Passing traffic (engine noise and tyres on wet road surface) Children shouting in play area SW of location. Bird noise. Departing Red Funnel car ferry (inaudible). HGV subjective audibility: 1	None
		1905	-	-	-	-	-	0	1	3	0	0	2	61	74	63	60	55	Passing traffic (engine noise and tyres on wet road surface). Children shouting in play area SW of location. Bird noise. Passing aircraft. Passing traffic responsible for high L_{Amax}. Aircraft subjective audibility: 1	None
		2025	1	W S W	12	78	1	0	0	3	1	0	2	58	73	61	57	52	Banging and engine noise from passing HGV traffic. Engine noise from passing traffic. Children shouting and high frequency squeaking from swings in play area SW of location. Bird noise. Intermittent siren audible from docks NW of location. HGV subjective audibility: 1	None
		2030	-	-	-	-	-	0	0	3	0	1	3	58	65	60	57	54	Engine noise from passing traffic. Bird noise. Public address announcement audible from departing Red Funnel car ferry.	None
		2145	<1	S W	11	85	2	0	0	3	1	2	0	58	71	60	56	51	Engine noise from passing traffic. Engine noise audible from passing vessel and arriving Red Funnel car ferry. Passing vehicle stereo audible. Intermittent banging from docks NW of location. Mid frequency whine audible from docks NW of location.	None
		2150	-	-	-	-	-	0	0	3	1	0	0	56	70	59	54	50	Banging and engine noise from passing HGV traffic. Engine noise from passing traffic. Intermittent siren audible from Red Funnel yard. Intermittent banging audible from docks NW of location. Mid frequency whine audible from docks NW of location.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2305223

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **High L_{Amax} due to traffic noise**	(Give number of, and reasons for pauses)
R04	31/03/08 N	23:55	<1	WSW	8	88	0	0	0	3	1	0		51	62	55	47	43	Passing vehicles; low frequency rumbling from docks WSW of location	Vehicle stereo x 1
	01/04/08	00:00						2	0	3	1	0		52	64	56	48	44	Passing vehicles; low frequency rumbling from docks WSW of location; intermittent metallic banging from Red Funnel site; bird noise (seagulls); HGV 'tug' operating on Red Funnel site – engine noise	Vehicle stereo x 1
		01:40	<1	WSW	8	93	2	2	1	3	2	0		50	65	52	45	43	Passing vehicles; low frequency rumbling from docks WSW of location; intermittent banging W of location; vehicles manoeuvring in Red Funnel yard (engine noise); Red Funnel car ferry docking S of location – inaudible	HGV x 1
		01:45						2	1	3	2	1		51	62	55	47	45	HGV 'tug' operating in Red Funnel yard; engine noise from docking red funnel ferry; intermittent banging W of location; bird noise (seagulls)	Coach x 1; Passer-by x 1
		03:30	1	WSW			3	2	1	2	1	0		50	62	54	46	44	HGV 'tug' operating in Red Funnel yard; passing traffic; low frequency rumbling from docks SW of location; bird noise (seagulls); intermittent siren SW of location	HGV x 2
		03:35						2	1	2	1	0		52	63	57	46	43	HGV's manoeuvring in Red Funnel yard; passing traffic; bird noise; low frequency rumbling from docks SW of location; intermittent banging from Red Funnel yard	HGV x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **High L_{Amax} due to passing traffic**	(Give number of, and reasons for pauses)
R04	08/04/08 N	23:55	0	/	1	71	2	2	0	3	1	0		50	63	54	44	43	Passing vehicles, distant train; intermittent banging west of location; Distant aircraft; intermittent banging and reversing alarm from Red Funnel site; engine noise & vehicle horn from HGV movements on Red Funnel site.	
		00:00						1	0	3	1	0		51	60	54	47	44	Passing vehicles; HGV movements on Red Funnel site; intermittent banging west of location; voices from passers-by	HGV x 1
		01:20	0	/	1	93	1	0	0	3	2	0		51	60	55	48	46	Mid freq 'whine' WNW of location (docks); passing vehicles; distant vehicle horn; intermittent banging WSW of location (docks); intermittent alarm from docks W of location; passing vehicle music audible	
		01:25						1	0	3	2	0		52	66	55	48	45	Passing vehicles; mid frequency 'whine' from docks WNW of location; intermittent banging from docks WSW of location; distant vehicle horn; HGV 'tug' operating in Red Funnel Yard (engine noise); intermittent reversing alarm from Red Funnel site; distant road noise audible	
		03:20	0	/	0	98	1	0	0	2	1	1		50	64	53	45	44	Distant road noise audible; passing vehicles; bird noise; intermittent banging from docks west of location; car alarm SSE of location; distant vehicle horn; engine noise from departing Red Funnel ferry.	
		03:25						0	0	2	1	2		52	67	56	47	44	Passing vehicles; engine noise from departing Red Funnel ferry'; distant vehicle horn; intermittent banging from docks west of location; engine noise & banging from passing HGV traffic; bird noise (seagulls); engine noise from arriving Red Funnel ferry	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO4	29-04-2008 Night	0000	<1	S W	8	93	3	0	0	2	1	0	0	52	64	55	48	46	Shouting, music and squeaking from swings in play area SW of location. Passing traffic. Mid frequency rumbling and intermittent banging from docks W of location.	None
		0005	-	-	-	-	-	0	0	2	1	0	0	50	59	52	47	46	Shouting and music from play area SW of location. Passing traffic. Mid frequency rumbling and intermittent banging from docks W of location.	None
		0130	<1	S W	8	97	3	0	0	3	1	0	2	51	64	54	47	45	Engine noise and banging from passing HGV traffic. HGV engine idling in Red Funnel yard. Passing traffic. Mid frequency rumbling from docks W of location.	None
		0135	-	-	-	-	-	0	0	3	1	0	2	53	65	56	48	44	Engine noise and banging from passing HGV traffic. HGV engine idling in Red Funnel yard. Passing traffic. Mid frequency rumbling from docks W of location. Distant vehicle horn.	None
		0330	<1	W	8	98	4	0	0	2	1	0	2	55	65	59	51	46	HGV engine idling in Red Funnel yard. Passing traffic. Bird noise. Mid frequency rumbling from docks W of location. Bird noise subjective audibility: 3	None
		0335	-	-	-	-	-	1	0	2	1	0	1	53	65	57	50	43	HGV engine idling and intermittent banging from Red Funnel yard. Passing traffic. Bird noise. Mid frequency rumbling from docks W of location. Bird noise subjective audibility: 3	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO5	10-04-2008 Day	0725	0	-	5	81	3	0	0	2	1	0	3	55	67	58	54	50	Low frequency rumbling from docks S of location. Banging and engine noise from passing HGV traffic. Bird noise. Passing traffic. Distant vehicle horn. HGV traffic subjective audibility: 3	None
		0730	-	-	-	-	-	0	0	2	1	0	3	58	69	61	57	52	Low frequency rumbling from docks S of location. Banging and engine noise from passing HGV traffic. Bird noise. Distant road noise audible. Distant aircraft. Distant vehicle horn. Passing train HGV Traffic subjective audibility: 3 Train subjective audibility: 2	None
		0910	1	S	8	39	1	0	0	2	2	0	3	55	70	58	52	48	Low frequency rumbling from docks SE of location. Banging and engine noise from passing HGV traffic. Intermittent power tool noise NNE of location. Reversing siren audible E of location. Passing passenger train. Bird noise. Distant aircraft. Passing traffic. Distant vehicle horn. HGV traffic subjective audibility: 3 Train subjective audibility: 2 Power tool noise subjective audibility: 1	Approaching vehicle x1
		0915	-	-	-	-	-	0	0	2	1	0	3	56	67	59	52	48	Banging and engine noise from passing HGV traffic. Intermittent power tool noise NNE of location. Intermittent banging and reversing siren audible from docks S of location. Passing passenger train. Bird noise. Distant aircraft. Passing traffic. Distant vehicle horn. Distant road noise audible. HGV traffic subjective audibility: 3 Train subjective audibility: 1 Power tool noise subjective audibility: 2	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO5	10-04-2008 Day	1044	1	S S E	12	25	2	1	0	2	1	0	2	56	68	60	52	48	Low frequency rumbling from docks SE of location. Banging and engine noise from passing HGV traffic. Bird noise. Passing traffic. Distant vehicle horn. Passing passenger train. Aircraft noise. Intermittent banging audible from adjacent property. HGV traffic subjective audibility: 3 Train subjective audibility: 1 Aircraft subjective audibility: 1	None
		1050	-	-	-	-	-	1	0	2	1	0	2	55	69	58	52	48	Low frequency rumbling from docks SE of location. Banging and engine noise from passing HGV traffic. Bird noise. Passing traffic. Distant vehicle horn. Passing passenger train. Aircraft noise. Intermittent banging audible from adjacent property. Distant train horn. Intermittent alarm SSW of location. HGV traffic subjective audibility: 3 Train subjective audibility: 1 Aircraft subjective audibility: 1	Approaching vehicle x1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO5	10-04-2008 Day	1335	0	-	14	65	6	0	0	2	1	0	2	57	65	60	56	54	Banging and engine noise from passing HGV traffic. Noise from tree-shredder operating N of location. Intermittent alarm from docks E of location. Intermittent metallic banging from docks S of location. Bird noise. Passing traffic. Tree-shredder subjective audibility: 3 Bird noise subjective audibility: 1	None
		1340	-	-	-	-	-	0	0	2	1	0	3	59	72	62	55	51	Banging and engine noise from passing HGV traffic (responsible for high L_{Amax}). Intermittent noise from tree-shredder operating N of location. Intermittent alarm from docks SSW of location. Passing passenger train. Bird noise. Distant aircraft. Passing traffic. Tree-shredder subjective audibility: 1 Bird noise subjective audibility: 1	None
		1520	1	S	13	39	6	0	0	2	1	0	3	59	69	61	56	50	Banging and engine noise from passing HGV traffic. Noise from tree-shredder operating N of location. Intermittent alarm from docks S of location. Passing passenger and freight trains. Bird noise. Distant aircraft. Distant vehicle horn. Passing traffic. Tree-shredder subjective audibility: 1 Train subjective audibility: 2 Bird noise subjective audibility: 2	None
		1525	-	-	-	-	-	0	0	2	1	0	3	60	70	64	58	53	Banging and engine noise from passing HGV traffic. Low frequency rumbling from docks SW of location. Intermittent alarm from docks S of location. Passing passenger and freight trains. Bird noise. Distant aircraft. Distant vehicle horn. Passing traffic. Train subjective audibility: 2 Bird noise subjective audibility: 2 Aircraft subjective Audibility: 1	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO5	10-04-2008 Day	1645	<1	S	13	35	5	0	0	2	2	0	3	57	70	61	55	42	Banging and engine noise from passing HGV traffic. Low frequency rumbling from docks SSW of location. Intermittent alarm from docks SSW of location. Passing passenger train. Distant emergency vehicle siren. Bird noise. Distant aircraft. Passing traffic. Train subjective audibility: 1 Bird noise subjective audibility: 2 Aircraft subjective Audibility: 1	None
		1650	-	-	-	-	-	0	0	2	2	0	3	57	68	60	54	50	Banging and engine noise from passing HGV traffic. Low frequency rumbling from docks SSW of location. Intermittent banging and alarm from docks SSW of location. Passing passenger train. Bird noise. Distant aircraft. Passing traffic. Train subjective audibility: 1 Bird noise subjective audibility: 1 Aircraft subjective Audibility: 1	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	R. Ditchburn

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	B&K 2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Trains	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	Train line nearby	(Give number of, and reasons for pauses)
RO5	15-04-2008 Day	11:40	1	S	23	27	1	2	1	4	2	1	3	58	72	63	52	48	Train passed, birds, road noise	Talking x 1
		11:47	<1	S W	23	23	1	2	1	4	2	1	3	95	66	59	52	48	Cars on road, HGV's, train	None
		13:43	<1	S	17	27	3	1	1	4	2	1	3	59	74	61	56	49	Train, HGV (cargo banging)	None
		13:53	/	/	16	27	3	1	1	4	2	1	3	58	75	60	55	51	Train, HGV's	None
		15:40	1	S W	19	31	0	1	1	4	2	1	3	59	75	61	58	54	Train, aeroplane, HGV's, car alarm	None
		15:47	2	S W	17	33	0	1	1	4	2	1	3	59	72	62	57	53	Car fan belt, HGV's, aeroplane, train.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO5	24-04-2008 Evening	1925	0	-	13	68	4	0	0	1	1	0	1	56	70	59	52	50	Banging and engine noise from passing HGV traffic. Bird noise. Distant road noise audible. Passing aircraft. Passing traffic. Distant shouting and referee's whistle N of location. Intermittent siren audible from docks SW of location. Passing passenger train Bird noise subjective audibility: 2	None
		1930	-	-	-	-	-	0	0	1	2	0	2	56	66	59	53	51	Banging and engine noise from passing HGV traffic. Bird noise. Distant road noise audible. Passing aircraft. Passing traffic. Distant shouting and referee's whistle N of location. Intermittent banging and siren audible from docks SW of location. Distant vehicle horn.	None
		2050	0	-	10	84	2	0	0	1	1	0	3	57	71	61	52	48	Banging and engine noise from passing HGV traffic. Distant road noise audible. Passing traffic. Distant shouting and referee's whistle N of location. High frequency whine from docks SW of location. Intermittent siren audible from docks SW of location. Passing passenger trains (responsible for high L_{Amax}). Train subjective audibility: 1	None
		2055	-	-	-	-	-	0	0	1	1	0	3	56	66	59	53	51	Banging and engine noise from passing HGV traffic. Distant road noise audible. Passing traffic. Distant shouting and referee's whistle N of location. High frequency whine from docks SW of location. Intermittent siren audible from docks SW of location. Distant emergency vehicle siren.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO5	24-04-2008 Evening	2210	0.0	-	8.1	85	2	0	0	1	2	0	3	52	68	55	50	49	Banging and engine noise from passing HGV traffic. Distant road noise audible. Passing traffic. Vehicle engine idling N of location. Distant vehicle horn. High frequency squealing and intermittent siren audible from docks SW of location.	None
		2215	-	-	-	-	-	0	0	1	2	0	1	52	64	53	20	49	Banging and engine noise from passing HGV traffic. Distant road noise audible. Passing traffic. Vehicle engine idling N of location. Distant vehicle horn. High frequency squealing audible from docks SW of location .Intermittent banging and siren audible from docks SW of location. Passing passenger train.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2305223

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry/birds	Wind in trees and vegetation	Roads	Docks	Ships	HGVs	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **High L_{Amax} due to HGV traffic noise**	(Give number of, and reasons for pauses)
R05	31/03/08 -N	00:25	1	S	8	92	2	0	0	1	2	0	4	56	71	58	51	48	Engine noise and banging from passing HGV traffic; distant vehicle horn, metallic banging south of location, distant vehicle traffic, distant siren SW of location, low frequency rumbling S of location, passing train..	HGV x III Dog x 1
		00:35						0	0	1	2	0	4	54	68	57	52	49	Passing train, distant siren SW of location, low frequency rumbling S of location, distant vehicle traffic, passing HGV traffic (engine noise and banging)	Train x 1
		02:10	1	S	7	94	3	1	0	1	2	0	4	55	66	59	51	48	Banging & engine noise from HGV traffic, distant road noise, passing train, intermittent banging from docks S of location, intermittent siren from docks S of location	
		02:15						1	0	1	2	0	3	55	65	58	53	49	Distant road noise, intermittent banging and siren from docks S of location, low frequency rumble from docks S of location, passing train, banging & engine noise from HGV traffic distant vehicle horn.	
		04:00	1	S S W	10	91	7	0	0	1	2	0	4	55	68	60	51	48	Low frequency rumbling SW of location, passing vehicles, distant road noise, engine noise & banging from HGV traffic, bird noise, intermittent siren SW of location	
		04:10						0	0	1	2	0	4	55	68	58	52	49	Low frequency rumbling SW of location, passing vehicles engine noise & banging from HGV traffic intermittent siren SW of location, bird noise.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry/birds	Wind in trees and vegetation	Roads	Docks	Ships	HGVs	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **High L_{Amax} due to HGV traffic noise**	(Give number of, and reasons for pauses)
R05	01/04/08 N	00:20	0	/	2	81	2	1	0	1	1	0	2	51	65	55	47	45	Engine noise and banging from passing HGV traffic; passing train; road noise audible; intermittent banging from docks south of location; distant vehicle horn.	
		00:25							1	1	2	0	2	51	63	53	47	45	Road noise audible; engine noise & banging from passing HGV traffic; intermittent alarm south of location; distant dog barking; unidentified high frequency ‘squealing’ ESE of location	
		01:50	0	/	2	89	2	0	0	1	2	0	3	54	68	58	50	47	Intermittent alarm SSW of location; banging & engine noise from passing HGV traffic; road noise audible; mid frequency ‘whine’ SSW of location.	
		01:55						0	0	1	2	0	2	50	65	53	47	45	Intermittent alarm SSW of location; mid frequency ‘whine’ SSW of location; road noise audible; banging & engine noise from passing HGV traffic; distant vehicle horn; intermittent banging SSW of location.	
		03:40	0	/	2	92	1	3	0	1	1	0	2	53	65	56	48	47	Bird noise; engine noise & banging from passing HGV traffic; distant road noise audible; intermittent alarm SW of location (docks)	
		03:45						3	0	1	2	0	2	53	68	57	49	47	Bird noise; engine noise & banging from passing HGV traffic; distant vehicle horn; distant road noise audible; intermittent alarm SW of locations (docks); intermittent metallic banging & high frequency ‘squealing’ east of location.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO5	29-04-2008 Night	0020	0	-	6	90	2	0	0	0	2	0	3	51	66	54	48	46	Engine noise and banging from passing HGV traffic. Vehicle engine idling SW of location. Passing traffic. Intermittent banging and siren from docks SW of location. Intermittent high frequency squealing from docks W of location.	None
		0025	-	-	-	-	-	0	0	1	2	0	3	54	66	58	49	47	Engine noise and banging from passing HGV traffic. Passing traffic. Intermittent banging and siren from docks SW of location. Distant road noise intermittently audible.	None
		0200	0	-	7	95	5	0	0	1	2	0	3	51	66	54	47	45	Engine noise and banging from passing HGV traffic. Vehicle engine idling SW of location. Passing traffic. Intermittent banging and siren from docks SW of location. Distant road noise intermittently audible. Distant vehicle horn.	None
		0205	-	-	-	-	-	0	0	1	2	0	3	53	69	55	46	44	Engine noise and banging from passing HGV traffic. Passing traffic. Intermittent banging and siren from docks SW of location. Distant road noise intermittently audible. Distant vehicle horn. Passing passenger train.	Coughing x1
		0355	0	-	7	98	3	0	0	1	2	0	3	51	64	54	46	44	Engine noise and banging from passing HGV traffic. Bird noise. Passing traffic. Intermittent banging and siren from docks SW of location. Distant road noise intermittently audible. Distant vehicle horn. Bird noise subjective audibility: 1	None
		0400	-	-	-	-	-	0	0	1	2	0	3	53	69	56	47	44	Engine noise and banging from passing HGV traffic. Bird noise. Passing traffic. Intermittent banging and siren from docks SW of location. Distant road noise intermittently audible. Bird noise subjective audibility: 1	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT2	10-04-2008 Day	0805	0	-	7	75	4	0	0	3	0	0	4	51	58	53	51	49	Passing traffic on Millbrook Road. Bird noise. Distant dog barking. Distant emergency vehicle siren. Distant aircraft.	Passing vehicle x1
		0810	-	-	-	-	-	0	0	3	0	0	4	51	60	53	50	48	Passing traffic on Millbrook Road. Bird noise. Banging from HGV traffic on Millbrook road. Distant vehicle horn. Distant aircraft. Intermittent metallic banging SE of location.	Passing vehicle x1
		0950	<1	S W	12	33	1	1	0	2	0	0	3	52	60	54	52	49	Passing traffic on Millbrook Road. Power tool noise SSE of location. Distant train. Intermittent banging from property No 4. Distant train and vehicle horn. Distant aircraft. Ringing telephone audible. Power tool subjective audibility: 3	Banging at No. 4 x2 Passing vehicle x1
		0955	-	-	-	-	-	1	0	2	0	0	3	51	65	53	50	48	Passing traffic on Millbrook Road. Bird noise. Distant dog barking. Intermittent banging and power tool noise SSE of location. Distant aircraft. Talking at property No 4. Power tool subjective audibility: 1	Talking at No. 4 x1 Vehicle door slamming x1
		1120	<1	S W	15	25	6	1	1	2	1	0	2	53	59	55	52	50	Passing traffic on Millbrook Road. Power tool noise SSE of location. Bird noise. Distant train. Distant emergency vehicle siren. High frequency squealing SSE of location. Siren intermittently audible from docks SW of location. Power tool subjective audibility: 3	Passer-by x2 Passing vehicle x1
		1125	-	-	-	-	-	1	0	2	1	0	2	51	59	53	51	49	Passing traffic on Millbrook Road. Power tool noise SSE of location. Bird noise. Distant train. Distant dog barking. High frequency squealing intermittently audible SSE of location. Siren intermittently audible from docks S of location. Power tool subjective audibility: 2	Passer-by x2 Passing vehicle x1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT2	10-04-2008 Day	1425	<1	S W	12	49	7	2	0	3	0	0	1	52	61	54	52	51	Passing traffic on Millbrook Road. Intermittent banging SE of location. Banging from HGV traffic on Millbrook road. Distant vehicle horn. Bird noise. Distant dog barking. Bird noise subjective audibility: 2	Passing vehicle x1
		1435	-	-	-	-	-	2	0	3	0	0	1	52	58	53	52	50	Passing traffic on Millbrook Road. Intermittent banging SE of location. Banging from HGV traffic on Millbrook road. Distant train and vehicle horns. Bird noise. High frequency squealing audible S of location. Intermittent banging WSW of location. Bird noise subjective audibility: 2	Approaching vehicle x2
		1555	<1	S W	13	41	6	0	1	3	1	0	1	54	63	56	54	52	Passing traffic on Millbrook Road. Intermittent banging from docks S of location. Banging from HGV traffic on Millbrook Road. Distant aircraft. Bird noise. Bird noise subjective audibility: 2 Aircraft subjective audibility: 1	Passing vehicle x1
		1600	-	-	-	-	-	0	0	3	1	0	1	54	61	56	53	51	Passing traffic on Millbrook Road. Intermittent alarms from docks WSW and SE of location. Banging from HGV traffic on Millbrook road. Distant aircraft. Bird noise. Intermittent rapid banging SE of location. Bird noise subjective audibility: 2 Aircraft subjective audibility: 1	Approaching vehicle x1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT2	10-04-2008 Day	1725	<1	W	15	35	2	0	1	3	1	0	2	55	65	57	54	52	Passing traffic on Millbrook Road. Banging from HGV traffic on Millbrook road. Intermittent alarm audible from docks SSW of location. Distant train. Bird noise. Distant dog barking. Distant aircraft. Bird noise subjective audibility: 1 Aircraft subjective audibility: 1 Train subjective audibility: 1	Approaching vehicle x2
		1730	-	-	-	-	-	0	1	3	1	0	2	54	60	56	54	52	Passing traffic on Millbrook Road. Banging from HGV traffic on Millbrook Road. Intermittent alarm audible from docks SSW of location. Distant train. Bird noise. Distant aircraft. Vehicle horn. Bird noise subjective audibility: 1 Train subjective audibility: 1	Passing vehicle x3 Shouting x1 Mobile telephone x1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	R. Ditchburn

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	B&K 2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Local Noise – neighbours	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT2	15-04-2008 Day	12:39	/	/	21	26	2	1	1	4	1	1	2	51	64	52	50	48	Neighbours talking end of road	Cars x 2;
		12:48	<1	S W	24	23	2	1	1	4	1	1	4	50	66	51	48	46	Some DIY (sawing & banging) @ No. 4	Van x 1
		14:38	1	S	19	28	3	1	1	4	1	1	4	58	72	60	55	52	Resident 'jet washing' wall @ end of street	Car x 1
		14:44						1	1	4	1	1	1	53	67	54	52	50	Jet washing stopped; road dominant; jet washing started again at 3.50	None
		16:25	/	/	20	28	1	1	1	4	1	1	3	55	72	57	54	52	Resident 'jet washing' & DIY	Cars x 2
		16:31	1	S W	24	27	0	1	1	4	1	1	4	55	69	56	54	52	Car door slamming; train, resident sweeping water	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT2	24-04-2008 Evening	2000	1	W	12	73	2	0	1	3	1	0	0	57	68	59	56	53	Road noise audible from traffic on Millbrook road. Bird noise. Passing aircraft (responsible for high L_{Amax}). Distant shouting W of location. Distant referee's whistle SSE of location. Strimmer in use intermittently behind opposite property. Intermittent banging and siren audible from docks SW of location. Bird noise subjective audibility: 1	Activity on adjacent property x1
		2005	-	-	-	-	-	0	1	3	2	0	1	56	67	58	56	52	Banging from HGV traffic and road noise audible from traffic on Millbrook road. Bird noise. Distant shouting W of location. Distant referee's whistle SSE of location. Strimmer in use intermittently behind opposite property. Intermittent banging and siren audible from docks S of location. Distant dog barking. Bird noise subjective audibility: 1	Passing vehicle x1
		2110	1	W	11	81	3	0	0	2	1	0	1	52	59	54	52	50	Banging from HGV traffic and road noise audible from traffic on Millbrook road. Distant referee's whistle SSE of location. Distant dog barking. Intermittent banging and siren audible from docks W of location. Distant train. Distant train and vehicle horns.	Passing vehicle x1
		2120	-	-	-	-	-	0	0	2	1	0	0	51	57	52	51	49	Road noise audible from traffic on Millbrook road. Distant shouting SW of location. Distant referee's whistle SSE of location. Intermittent banging and siren audible from docks W of location. Distant train.	Activity on opposite property x1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT2	24-04-2008 Evening	2235	1	S W	9	86	2	0	0	3	2	0	0	56	60	54	51	49	Road noise audible from traffic on Millbrook Road. Vehicle engine idling S of location. Burglar alarm sounding intermittently W of location. Intermittent banging and siren audible from docks W of location.	None
		2240	-	-	-	-	-	0	1	3	2	0	0	50	56	52	50	48	Road noise audible from traffic on Millbrook Road. Vehicle engine idling S of location. Intermittent banging and siren audible from docks W of location. Distant train. Distant vehicle horn and emergency vehicle siren.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2305223

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
LT2	01/04/08 N	01:20	1	S W	8	97	2	1	0	2	2	0		47	54	49	46	45	Distant docks siren S of location; traffic on Millbrook Road; intermittent banging SW of location; low frequency rumbling from docks SW of location; banging from HGV traffic on Millbrook Road; distant train	
		01:25						1	0	2	2	0		48	54	50	47	45	Distant docks siren S of location; traffic on Millbrook Road; low frequency rumbling from docks SW of location; distant reversing siren; distant train; intermittent banging SW of location; banging from HGV traffic on Millbrook Road; distant vehicle horn	
		03:05	0	/	9	92	2	1	1	3	2	0	1	48	57	50	47	46	Passing traffic (Millbrook Road); distant train; banging from HGV traffic (Millbrook Road); intermittent banging SSW of location; intermittent siren WSW of location; bird noise.	
		03:10						1	0	3	2	0	1	48	55	51	47	45	Passing traffic (Millbrook Road); bird noise; intermittent siren WSW of location; intermittent banging WSW of location; banging from HGV traffic (Millbrook Road)	
		04:47	2	W	10	98	7	0	1	3	2	0	2	50	57	52	50	49	Passing traffic (Millbrook Road); bird noise; intermittent alarm SW of location; banging from HGV traffic (Millbrook Road)	
		04:55						0	1	3	2	0	2	51	61	53	50	48	Passing traffic (Millbrook Road); bird noise; intermittent alarm SW of location; banging from HGV traffic (Millbrook Road); distant vehicle horn; intermittent banging SSW of location	Wind noise

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2305223

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
LT2	08/4/08 N	01:00	0	/	-1	89	2	0	0	2	1	0		43	52	45	42	41	Mid frequency 'rushing' noise with intermittent rattle; road noise audible; intermittent banging WSW & SE of location;' banging from HGVs on Millbrook Road.	
		01:05						0	0	2	1	0		43	53	45	43	42	Noise from boiler flue on property SE of location; road noise audible; banging from HGV's on Millbrook Road; intermittent banging WSW of location; intermittent alarm WSW of location; intermittent banging from property WNW of location.	
		02:50	0	/	-2	98	2	0	0	3	2	0		44	51	47	43	41	Intermittent banging SE (docks) & ENE of location; road noise audible; boiler flue noise from property opposite location; intermittent reversing siren SE of location (docks); engine noise & banging from HGV traffic on Millbrook Road.	
		02:55						0	0	2	2	0		44	52	46	43	41	Intermittent banging S of location (docks); road noise audible; intermittent metallic banging SE of location (docks); boiler flue noise from property opposite; engine noise & banging from HGV traffic on Millbrook Road; high frequency 'squealing' from docks S of location (intermittent).	
		04:25	0	/	-3	98	2	0	0	2	1	0		45	52	47	44	42	Bird noise; intermittent banging SW of location (docks); intermittent alarm SE of location (docks); passing traffic on Millbrook Road; engine noise & banging from HGV traffic on Millbrook Road; distant road noise audible.	
		04:30						0	0	2	1	0		44	53	47	43	42	Bird noise; engine noise & banging from HGV traffic on Millbrook Road; distant road noise audible; intermittent alarm from docks SE of location.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT2	29-04-2008 Night	0110	1	S W	6	98	1	0	0	2	2	0	1	46	55	48	46	44	Passing traffic on Millbrook Road. Banging from HGV traffic on Millbrook Road. Bird noise. Mid frequency hum from docks SW of location. Intermittent banging and siren from docks SW of location. Distant train. Vehicle engine idling S of location.	Passing vehicle x1
		0115	-	-	-	-	-	0	0	2	2	0	1	46	53	47	45	44	Passing traffic on Millbrook Road. Banging from HGV traffic on Millbrook road. Mid frequency hum from docks SW of location. Intermittent banging and siren from docks SW of location. Distant train. Vehicle engine idling S of location.	None
		0300	1	S W	8	98	5	0	0	3	2	0	0	47	58	49	47	45	Passing traffic on Millbrook Road. Intermittent banging and siren from docks SW of location. Distant train. Vehicle engine idling S of location.	None
		0305	-	-	-	-	-	0	0	3	3	0	0	46	63	48	45	43	Passing traffic on Millbrook Road. Bird noise. Intermittent banging and siren from docks SW of location. Distant train. Vehicle engine idling S of location. Distant vehicle horn.	None
		0430	1	W	8	98	6	0	0	3	1	0	2	48	59	52	45	42	Passing traffic on Millbrook Road. Banging from HGV traffic on Millbrook Road. Bird noise. Intermittent banging and siren from docks S of location. Distant vehicle horn. Bird noise subjective audibility: 2	None
		0435	-	-	-	-	-	0	0	3	2	0	2	49	60	52	48	45	Passing traffic on Millbrook Road. Banging from HGV traffic on Millbrook Road. Bird noise. Low frequency rumble from docks W of location. Distant vehicle horn. Bird noise subjective audibility: 2	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO6	10-04-2008 Day	0745	1	S W	5	76	4	0	0	4	0	0	2	64	70	66	64	62	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Vehicle horn. Bird noise subjective audibility: 2	Passer-by x1
		0750	-	-	-	-	-	0	0	4	0	0	2	63	69	65	63	62	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Vehicle horn. Bird noise subjective audibility: 1	None
		0935	1	S W	10	35	1	0	0	3	0	0	3	63	74	65	62	61	Banging from dock gate twenty HGV traffic. Passing traffic (responsible for high L_{Amax}). Distant aircraft. Pneumatic drill operating S of location. Pneumatic drill subjective audibility: 2 Aircraft subjective audibility: 2	None
		0940	-	-	-	-	-	0	0	3	1	0	3	62	68	64	62	60	Banging from dock gate twenty HGV traffic. Passing traffic. Distant aircraft. Pneumatic drill operating intermittently S of location. Metallic banging from unloading of gas cylinders W of location. Intermittent siren audible from docks S of location. Pneumatic drill subjective audibility: 2 Aircraft subjective audibility: 2	Passer-by x1
		1105	1	S W	11	24	4	1	0	3	1	0	3	63	71	65	63	61	Banging from dock gate twenty HGV traffic. Passing traffic. Distant aircraft. Distant train horn. Straddle carrier siren audible from freightliner terminal SSW of location. Distant emergency vehicle siren. Aircraft subjective audibility: 1	Passing ambulance siren x1
		1110	-	-	-	-	-	1	0	3	1	0	1	62	73	64	62	61	Banging from dock gate twenty HGV traffic. Passing traffic. Distant aircraft. Bird noise. Straddle carrier siren intermittently audible from freightliner terminal SSW of location. Aircraft subjective audibility: 1	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO6	10-04-2008 Day	1405	1	S W	11	51	6	0	0	4	0	0	2	65	72	67	65	63	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Distant aircraft. Distant train. Vehicle horn. Bird noise subjective audibility: 1	Passer-by x1
		1410	-	-	-	-	-	0	0	4	0	0	2	66	73	68	65	63	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Distant aircraft. Aircraft subjective audibility: 1 Bird noise subjective audibility: 1	None
		1540	1	S W	14	38	6	0	0	3	0	0	2	64	73	66	64	57	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Distant aircraft. Vehicle horn. Aircraft subjective audibility: 1 Bird noise subjective audibility: 1	Passer-by x1 Approaching vehicle x1
		1545	-	-	-	-	-	0	0	4	0	0	2	67	72	68	66	64	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Distant aircraft. Vehicle horn. Aircraft subjective audibility: 1 Bird noise subjective audibility: 2	None
		1705	1	S W	15	36	3	0	1	3	0	0	4	65	72	67	65	63	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Distant aircraft. Passing vehicle stereo audible. Aircraft subjective audibility: 1 Bird noise subjective audibility: 1	Passer-by x1
		1710	-	-	-	-	-	0	0	3	0	0	4	65	72	66	65	64	Banging from dock gate twenty HGV traffic. Passing traffic. Bird noise. Distant aircraft. Vehicle horn. Passing vehicle stereo audible. Aircraft subjective audibility: 1	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	R. Ditchburn

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	B&K 2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO6	15-04-2008 Day	12:17	1	S W	14	25	1	1	1	4	1	1		62	72	64	61	58	Car horn, bird call fair close, HGVs	None
		12:22	1	S	15	27	1	1	1	4	1	1		62	74	64	61	60	Cars on roundabout very dominant	None
		14:20	<1	W	16	33	3	1	1	4	1	1		63	70	65	63	61	Car horn @ 3 mins; road noise	Boy talking x 1
		14:25	<1	S W	14	34	3	1	1	4	1	1		65	77	66	64	62	Police siren; loud motorbike;	1 x passerby
		16:09	1	S W	16	36	0	1	1	4	1	1		64	73	66	64	62	Traffic on roundabout	None
		16:15	1	S W	14	37	0	1	1	4	1	1		65	77	67	64	62	Traffic, car horn	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO6	24-02-2008 Evening	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Measurements at this location omitted throughout the survey period due to roadworks taking place on Millbrook roundabout.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2305223

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
R06	01/04/08 N	01:00	1	S W	8	94	2	0	0	2	2	0		57	67	59	56	54	Passing vehicles; banging from docks SSW of location; distant siren SSW of location; banging from HGV traffic (dock gate 20); low frequency rumbling from docks SSW.	Motercycle x 2
		01:05						0	0	2	2	0		57	66	59	55	53	Passing vehicles; distant siren SSW; banging from docks SSW; low frequency rumbling from docks SSW; banging from HGV traffic (Dock Gate 20); distant vehicle horn	
		02:45	1	S W	8	94	3	0	0	2	3	0		56	63	58	55	53	Passing vehicles; siren from docks SSW of location; engine noise & banging from Dock Gate 20 HGV traffic; bird noise.	
		02:50						0	0	1	3	0	3	57	73	59	55	53	Passing vehicles; intermittent siren & banging from docks SSW of location; engine noise & banging from Dock Gate 20 HGV traffic; bird noise.	
		04:25	2	S W	`0	94	7	0	0	3	2	0		58	67	61	56	53	Passing vehicles; banging & engine noise from Dock Gate 20 HGV traffic; intermittent sirens from docks SW of location.	
		04:30						0	0	3	2	0		57	65	60	56	54	Passing vehicles; banging & engine noise from Dock Gate 20 HGV traffic; intermittent siren from docks SW of location; bird noise	Wind noise x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	1933780

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGVs	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **High L_{Amax} due to Dock Gate 20 HGV traffic**	(Give number of, and reasons for pauses)
R06	08/04/08 N	00:40	/		-1	90	0	0	0	2	0	0	3	56	66	59	55	51	Passing vehicles; vehicle engine idling 15m SW of location; engine noise & banging from Dock Gate 20 HGV traffic.	
		00:45						0	0	2	1	0	3	54	73	56	51	48	Passing vehicles; vehicle engine ideling 15m SW of location; engine noise & banging from Dock Gate 20 HGV traffic; intermittent reversing siren SSW of location (from docks).	
		02:25	<1		-3	94	0	0	0	3	2	0	2	53	65	55	51	49	Passing vehicles; intermittent alarm SSE of location (docks); engine noise & banging from Dock Gate 20 HGV traffic; mid frequency 'whine' SSW of location (docks)	
		02:30						0	0	2	2	0	3	54	71	58	51	49	Passing vehicles; mid frequency 'whine' from docks SSW of location; intermittent alarm SSE of location; engine noise & banging from Dock Gate 20 HGV traffic	
		04:05	0		-2	96	1	0	0	3	1	0	3	56	69	60	54	51	Distant road noise audible; passing traffic; engine noise & banging from Dock Gate 20 HGV traffic; bird noise; intermittent alarm from docks SSE of location.	
		04:10						0	0	3	1	0	2	55	66	58	53	48	Intermittent alarm from docks SSW of location; passing vehicles; engine noise & banging from Dock Gate 20 HGV traffic; distant road noise audible; bird noise.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO6	29-04-2008 Night	0040	0	-	6	95	1	0	0	2	0	0	2	63	79	64	59	56	Mini excavator and road roller operating approx 30 metres SE of location (engine noise, reversing siren and metallic banging). Engine noise and banging from dock gate twenty HGV traffic. Passing traffic. No dock noise audible. Roadworks subjective audibility: 4	Passer-by x1
		0100	-	-	-	-	-	0	0	2	0	0	2	65	77	69	60	57	Mini excavator and road roller operating approx 30 metres SE of location (engine noise, reversing siren and metallic banging). Engine noise and banging from dock gate twenty HGV traffic. Passing traffic. Shouting from roadworks contractors. No dock noise audible. Roadworks subjective audibility: 4	None
		0230	<1	S	8	97	6	0	0	2	1	0	3	57	77	58	52	49	Engine noise and banging from dock gate twenty HGV traffic. Vehicle engine idling SSE of location. Passing traffic. Intermittent siren and banging from docks S of location. Public address announcement audible from Freightliner terminal. Mid frequency 'rushing' noise audible from docks S of location. Bird noise.	None
		0235	-	-	-	-	-	0	0	2	1	0	3	53	74	54	50	48	Engine noise and banging from dock gate twenty HGV traffic. Vehicle engine idling SSE of location. Passing traffic. Intermittent siren and banging from docks S of location. Public address announcement audible from Freightliner terminal. Mid frequency 'rushing' noise audible from docks S of location. Bird noise. Distant vehicle horn.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	HGV's	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO6	29-04-2008 Night	0415	0	-	7	98	2	0	0	2	1	0	3	55	74	57	51	48	Engine noise and banging from dock gate twenty HGV traffic. Passing traffic. Intermittent siren from docks S of location. Bird noise. Distant vehicle horn. Bird noise subjective audibility: 2	None
		0420	-	-	-	-	-	0	0	2	1	0	4	57	74	59	54	50	Engine noise and banging from dock gate twenty HGV traffic. Passing traffic. Intermittent siren from docks S of location. Bird noise. Bird noise subjective audibility: 2	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	B&K 2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**Background from roads or docks – uncertain; loud birds – cause of some L_{Amax}**	(Give number of, and reasons for pauses)
RO7	17-03-2008 Day	13:00	1	N E	12	38	7	0	1	2	2	0	3	53	70	54	51	50	L_{A90} from roads on east side of river; some crashes & bangs from docks; loud birdsong	Car 1 x; passerby x 1
		13:11	1	N E	12	40	7	1	0	2	2	0	3	55	71	55	50	49	Relative contribution from roads/docks uncertain	None
		14:47	1	E	10	53	8	0	1	2	2	1	2	51	59	53	51	49	Some aircraft noise; less impact noise from docks so lower L_{Amax}	Passerby x 1
		14:56	1	E	10	47	8	0	1	1	2	0	2	51	75	52	50	49	L_{Amax} due to crash noise at docks	None
		16:28	1	E	9	44	8	0	1	0	3	0	3	53	67	56	51	50	Loud birdsong & dock noise; reversing alarms and crashes; distant aircraft	None
		16:34	1	E	9	44	8	0	14	1	3	0	2	53	67	55	51	50	Loud birdsong & dock noise; reversing alarms and crashes; distant aircraft	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO7	16-04-2008 Day	08:20	0	/	7	64	0	1	0	1	2	0	2	52	62	54	52	44	Intermittent siren, banging and engine noise from docks E of location. Bird noise. Passing traffic on Eling Hill. Distant train horn.	None
		08:25	-	-	-	-	-	1	0	1	3	0	2	53	68	55	51	49	Engine noise, intermittent banging and intermittent siren from docks E of location; bird noise; passing traffic on Eling Hill; distant train and vehicle horn;	Traffic x 1
		10:20	1	E	13	31	3	2	0	0	3	0	3	51	64	53	51	44	Intermittent power tool noise N of location; low frequency rumbling; intermittent banging and intermittent alarms from docks E of location;	None
		10:25	-	-	-	-	-	2	0	1	3	0	3	53	60	55	52	50	Distant aircraft; Low frequency rumbling; intermittent siren and intermittent banging from docks E of location.; bird noise; passing traffic on Eling Hill; intermittent power tool noise N of location.	None
		12:00	1	E	16	22	3	3	0	1	2	0	3	55	66	58	54	51	Intermittent banging & low frequency rumbling from docks E of location; lawnmower operating intermittently in park E of location (engine noise); intermittent power tool noise NNE of location; bird noise; distant aircraft; traffic on Eling Hill	n
		12:05	-	-	-	-	-	0	0	1	3	0	3	55	69	57	53	51	Intermittent siren, banging; engine noise and low frequency rumbling from docks E of location. Bird noise; passing traffic on Eling Hill; distant aircraft.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO7	22-04-2008 Day	1110	1	E	16	42	0	0	1	1	2	0	3	49	59	51	48	47	Intermittent siren and banging audible from docks E of location. Bird noise. Distant aircraft. Passing traffic on Eling Hill. Distant train and vehicle horn. Distant shouting.	None
		1115	-	-	-	-	-	1	1	0	2	0	3	50	62	53	49	48	Low frequency rumbling, intermittent metallic banging and siren audible from docks E of location. Bird noise. Distant aircraft. Intermittent banging NE of location.	None
		1305	1	N	18	25	4	1	0	1	3	0	4	49	61	51	48	42	Low frequency rumbling, intermittent metallic banging and siren audible from docks E of location. Intermittent high frequency whine audible from docks E of location. Bird noise. Passing traffic on Eling Hill. Intermittent banging N of location.	None
		1310	-	-	-	-	-	1	0	1	3	0	4	51	64	53	49	47	Low frequency rumbling, intermittent metallic banging and siren audible from docks E of location. Intermittent high frequency whine audible from docks E of location. Bird noise. Distant vehicle horn. Passing traffic on Eling Hill. Intermittent banging N of location.	None
		1510	1	E	19	45	2	0	0	2	1	0	3	51	61	54	50	48	Low frequency rumbling and intermittent siren audible from docks E of location. Bird noise. Distant aircraft. Passing traffic on Eling hill. Distant train and vehicle horn. Marchwood road traffic noise audible.	None
		1520	-	-	-	-	-	0	0	2	2	1	3	53	65	56	51	48	Low frequency rumbling, intermittent banging and siren audible from docks E of location. Bird noise. Distant aircraft. Passing traffic on Eling hill. Distant train and vehicle horn. Marchwood road traffic noise audible. Engine noise from passing small vessel.	None

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Contribution from ship very uncertain**	(Give number of, and reasons for pauses)
RO7	18/3/08 E	19:12	0	1			8	0	0	1	2	0		50	60	51	50	49	Siren on road; docks clearly audible; discrete events – bangs; pause for passer-by	1
		19:21	0	1	5		7	0	0	1	2	0		51	59	52	51	50	Train; aeroplane; car noise; reversing alarm; bangs	
		20:49	0	1	6	56	7	0	0	1	2	1		48	61	49	47	47	Chugging of ship's engine; dock sounds-whine; clattering; sirens; crashes; deep rumbling – could be ship??	
		20:56	0	1			8	0	0	1	2	2		49	56	50	48	47	Train; rumbling from ship? Mostly docks again.	
		22:30	0	1			8	0	0	0	2	2		48	58	49	48	47	Deep rumbling from ship? Mostly docks again	
		22:36	0	-	4	72	8	0	0	0	2	2		49	58	49	48	47	As above; note peak at 31.5Hz from rumbling ship.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name: C3_0000** **General comments:** **Component from ships unknown due to Tree-screen, estimated**	(Give number of, and reasons for pauses)
RO7	18/3/08 – N	00.00	<1	E			7	0	0	0	4	2	1	51	66	52	50	49	Engine noises, crashes, rumbles. Docks dominate. Constant background with discrete event every few seconds	
		00.07	1	E	6	34	7	0	0	0	4	2	2	51	64	52	50	49	Birds more vocal, otherwise as above.	
		01.59	1	E			0	0	0	0	4	2	1	51	56	51	50	49	Loud ‘thumping’ engine – stop? Docks dominate. Lower max because of chance – random distribution of loud events.	
		02.05	<1	E	3	34	0	0	0	0	4	2	0	51	58	52	51	49	As above	
		03.40	1	N E	2	34	0	0	0	0	2	3	1	50	59	51	50	49	Pulsating throbbing engine sound almost dominant. Some events but fewer than earlier.	
		03.46					0	0	0	0	2	3	1	50	65	51	50	49	As above	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name: C3_0000** **General comments:** **Cannot distinguish with certainty between ships & docks. Ships here refers to an idling engine noise**	(Give number of, and reasons for pauses)
RO7	19/3/08 – N	00:14	0	/	5	65	8	0	0	1	3	3		48	54	49	47	46	Usual deep rumbling; alarms; broadband background; sirens; whistling from wading birds.	
		00:20	0	/	5	65	8	0	0	1	3	3		47	58	48	46	45	Usual deep rumbling; alarms; broadband background; sirens; whistling from wading birds.	
		02:00	0	/	4	70	8	0	0	0	3	3		46	54	47	46	45	Usual deep rumbling; alarms; broadband background; sirens; whistling from wading birds.	
		02:08	0	/	/	/	8	0	0	0	3	3		46	56	47	46	44	Usual deep rumbling; alarms; broadband background; sirens; whistling from wading birds.	
		03:53	0	/	3	76	1	0	0	0	3	3		46	52	47	46	45	Usual deep rumbling; alarms; broadband background; sirens; whistling from wading birds; perhaps a little less activity	
		04:00	0	/	/	/	0	0	0	0	3	3		46	53	47	46	45	Usual deep rumbling; alarms; broadband background; sirens; whistling from wading birds; lots of bird calls.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	1847532

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
RO7	8/05/2008 Night	00.06	1	E	16	67	0	0	1	0	3	0		50	57	51	50	49	Reversing alarm; other alarms; clattering; engine noises; car horn; crashes (from directly opposite far side of river; much activity audible).	None
		00.13	1	E	-	-	0	0	1	0	3	0		50	60	51	50	49	Reversing alarm; other alarms; clattering, engine noises; car horn, crashes (from directly opposite; far side of river; much activity audible)	Sneezing x 1
		01.43	1	E	15	74	0	0	0	0	4	0		51	59	52	50	49	Throbbing engine type noise; sirens; crashes; docks louder(?); L_{Amax} from loud crash; as above.	None
		01:48	1	E	15	75	0	0	0	0	4	0		51	55	52	50	49	As above; L_{Amax} from crash again	None
		03.20	0	/	/	/	0	0	0	0	4	0		51	62	52	51	50	Throbbing engine; sirens; crashes; same as previous measurements	None
		03.25	0	/	13	82	0	0	0	0	4	0		51	58	51	51	50	As above; some geese heard	Passer-by x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Construction	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Construction noise at Siemens power plant (new Power Station being constructed) adjacent)**	(Give number of, and reasons for pauses)
LT3RO	17-03-2008 Day	13:33	2	E N E	11	42	6	0	0	1	3	0	2	53	61	55	52	50	Power tools from docs; metallic crashes & thuds from docks; sirens; construction noise from this bank to south (big silver dome – Veolia)	Walker x 2
		13:41	1	E	13	37	7	0	0	0	4	0	1	54	62	55	53	52	Construction noise to south, this side; noise from docks dominate	Walker x 1
		15:13	1	N E	-	-	6	0	0	1	3	0	2	52	62	53	51	50	Banging from docks to north of location	None
		15:19	2	N E	11	42	7	0	0	1	3	0	1	53	65	54	52	51	Banging from docks to north of location	None
		16:48	3	E	-	49	5	0	1	0	3	0	1	53	72	54	53	52	L_{Amax} due to hooter @ docks; mostly dock noise – engines, crashes	none
		16:54	2	E	6	53	3	0	1	1	3	0	0	52	66	53	52	51	Docks mostly	Dog walker x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Dock Construction	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**Container ship being loaded NNW of location (inaudible);** **Dock crane being constructed WNW of location**	(Give number of, and reasons for pauses)
LT3RO	16-04-2008 Day	07:40	<1	N	5	70	1	1	0	0	0	2	3	58	65	60	58	56	Repeated power tool noise from dock construction work NE of location, intermittent banging from incinerator site SE of location, bird noise, manoeuvring container vessel (engine noise) N of location, distant vehicle horn	
		07:45	-	-	-	-	-	2	0	0	0	2	3	57	61	58	57	55	Bird noise, repeated banging from dock construction works NE of location, intermittent metallic banging & power tool noise from incinerator site SE of location, engine noise from manoeuvring container vessel N of location, engine & reversing siren noise from forklift operating in yacht club yard S of location, distant vehicle horn,	Passer-by x 2
		09:55	2	E N E	17	37	3	1	0	0	1	0	2	52	58	54	52	51	Bird noise, repeated banging for dock construction works NNE of location, distant train noise, intermittent banging on incinerator site (+ power tool noise);engine noise from docks NNW of location	Passer-by x1
		10:00	-	-	-	-	-	2	0	0	2	0	3	53	62	55	52	50	Intermittent metallic banging from construction of crane WNW of location; engine noise from docks NNW of location; distant aircraft; intermittent banging and power tool noise from incinerator site; bird noise; intermittent siren from docks NNE of location.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Dock Construction	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**Container ship being loaded NNW of location (inaudible);** **Dock crane being constructed NNW of location (inaudible)**	(Give number of, and reasons for pauses)
LT3RO	16-04-2008 Day	11:25	1	E	15	29		2	0	0	1	1		54	67	55	53	51	Intermittent reversing siren from incinerator site; distant aircraft; cargo vessel being loaded NNW of location (inaudible); intermittent metallic banging from docks NW of location; excavator operating on incinerator site; intermittent banging; power tool noise from incinerator site & intermittent banging; wind noise; engine noise from passing motor boat; bird noise; distant shouting; engine noise & intermittent siren from docks	Passerby x 3 Gate slamming x 1
		11:35	-	-	-	-	-	2	0	0		1		55	70	56	54	52	Banging from generator on incinerator site; engine noise from passing small vessels; bird noise; intermittent power tool noise from incinerator site; cargo vessel being loaded NNW of location (inaudible); intermittent metallic banging from incinerator site; engine noise from docks NNW of location; intermittent reversing siren from incinerator site.	Passerby x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Incinerator site noise	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT3RO	22-04-2008 Day	1030	1	N	18	39	1	1	0	0	2	1	3	55	62	56	54	53	Vehicle-mounted pressure washer operating on incinerator site (engine and high pressure water noise). Intermittent siren audible from incinerator site. Engine noise from military vessel movements and passing small vessels. Intermittent siren and metallic banging from docks N of location. Distant shouting.	Passer-by x4
		1035	-	-	-	-	-	1	0	0	2	2	3	56	63	59	55	52	Vehicle-mounted pressure washer operating on incinerator site (engine and high pressure water noise). Intermittent siren audible from incinerator site. Engine noise from military vessel movements and passing small vessels. Intermittent siren and metallic banging from docks N of location. Intermittent banging from dock HGV movements. Intermittent banging from yacht club yard. Distant talking. Distant vehicle horn. Distant aircraft. Bird noise. Bird noise subjective audibility: 1	Passer-by x6 Vehicle door slamming x1
		1240	1	N	19	14	2	0	0	0	1	2	3	56	62	57	57	54	Vehicle-mounted pressure washer operating on incinerator site (engine and high pressure water noise). Intermittent siren and power tool noise audible from incinerator site. Shouting from incinerator site audible .Intermittent siren and banging from docks N of location. Engine noise from tugboats manoeuvring QE2.	Passer-by x2
		1245	'	'	'	'	'	1	0	0	1	2	3	56	67	57	56	57	Vehicle-mounted pressure washer operating on incinerator site (engine and high pressure water noise). Intermittent power tool noise audible from incinerator site. Intermittent siren from docks N of location. Engine noise from tugboats manoeuvring QE2. Intermittent banging from yacht club yard.	Passer-by x2

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Incinerator site noise	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
LT3RO	22-04-2008 Day	1430	1.3	NE	23.5	29	6	1	0	0	1	1	3	55	66	60	53	62	Vehicle-mounted pressure washer operating on incinerator site (engine and high pressure water noise). Intermittent siren, power tool noise and metallic banging audible from incinerator site. Shouting from incinerator site audible. Engine noise from passing small vessel. Intermittent siren and metallic banging audible from docks NW of location. Bird noise. Distant vehicle horn. Bird noise subjective audibility: 1	Dog barking x2
		1435	-	-	-	-	-	1	0	0	1	2	3	57	74	60	55	53	Vehicle-mounted pressure washer operating on incinerator site (engine and high pressure water noise). Intermittent high frequency squealing audible from incinerator site. Engine noise from passing commercial vessel. Intermittent alarm audible from docks NNE of location. Intermittent banging audible from movement of yacht club pontoons. Bird noise. Distant talking. Passing aircraft (responsible for high L_{Amax}). Bird noise subjective audibility: 2 Aircraft subjective audibility: 1	Passing coastguard helicopter x1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N. Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Mainly docks component due to roads uncertain**	(Give number of, and reasons for pauses)
LT3RO	18/3/08 – E	19:43	<1	E	5		7	0	0	1	3	0		51	65	52	50	49	Docks; one small dinghy passed; sirens; docks? Bangs & thuds	Walker x 1
		19:49	1	NE	/	/	8	0	0	1	3	0		51	63	52	50	50	Train just audible; continuous noise with distant clangs & thuds from docks	
		21:12	1	N	6	56	8	0	0	0	3	0		50	60	52	49	48	Docks; birds (occasional); water still	
		21:21	<1	NE	/	/	8	0	0	0	4	0		51	64	53	50	49	Docks – engine whine; 'whistling' siren; loud engine later on	
		22:54	1	N	6	64	8	0	0	0	4	0		54	62	55	54	53	Floating moorings clanking; docks dominant; sirens, engine noise; ships wake lapping on shore (potentially explains higher stats)	
		23:00	1	N	/	/	8	0	0	0	4	0		51	62	52	50	49	Sirens in abundance; docks dominant; less waves/floating mooring clanking.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Just docks almost entirely**	(Give number of, and reasons for pauses)
LT3RO	18/3/08 – N	00.56	1	E	5	34	8	0	1	0	4	0		51	68	52	50	49	Dominated by noise from docks: clanks, alarms, engines, crashes, thuds.	
		01.02	1	E			8	0	0	0	4	0		51	65	52	50	48	Mostly from NE and N, as above.	
		02.41	1	NE	3	34	0	0	0	0	4	0		50	59	52	50	49	As above	
		02.46	1	NE			0	0	0	0	4	0		51	65	52	50	49	As above.	
		04.29	2	NE	2	34	0	0	0	0	4	0		52	64	53	51	50	Docks, crashes, reversing alarms.	
		04.36	1	N			0	0	0	0	4	2		53	66	54	52	50	As above; tug boat passed.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Docks dominate**	(Give number of, and reasons for pauses)
LT3RO	19/3/08 – N	01:03	2	N	6	65	6	0	0	0	4	0		48	58	50	48	47	Docks, birds, sirens; engines; container handling; no waves	
		01:09	2	N	/	/	5	0	0	0	4	0		48	58	49	47	46	Docks, birds, sirens; engines; container handling; no waves	
		02:45	3	N	4	70	8	0	0	0	4	3		50	66	51	50	49	Docks, birds, sirens; engines; container handling no waves; small container vessel trundled past – much low frequency	
		02:51	/	N	/	/	8	0	0	0	1	4		54	59	57	53	49	Container ship masked docks; wave hit beach later but v. quiet.	
		04:24	3	N	4	73	1	0	0	0	4	0		49	59	50	49	48	Usual dock sounds	
		04:29	/	/	/	/	1	0	0	0	4	0		48	59	49	48	47	As above	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	1847532

			Local Weather					Subjective Audibility (1 – 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:**	(Give number of, and reasons for pauses)
LT3RO	8/05/2008 Night	00.50	2	N E	16	73	0	0	0	1	4	0		47	55	49	47	45	Container lifting; engine; bumps; engines from container terminal to north; occasional alarm; some similar noises from east, down river	Person kicking stone x 1
		00.55	2	N E	14	79	0	0	0	1	4	0		47	64	48	46	45	As above; some truck movements on opposite bank; some squealing brakes; train movement; high L_{Amax} unknown	None
		02:19	2	E	15	75	0	0	0	1	4	0		46	53	47	46	45	Fewer obvious container movements seen or heard; bangs, crashes, distant alarms, engines	Person sneezing x 1
		02:25	2	E	/	/	0	0	0	1	4	0		46	58	48	46	45	As above	None
		03.57	0	/	11	84	0	0	0	0	4	0		50	64	51	49	48	As above; some loud thumps	None
		04:02	0	/	/	/	0	0	0	0	4	0		51	61	52	50	49	As above	Person sneezing x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **No buzzing from pylons conducted by road due to clattering gates. Fraction due to ships very uncertain.**	(Give number of, and reasons for pauses)
RO8	18/3/08 – N	00.27	2	E	5	34	8	0	0	0	4	2		50	56	51	49	48	Docks totally dominant. Events both rumbling and clanging (low + high freq)	1 - Car
		00.34																	Repeated due to accidentally continuing measurement after 5 mins	
		00.42	1	N E			8	0	0	0	4	2		50	61	51	50	48	High max due to loud crash from docks. PA audible occasionally.	3 – Car
		02.15	1	N E	3	34	0	0	0	0	4	1		52	64	53	51	50	Almost ‘white’ noise – fewer distant events than Eling (RO7). Ship engine (?) audible.	1 - Car
		02.22	2	N E	2	34	0	0	0	0	4	3		51	59	53	51	49	Probably no actual change in fraction due to ships engine, merely change in opinion.	8 - Car
		04.03	1	E	1	34	0	0	0	0	2	3		52	60	53	52	51	Engine noise (or similar) dominant. General dock noise.	9 - Car
		04.13	<1	E			0	0	0	0	3	2		53	63	54	53	51	Pulsing engine noise not constantly audible – quieter.	5 - Car

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **No hum from pylons; any ship component unknown**	(Give number of, and reasons for pauses)
RO8	19/3/08 – N	00:38	0	/	6	68	8	0	0	0	4	0		48	63	49	48	47	Sirens rumbling; impact noise from docks; thuds	3 - Car
		00:46	0	/	/	/	8	0	0	0	4	0		48	58	49	47	46	As above; distant dog barking; reversing alarm; PA audible	5 – car
		02:23	0	/	4	76	8	0	0	1	4	0		45	54	46	45	44	Much rumbling; like low frequency engine noise; some thuds; perhaps fewer events less activity	4 – vehicles
		02:31	0	/	/	/	8	0	0	1	4	0		46	52	46	45	44	Much rumbling; like low frequency engine noise; some thuds; perhaps fewer events less activity	4 – vehicles
					3	76	0	0	0	2	3	0							Abandoned – too much traffic but stored (after 30 seconds) twice to preserve numbering	5 vehicles

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	1847532

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Securaty Guard's car	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** Always present 'throbbing engine' (could be ship but unknown). Security guard's car constant (Mitie based at Marchwood Ind. Estate ?)	(Give number of, and reasons for pauses)
RO8	8/05/2008 Night	00.26	0	/	16	69	0	0	0	0	4	0	2	53	61	54	52	51	Throbbing of distant engine (ship?); car engine – security car; clattering; crashes; general activity	Car x 3
		00.33	1	E	15	71	0	0	0	0	4	0	2	54	62	55	54	52	As above; throbbing engine	Car x 5
		01.58	<1	E	15	72	0	0	0	0	4	0	2	54	60	55	53	52	As above	Car/truck x 7
		02:06	1	E	14	73	0	0	0	0	4	0	2	54	62	55	53	52	As above	Car/truck x 3
		03.35	0	/	12	86	0	0	0	0	4	0	2	54	59	55	53	52	As above	Car x 6
		03.43	0	/	12	86	0	0	0	0	4	0	2	54	61	55	53	52	As above	Car x 5

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Yacht Mast & Rope Clanging	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **Noise from lapping waves negligible**	(Give number of, and reasons for pauses)
RO9	17-03-2008 Day	14:09	2	E	10	46	7	1	0	0	2	1	0	49	61	50	48	46	Mostly from Town Quay area; industry includes workers boats; marina maintenance etc	Car x 3
		14:20	1	E	10	46	8	2	0	0	1	2	0	50	58	52	50	48	Boat traffic	Car x 2
		15:51	5	E	9	45	7	1	0	0	1	1	2	52	70	57	47	44	Town Quay main continuous source; local yacht related noises noticeable if quieter; source of high L_{Amax} unknown	Children x 1 Car x 1 Car door x 2
		16:02	3	E	9	50	6	0	0	1	1	2	1	58	73	61	48	46	Aeroplanes; passing ferry;	None
		17:20	2	E	9	51	6	0	0	0	2	2	0	52	66	55	48	46	Large ship engine noise; aeroplane; last 2 minutes quiet; non ships/planes	Car x 1
		17:27	1	E	8	52	7	0	0	0	2	0	0	48	61	51	46	44	Aeroplane; no ships; generally quiet	Car x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 – 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO9	16/04/08 Day	06:56	0	/	4	76	1	1	0	0	1	3	2	52	58	55	51	49	Engine noise from passing Red Funnel catamaran. Alarm from dock gates NW of location, bird noise, engine noise from passing cargo vessel, engine noise from passing cruise ship, intermittent siren from docks N of location	Passing vehicle x2
		07:01	-	-	-	-	-	1	0	1	0	3	2	49	53	50	49	47	Bird noise, engine noise form passing cargo vessel & cruise ship, wave noise, intermittent banging ESE of location, distant road noise audible, distant vehicle horn.	
		09:10	1	N E	16	37	1	1	0	0	1	2	2	46	64	49	46	43	Distant banging from train on Hythe Ferry Pier, distant aircraft, distant shunting, bird noise, PA announcement & engine noise from passing Red Funnel car ferry, distant siren from boat hoist in marine NW of location	Passing vehicle x 2; Passerby x 1
		09:20	-	-	-	-	-	1	0	0	1	2	2	48	64	50	46	40	Distant shouting, bird noise, distant siren & engine noise from boat hoist in marine NW of location, vehicle engine idling adjacent to lock control office, engine noise from passing Red Funnel catamaran	Gate slamming x 1; L_{Amax} due to bird noise
		10:50	1	N N E	13	37	3	1	0	0	0	2	1	52	63	57	49	46	Engine noise from passing Red Funnel Catamaran. Distant shouting, bird noise, distant banging from Hythe Ferry pier train, intermittent banging from marine SW of location	Passing vehicle x2 Gate slamming x2
		11:00	-	-	-	-	-	1	0	0		1	1	45	55	47	44	42	Intermittent banging from marina NW of location, distant aircraft, bird noise, distant church bells SSW of location, distant shouting, engine noise from passing Red Funnel catamaran, rope banging against mast in marina SE of location, distant train horn	Passing vehicle x 1 Car boot slamming x1 Shouting x 1

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Marina Activity	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO9	22-04-2008 Day	0955	1	N N E	14	39	1	1	0	0	1	3	2	57	64	60	55	50	Low frequency rumbling from docks NNE of location. Alarm intermittently audible from lock gates operating NW of location. Public address announcement audible from docked cruise ship. Engine noise from passing Red Funnel catamaran and small vessels. Bird noise audible. Distant talking. Passing aircraft. Bird noise subjective audibility: 1 Aircraft subjective audibility: 1	Passing vehicle x2 Vehicle door slamming x1
		1000	-	-	-	-	-	1	0	0	1	3	2	57	71	58	54	52	Public address announcement audible from docked cruise ship. Engine noise from passing small vessels. Intermittent siren audible from docks NNE of location. Bird noise. Distant talking. Passing aircraft (responsible for high L_{Amax}). Bird noise subjective audibility: 1 Aircraft subjective audibility: 1	Passing vehicle x1
		1145	1	N	23	15	0	1	0	0	1	2	3	53	66	56	51	49	Low frequency rumbling from docks NNE of location. Alarm intermittently audible from lock gates operating NW of location. Engine noise from passing Red Funnel catamaran and commercial vessels. Distant talking. Passing aircraft. Aircraft subjective audibility: 1	Passing vehicle x6
		1200	-	-	-	-	-	1	0	0	1	2	3	50	62	52	50	48	Low frequency rumbling from docks NNE of location. Engine noise and public address announcement audible from passing Red Funnel car ferry. Engine noise from passing vessels. Intermittent banging from marina S of location. Intermittent siren audible from docks N of location. Distant church bells and emergency vehicle siren. Distant talking.	Passing vehicle x8

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	D. Ricketts

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	Norsonic 118
SLM Serial No:	30523

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Marina Activity	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}		(Give number of, and reasons for pauses)
RO9	22-04-2008 Day	1355	1	N	25	28	5	0	0	0	1	2	3	57	68	62	51	48	Low frequency rumbling from docks NNE of location. Alarm intermittently audible from lock gates operating NW of location. Engine noise from passing vessels and hovercraft. Engine noise from boat hoist operating NW of location. Distant dog barking. Distant talking. Passing aircraft.	Passing vehicle x6 Passer-by x1 Gate slamming x1
		1400	-	-	-	-	-	0	0	0	1	2	3	51	61	55	48	45	Low frequency rumbling from docks NNE of location. Alarm intermittently audible from lock gates operating NW of location. Engine noise from passing vessels. Intermittent alarm audible S of location. Intermittent high frequency squealing from marina S of location. Distant dog barking. Distant talking. Passing aircraft.	Passing vehicle x4 Passer-by x2 Gate slamming x2

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	BK2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** Noise from Town Quay Southampton assumed to be docks, though not certain	(Give number of, and reasons for pauses)
R09	18/3/08 – E	20:09	1	N E	7	56	8	0	0	0	2	0		39	46	40	39	38	Distant talking; distant birds; mostly docks; some discrete events	
		21:15	1	N	/	/	8	0	0	1	2	0		41	56	42	41	39	Road uncertain; docks largest source of noise; some tonal noise.	Walkers x 1
		21:45	<1	N	6	57	8	0	0	0	3	0		47	60	50	42	40	Aeroplane (high L_{A10}); docks	Walker x 1; car x 1
		21:53	0	/	6	57	8	0	0	0	2	1		42	54	43	41	40	Docks, distant aeroplane	Car x 1
		23:33	<1	N	6	66	8	0	0	0	2	1		44	56	49	40	39	Passing fast boat (high L_{A10}); distant voices; docks; some bangs audible; seagulls; distant train	
		23:41	<1	N W	/	/	8	0	0	0	1	1		42	54	44	41	39	Boat – IOW ferry?; docks scarcely audible at time.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	'Wailing', 'clanking'	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name: c3_0000** **General comments:** **'Wailing' wind in ropes (sheets) and associated clanking of ropes on masts is column 6 of subjective audibility.**	(Give number of, and reasons for pauses)
RO9	18/3/08 – N	01.27	3	N E	5	34	3	0	0	0	1	0	4	43	54	46	42	39	'Wailing' from ropes dominant; birds and Town Quay faintly audible.	
		01.33	2	N E	4	34	1	0	0	0	1	0	3	42	54	44	41	39	'Wailing' from ropes dominant; birds and Town Quay faintly audible; waves lapping audibly.	
		03.09	2	N E	4	34	0	0	0	0	2	0	0	40	55	41	39	38	Distant gulls; distant dock noise; few discrete events	
		03.15	2	N E			0	0	0	0	2	2	1	41	55	42	40	39	Distant gulls; distant dock noise; few discrete events; one ferry passed	
		04.55	2	N	4	34	3	0	0	0	2	0	1	42	54	43	42	41	Town Quay main source, or docks behind; distant gulls.	
		05.00	3	N	/	/	5	0	0	0	2	0	0	42	53	43	42	41	Town Quay main source, or docks behind; distant gulls.	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

SLM Type:	2260
SLM Serial No:	2290708

			Local Weather					Subjective Audibility (1 - 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships		L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** **All noise from direction of Town Quay/Southampton assumed to be docks**	(Give number of, and reasons for pauses)
RO9	19/3/08 – N	01.29	1	N	5	70	5	0	0	0	3	0		40	57	51	40	39	Little but gentle 'roar' from Town Quay direction. Occasional crash or clatter, distant engine.	
		01.36	1	N	/	/	7	0	0	0	3	0		41	54	42	40	39	Little but gentle 'roar' from Town Quay direction. Occasional crash or clatter, distant engine	
		03.14	1	N	5	70	5	0	0	0	3	1		40	50	41	39	38	Small ship passed. Broadband noise from Town Quay/Southampton; few discrete 'events'	
		03.19	1	N	5	71	5	0	0	0	3	1		41	47	43	41	40	Small ship passed. Broadband noise from Town Quay/Southampton; few discrete 'events'	
		04.50	2	N	3	75	0	0	0	0	2	1		41	54	42	40	39	Ship moving N up ahead; dock quiet but audible; ship wake fairly loud but brief	
		04:57	2	N	3	75	0	0	0	0	1	0		39	50	40	39	39	Docks audible but quiet; some 'clanging' from masts/	

ENVIRONMENTAL NOISE SURVEY SHEET

Job No:	NSOX0549
Surveyor Details:	N Haigh

Title: **ABP Port of Southampton, 2008 Baseline Survey**

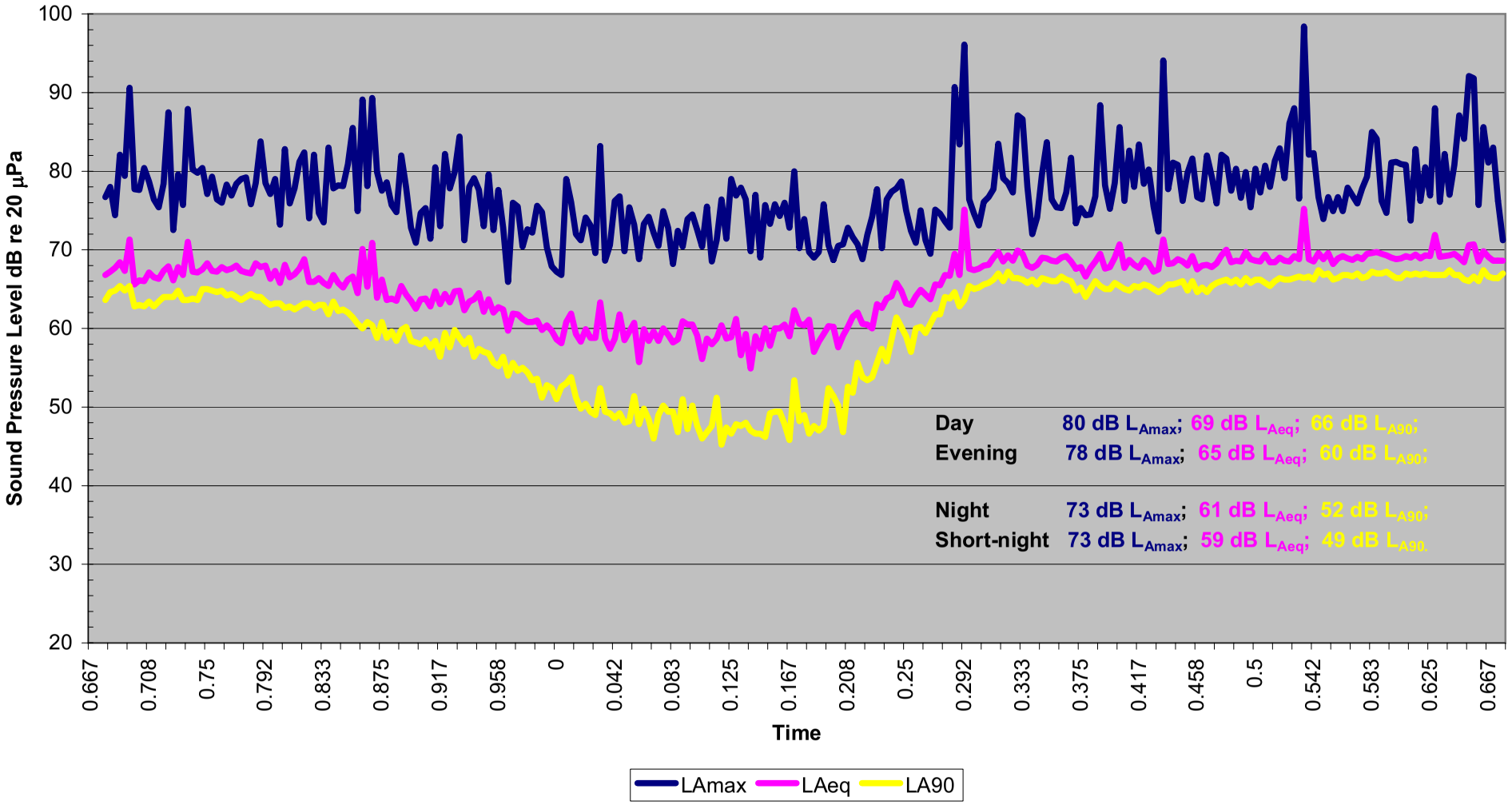
SLM Type:	2260
SLM Serial No:	1847532

			Local Weather					Subjective Audibility (1 – 4)						Sound Pressure Level, dB					Comments	Pauses
Location	Date and period (N=night, E=Evening, D = day)	Start Time (Night is 00:00 to 04:00)	Wind Speed, ms^{-1}	Wind Direction	Temperature, °C	Humidity, %RH	Cloud, Octants	Industry	Wind in trees and vegetation	Roads	Docks	Ships	Birds	L_{Aeq}	L_{Amax}	L_{A10}	L_{A50}	L_{A90}	**File name:** **General comments:** 'Industry' refers to noise of unknown source from SE – Fawley?; general 'roar' almost featureless	(Give number of, and reasons for pauses)
RO9	8/05/2008 Night	01:16	2	E	16	73	0	2	0	0	0	0	1	41	52	42	41	40	'Roar; from SE – Fawley?; sounds like roads; v. faint lapping of waves	Car x 1; Car door x 1
		01:22	3	E	16	75	0	2	0	0	0	1	1	42	49	43	42	41	As above; nothing audible from docks; engine noise from ship in final 15 seconds.	None
		02:44	0	/	14	82	0	2	0	0	0	2	1	47	52	47	46	45	Modest boat passed by; moorhen 'peeping'; deep rumbling engine noise from SW (ship); also 'roar' mentioned above.	None
		02:51	0	/	/	/	0	2	0	0	0	3	1	48	55	50	47	45	As above	None
		04:22	0	/	13	85	0	2	0	0	0	3	3	48	55	52	46	41	Two small noise boats; birds; roar and crashes from SE.	None
		04:28	0	/	/	/	0	2	0	0	0	0	3	42	48	43	41	41	Roar from SE; birds.	None

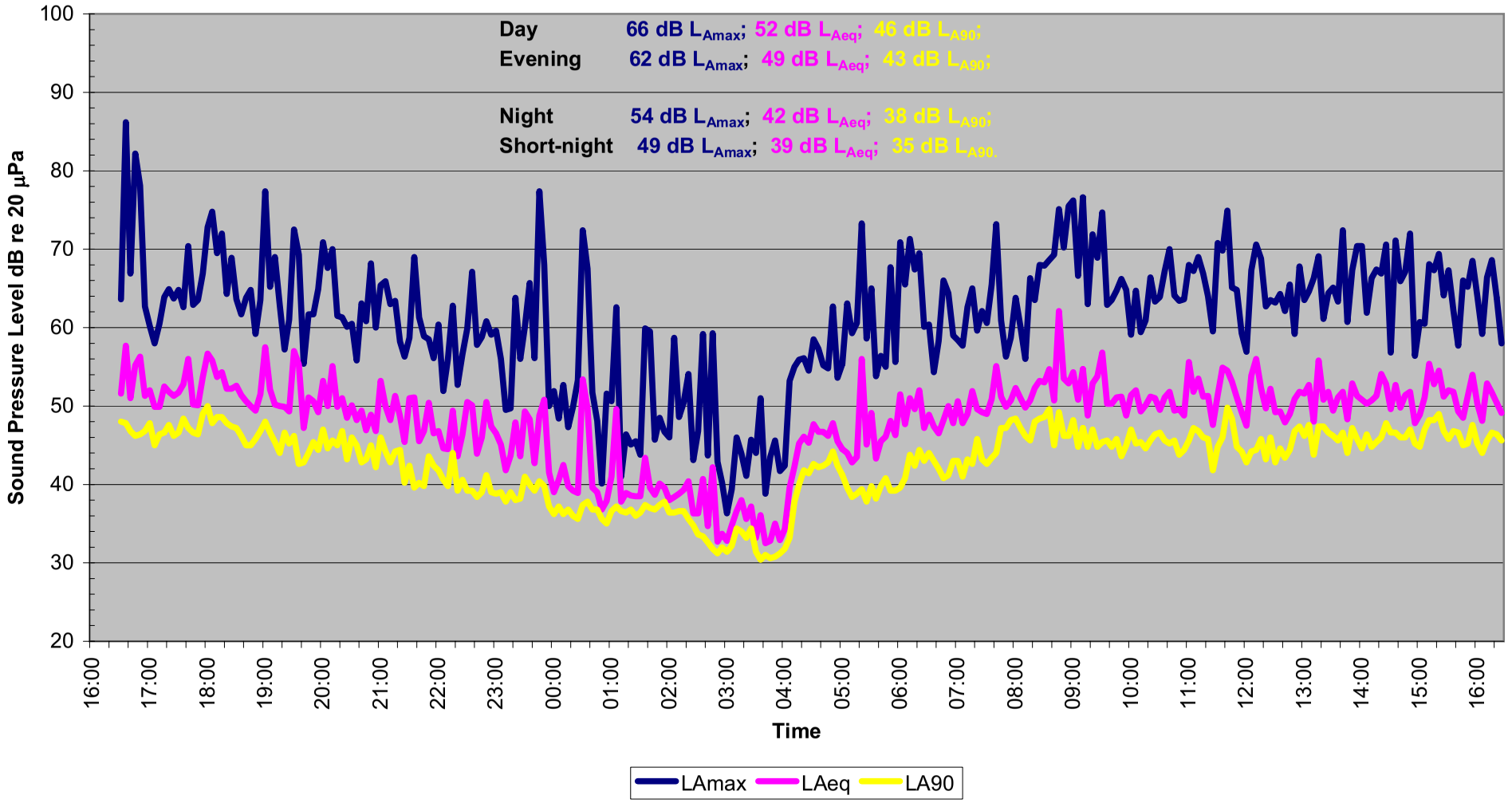
Appendix 5

24 Hour Noise Survey Results

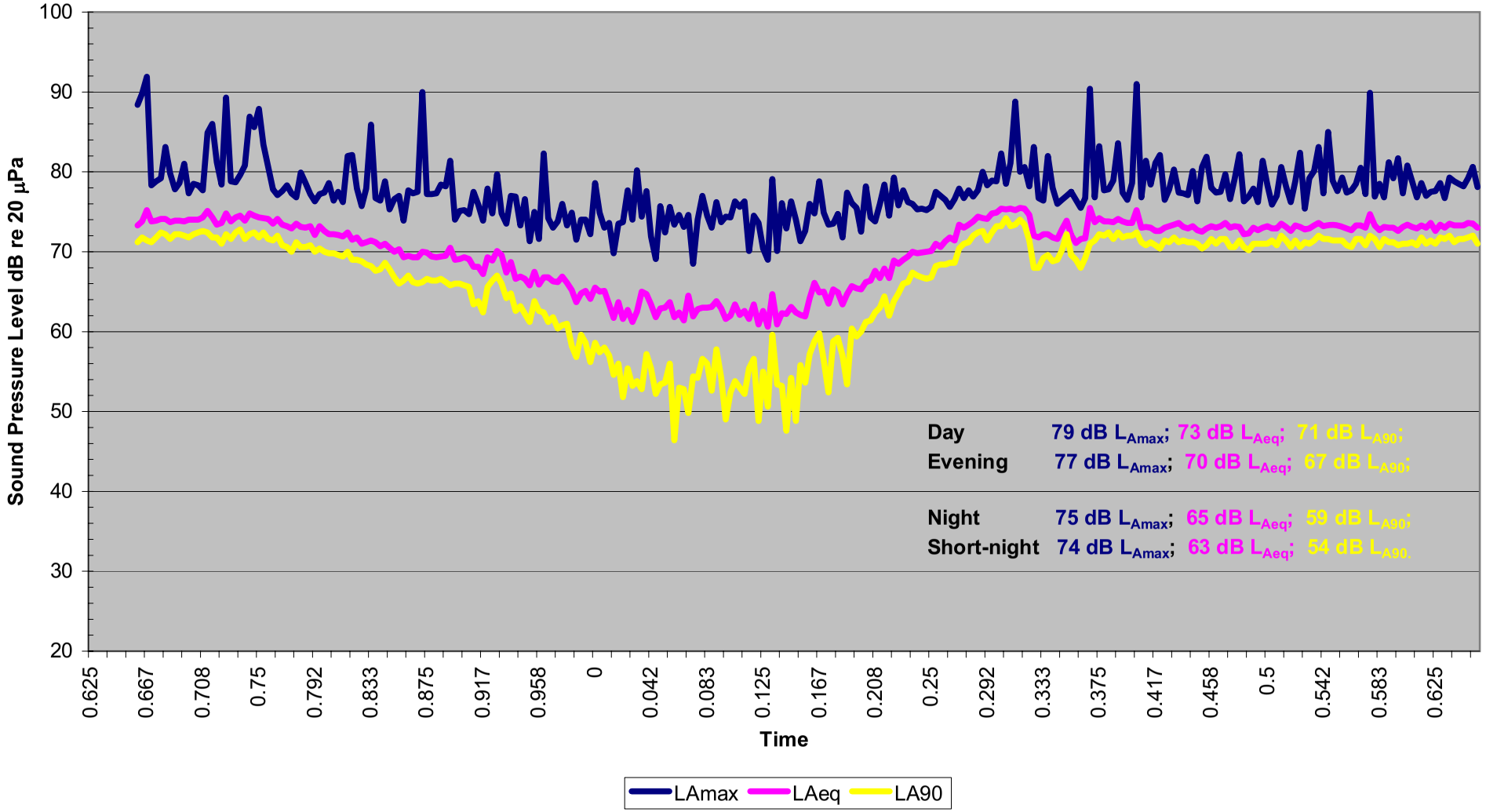
24 Hour Ambient Noise Survey, 3rd Floor, Cleasby Close, Millbrook, Southampton, 17th - 18th April 2008



24 Hour Ambient Noise Survey, 18th Floor, 105 Canberra Towers, Weston, Southampton, 22nd - 23rd May 2008



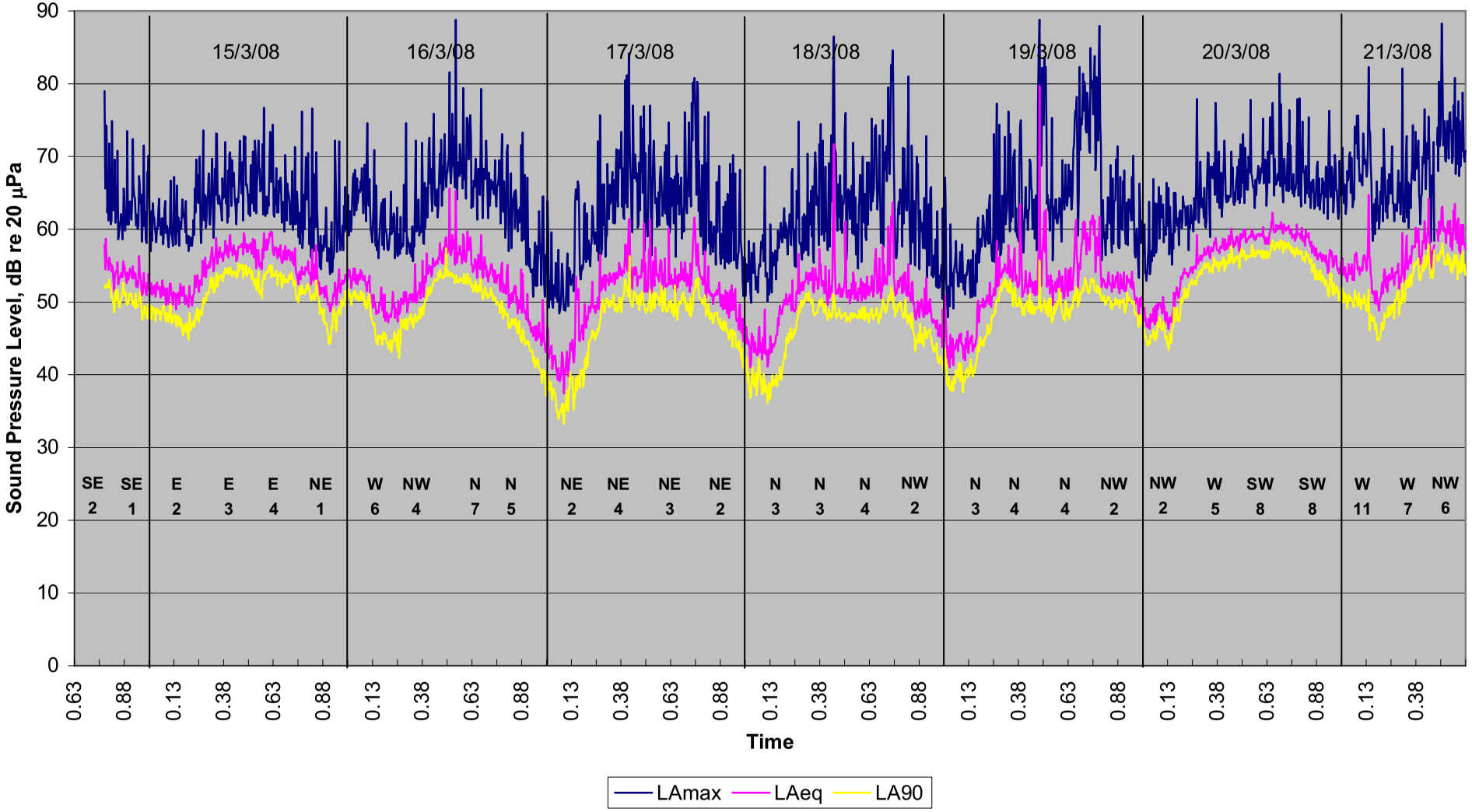
24 Hour Ambient Noise Survey, 110 Redbridge Towers, Redbridge, Southampton, 21st - 22nd April 2008 (19th Floor)



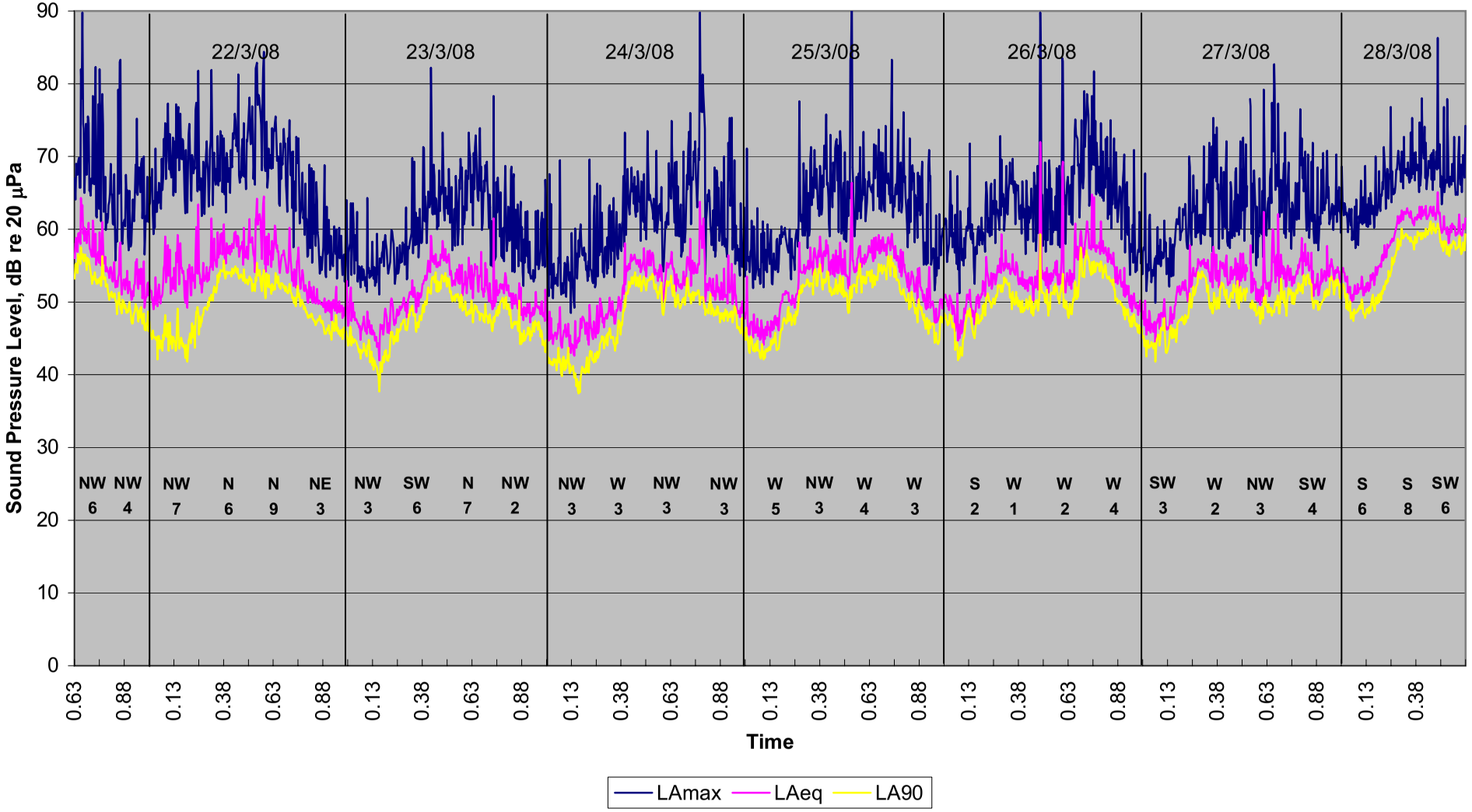
Appendix 6

6 Week Noise Survey Results

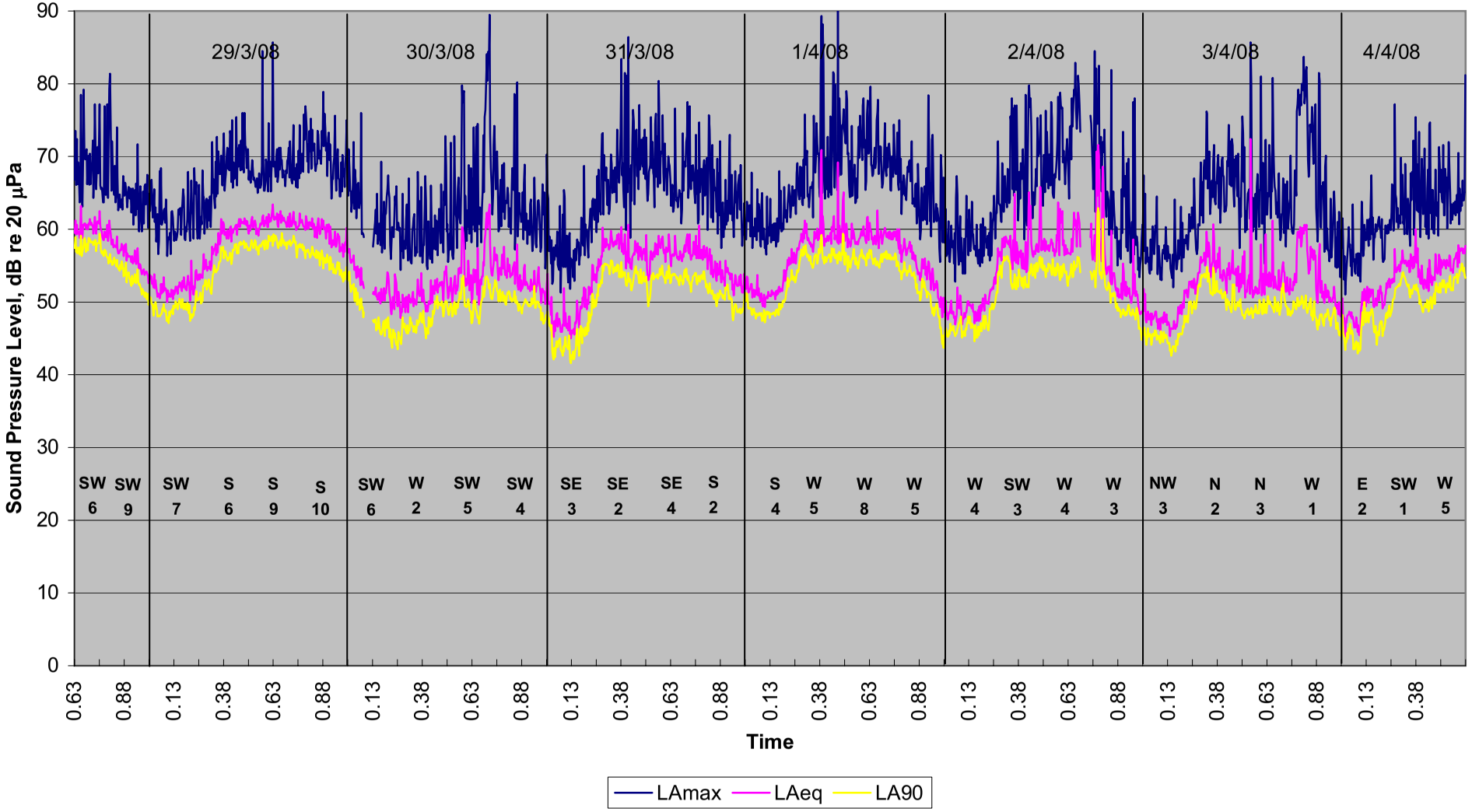
Ambient Noise Levels LT2, 14th - 21st March 2008 (Week 1)



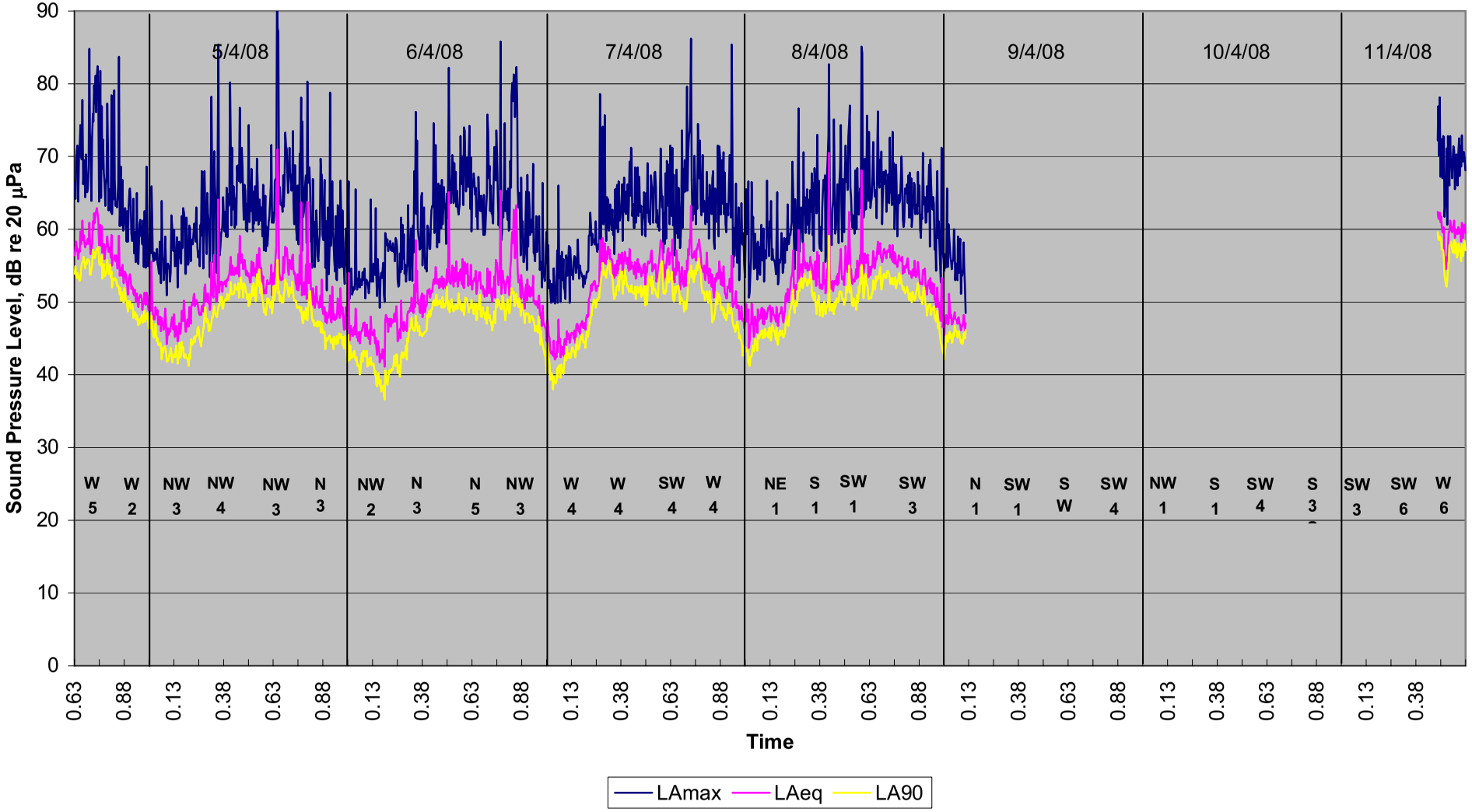
Ambient Noise Levels LT2, 21st - 28th March 2008 (Week 2)



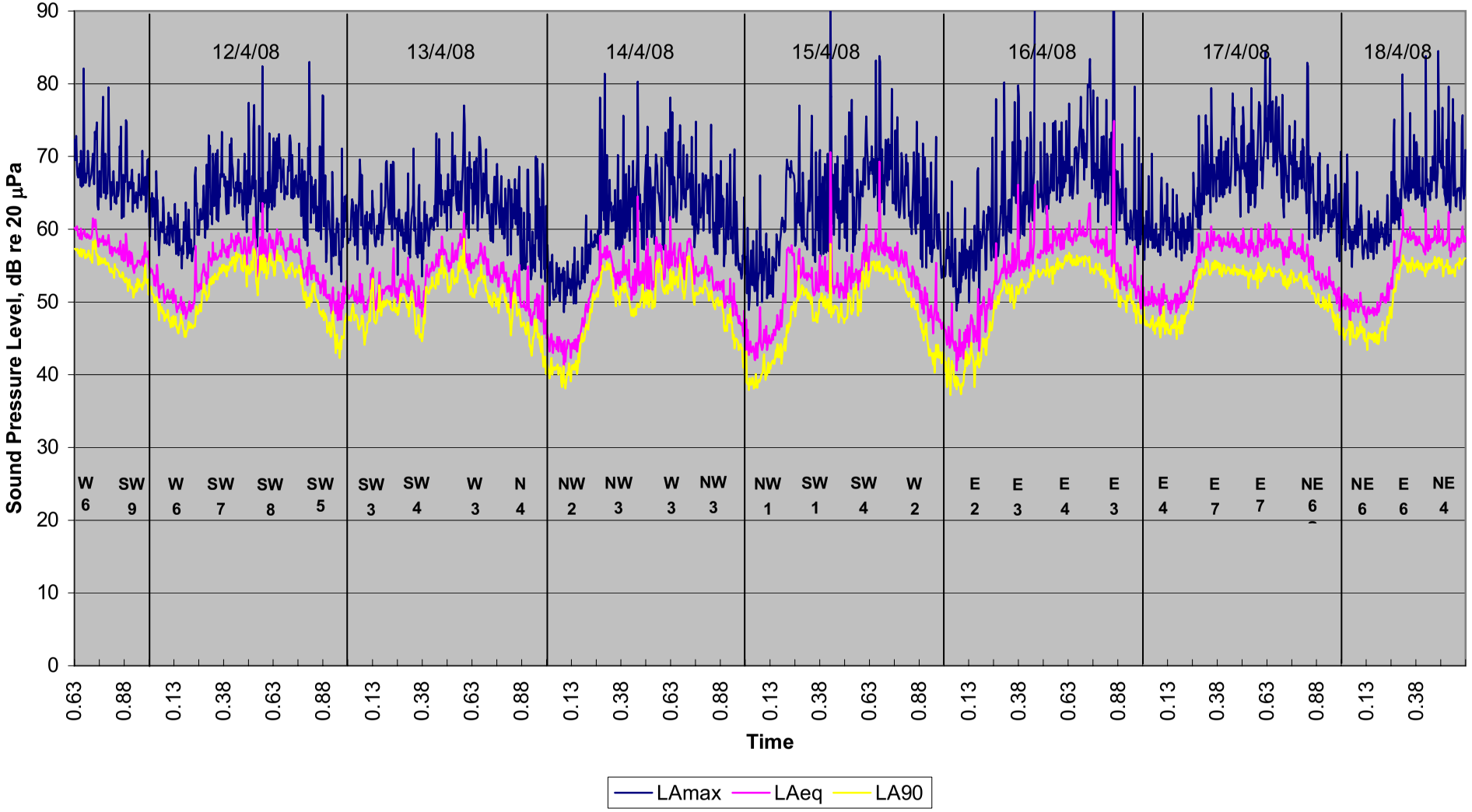
Ambient Noise Levels LT2, 28th March - 4th April 2008 (Week 3)



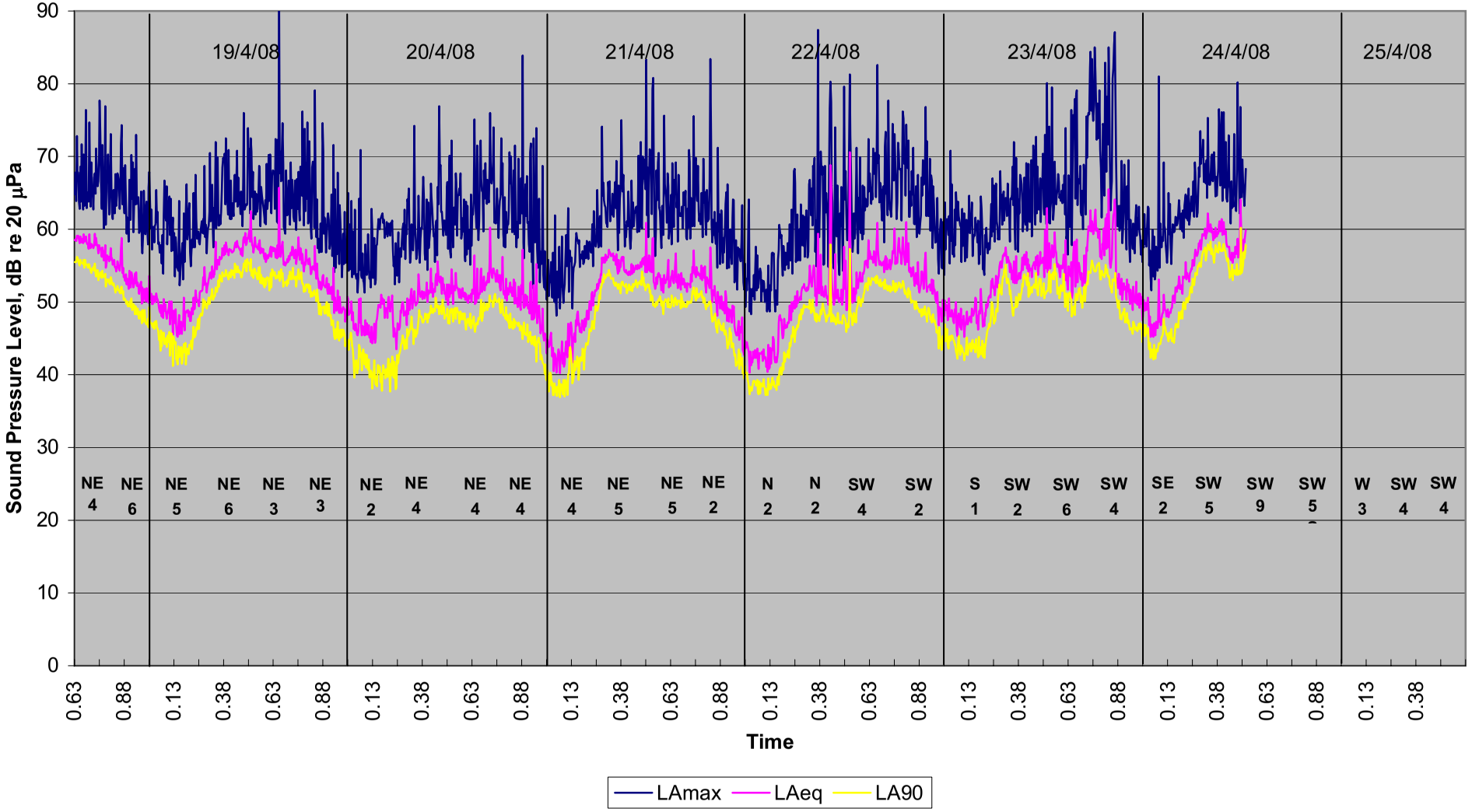
Ambient Noise Levels LT2, 4th - 11th April 2008 (Week 4)



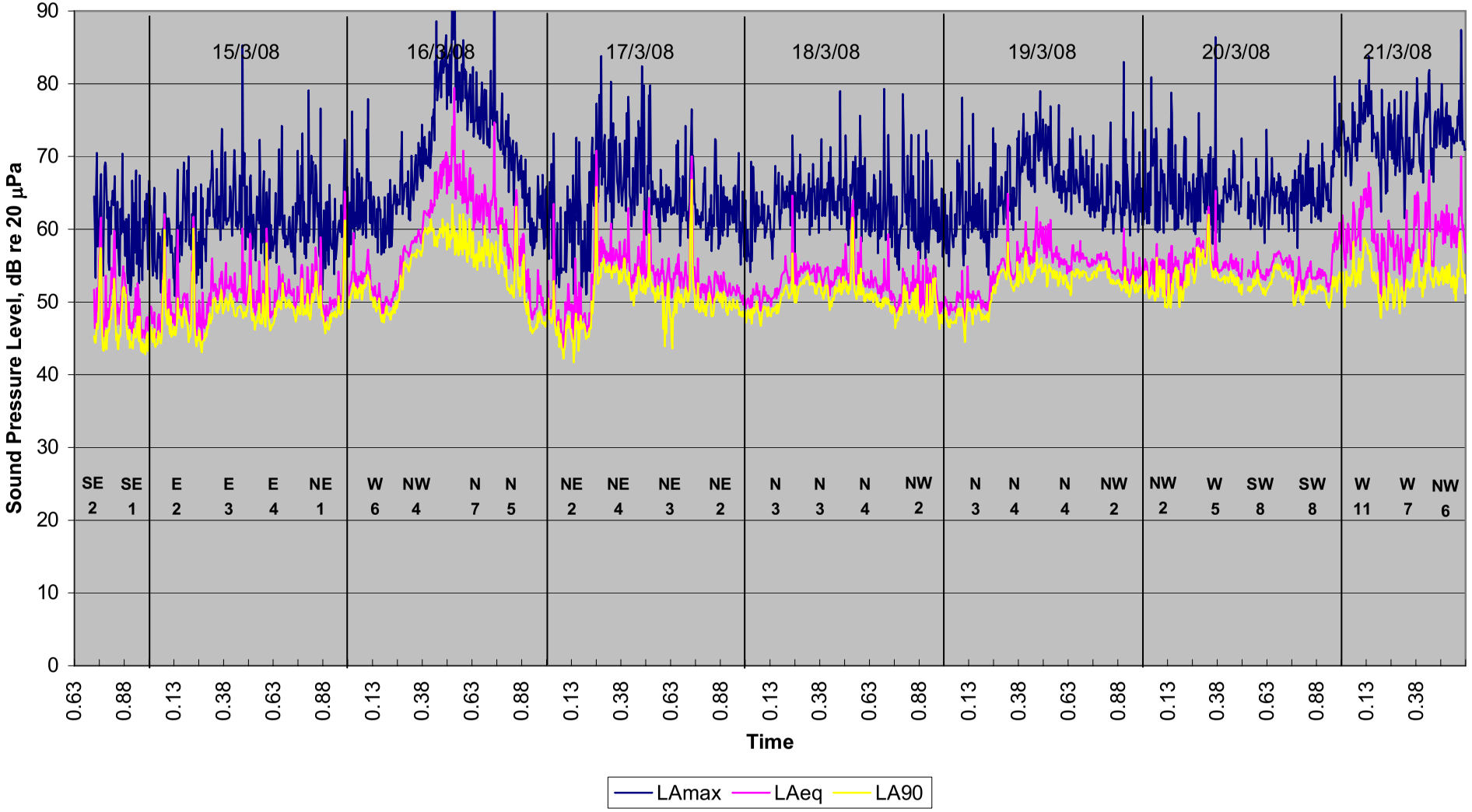
Ambient Noise Levels LT2, 11th - 18th April 2008 (Week 5)



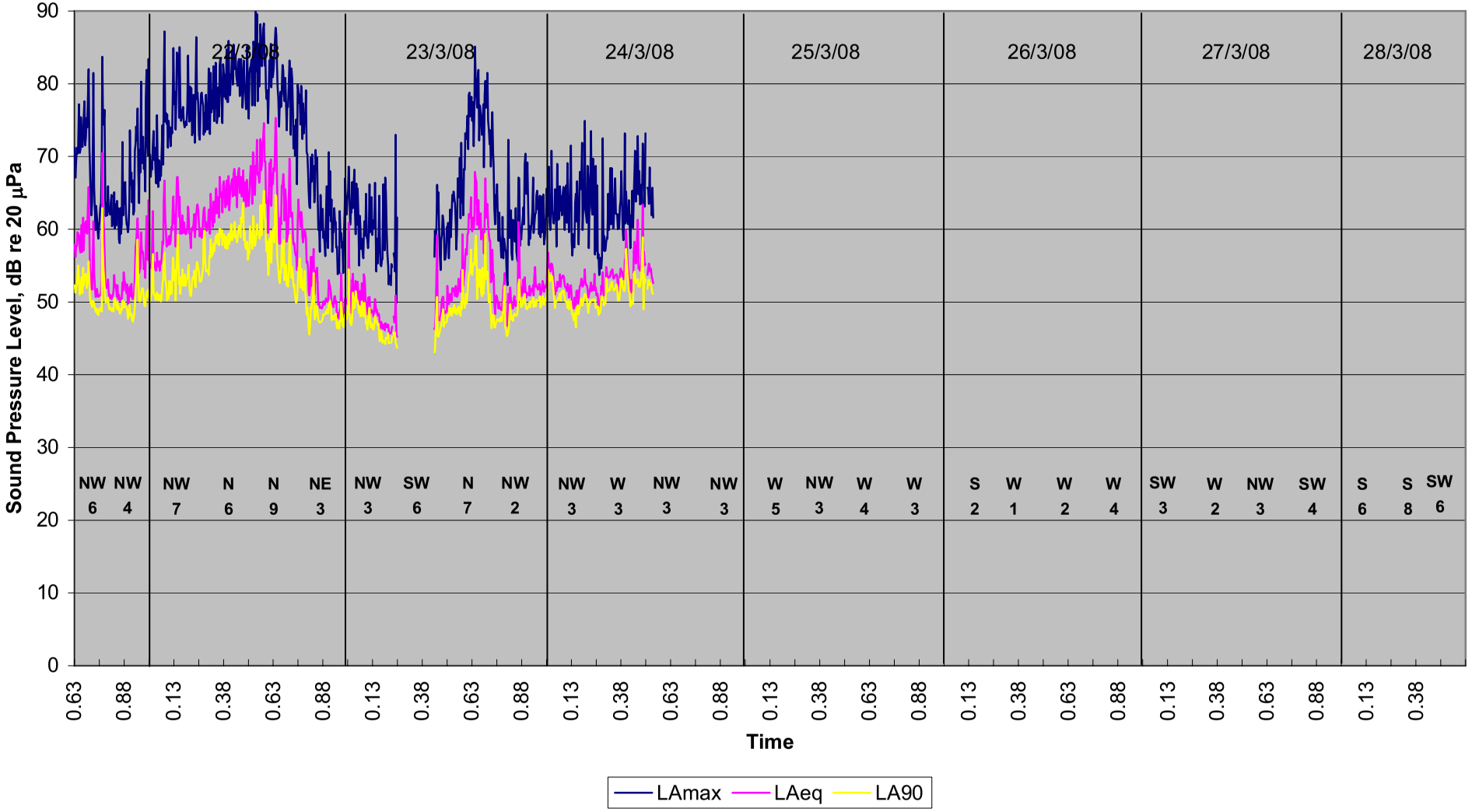
Ambient Noise Levels LT2, 18th - 25th April 2008 (Week 6)



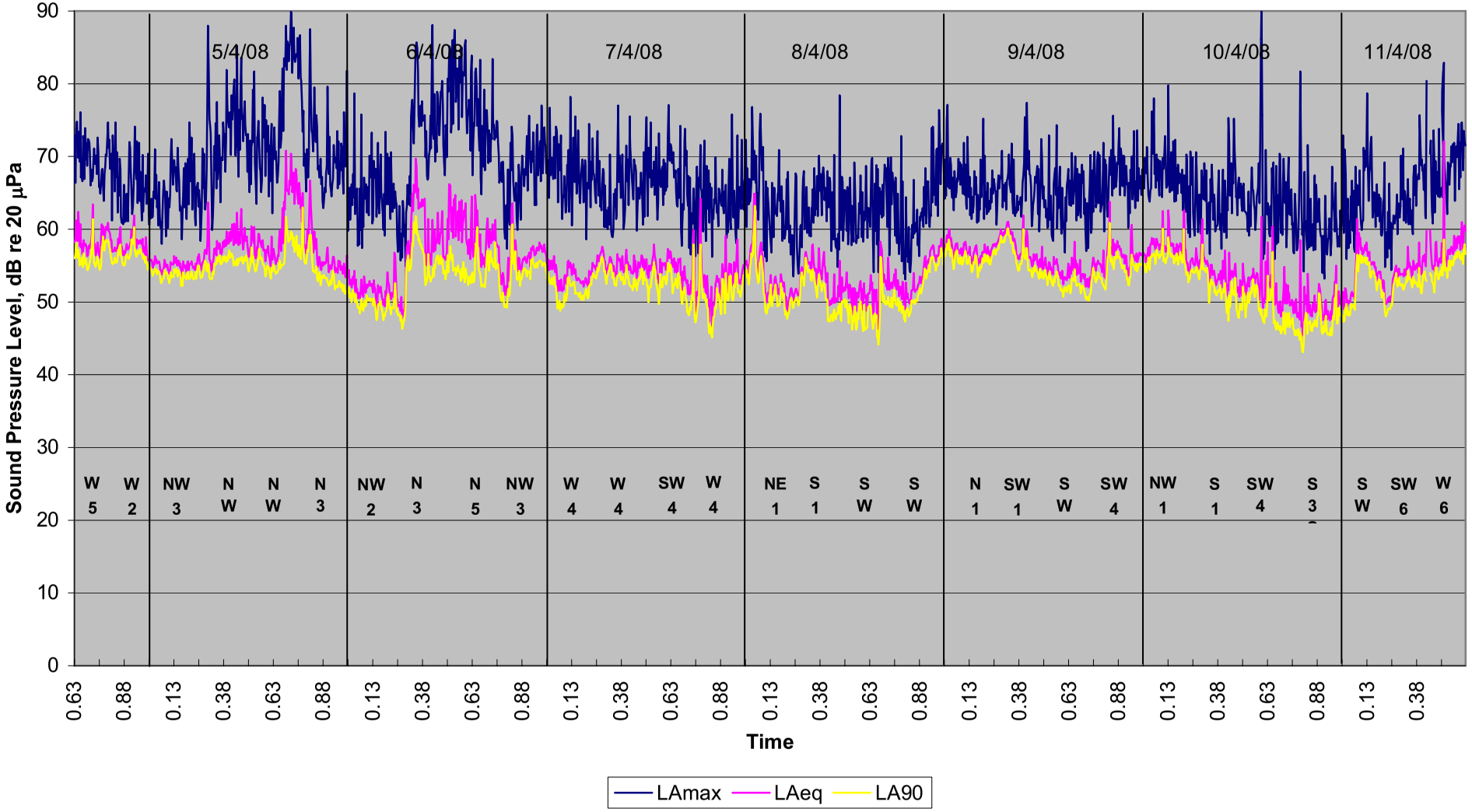
Ambient Noise Levels LT3, 14th - 21st March 2008 (Week 1)



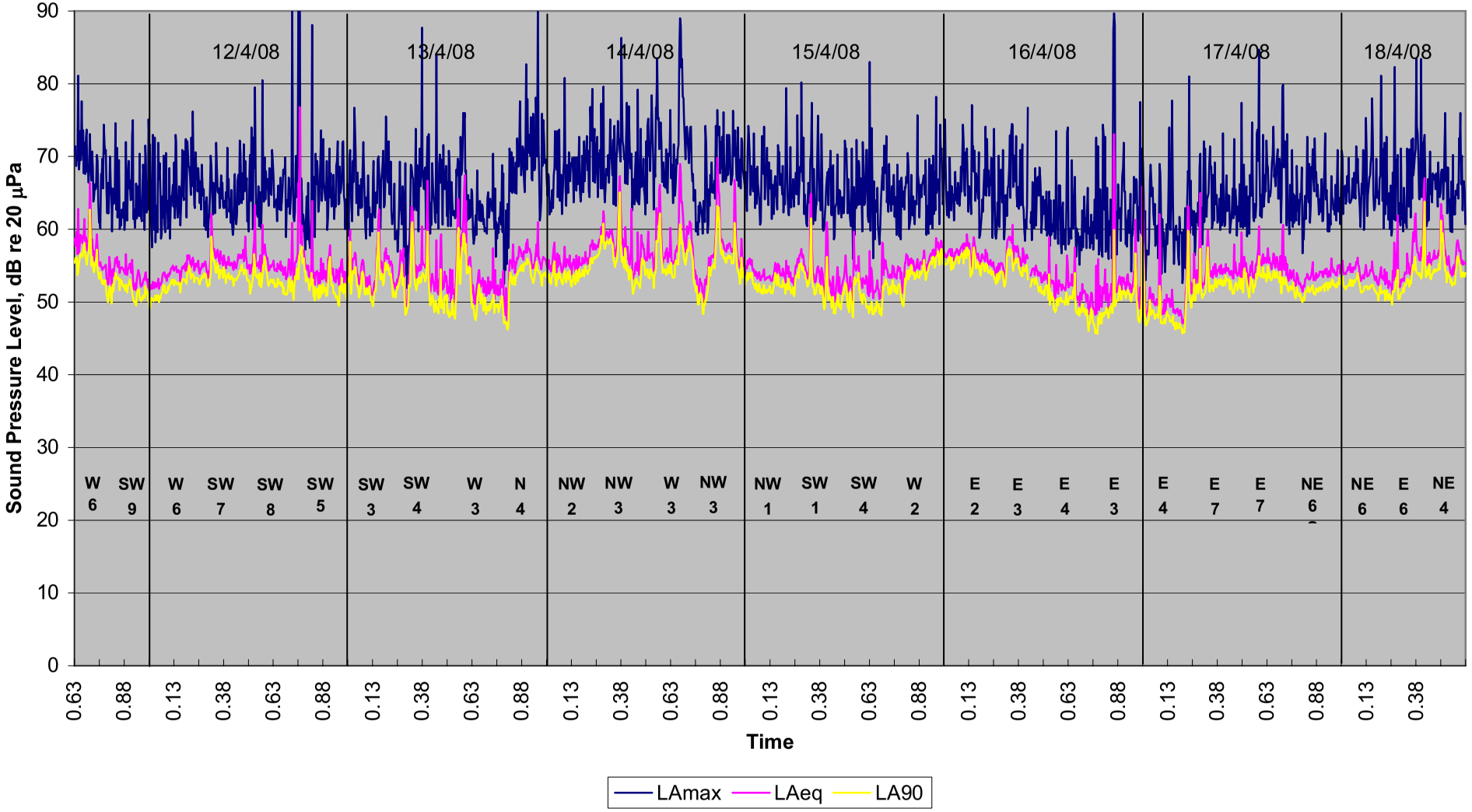
Ambient Noise Levels LT3, 21st - 28th March 2008 (Week 2)



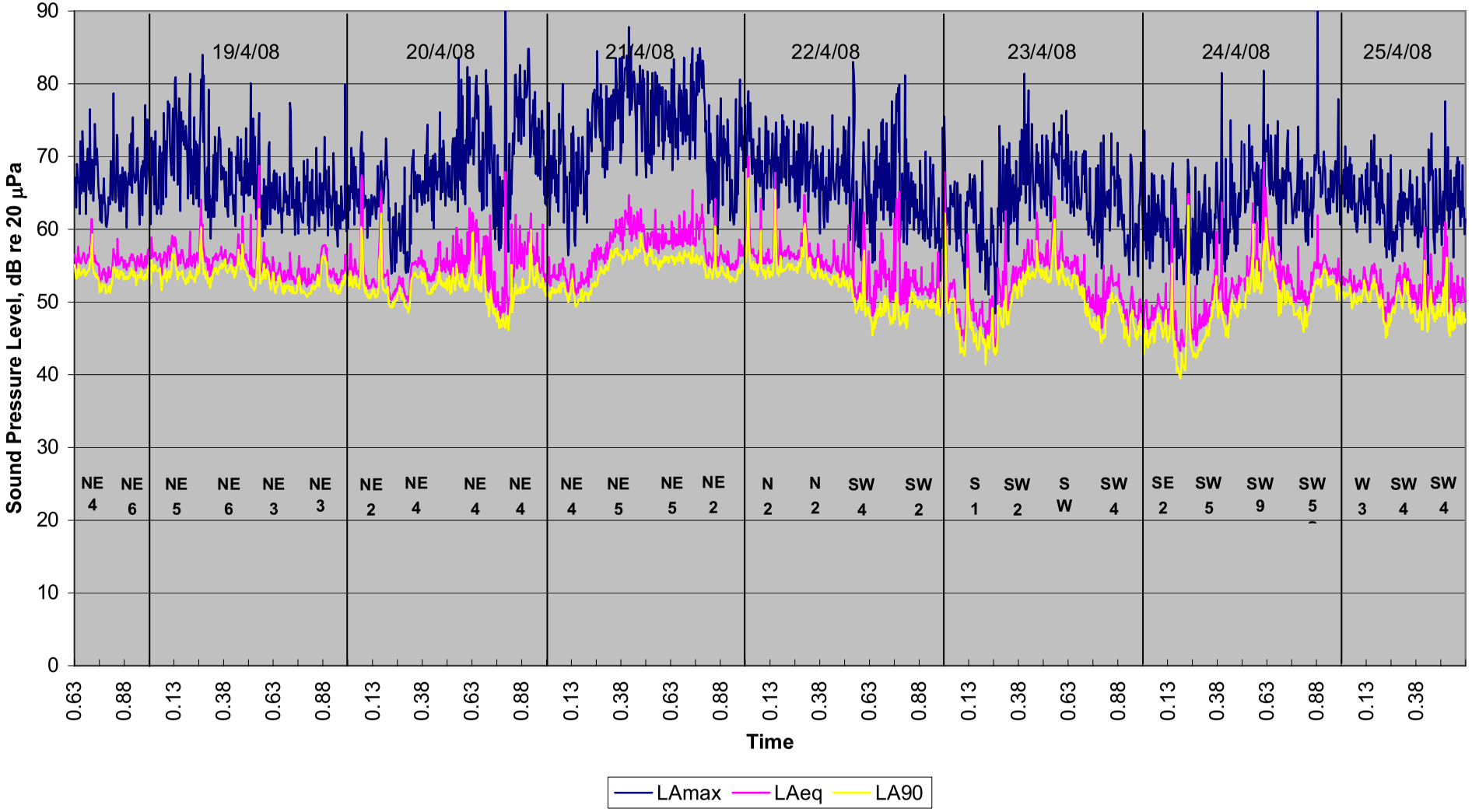
Ambient Noise Levels LT3, 4th - 11th April 2008 (Week 4)



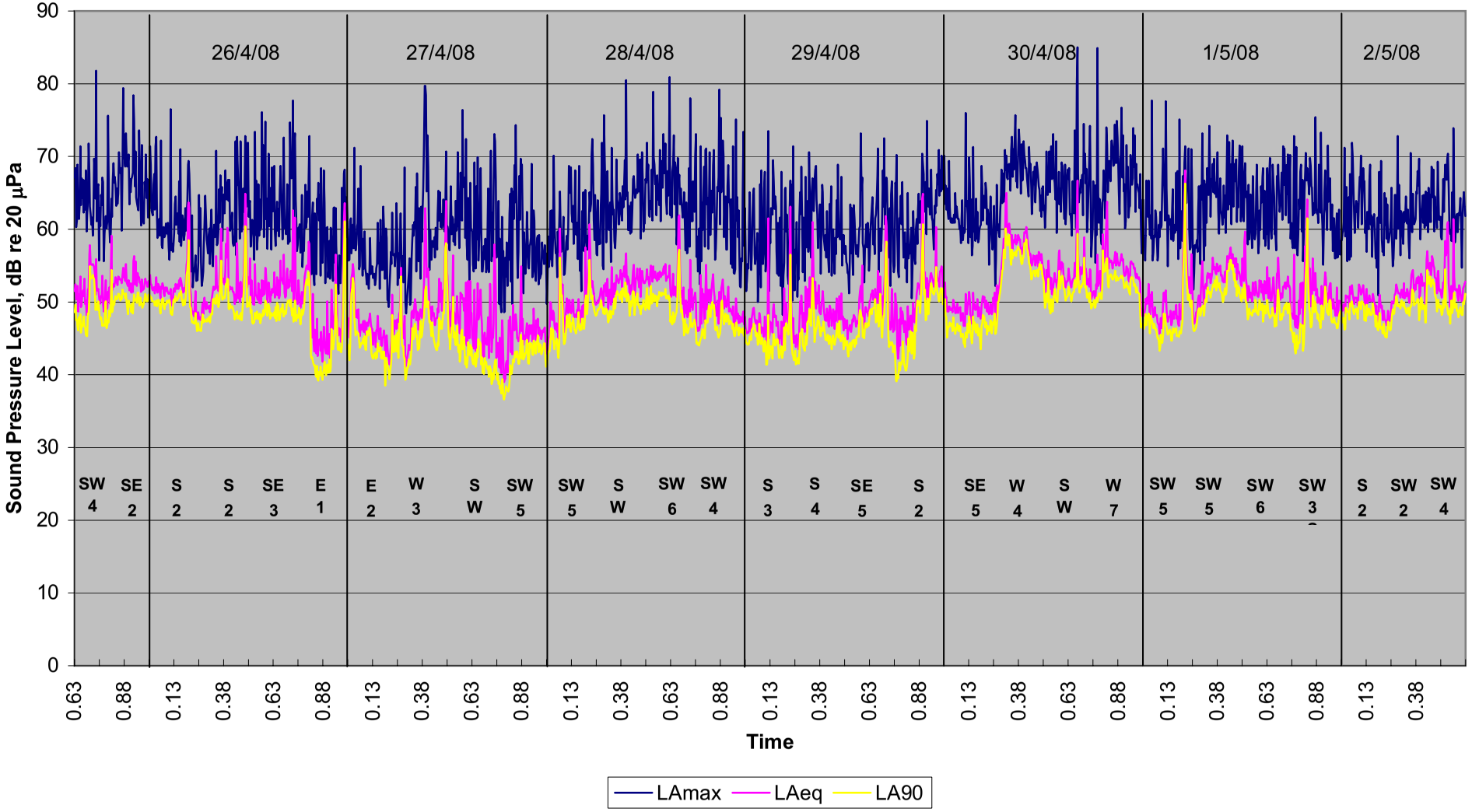
Ambient Noise Levels LT3, 11th - 18th April 2008 (Week 5)



Ambient Noise Levels LT3, 18th - 25th April 2008 (Week 6)



Ambient Noise Levels LT3, 25th - 2nd May 2008 (Week 7)



Ambient Noise Levels LT3, 2nd - 9th May 2008 (Week 8)