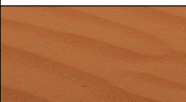


NOISE IMPACT ASSESSMENT



APPENDIX 9



HEGGIES

REPORT 30-2497-R2

Revision 2

**Awaba Colliery Mining Project
Part 3A Application
Noise Impact Assessment**

PREPARED FOR

Centennial Coal Company
PO Box 1000
Toronto NSW 2283

23 SEPTEMBER 2010

HEGGIES PTY LTD
ABN 29 001 584 612



Awaba Colliery Mining Project

Part 3A Application

Noise Impact Assessment

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DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
30-2497-R2	Revision 2	23 September 2010	Katie Teyhan	Nathan Archer	John Cotterill
30-2497-R2	Revision 1	9 September 2010	Katie Teyhan	John Cotterill	John Cotterill
30-2497-R2	Revision 0	21 July 2010	Katie Teyhan	John Cotterill	John Cotterill



EXECUTIVE SUMMARY

Heggies Pty Ltd (Heggies) has been commissioned by GSS Environmental (GSSE) on behalf of Centennial Coal Pty Limited (Centennial) to undertake a Noise Impact Assessment for the Awaba Colliery Mining Project located on Wilton Road, Awaba, NSW.

Broadly, the objective of the noise assessment was to identify the potential impacts of noise from operation of the facility and to provide advice with regard to effective mitigation strategies where necessary.

An ambient noise monitoring program was undertaken by Heggies. Ambient noise levels were monitored at two locations, considered to be representative of the nearest potentially affected receivers. The objective of this survey was to measure $LA_{90}(\text{period})$ and $LA_{eq}(15\text{minute})$ noise levels at the nearest potentially affected residential locations during the day, evening and night-time periods to enable the determination of the project specific noise criteria for the project.

OPERATIONAL NOISE PREDICTIONS

A computer model was used to predict noise emissions from the project. Noise levels were predicted for the general operational scenario summarised in **Section 7.1.3** with the inclusion of the noise mitigation and management procedures detailed in **Section 2.5**.

Operational noise levels are predicted to meet the project specific noise criteria at all considered residential locations under calm and prevailing weather conditions.

Since the operational scenario modelled is likely to represent an acoustically worst-case scenario, actual operational noise levels from the project are likely to be less than those predicted.

SLEEP DISTURBANCE ASSESSMENT

In the interests of minimising sleep disturbance impacts it has been assumed that there will be no requirement for trucks to reverse on site during the night-time period due to the layout of the site.

The highest L_{Amax} noise level at any residential area is predicted to occur as a result of truck pass-by events on either the Newstan or Eraring private haul roads in the presence of a temperature inversion. External noise levels up to L_{Amax} 45 dBA may occur at residences in Olney Street, Awaba and John Street, Blackalls Park under these circumstances. Hence, predicted noise levels meet the most stringent recommended sleep disturbance noise goal of 46 dBA.

VIBRATION ASSESSMENT

It is noted that blasting is not proposed to occur for the life of the project. The main vibration generating activities will include the operation of mobile equipment such as the loader and trucks. Given the separation distance between mining operations and the nearest potentially affected residential locations vibration levels from these activities is predicted to be negligible and below levels for human perception at the nearest residential locations.



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1 INTRODUCTION

Heggies Pty Ltd (Heggies) has been commissioned by GSS Environmental (GSSE) on behalf of Centennial Coal Pty Limited (Centennial) to undertake a Noise Impact Assessment for Awaba Colliery located on Wilton Road, Awaba, NSW.

Broadly, the objective of the noise assessment was to identify the potential impacts of noise from operation of the facility and to provide advice with regard to effective mitigation strategies where necessary.

The Noise Impact Assessment (NIA) has been prepared with reference to Australian Standard AS 1055:1997 *Description and Measurement of Environmental Noise* Parts 1, 2 and 3 and in accordance with the Department of Environment, Climate Change and Water (DECCW) NSW Industrial Noise Policy (INP). Where issues relating to noise are not addressed in the INP, such as sleep disturbance, reference has been made to the NSW Environmental Noise Control Manual (ENCM) and the Environmental Criteria for Road Traffic Noise (ECRTN).

The Scope for the NIA has been designed to address the Director General's Requirements (DGR's) with regard to the assessment of noise emissions. Comments on the DGR's have also been provided by other government agencies. These have been reviewed with regard to their relevance to the assessment of noise impacts. Where relevant, these have also been addressed within the NIA. A summary of the DGR's and relevant comments is provided in **Table 1** together with the relevant section of the NIA addressing the particular DGR/comment.



2 PROJECT OVERVIEW

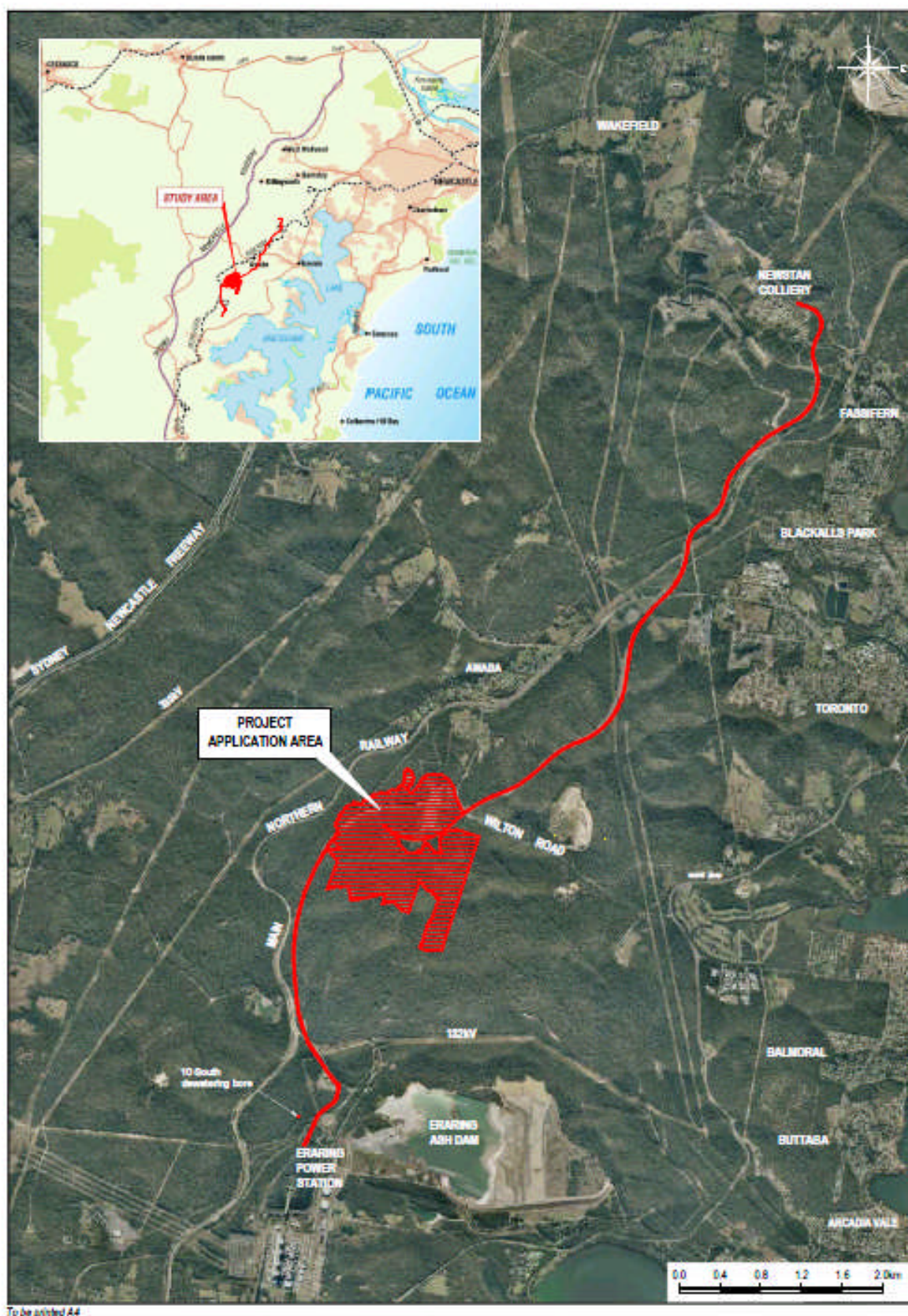
2.1 Background

Awaba Colliery is a small underground coal mine operated by Centennial Newstan Pty Ltd (Newstan), a wholly owned subsidiary of Centennial Coal Company Ltd (Centennial). The mine entry and primary surface facilities are located approximately one kilometre south of the Awaba village and 5.5 kilometres (km) south west of Toronto on the western side of Lake Macquarie, near Newcastle NSW.

Awaba Colliery has been producing coal by bord and pillar method since 1947. The site is situated on crown land under lease to Centennial for the purpose of mining under Consolidated Coal Lease CCL746, and is adjacent to the Newstan-Eraring haul road owned by Eraring Energy. The locality of the mine is illustrated in **Figure 1**.



Figure 1 Awaba Colliery Project Location Area



Source: GSSE, September 2010



Awaba Colliery is a small operation with approximately 100 employees and contractors, historically producing around 800,000 tonnes of thermal coal annually. Since commencing mining operations in 1947, over 30 million tonnes of coal has been won from the Great Northern Seam using a combination of first workings development, pillar extraction, pillar quartering, and pillar stripping.

A form of pillar extraction of narrow panels is used to recover coal in pillars developed previously by bord and pillar methods. Development of bords (roadways) and pillars is ongoing but in some areas were developed many years ago. This mining method currently utilises continuous miners. Mine planning ensures panels are not extracted where depth of cover or surface constraints preclude total extraction. This mining method has been developed in consultation with the Department of Primary Industries – Mineral Resources (now known as Industry and Investment, NSW (I&I)) and has been used successfully to date, and is proposed to be continued for the Project.

Mining operations commenced at the Awaba Colliery in 1947, prior to the commencement of any planning controls, and have continued without abandonment since that time. Consequently, the Awaba Colliery presently operates pursuant to section 109(1) of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) and clause 6B(1) of the State Environmental Planning Policy (Major Development) 2005. An application for a Part 3A Project Approval has been lodged by Centennial for the **Awaba Colliery Mining Project (the “Project”)**, which seeks approval from the Minister of Planning to allow an extension of underground mining and the ongoing use of associated surface operations. A detailed description of the Project and the **Project Application Area (the “Application Area”)** (including focus study areas) is detailed further in **Sections 2.2 and 2.3**.

Minimal changes are proposed to existing surface operations, with one proposed additional surface disturbance relating to increased pollution control dam capacity located in a previously disturbed area. No significant changes to coal handling are proposed. Underground mining areas requiring approval to allow continued mine operations and production are outlined in **Sections 2.2 and 2.3**.

At present, it is anticipated that the Project will recover approximately 2.0 million tonnes of coal which will be extracted from those areas depicted in Study Area 2 and Study Area 3 (refer **Section 2.2.1**) over a period of approximately five years or more, depending on actual mining conditions and relevant market drivers. The application for the proposed Project is supported by an Environmental Assessment (“EA”).

2.2 Project Application Area

The **Project Application Area** (the “Application Area”) is illustrated in **Figure 1**. The Application Area has been identified as the footprint of the proposed Project including proposed mining areas and related surface operations that are considered relevant to the continuation of Awaba Collieries operations, as well as, the existing workings areas that will continue to be relied upon for ventilation and other mining related purposes, access to proposed mining areas or for any required emergency evacuation.

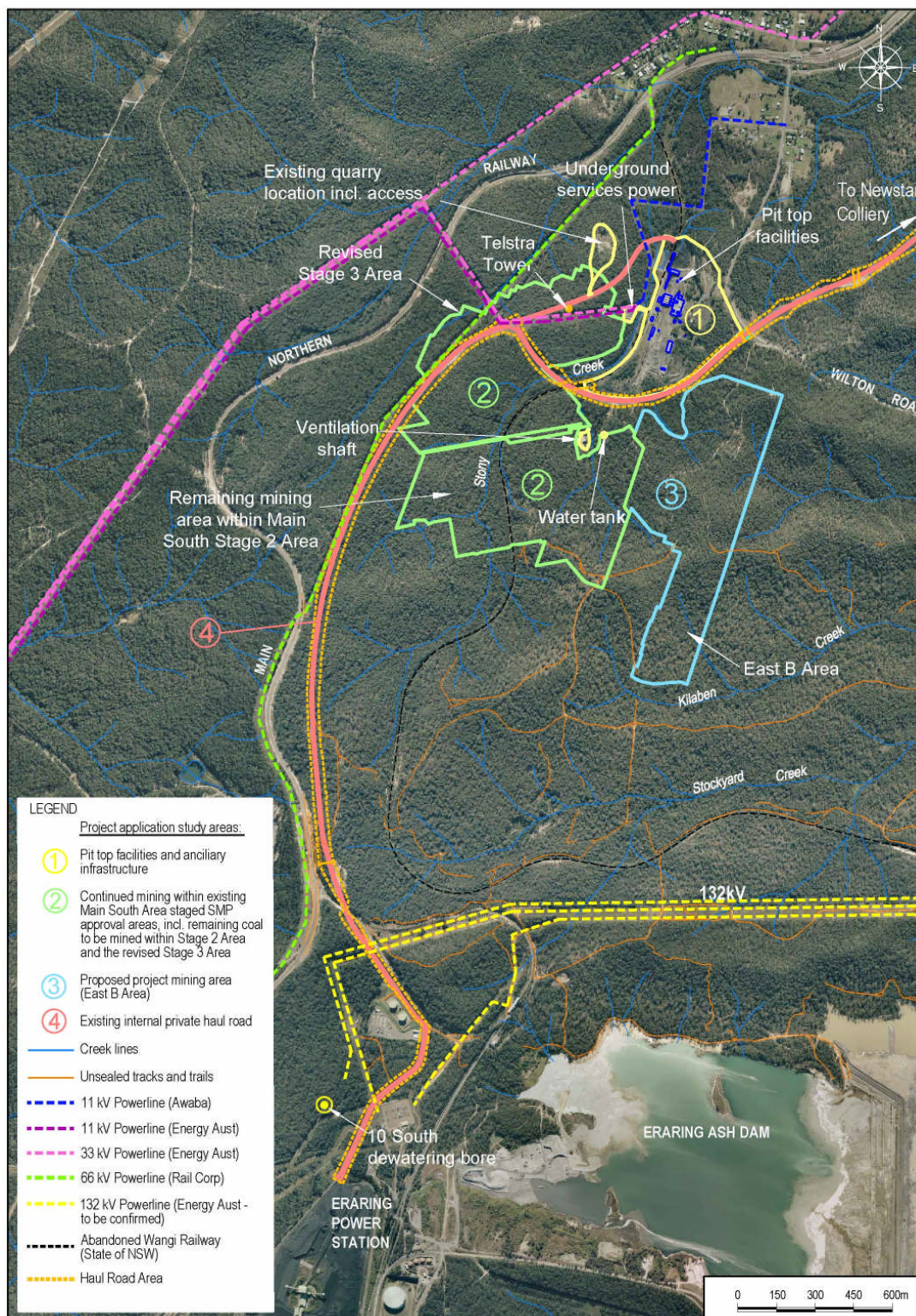
The Application Area has been broken into a number of Study Areas based on the types of activities to be undertaken for the Project. These Study Areas are outlined below in **Section 2.2.1** below. The extent of the existing workings has not been included as a Study Area as it is considered inappropriate to obtain retrospective approval for historical operations. Additionally, there are no activities proposed in these areas for the Project and ongoing management of these areas is covered by the existing Awaba Colliery Mining Lease conditions.



2.2.1 Study Areas

The Study Areas that have been assessed as part of this EA are illustrated in **Figure 2**.

Figure 2 Project Application Study Areas



Source GSSE July2010



The study areas are described as follows:

- **Study Area 1 – Surface Facilities and Ancillary Infrastructure** – This area includes the colliery pit top facilities (including office and amenities buildings, existing coal crushing plant, workshop and storage areas) ventilation shafts, an existing quarry and mine dewatering bore (10 South Bore).
- **Study Area 2 – Continued Mining within Existing Main South Area staged SMP Approval Areas (including the Remaining Coal to be Mined within Stage 2 and the Revised Stage 3)** – The impacts associated with mining in these areas have previously been assessed in Subsidence Management Plan (SMP) Applications. The Stage 2 Area application was approved by Industry and Investment in September 2008, with the SMP Application for the Revised Stage 3 Area submitted to I&I in December 2009 awaiting approval. These areas are defined by a 26.5 degree angle of draw (as per DPI-MR SMP Guidelines, 2003). The outcomes from the SMP assessment will be summarised along with any impacts that are not considered to have been adequately addressed for this EA. It is important to note that, in relation to Stage 2 Area, only the coal remaining from the 1st of August will require approval for this Project; and
- **Study Area 3 – Proposed Project Mining Areas** - Consideration of the proposed Mining Area (East B Area) defined as the proposed workings plus 26.5 degree angle of draw (i.e. as per DPI-MR SMP Guidelines, 2003);
- **Study Area 4 – Existing Internal Private Haul Road** – This haul road will be utilised for transporting coal from the Awaba Colliery operations to Newstan Collieries existing Run of Mine Stockpile or Rail Loop and subsequently transported to the Port of Newcastle or Port Kembla for shipping to export markets (to be undertaken in accordance with the Newstan Colliery development consent) and also to the Eraring Power Station. It is noted that a modification to the Newstan Colliery development consent (DA 73-11-98) will be applied for under Section 96(1A) of the EP&A Act to allow for the preparation of coal sourced from the Awaba Colliery using the existing Newstan Colliery infrastructure.

In general, potential environmental impacts associated with mine access, ventilation and other services provided through the existing workings areas to the active and proposed mining areas will also be addressed in the EA.

2.3 Project Description

Awaba Colliery is seeking an approval from the Minister of Planning under the provisions of Part 3A of the EP&A Act to:

- Continue bord and pillar development and pillar extraction by continuous miners within the “Main South Area” (being the remaining sections of Stage 2 and Revised Stage 3, refer **Study Area 2**);
- Extend bord and pillar development and pillar extraction by continuous miners into the “East B” Area (refer **Study Area 3**);
- Produce, handle and distribute up to 880,000 tonnes of Run of Mine coal per annum (financial year) using existing surface facilities;
- Continue the use of existing ancillary surface facilities (all **Study Areas**);
- Expand the existing final Pollution Control Dam (refer **Study Area 1**);
- Continue the delivery of coal to the Newstan Colliery and/or Eraring Power Station using existing private haul road/transport facilities (refer **Study Area 4**).



The proposed **East B Area** contains a proportion of coal that extends beyond the existing footprint of mining at Awaba Colliery and includes areas of both existing workings and areas requiring new workings to be developed. Subsequently, areas of new workings are lateral extensions to the mine footprint which will require new development approval (being sought under the current Part 3A application). The East B area is located to the east of the Main South Stage 2 Area. The overlying surface in the East B Area is predominantly bush land on crown land leased to Centennial Newstan and contains no significant surface infrastructure. This area forms **Study Area 3** for the Project, as discussed in **Section 2.2** above.

Mining will also be continued at Awaba Colliery in two (2) separate areas, these have been outlined below and illustrated as **Study Area 2** in **Figure 2**:

- **Remaining sections of Stage 2 of the Main South Area** (currently being mined) – this area was approved by I&I in September 2008 following an SMP application (as modified) under the NSW *Mining Act, 1992*.
- **Revised Stage 3 Area** (of Main South Area) – this area has recently undergone a number of specialist surveys relating to a SMP application submitted in December 2009 (approval currently awaited from I&I prior to December 2010).

At present, it is anticipated that the Project will recover approximately 2.0 million tonnes of coal which will be extracted from those areas depicted in Study Area 2 and Study Area 3 (see **Figure 2**) over a period of approximately five years or more, depending on actual mining conditions and relevant market drivers.

All existing ancillary surface facilities, supporting infrastructure, workings and their associated uses will continue to be relied upon by the Awaba Colliery (no significant change) as outlined further below. These aspects of the Project will continue to be used until such time as the Awaba Colliery is placed on care and maintenance, and thereafter throughout that phase also. When the Awaba Colliery is placed on care and maintenance, this will be done in accordance with the *Life of Mine Plan* approved by I&I NSW in 2009, until such time that a final Detailed Life of Mine Strategy has been developed.

Annual production, handling and distribution of approximately 880,000 tonnes per financial year is required.

Awaba Colliery requires approval to deliver coal via the private haul road to the Newstan Colliery ROM coal stockpile (in addition to the Rail Loop stockpile). This is assessed within **Study Area 4**. Newstan Colliery has submitted an application to modify its development consent in order to process coal received from the Awaba Colliery

Existing mining areas, will continue to be utilised for ongoing mining operations including (but not limited to) mine access, emergency management and underground services and infrastructure.



Continuing Mine Operations:

For the purposes of environmental assessment, further to the information above regarding continued mining areas, it is noted that the following aspects of mine operations are proposed to continue and remain unchanged. Existing mining operations are presented in detail in Section 3 of the *Environmental Assessment (EA)* and, where relevant, components are discussed further in this specialist report.

- **Coal Handling, preparation and stockpiles** – No changes are proposed to the current coal handling, preparation or stockpile procedures to the existing operations.
- **Mine support facilities and site access** – No changes are proposed to the current infrastructure and facilities, with the only exclusion being the expansion of the Pollution Control Dam (PCD) mentioned earlier above, with related water management considerations. Mine access from Wilton Road will continue to be utilised and no significant change is anticipated from current use.
- **Plant and equipment** – No changes are proposed to the typical plant and equipment used at the Awaba Colliery.
- **Transportation procedures** – No changes are proposed to the current transport procedures. The Project will continue to use the Newstan-Eraring private haul road to transport coal from the operations to Newstan and Eraring.
- **Mining methodology** – There will be no significant changes to current mining methods for the Project. This includes predicted subsidence levels and operational structure. Production rates may be slightly increased from approximately 800,000 to 880,000 tonnes per annum (financial year), depending on mining efficiency and market demands.
- **Operational water management** – the domestic wastewater generation rate from the Pit Top facilities will be similar to that which currently exists as there is no plan for an increase or significant change in staff numbers. Disposal of the domestic wastewater will remain as currently exists at site.
- **Mine dewatering procedures** – the 10 South Bore will continue to be used for groundwater management and dewatering during both continued operation and care and maintenance conditions.



2.4 Acoustically Significant Sources

2.4.1 Mining Operations

Awaba Colliery utilises two continuous miners for coal extraction and a range of other ancillary equipment both in the underground workings and during operations at the Surface Facilities.

Noise measurements have been conducted of acoustically significant plant and equipment utilised during operations at the Surface Facilities. Sound power levels of such plant have been determined and utilised for the purpose of this noise assessment. Where on-site measurements could not be conducted sound power levels have been obtained from a Heggies database of similar equipment. The relevant acoustically significant plant and equipment and the associated sound power levels are provided in **Table 2**.

Table 2 Awaba Colliery - Acoustically Significant Plant and Equipment

Plant and Equipment	Sound Power Level
Mining - Surface Operations	
Conveyor drive (adjacent to ROM bin)	97 dBA
Compressor shed	105 dBA
Processing plant	116 dBA
Forklift*	93 dBA
Underground man transport vehicle	111 dBA
Truck loaded (at 500t final product bin)	107 dBA
Front end loader (utilised during occasions where coal is stockpiled)	107 dBA
Workshop* (eg use of grinder)	104 dBA
Ventilation fan	88 dBA
Haul truck	98 dBA
Quarry	
Excavator*	106 dBA
Truck (approx. 20t) Pass-by*	98 dBA

* Sound power levels for these sources have been obtained from a Heggies database. All other sound power level data presented here has been obtained from noise measurements undertaken at the project site.

It should be noted that the plant and equipment utilised underground has not been considered as acoustically significant.

2.4.2 Construction

Minimal changes are proposed to existing surface operations, with only one proposed new surface disturbance relating to increased pollution control dam capacity. This activity would be considered as construction activity and require assessment in accordance with the Interim Construction Noise Guideline.

Increasing the capacity of the pollution control dam is expected to take up to 2 weeks duration and involve the use of one excavator and some haul trucks. For the purpose of the noise assessment the sound power level of these items has been assumed to be the same as those in use at the quarry (refer **Table 2**).



2.5 Existing Noise Mitigation and Management Measures

Noise mitigation and management measures currently implemented at Awaba Colliery include the following:

- Standard work procedures and maintenance tasks to minimise noise emissions.
- Enclosed conveyors and processing plant.

2.6 Noise Complaints

Awaba has received a noise complaint in 2007. The following text is an extract from the 2007 AEMR in regard to the complaint.

The complaint was received via telephone from an Awaba resident 30 October 2007 late at night. The complaint was in relation to concerns of a noise similar to a “reversing buzzer” late at night. No machinery with reversing buzzers was operating at the time. It was thought that noise may have been a conveyor magnet warning buzzer although hasn’t been able to be confirmed.

3 PROJECT SETTING

3.1 Site Details

Awaba Colliery is located on the sloping side of a narrow valley, which trends in a north-south direction. The site has an approximate elevation of 55 metres at the eastern end of the surface facilities and Stoney Creek borders the western side of the mine. The township of Awaba is situated less than 1 km north and Toronto is approximately 5.5 km northeast of the site. The western shore of Lake Macquarie is approximately 4km east of the site.

3.2 Sensitive Receptors

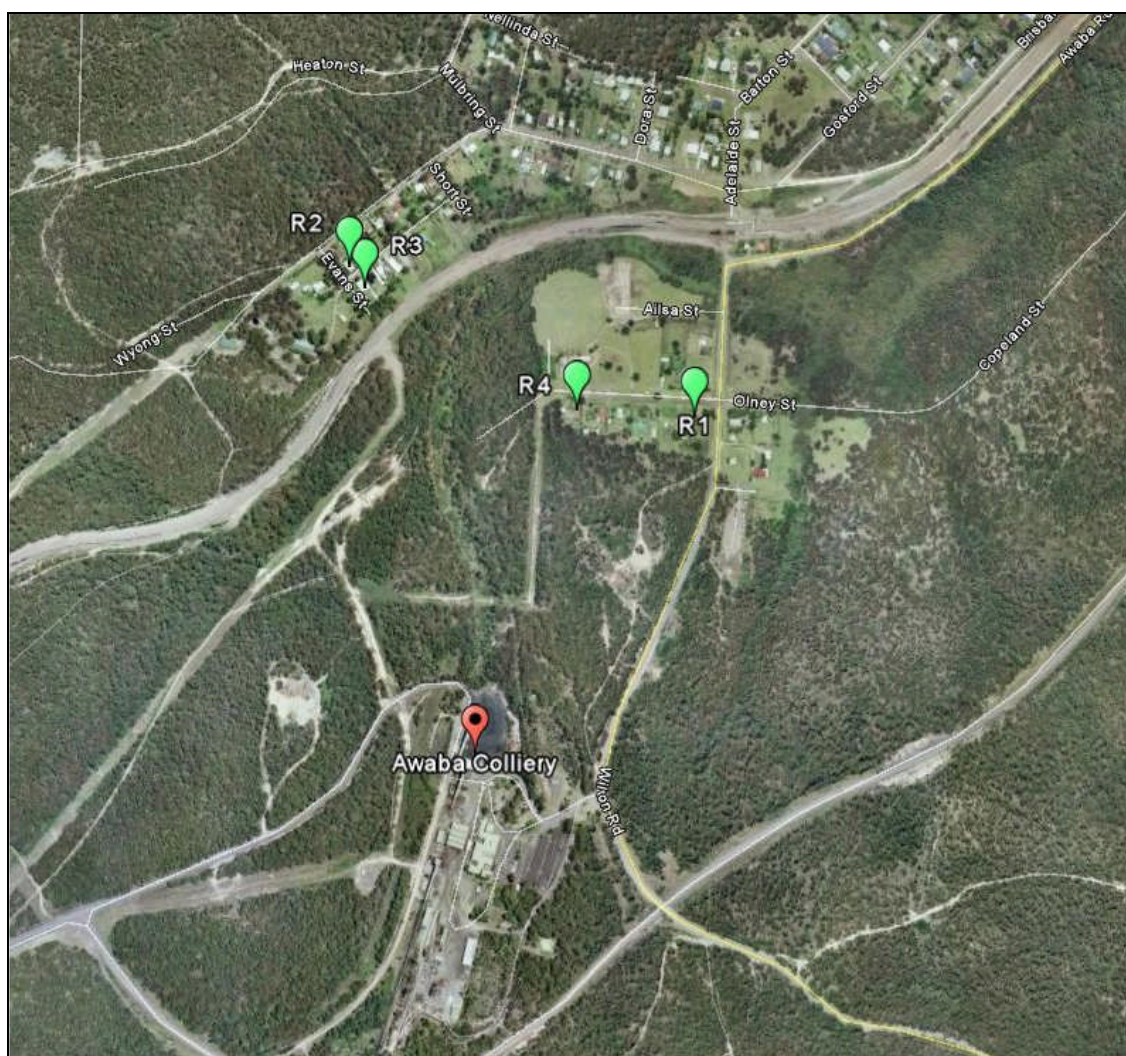
A number of residences are located in the area surrounding the Project Site. The nearest residences have been identified as sensitive receptor locations to be taken into account during the assessment. A list of the nearest sensitive receptors (R1 to R4) identified in the immediate vicinity of the Project Site, and their respective distances from the Project Site boundary, are presented in **Table 3** and **Figure 3**.

Table 3 Nearest Sensitive Receptors

Receptor ID	Location	Location (m, MGA56)		Distance (km) / Direction From Site Boundary	Elevation (m, AHD)
		Easting	Northing		
R1	9 Olney Street, Awaba	363733	6346064	0.6 / NNE	30
R2	15 Evans Street, Awaba	363203	6346323	0.8 / N	32
R3	51 Puddy Lane, Awaba	363220	6346274	0.7 / N	29
R4	1A Olney Street, Awaba	363547	6346080	0.5 / NNE	32



Figure 3 Surrounding Sensitive Receptor Locations

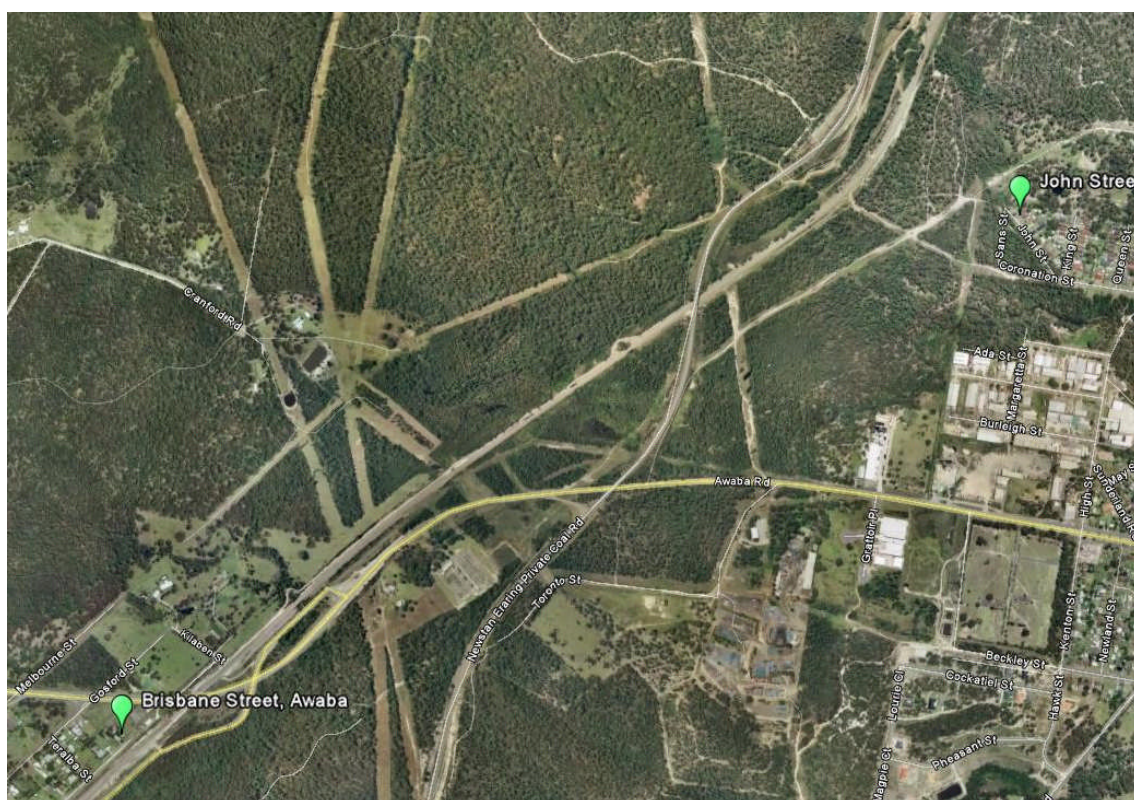


Source: Google Earth

For the purpose of assessing potential noise impacts from the haul roads the residential locations shown in **Figure 4** have also been considered.



Figure 4 Other Noise Sensitive Receivers



Source: Google Earth

It is noted that other noise-sensitive locations such as schools, churches and hospitals are not in the vicinity of Awaba Colliery and, as such, have not been considered as being potentially affected by noise emissions from the Project.



4 NOISE IMPACT ASSESSMENT PROCEDURES

4.1 General Objectives - Industrial Noise Policy

The Industrial Noise Policy (INP) was released in January 2000 and provides a framework and process for deriving noise criteria for consents and licences that enables the DECCW to regulate premises that are scheduled under the Protection of the Environment Operations Act, 1997.

The specific policy objectives are:

- To establish noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses.
- To use the criteria as the basis for deriving project specific noise levels.
- To promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects.
- To outline a range of mitigation measures that could be used to minimise noise impacts.
- To provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise impacts with the economic, social and environmental considerations of industrial development.
- To carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the Act.

The INP provides two forms of noise criteria with the aim of achieving environmental noise objectives; one to account for intrusive noise which involves setting a noise goal relative to the existing acoustic environment and the other to protect the amenity of particular land uses.

For assessing intrusiveness, the background noise needs to be measured. The intrusiveness criterion essentially means that the equivalent continuous noise level of the source over any 15 minute period ($L_{Aeq}(15\text{minute})$) should not be more than five (5) decibels above the measured background level (L_{A90}).

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include road, rail or community noise. An extract from the INP that relates to the amenity criteria is given in **Table 4**.



**Table 4 Amenity Criteria
Recommended LAeq Noise Levels from Industrial Noise Sources**

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended LAeq(Period) Noise Level (dBA)	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
	Urban/Industrial Interface (for existing situations only)	Day	65	70
		Evening	55	60
		Night	50	55
School classrooms - internal	All	Noisiest 1 hour period when in use	35	40
Hospital wards - internal - external	All	Noisiest 1 hour period	35	40
			50	55
Place of worship - internal	All	When in use	40	45
Area specifically reserved for passive recreation (eg National Park)	All	When in use	50	55
Active recreation area (eg school playground, golf course)	All	When in use	55	60
Commercial premises	All	When in use	65	70
Industrial premises	All	When in use	70	75

Note: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am, On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

If the measured existing noise level from industry approaches the criterion value, then noise levels from new industries need to be designed so that the cumulative effect does not produce noise levels that would significantly exceed the criterion. In this case, the amenity criteria provided in **Table 4** would need to be adjusted in accordance with the INP as per **Table 5**.



Table 5 Modification to Acceptable Noise Level (ANL)* to Account for Existing Levels of Industrial Noise

Total Existing LA_{eq} noise level from Industrial Noise Sources	Maximum LA_{eq} Noise Level for Noise from New Sources Alone, dBA
≥ Acceptable noise level plus 2 dBA	If existing noise level is <i>likely to decrease</i> in future acceptable noise level minus 10 dBA If existing noise level is <i>unlikely to decrease</i> in future existing noise level minus 10 dBA
Acceptable noise level plus 1 dBA	Acceptable noise level minus 8 dBA
Acceptable noise level	Acceptable noise level minus 8 dBA
Acceptable noise level minus 1 dBA	Acceptable noise level minus 6 dBA
Acceptable noise level minus 2 dBA	Acceptable noise level minus 4 dBA
Acceptable noise level minus 3 dBA	Acceptable noise level minus 3 dBA
Acceptable noise level minus 4 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 5 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 6 dBA	Acceptable noise level minus 1 dBA
< Acceptable noise level minus 6 dBA	Acceptable noise level

* ANL = recommended acceptable LA_{eq} noise level for the specific receiver, area and time of day from **Table 4**

4.2 Assessing Sleep Disturbance

The DECCW has acknowledged that the relationship between maximum noise levels and sleep disturbance is not currently well defined. Criteria for assessing sleep disturbance has not been identified under the INP and hence, sleep arousal is often assessed using the guidelines set out in the Environmental Noise Control Manual (ENCM) Chapter 19-3.

To avoid the likelihood of sleep disturbance the ENCM recommends that the LA_{1(1minute)} noise level of the source under consideration should not exceed the background noise level (LA₉₀) by more than 15 dBA when measured outside the bedroom window of the receiver during the night-time hours (10.00 pm to 7.00 am).

4.3 Assessing Construction Noise

The DECCW released the Interim Construction Noise Guideline in July 2009. The guideline sets out noise management levels, in relation to construction type activities, for sensitive receivers and how they are to be applied. The guideline suggests restriction to the hours of construction that apply to activities that generate noise at noise-sensitive receivers above the 'highly affected' noise management level. A summary of the noise management levels relevant to residential locations from the Guideline is contained in **Table 6**.



Table 6 Interim Construction Noise Guideline (Residences)

Time of day	Management level LAeq(15minute)	How to apply
Recommended standard hours Monday to Friday 7am to 6pm Saturday 8am to 1pm No work Sundays or public holidays	Noise Affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. - Where the predicted or measured LAeq(15minute) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. - The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. - Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise Affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. - The proponent should apply all feasible and reasonable work practices to meet the noise affected level. - Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.



5 EXISTING ACOUSTICAL AND METEOROLOGICAL ENVIRONMENT

5.1 General Methodology

Ambient noise surveys were conducted to characterise and quantify the existing acoustical environment in the area surrounding the Awaba Colliery. A background monitoring survey was undertaken at two (2) residential locations on Olney Street, Awaba, considered representative of the nearest potentially-affected noise-sensitive receivers to the Awaba Colliery.

The background noise monitoring consisted of continuous, unattended noise logging and operator attended noise surveys. The operator attended noise surveys help to define noise sources and the character of noise in the area and are, therefore, used to qualify unattended noise logging results.

All acoustic instrumentation employed throughout the monitoring programme has been designed to comply with the requirements of AS 1259.2-1990, "Sound Level Meters" and carries current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding ± 0.5 dBA.

5.2 Operator-Attended Noise Monitoring

Operator attended noise measurements were conducted during the day and night-time periods at both noise monitoring locations. The purpose of these surveys was twofold; to qualify the unattended noise logging results and to determine the contribution of existing industrial noise sources (including Awaba colliery) to the total ambient noise environment.

Each noise survey was conducted over a 15 minute period using a B&K 2270 integrating sound level meter (S/N 2449940). The results of the operator-attended noise measurements are given in **Table 7**. Ambient noise levels given in the table include all noise sources such as road, insects, birds, as well as any industrial operations.

Table 7 Operator Attended Noise Survey Results

Location	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 μ Pa)					Description of Noise Emission, Typical Maximum Levels LAmax (dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Location 1 11 Olney St	9/4/2010 3:42pm Temp 22 °C Wind Calm	61	55	49	38	46	Dominated by road traffic on Wilton Rd 40-55 Insect noise to 61 Birds to 54 Local residential activity to 60 No industrial noise discernible
Location 1 11 Olney St	10/2/2010 12:54am Temp 22 °C Wind Calm	83	71	50	32	58	Freight train to 65 Car pass-by to 83 Industrial hum 30-32 Awaba Colliery only audible in very quiet lulls ~25
Location 2 1A Olney St	9/4/2010 4:07pm Temp 22 °C Wind Calm	55	46	42	37	40	Dominated by road traffic on Wilton Rd 40-50 Boy kicking football to 55 Birds 40-43 Lawn mower to 40 No industrial noise discernible
Location 2 1A Olney St	10/2/2010 12:34am Temp 22 °C Wind Calm	72	66	50	40	53	Distant traffic to 52 Freight train to 72 Residential a/c unit ~40 Passenger train to 50, horn 57 Cicadas 40-43 Awaba Colliery inaudible



Results of operator-attended noise surveys indicate that local traffic, the natural environment and residential activity are the main contributors to the ambient noise environment during the daytime period at each monitoring location. Local traffic and noise from trains are significant contributors during the night-time period with no significant noise contribution from Awaba Colliery or any other industrial sources during this period.

5.3 Unattended Continuous Noise Monitoring

Background noise levels were monitored by Heggies. The objective of the background noise survey was to measure LA90(period) and LAeq(15minute) noise levels at the nearest potentially affected residential locations during the day, evening and night-time periods to enable the determination of the intrusiveness and amenity criteria for the project.

Background noise levels were monitored at two separate locations, considered to be representative of the nearest potentially affected receivers, from Tuesday 30 March to Friday 9 April 2010, inclusive. Details of monitoring locations are provided in **Table 8**.

Table 8 Ambient Noise Monitoring Locations

Location	Address Location Description	Logger Serial No.
Location 1	11 Olney Street, Awaba Logger located in backyard, on Eastern boundary fence.	16-306-039
Location 2	1A Olney Street, Awaba Logger located in backyard, on Eastern boundary fence.	16-203-509

It is noted that the monitoring period coincided with the Easter long-weekend and school holiday period. It is anticipated that this would not significantly affect the measured ambient noise levels in the area. It is also noted that mining operations were not being conducted at Awaba Colliery for the duration of the unattended monitoring due to a scheduled shut-down period.

ARL Type EL316 noise loggers were used to monitor the ambient noise levels at each location. The noise loggers were programmed to record statistical noise level indices continuously in 15 minute intervals, including LAmax, LA1, LA50, LA90, LA99, LAmin and LAeq. Precautions were taken to minimise influences from extraneous noise sources and reflections from adjacent buildings.

Weather data for the survey period was obtained from the automatic weather station located at Newstan Colliery (approximately 6 km north-west of the Awaba Colliery). Noise data corresponding to periods of rainfall and/or wind speeds in excess of 5 m/s (approximately 9 knots) were discarded in accordance with INP data exclusion methodology. A summary of the results of the background surveys is given in **Table 9**. Results are displayed graphically in **Appendix A**.



Table 9 Summary of Existing Ambient Noise Levels

Location	Period	Background LA90 Noise Level	Measured LAeq(Period)	Estimated Existing Industrial Contribution LAeq
		Rating Background Level		
11 Olney Street, Awaba	Day	33 dBA	50 dBA	<49 dBA
	Evening	38 dBA	52 dBA	<39 dBA
	Night	36 dBA	45 dBA	<34 dBA
1A Olney Street, Awaba	Day	33 dBA	51 dBA	<49 dBA
	Evening	34 dBA	53 dBA	<39 dBA
	Night	31 dBA	47 dBA	<34 dBA

Note: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am
Morning Shoulder 6.00 am to 7.00 am
On Sundays and Public Holidays, Daytime 8.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 8.00 am
The LA90 represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level
LAeq - The equivalent continuous noise level is defined as the level of noise equivalent to the energy average of noise levels occurring over a measurement period

5.4 Effects of Meteorology on Noise Levels

5.4.1 Wind

Wind has the potential to increase noise at a receiver when it is light and stable and blows from the direction of the source of the noise. As the strength of the wind increases the noise produced by the wind will obscure noise from most industrial and transport sources.

Wind effects need to be considered when wind is a feature of the area under consideration (in accordance with the INP). Where wind blows from the source to the receiver at speeds up to 3 m/s for more than 30% of the time in any season, then wind is considered to be a feature of the area and noise level predictions must be made under these conditions.

Weather data was obtained from the Newstan Colliery automatic weather station. This location is approximately 6 km north-west of the Awaba Colliery. Wind speed and direction data for the period January 2006 to April 2010 was analysed to determine the frequency of occurrence of winds up to speeds of 3 m/s for daytime, evening and night in each season. A summary of the most frequently occurring winds is contained within **Table 10**, **Table 11** and **Table 12**. The percentage occurrence figures provided in bold are those that exceed the 30% threshold.

Table 10 Seasonal Frequency of Occurrence of Wind Speed Intervals - Daytime

Period	Calm	Wind Direction	0.5 - 2 m/s	2 - 3 m/s	0.5 - 3 m/s
Summer	4.2%	SE±45°	12.0%	15.4%	27.4%
Autumn	2.9%	SSE±45°	20.6%	16.0%	36.6%
Winter	2.6%	S±45°	16.6%	14.7%	31.3%
Spring	1.1%	SE±45°	11.7%	15.8%	27.6%

**Table 11 Seasonal Frequency of Occurrence of Wind Speed Intervals - Evening**

Period	Calm	Wind Direction	0.5 - 2 m/s	2 - 3 m/s	0.5 - 3 m/s
Summer	5.2%	ENE $\pm$ 45°	20.6%	17.0%	37.5%
Autumn	8.3%	S $\pm$ 45°	25.2%	11.2%	36.4%
Winter	7.2%	SSW $\pm$ 45°	26.2%	13.2%	39.4%
Spring	4.4%	SSE $\pm$ 45°	20.2%	8.7%	28.9%

Table 12 Seasonal Frequency of Occurrence of Wind Speed Intervals - Night

Period	Calm	Wind Direction	0.5 - 2 m/s	2 - 3 m/s	0.5 - 3 m/s
Summer	13.7%	S $\pm$ 45°	32.4%	9.6%	42.0%
Autumn	14.2%	S $\pm$ 45°	29.7%	10.5%	40.2%
Winter	6.4%	S $\pm$ 45°	23.1%	14.5%	37.6%
Spring	9.8%	S $\pm$ 45°	26.1%	9.9%	36.1%

Seasonal wind records indicate that source-to-receiver winds (from the south) from 0.5 m/s to 3 m/s exceed the 30% threshold during all periods (day, evening and night) in most seasons. Therefore, a prevailing southerly wind is deemed to be a feature of the area and has been considered as part of this noise assessment.

It is recognised that within the Newstan meteorological data, northerly winds from the north north-west to north north-east are absent. This appears to be due to a fault with the weather station; this is currently under investigation. Notwithstanding this, the prevailing winds are from the south and are considered to be worst case meteorological conditions for potential noise impacts at the receivers. The Newstan meteorological data is considered highly conservative and an applicable data set to use in this instance.

5.4.2 Temperature Inversion

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions occur predominantly at night during the winter months. For a temperature inversion to be a significant characteristic of the area it needs to occur for approximately 30% of the total night-time during winter, or about two nights per week.

Meteorological data was not available to allow the determination of the percentage occurrence of temperature inversions during winter nights. A worst case analysis was therefore undertaken and the occurrence of temperature inversion during the night-time period has been considered as part of this noise assessment. Default temperature inversion values, as defined in the INP, have been assumed during the night-time period. Further details are provided in **Section 7.1.1**.

6 PROJECT SPECIFIC NOISE CRITERIA

6.1 Operational Noise Design Criteria

The noise emission design criteria for the project have been established with reference to the INP outlined in **Section 4.1** of this report.

The existing L_{Aeq} noise levels in the vicinity of the subject site are dominated by traffic and local residential activity. The amenity criteria have been established using the results of ambient noise measurements.



The acoustical environment typifies a suburban environment; “an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry” (INP). Therefore, the residences in the general area have been assessed as “suburban” receiver types.

The resulting operational project specific noise criteria for the project are shown in **Table 13**.

Table 13 Project Specific Noise Criteria

Location	Period	Measured Background Noise Level (LA90)	Adopted RBL* LA90	Intrusiveness Criteria LAeq(15minute)	Amenity Criteria LAeq(Period)	Project Specific Noise Criteria
Location 1 11 Olney St, Awaba	Day	33 dBA	33 dBA	38 dBA	55 dBA	38 dBA
	Evening	38 dBA	33 dBA	38 dBA	45 dBA	38 dBA
	Night	36 dBA	33 dBA	38 dBA	40 dBA	38 dBA
Location 2 1A Olney St, Awaba	Day	33 dBA	33 dBA	38 dBA	55 dBA	38 dBA
	Evening	34 dBA	33 dBA	38 dBA	45 dBA	38 dBA
	Night	31 dBA	31 dBA	36 dBA	40 dBA	36 dBA

* For the purposes of determining the relevant project specific noise criteria the adopted RBL has been chosen such that the intrusive noise goal (RBL+5dBA) for evening is no greater than that determined for the daytime period and the intrusive noise goal for night is no greater than that determined for the day or evening period. This is consistent with information provided in the DECCW *Application Notes - NSW Industrial Noise Policy*.

6.2 Sleep Disturbance Noise Goals

The relevant sleep disturbance noise goals for each residential area are provided in **Table 14**.

Table 14 Sleep Disturbance Noise Goals

Location	Period	Measured Background Noise Level (LA90)	Adopted RBL* LA90	Sleep Disturbance Noise Goal
Location 1 11 Olney Street	Night	36 dBA	33 dBA	48 dBA
Location 2 1A Olney Street	Night	31 dBA	31 dBA	46 dBA

* For the purposes of determining the relevant sleep disturbance noise goal the lowest measured RBL (for day, evening and night-time periods) has been adopted.

The Environmental Criteria for Road Traffic Noise (ECRTN) provides further guidance with regard to sleep disturbance and calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The DECCW policy document acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the ECRTN provides that maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions and one or two events per night, with maximum internal noise levels of 65 dBA to 70 dBA (inside dwellings) are not likely to significantly affect health and wellbeing.



6.3 Construction Noise Goals

The relevant construction noise goals have been developed with reference to the Interim Construction Noise Guideline outlined in **Section 4.3** and are contained in **Table 15**.

Note that the Noise Affected level for daytime is determined as background noise plus 10 dBA. The Noise Affected level for evening and night (ie outside recommended hours) is determined as background noise plus 5 dBA. The Highly Noise Affected level is defined in the Interim Construction Noise Guideline. It should be noted that a Highly Noise Affected level is not defined for the evening or night periods. A strong justification would typically be required for works outside the recommended standard hours. It is Heggies understanding that no construction activity would occur during the evening or night-time periods.

Table 15 Construction Noise Goals

Location	Period	Construction Noise Goal LAeq(15minute)	
		Noise Affected (dBA)	Highly Noise Affected (dBA)
Location 1 11 Olney Street	Day	43 dBA	75
	Evening	38 dBA	n/a
	Night	38 dBA	n/a
Location 2 1A Olney Street	Day	43 dBA	75
	Evening	38 dBA	n/a
	Night	36 dBA	n/a

7 ASSESSMENT OF NOISE IMPACTS

7.1 Operational Noise Modelling

7.1.1 Operational Noise Modelling Parameters

A computer model was used to predict noise emissions from operation of the project. The operational noise modelling was undertaken using SoundPLAN v6.4 software, developed by Braunstein and Berndt GmbH in Germany. A three-dimensional digital terrain map giving all relevant topographic information was used in the modelling process. The model used this map, together with noise source data, ground cover, shielding by barriers and/or adjacent buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers.

Topographic contours and operational plans were supplied by Centennial for the purpose of modelling noise from the project. Prediction of noise emission levels was carried out under calm and prevailing atmospheric conditions. Atmospheric parameters under which noise predictions were made are given in **Table 16**.



Table 16 Meteorological Parameters Considered for Noise Predictions

	Temperature	Humidity	Wind Speed	Wind Direction (degrees from north)	Temperature Inversion
Calm (All periods)	20°C	65%	n/a	n/a	n/a
Southerly Wind (All periods)	20°C	65%	3m/s	180°	n/a
Inversion (Night only)	10°C	90%	n/a	n/a	3°C/100m

Sound power levels of relevant plant and equipment have been obtained from measurements of plant already operating at the site or have been sourced from a Heggies database of similar equipment.

Assumptions made in modelling noise emissions from the subject site include the following:

- All acoustically significant plant and equipment operates simultaneously.
- Mobile noise sources, such as delivery and product despatch trucks, were modelled at typical locations and assumed to operate in repetitive cycles.
- All mitigation measures described in **Section 2.5** are implemented.
- The quarry operates only in the daytime period (7.00am - 4.00pm).
- The loader operates only in the daytime period (7.00am - 3.00pm) and is utilised during occasions where coal is stockpiled. The loader may operate up to midnight on very rare occasions, if required, but this has not been considered in predicting noise emission levels from the project.

7.1.2 Noise Management and Mitigation

Noise emission levels have been predicted assuming that the existing noise management and mitigation measures described in **Section 2.5** are implemented. No additional noise management or mitigation measures have been considered.



7.1.3 Operational Scenario - Noise Model Summary

The operational scenario modelled during each period is summarised in **Table 17**. A tick (✓) indicates that the equipment is in operation during the relevant period. A cross (x) indicates that the equipment is not in operation during the relevant period. Where there is a number in brackets following a tick, this represents the number of pieces of the equipment that has been considered in the noise model during the relevant period. It should be noted that the operational scenario modelled is likely to represent an acoustically worst-case scenario.

Table 17 Operational Scenario Considered in Noise Model

Plant and Equipment	Day	Evening	Night
Mining - Surface Operations			
Conveyor drive (adjacent to ROM bin)	✓	✓	✓
Compressor shed	✓	✓	✓
Processing plant	✓	✓	✓
Forklift	✓	✓	✓
Underground man transport vehicle (entering or exiting portal)	✓ (1)	✓ (1)	✓ (1)
Truck loaded (at 500t final product bin)	✓ (1)	✓ (1)	✓ (1)
Front end loader (utilised during occasions where coal is stockpiled)	✓	x	x
Workshop (eg use of grinder)	✓	✓	✓
Ventilation fan	✓	✓	✓
Haul truck (transporting product on Newstan haul road)	✓ (4)	✓ (4)	✓ (4)
Haul truck (transporting product on Eraring haul road)	✓ (4)	✓ (4)	✓ (4)
Quarry			
Excavator	✓	x	x
Truck (approx. 20t) Pass-by	✓	x	x

7.1.4 Operational Noise Modelling Results and Discussion

Noise emission levels were predicted from the proposed development for the typical operational scenario described in **Table 17** including the noise mitigation and management procedures described in **Section 2.5**.

Noise from all sources that contribute to the total noise from the site have been examined to identify characteristics that may cause greater annoyance (for example tonality, impulsiveness etc). The appropriate modifying factors, as outlined in the INP, have been applied where these characteristics are considered to be present. Noise levels predicted at the nearest potentially affected residential locations are provided in **Table 18**. Noise contour maps are provided in **Appendix B** for each meteorological scenario considered.



Table 18 Predicted Noise Levels - Awaba Colliery

Location	Period	Predicted Noise Level LAeq(15minute) (dBA)			Project Specific Noise Criteria (LAeq)
		Calm	Southerly Wind	Temperature Inversion	
11 Olney St, Awaba	Day	< 30	< 30	n/a	38 dBA
	Evening	< 30	< 30	n/a	38 dBA
	Night	< 30	< 30	< 30	38 dBA
1A Olney St, Awaba	Day	34	37	n/a	38 dBA
	Evening	32	36	n/a	38 dBA
	Night	32	36	36	36 dBA
9 Olney St, Awaba*	Day	< 30	< 30	n/a	38 dBA
	Evening	< 30	< 30	n/a	38 dBA
	Night	< 30	< 30	< 30	38 dBA
Brisbane St, Awaba**	Day	< 30	< 30	n/a	38 dBA
	Evening	< 30	< 30	n/a	38 dBA
	Night	< 30	< 30	< 30	36 dBA
John St, Blackalls Park**	Day	< 30	< 30	n/a	38 dBA
	Evening	< 30	< 30	n/a	38 dBA
	Night	< 30	< 30	< 30	36 dBA
Puddy Lane, Awaba**	Day	30	35	n/a	38 dBA
	Evening	< 30	33	n/a	38 dBA
	Night	< 30	33	33	36 dBA
Wilton Road, Awaba*	Day	< 30	< 30	n/a	38 dBA
	Evening	< 30	< 30	n/a	38 dBA
	Night	< 30	< 30	< 30	38 dBA

*Project Specific Noise Criteria applicable to 11 Olney Street have been adopted at these locations.

**As a conservative approach, given that it is likely that ambient noise levels at these locations are higher than those measured at Olney Street, the Project Specific Noise Criteria applicable to 1A Olney Street have been adopted at these locations.

Results presented in **Table 18** indicate that operational noise levels are predicted to meet the project specific noise criteria at all considered residential locations under calm and prevailing weather conditions.

Since the operational scenario modelled is likely to represent an acoustically worst-case scenario, actual operational noise levels from the project are likely to be less than those predicted.

7.1.5 Cumulative Noise Assessment

Potential cumulative noise impacts from existing and successive developments are embraced by the INP procedures by ensuring that the appropriate noise emission criteria are established with a view to maintaining acceptable noise *amenity* levels for residences. It is noted that there are no developments in the vicinity of the subject site (with the exception of Newstan Colliery's Mine Access Facilities) that have received development consent but which have not commenced.



Newstan Colliery has approval to construct and operate Mine Access Facilities on the Awaba Colliery Site. To date the construction of these facilities has not been required. An assessment of the Newstan Mine Access Facilities was contained in the Environmental Impact Statement (EIS) for the development *Newstan Colliery Life Extension Project* dated November 1998. As part of this EIS an assessment of noise from the Newstan Mine Access Facilities was predicted as contained in **Table 19**.

Table 19 Newstan Mine Access Facilities Predicted LA10(15minute) - dBA Noise Emission Levels

Location	Daytime (0700 hr to 2200 hr)		Night Time (2200 hr to 0700 hr)		
	Calm	Wind	Calm	Wind	Inversion
1A Olney Street	29	26	29	26	32
Puddy Lane	30	29	30	29	31

It should be noted that the predicted noise emission levels contained in **Table 19** are LA10(15minute) levels which are typically 3 dBA higher than LAeq(15minute) used elsewhere in the report.

In order to assess potential cumulative noise impacts it is important to appreciate and distinguish the INP's first and second environmental noise control objectives as follows:

Intrusive Noise Criteria LAeq(15minute)

The INP's first objective, that the intrusive noise emission from any single source does not exceed the background level by more than 5 dBA relates to each individual development and the intrusive noise limit is generally specified in the Development Consent and/or Licences and Approvals.

There is not an established procedure (or regulatory requirement) to determine the cumulative intrusive LAeq(15minute) noise criterion in relation to the simultaneous operation of existing operations.

Cumulative Noise Amenity Criteria LAeq(period)

The INP's second objective is that the LAeq(period) amenity level does not exceed the specified "acceptable" level appropriate for the particular locality and land use and is aimed at restricting the potential cumulative increase in noise *amenity* levels (otherwise known as "background creep").

Based on the INP, the acceptable LAeq(period) noise *amenity* level in relation to the simultaneous operation of the Awaba Colliery and the approved Newstan Mine Access Facilities are daytime 55 dBA LAeq(11hour), evening 45 dBA LAeq(4hour) and night-time 40 dBA LAeq(9hour). The cumulative noise impact of the project with other existing industrial noise sources has been assessed in the determination of the amenity levels at surrounding potentially affected noise sensitive areas.

The potential for the simultaneous operation of the Awaba Colliery and Newstan Mine Access Facility to exceed the acceptable and maximum noise amenity criteria can be assessed on a worst case scenario basis by adding the predicted intrusive noise levels from each individual activity together for each period. The cumulative intrusive level is then adjusted (by -3 dBA) to the equivalent amenity level for comparison with the relevant amenity criteria for each location. The cumulative noise amenity levels during calm and adverse weather conditions for the areas of greatest potential cumulative impact are presented in **Table 20**.



Table 20 Predicted Cumulative Noise Impact Awaba Colliery and Newstan Mine Access Facility

Location	Period	Intrusive Predicted Noise Level LAeq(15minute) (dBA)				Cumulative Amenity Level LAeq(period)		Amenity Criteria (LAeq)
		Awaba Colliery		Newstan Mine Access Facilities				
		Calm	Adverse	Calm	Adverse	Calm	Adverse	
1A Olney Street	Day	34	37	< 30	< 30	32	34	55 dBA
	Evening	32	36	< 30	< 30	30	33	45 dBA
	Night	32	36	< 30	< 30	30	34	40 dBA
Puddy Lane	Day	30	35	< 30	< 30	< 30	33	55 dBA
	Evening	< 30	33	< 30	< 30	< 30	31	45 dBA
	Night	< 30	33	< 30	< 30	< 30	31	40 dBA

The results contained in **Table 20** show that the operation of the Awaba Colliery and the Newstan Mine Access Facilities will comply with the relevant amenity criteria set in accordance with the INP at the nearest affected residential receivers surrounding the site.

7.2 Sleep Disturbance Analysis

In the interests of minimising sleep disturbance impacts it has been assumed that there will be no requirement for trucks to reverse on site during the night-time period due to the layout of the site.

In assessing sleep disturbance, typical L_{Amax} noise levels of acoustically significant plant and equipment to be used at the subject site (refer to **Table 21**) were used as input to the noise model. L_{Amax} noise level predictions were made at the nearest residential areas in Awaba under adverse weather conditions at night. Noise events considered include loading into an empty truck and those associated with haul truck drive-off or pass-by. The use of the L_{Amax} noise level provides a worst-case prediction since the LA1(1minute) noise level of a noise event is likely to be less than the L_{Amax}.

Table 21 L_{Amax} Sound Power Levels

Source	Maximum Sound Power Level
FEL loading into an empty truck*	117 dBA
Haul truck pass-by	113 dBA

*It is anticipated that this activity is unlikely to occur during the night-time period but has been included for the purpose of assessing the potential for sleep disturbance.

The highest L_{Amax} noise level at any residential area is predicted to occur as a result of truck pass-by events on either the Newstan or Eraring private haul roads in the presence of a temperature inversion. External noise levels up to L_{Amax} 45 dBA may occur at residences in Olney Street, Awaba and John Street, Blackalls Park under these circumstances. Hence, predicted noise levels meet the most stringent recommended sleep disturbance noise goal of 46 dBA.

7.3 Construction Noise Assessment

Given the temporary nature of construction works (up to 2 weeks duration) and that noise emissions from proposed construction activity is identical in nature to operational noise from the Project it is unlikely that noise impacts will occur from construction-type activity at the site. It is also noted that construction activity is anticipated to occur during the daytime period only.



Notwithstanding this, noise levels from the operation of an excavator and haul trucks at the pollution control dam are expected to be in the order of 30 dBA under adverse weather conditions (3m/s southerly wind) at the nearest potentially affected residential locations. This is significantly below the relevant daytime construction noise goal of 43 dBA.

7.4 Vibration Assessment

It is noted that blasting is not proposed to occur for the life of the project. The main vibration generating activities will include the operation of mobile equipment such as the loader and trucks. Given the separation distance between mining operations and the nearest potentially affected residential locations vibration levels from these activities is predicted to be negligible and below levels for human perception at the nearest residential locations.



8 CONCLUSION

Heggies Pty Ltd (Heggies) has undertaken a Noise Impact Assessment for the Awaba underground coal mine located on Wilton Road, Awaba, NSW.

Broadly, the objective of the noise assessment was to identify the potential impacts of noise from operation of the facility and to provide advice with regard to effective mitigation strategies where necessary.

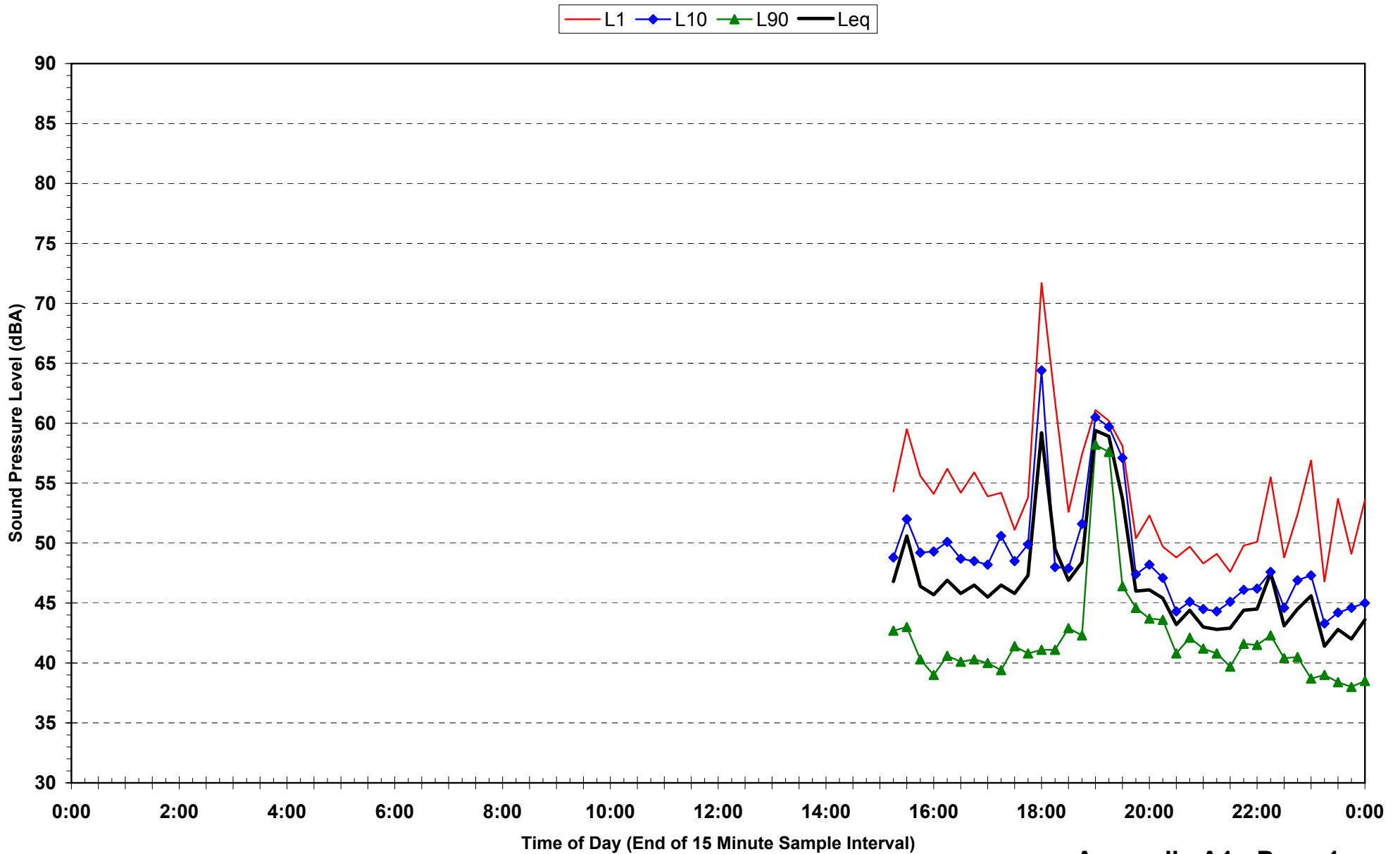
Results presented in **Table 18** indicate that operational noise levels are predicted to meet the project specific noise criteria at all considered residential locations under calm and prevailing weather conditions.

Since the operational scenario modelled is likely to represent an acoustically worst-case scenario, actual operational noise levels from the project are likely to be less than those predicted.

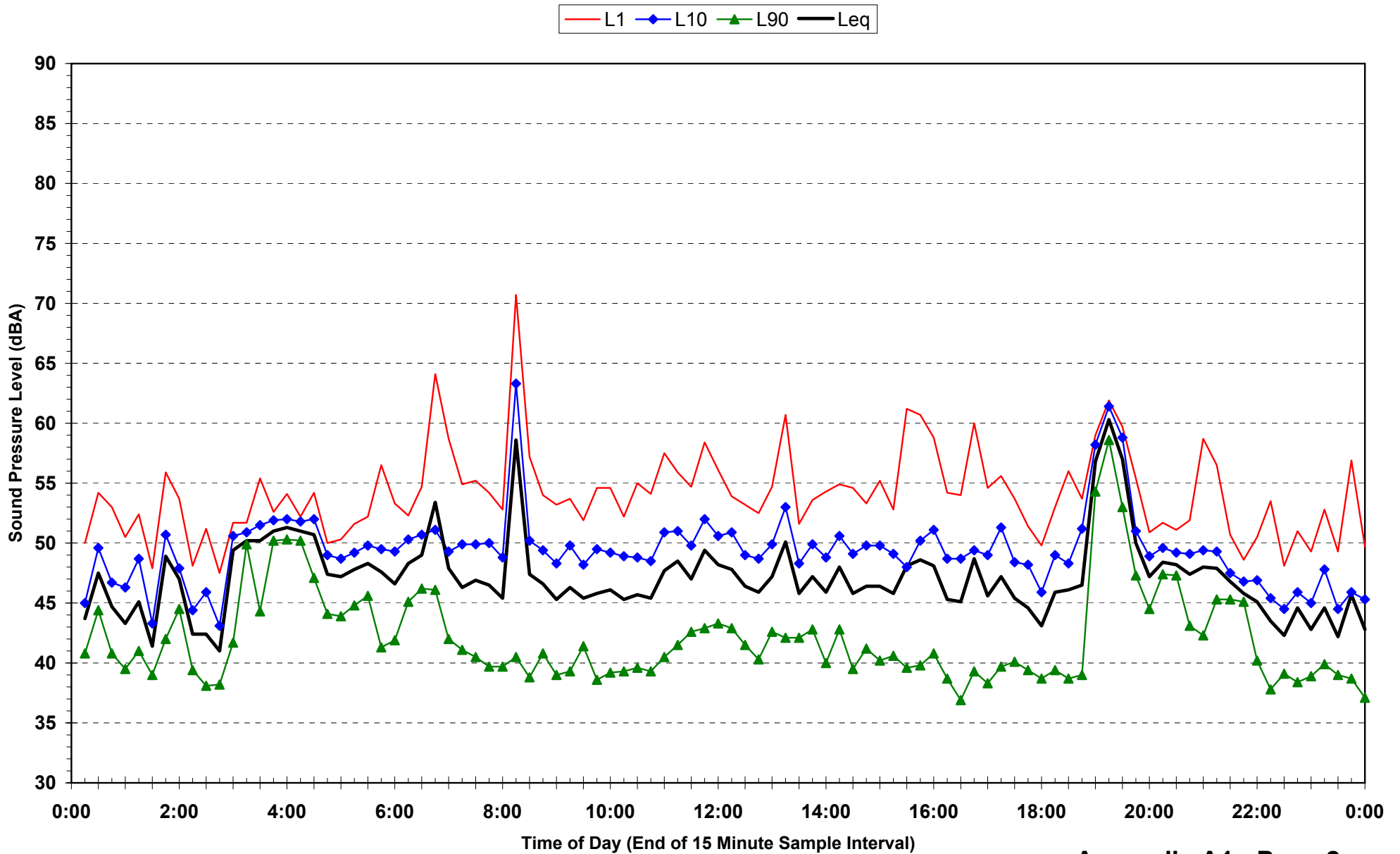
In addition, L_{Amax} noise levels are predicted to meet the most stringent recommended sleep disturbance noise goal of 46 dBA.

Accordingly, no further mitigation measures other than those outlined in **2.5**, or additional noise monitoring, are considered to be required in relation to this project.

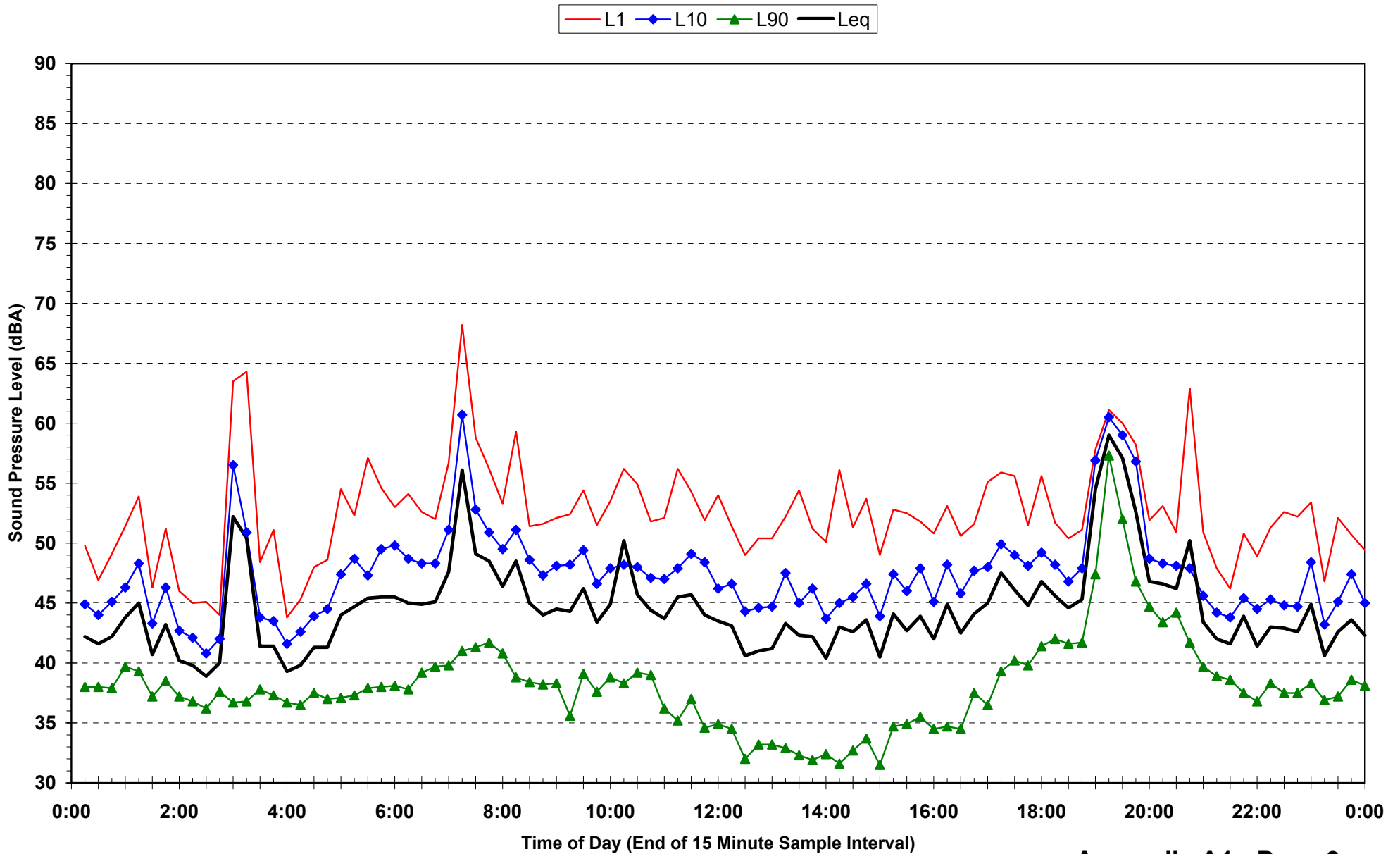
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Tuesday 30 March 2010



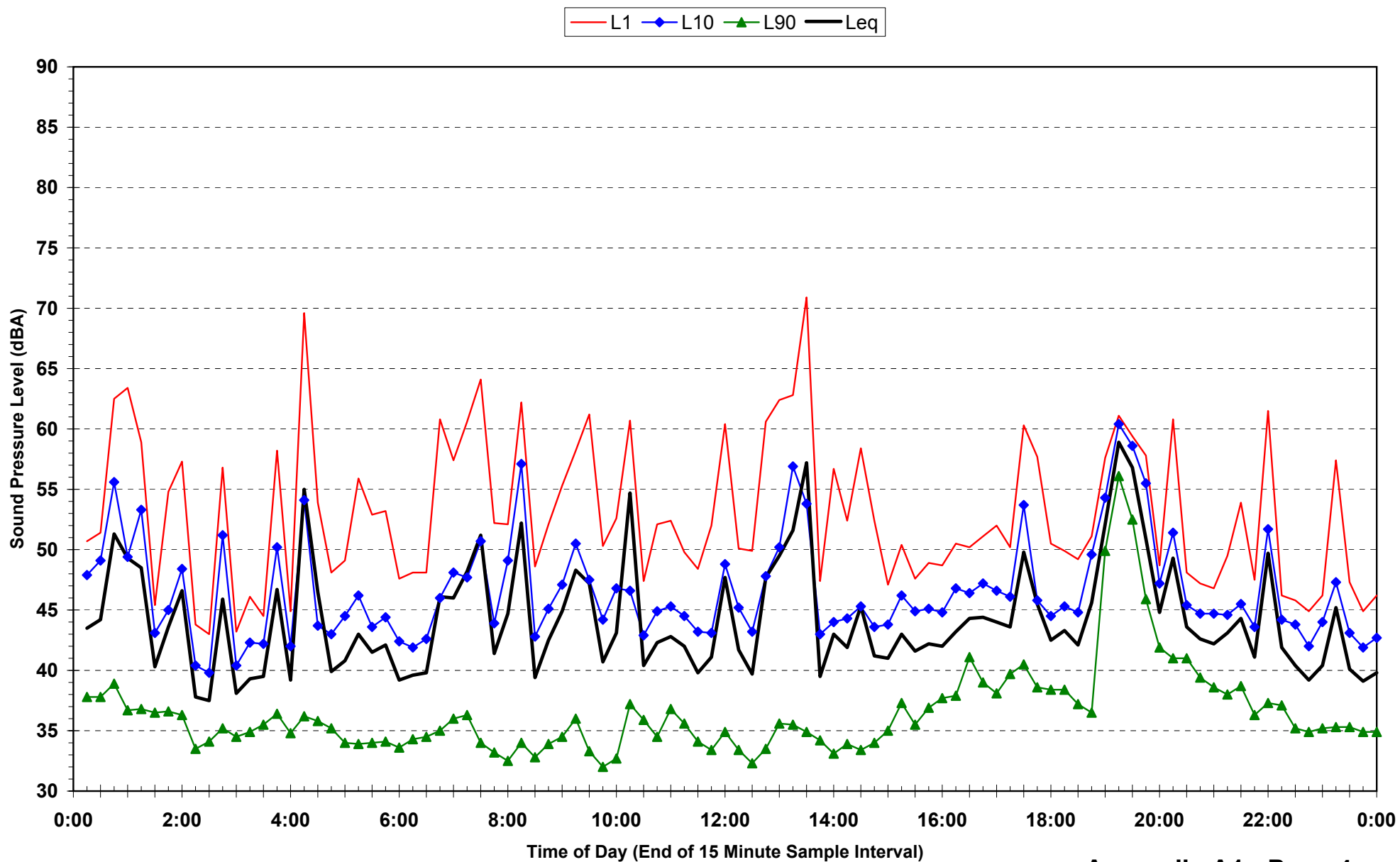
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Wednesday 31 March 2010



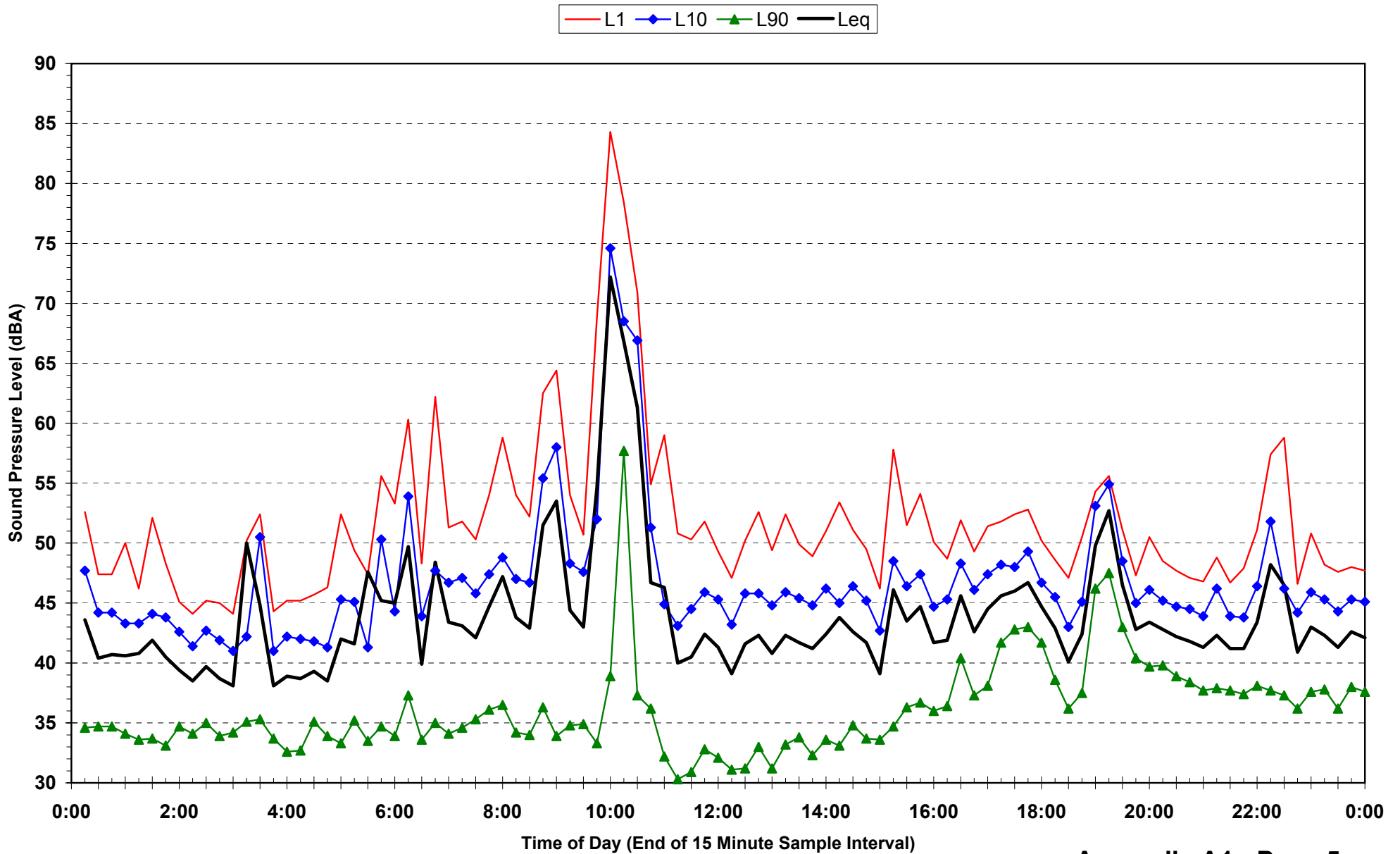
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Thursday 1 April 2010



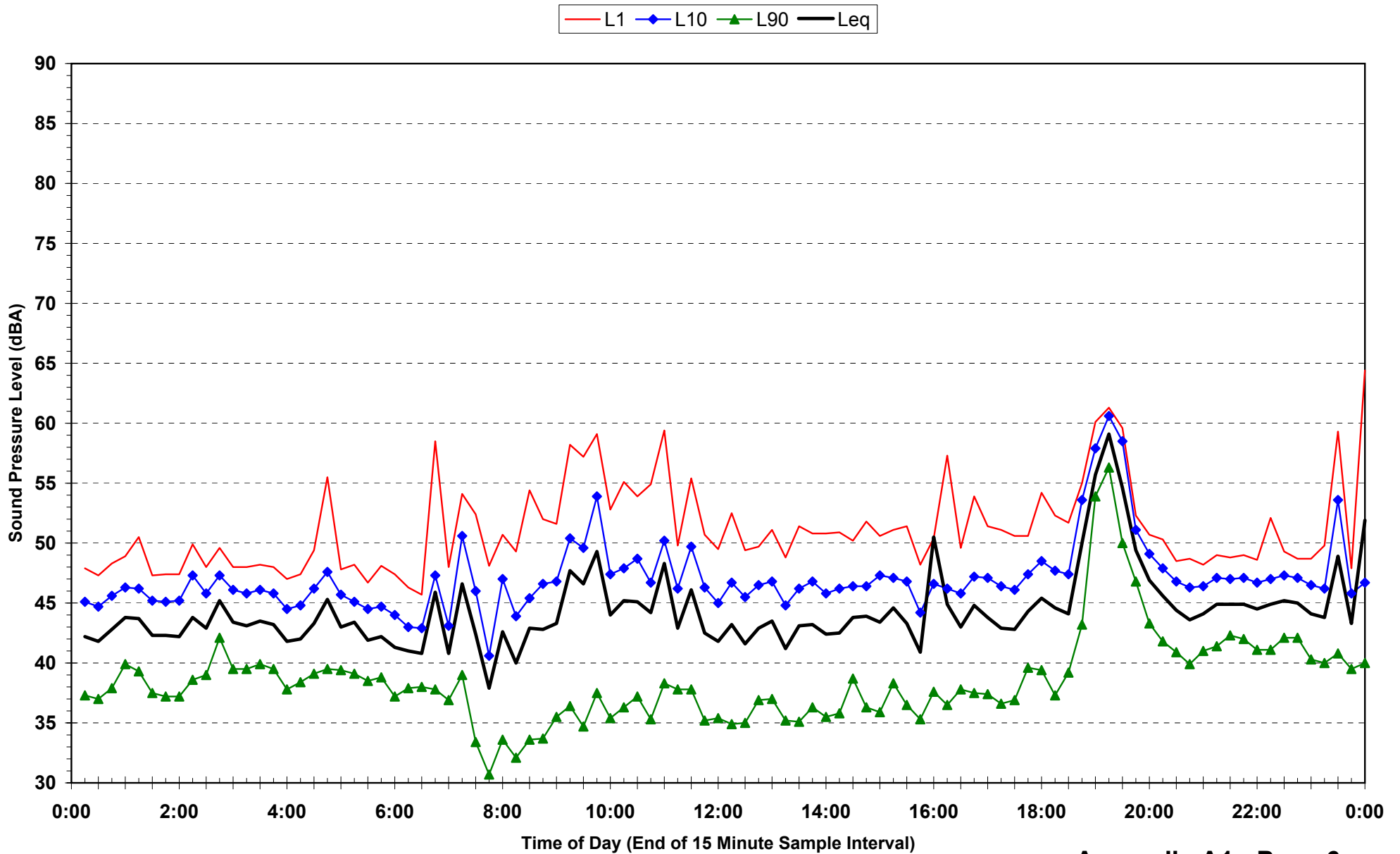
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Friday 2 April 2010



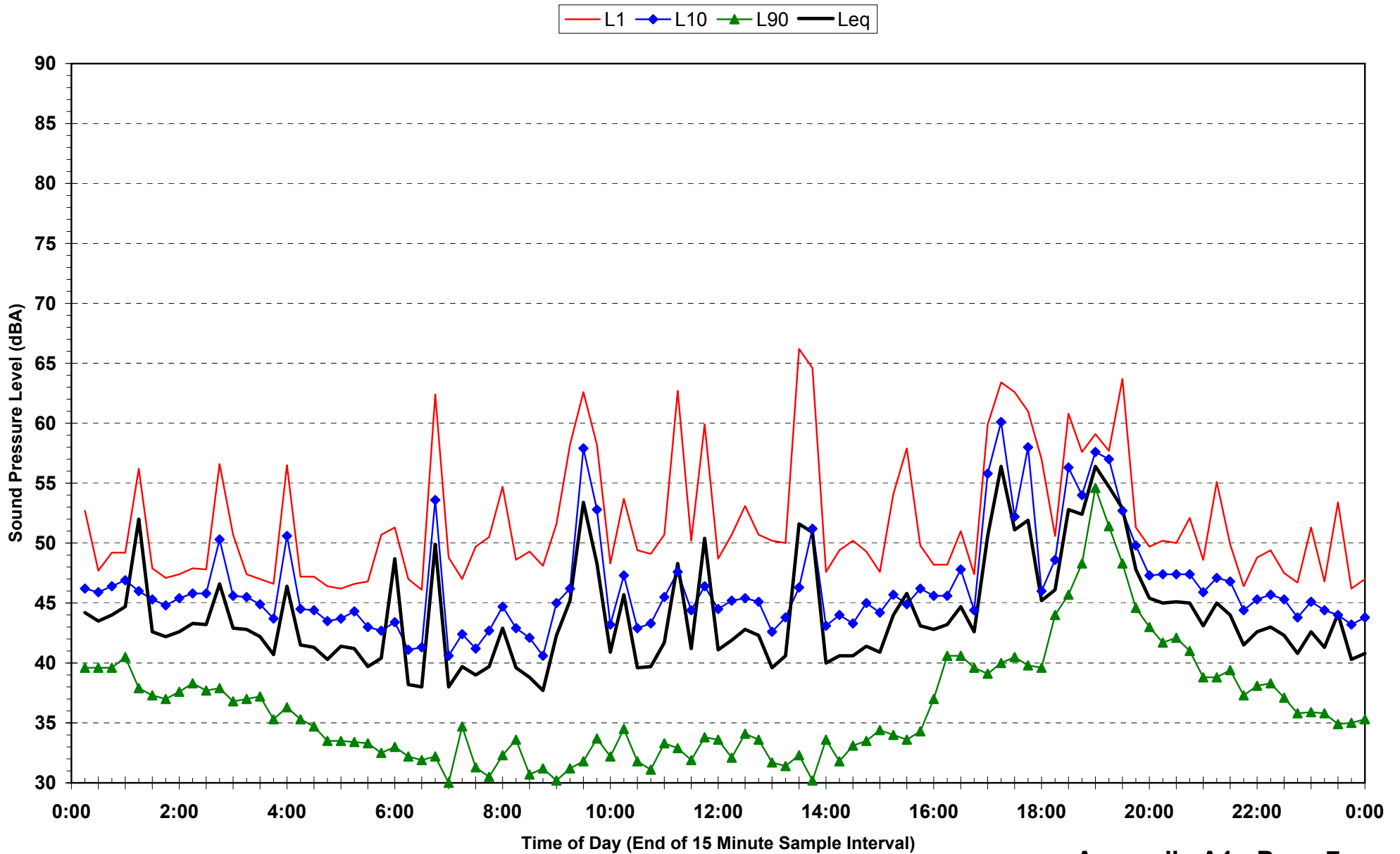
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Saturday 3 April 2010



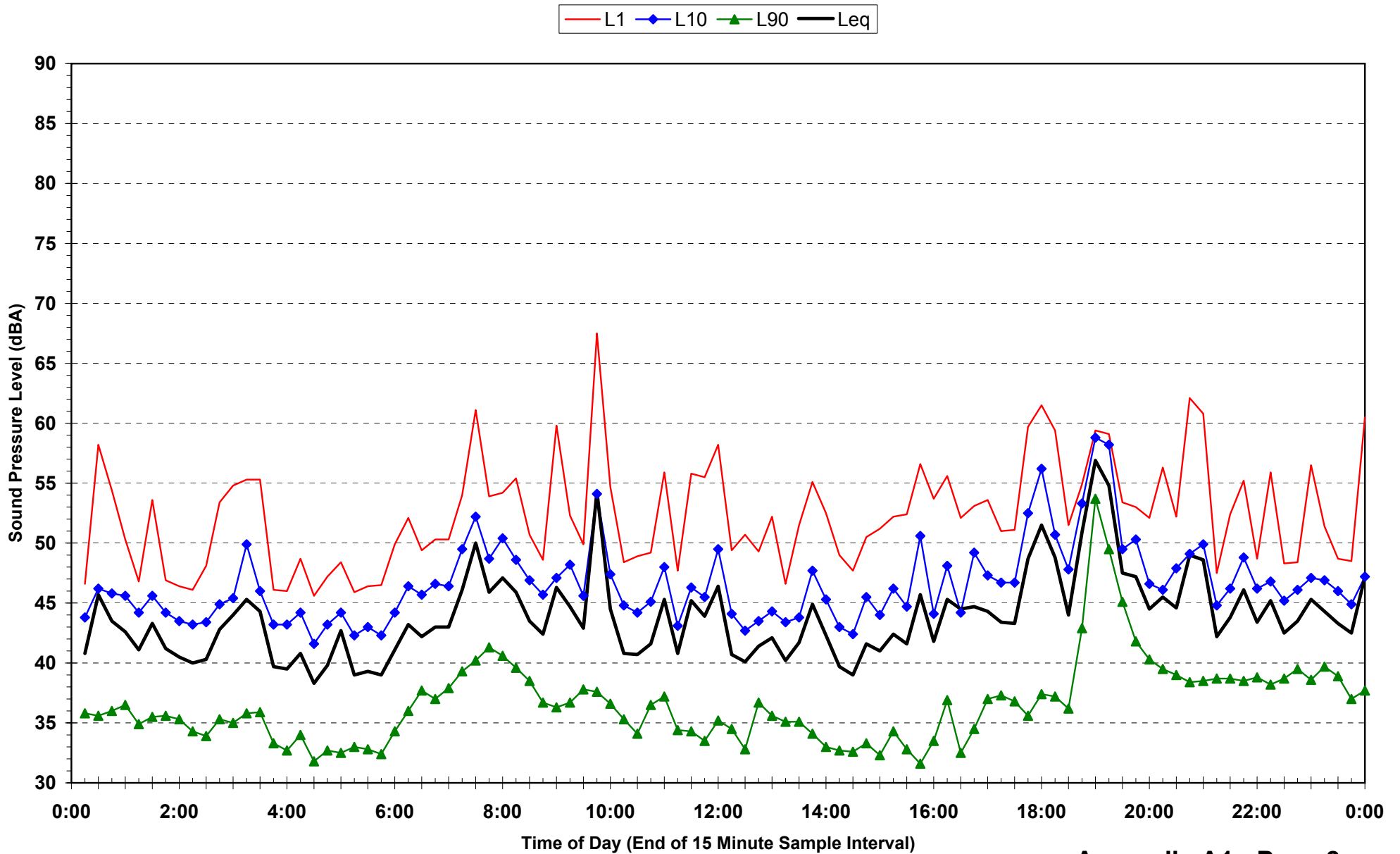
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Sunday 4 April 2010



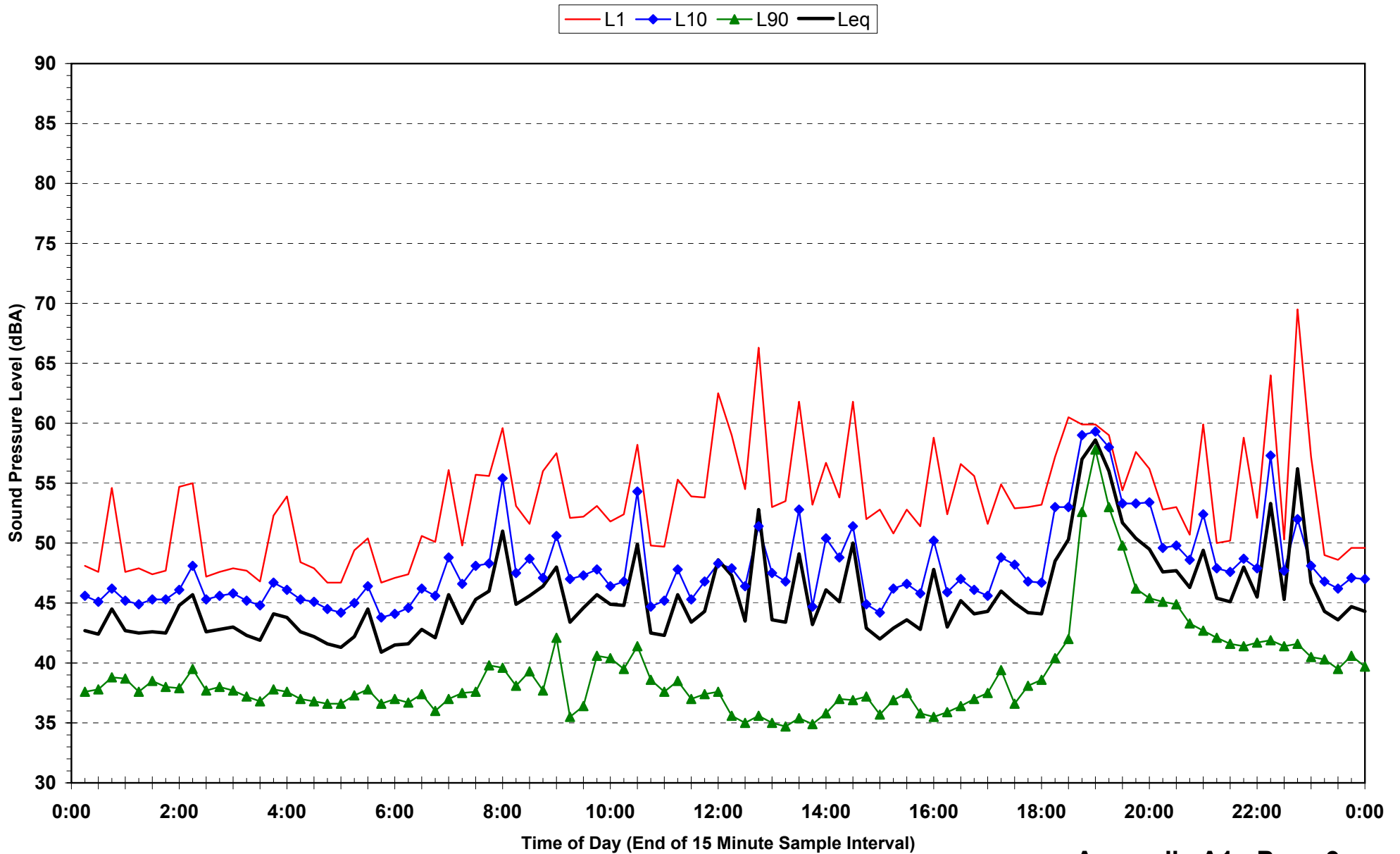
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Monday 5 April 2010



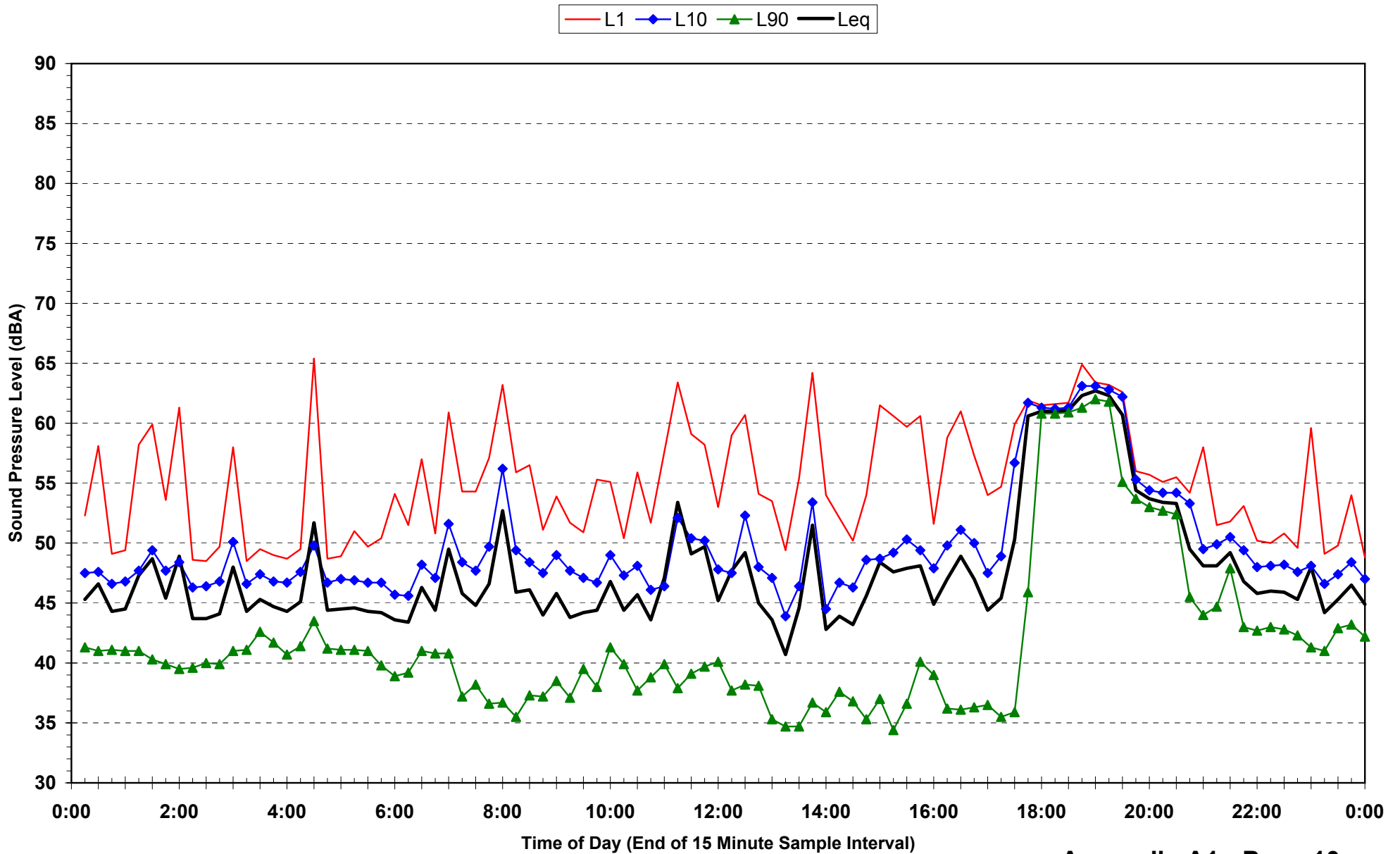
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Tuesday 6 April 2010



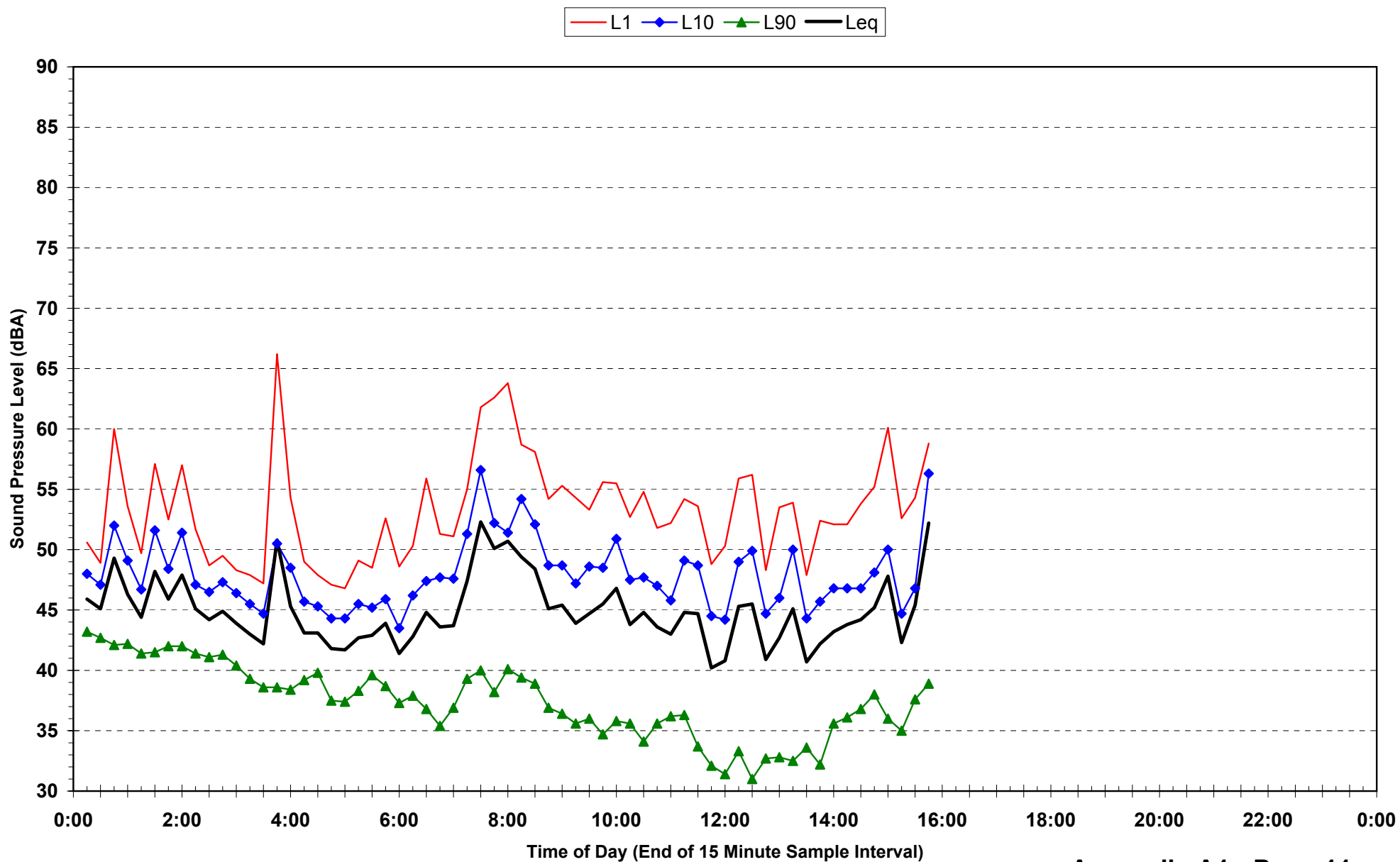
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Wednesday 7 April 2010



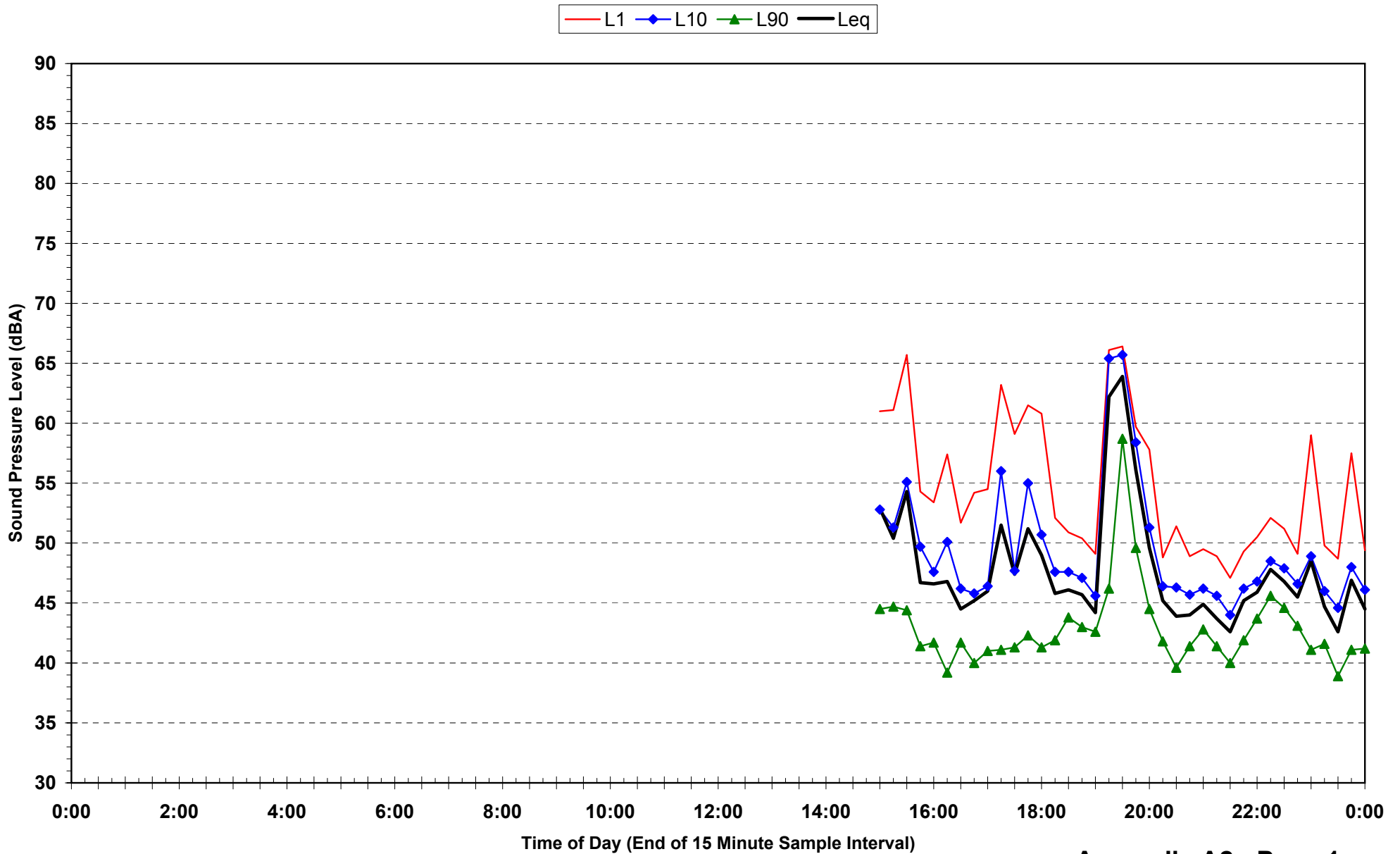
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Thursday 8 April 2010



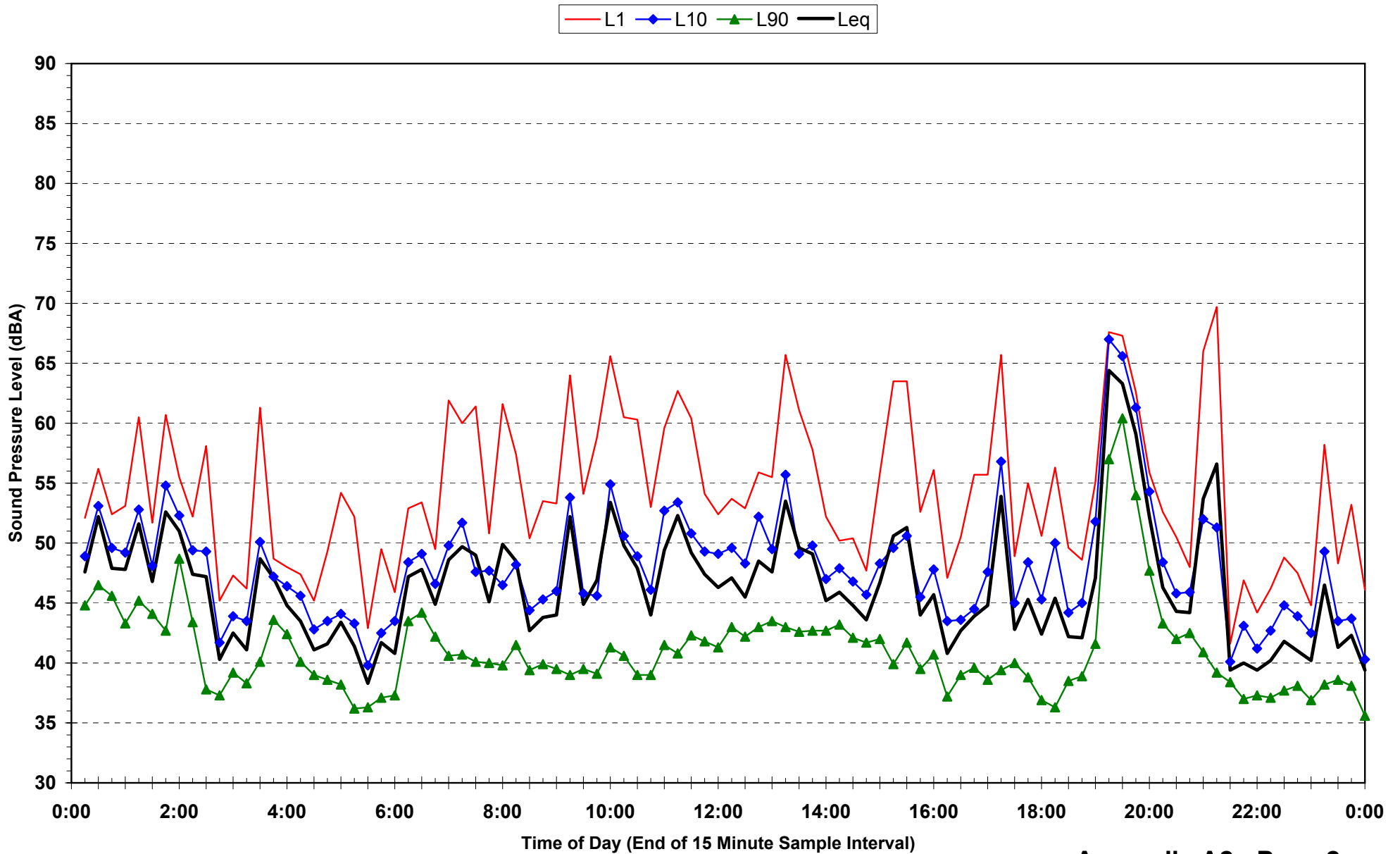
Statistical Ambient Noise Levels
11 Olney Street, Awaba - Friday 9 April 2010



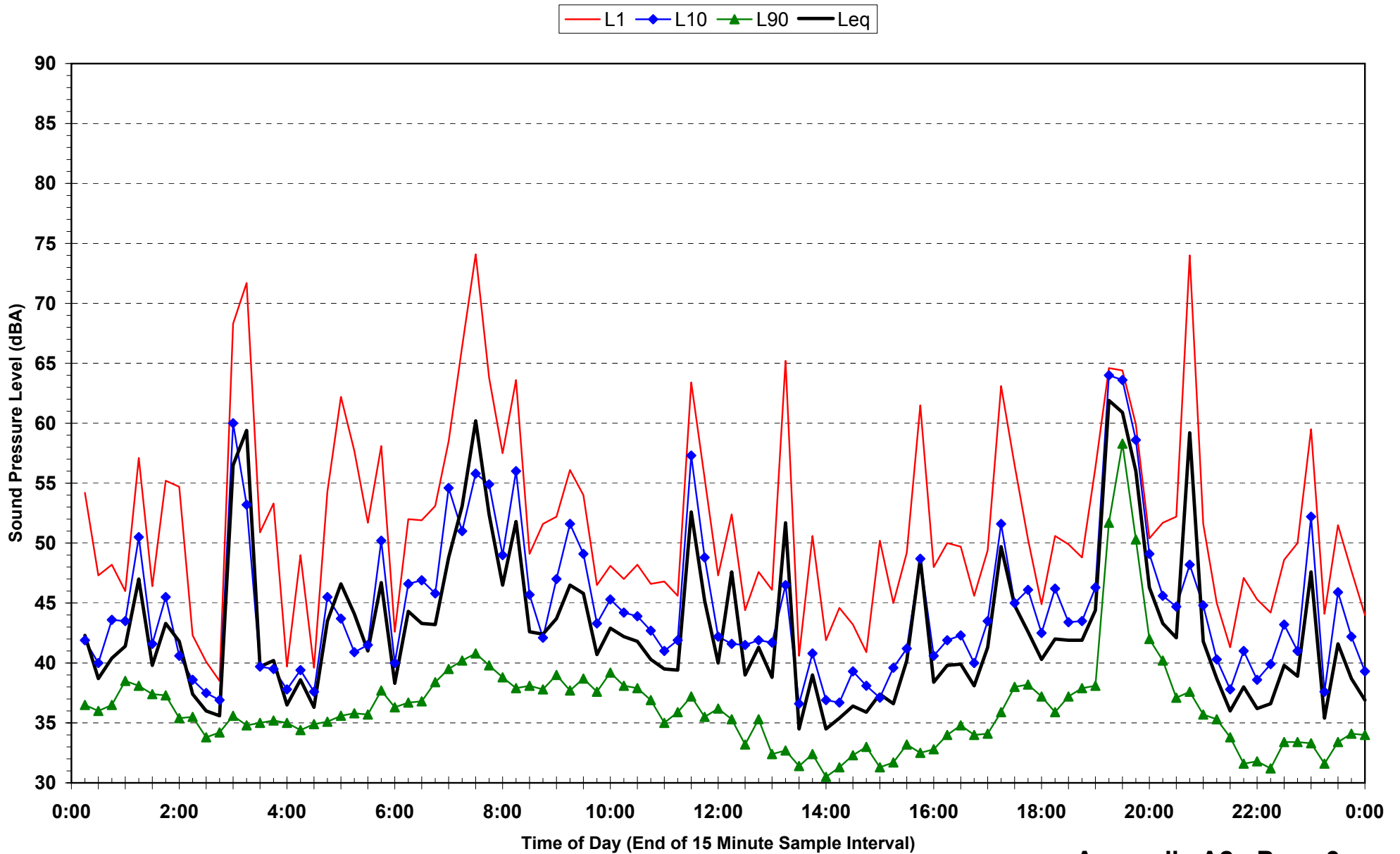
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Tuesday 30 March 2010



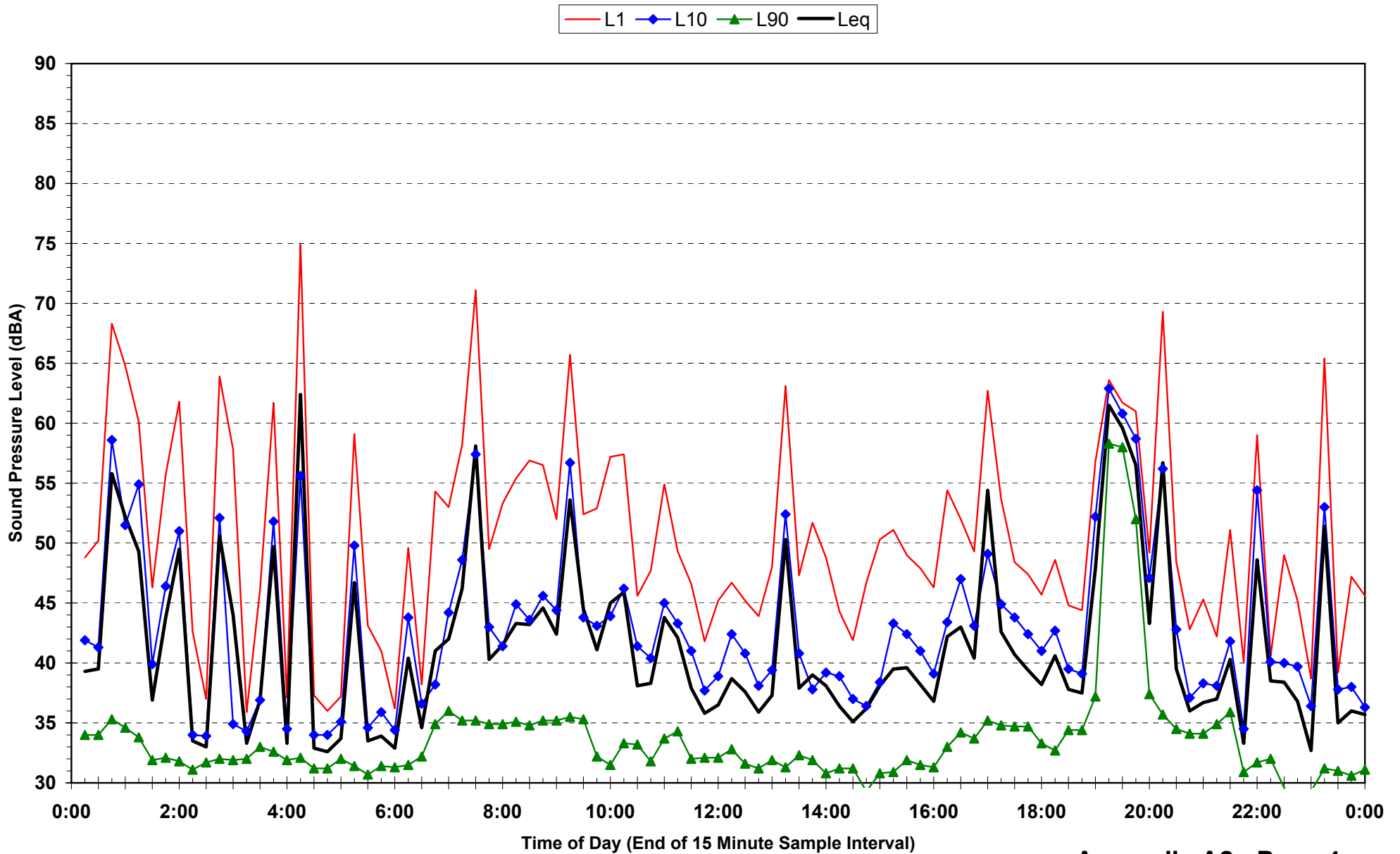
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Wednesday 31 March 2010



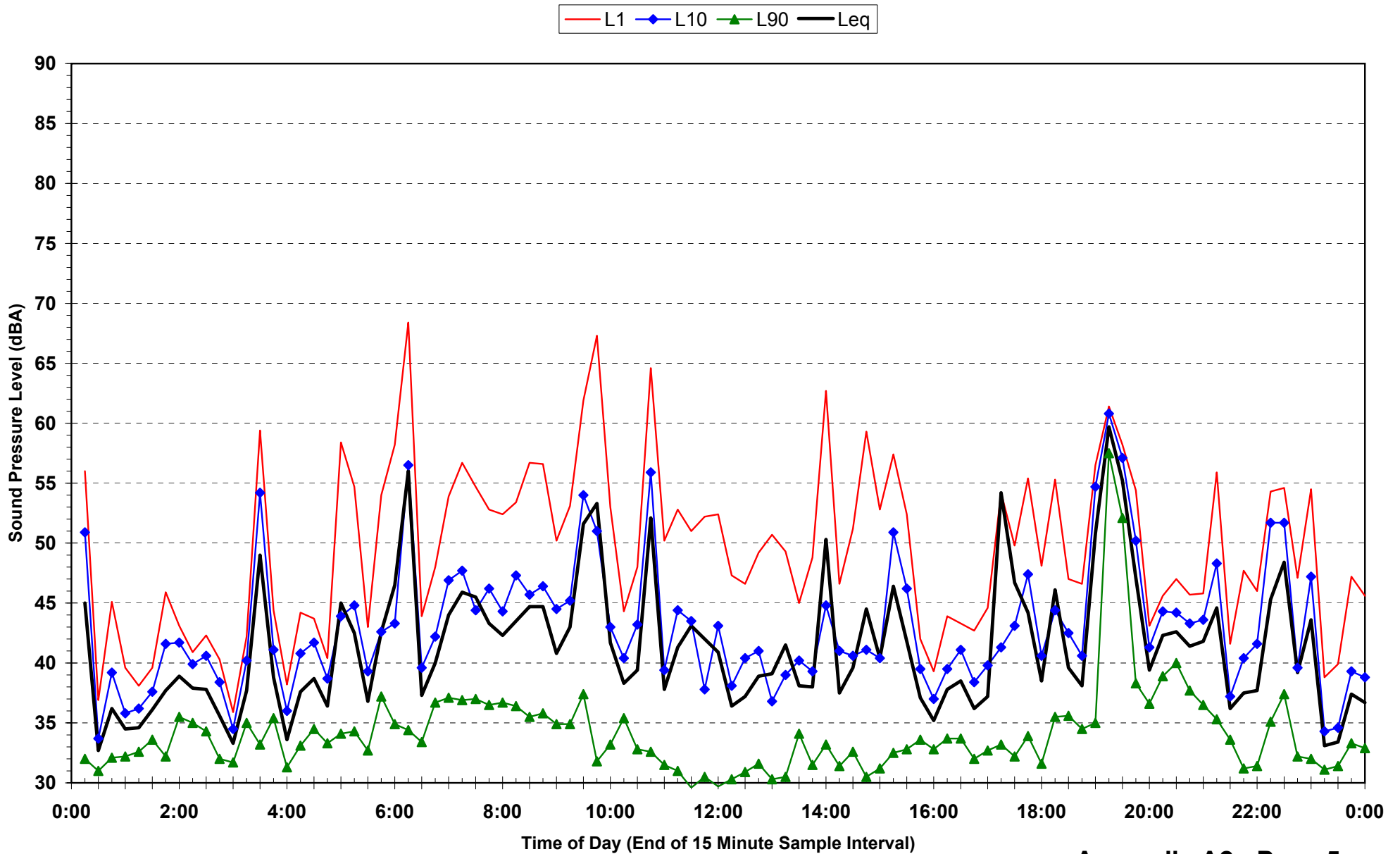
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Thursday 1 April 2010



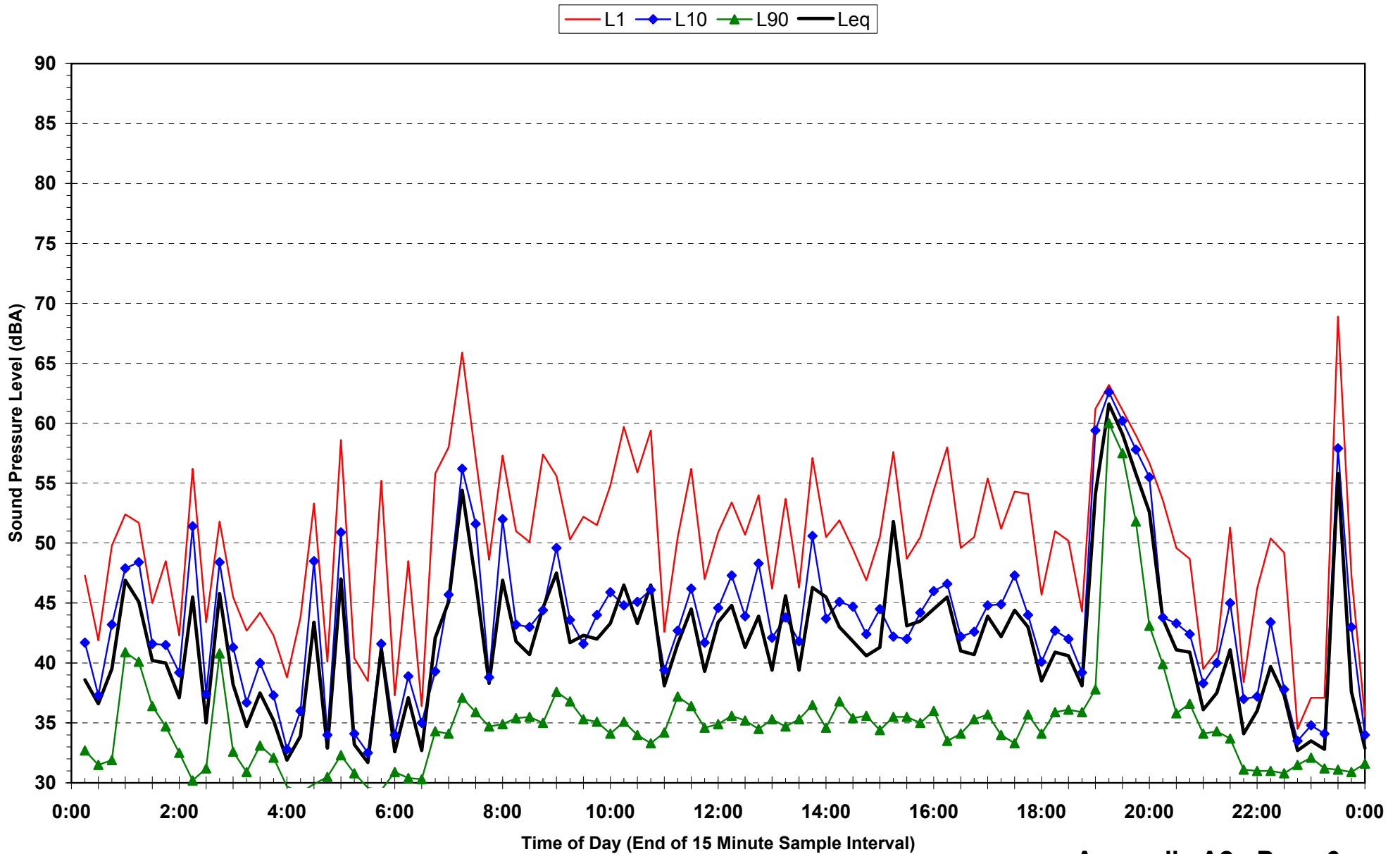
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Friday 2 April 2010



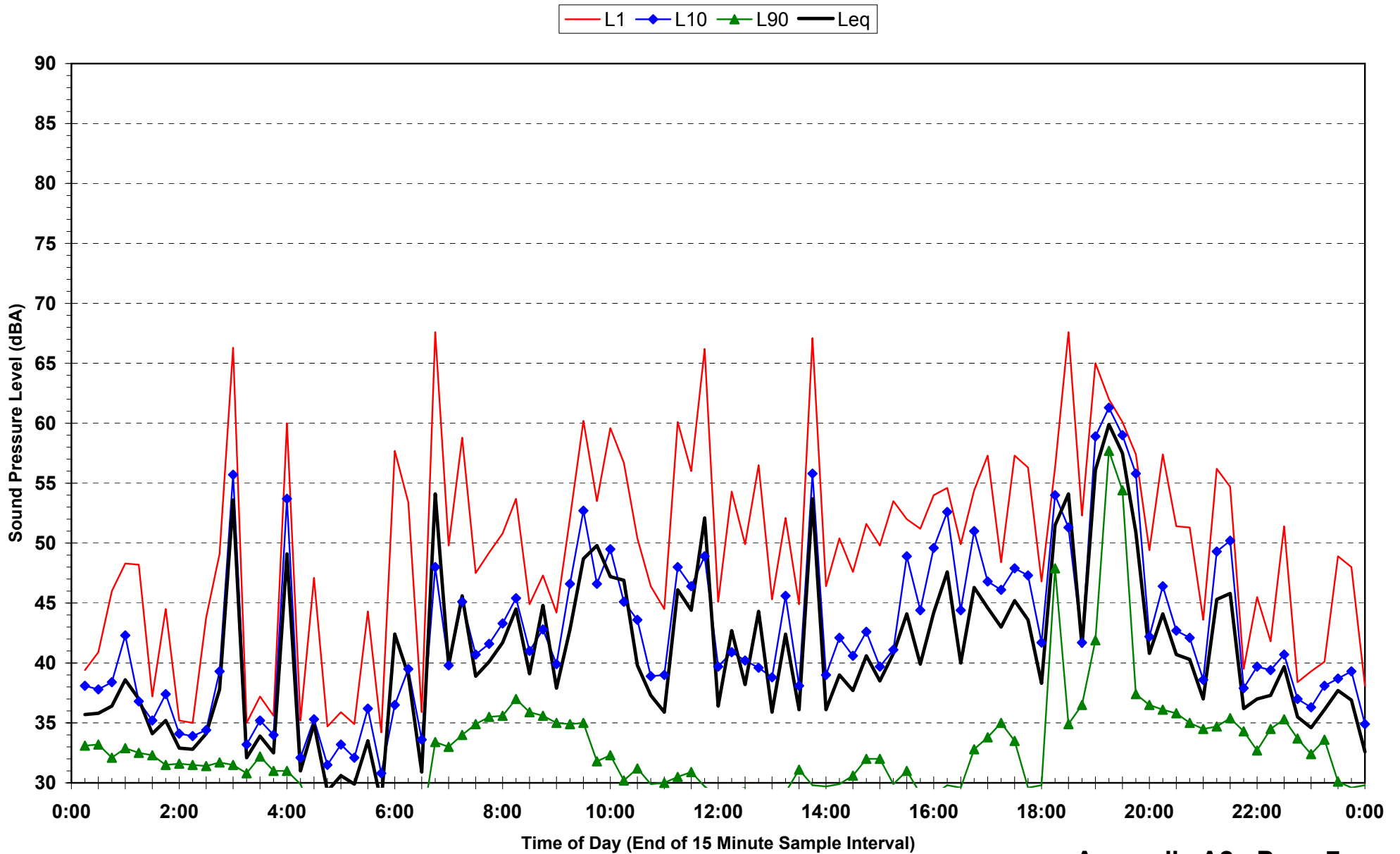
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Saturday 3 April 2010



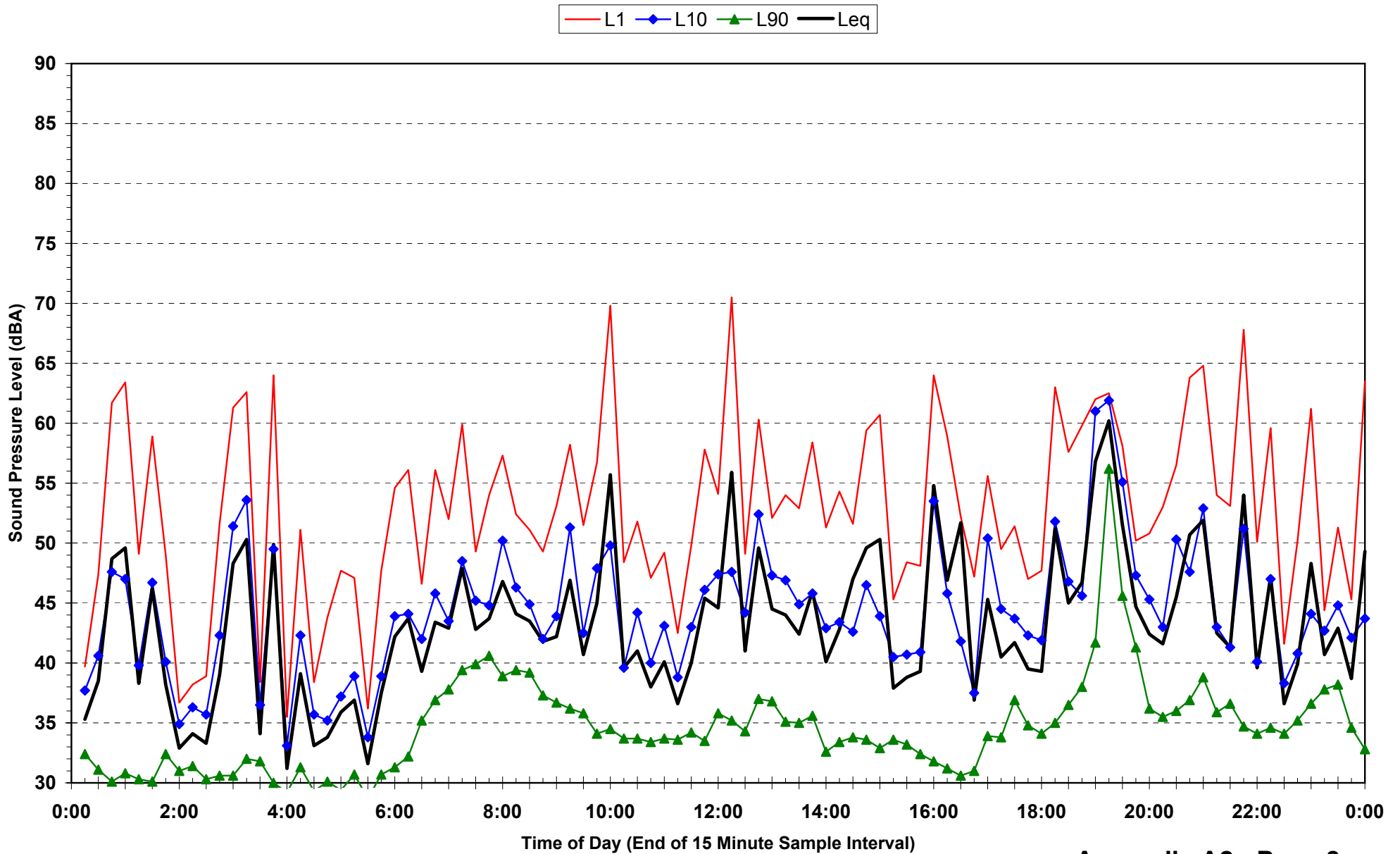
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Sunday 4 April 2010



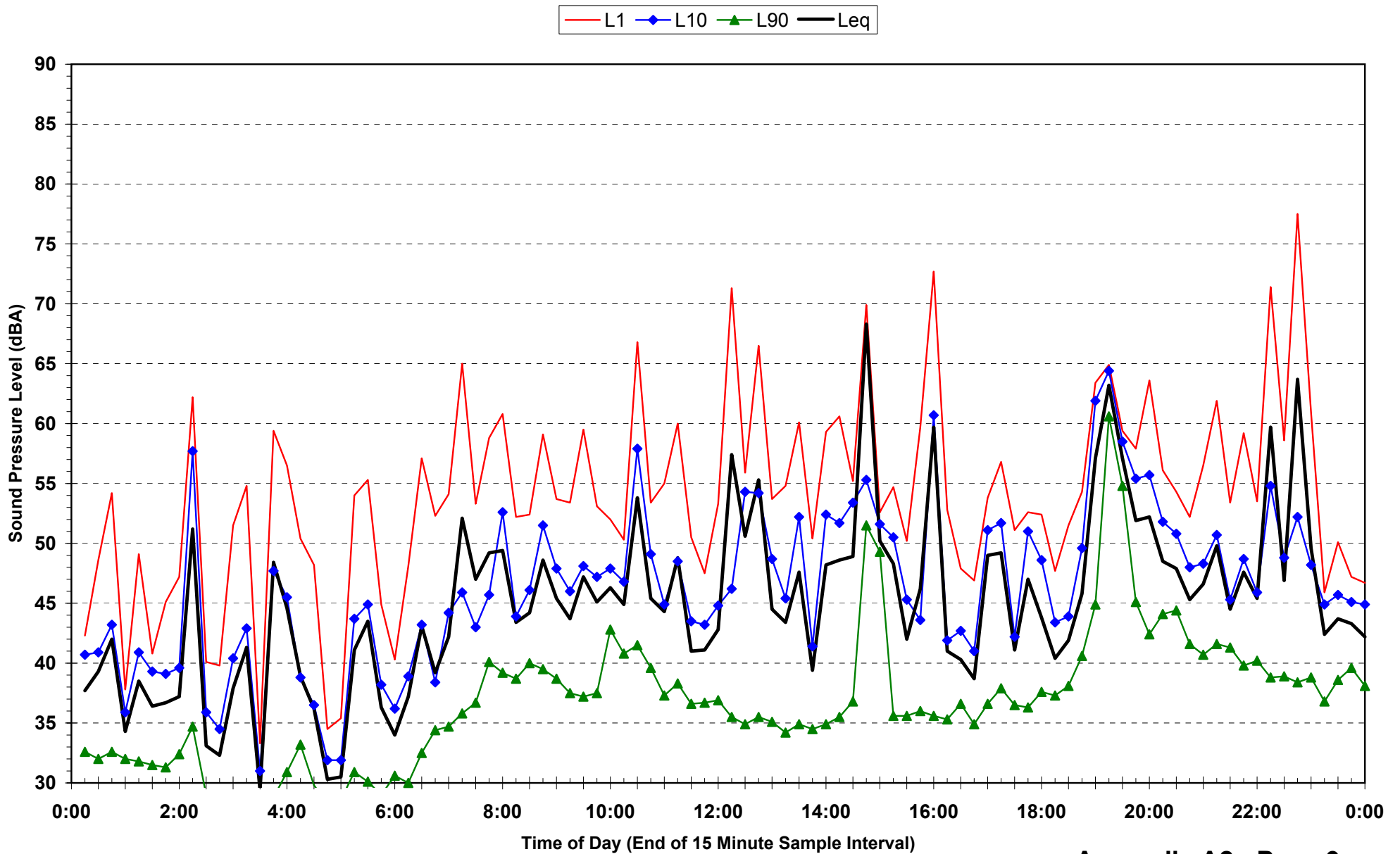
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Monday 5 April 2010



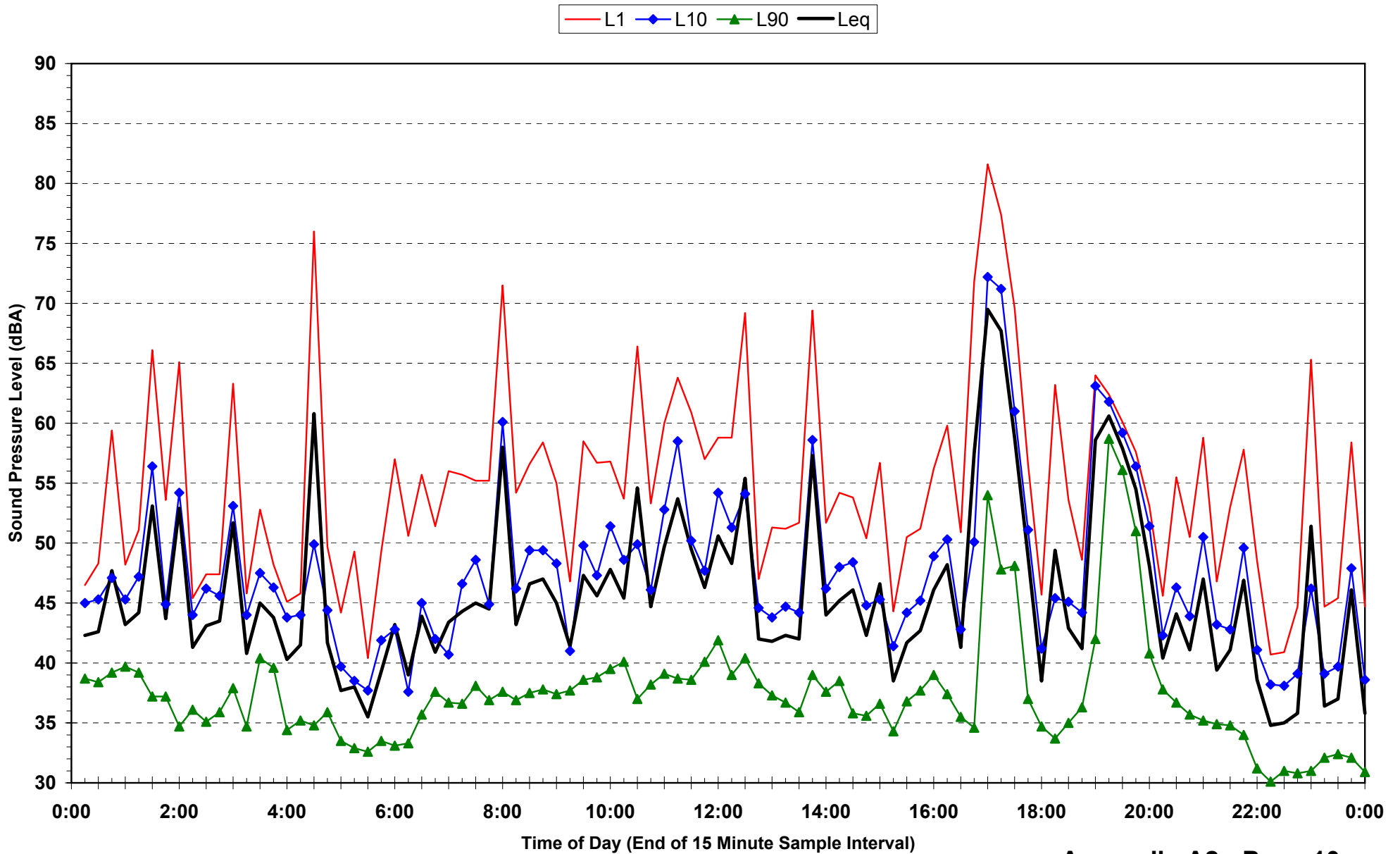
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Tuesday 6 April 2010



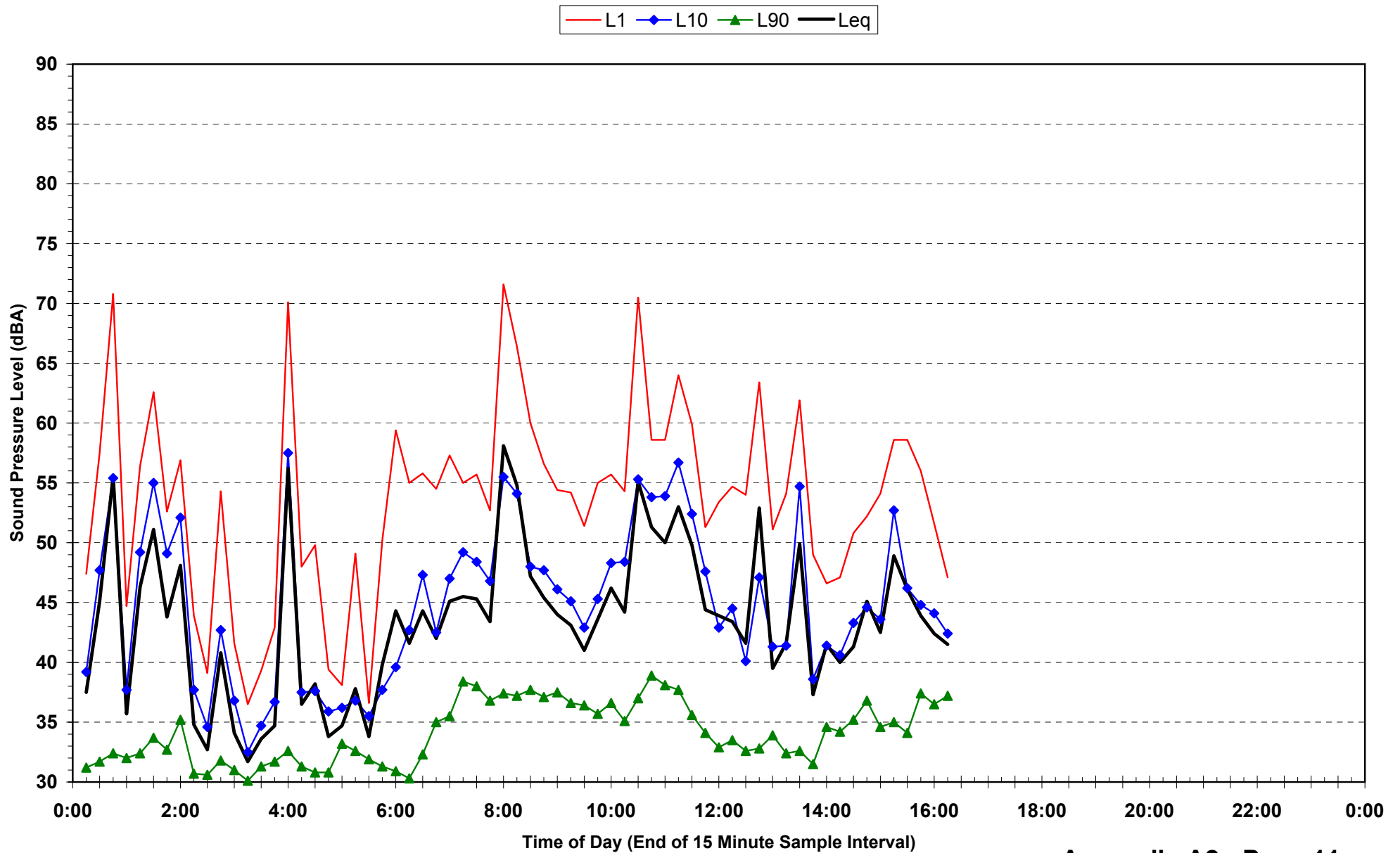
Statistical Ambient Noise Levels
1A Olney Street, Awaba - Wednesday 7 April 2010



Statistical Ambient Noise Levels
1A Olney Street, Awaba - Thursday 8 April 2010



Statistical Ambient Noise Levels
1A Olney Street, Awaba - Friday 9 April 2010

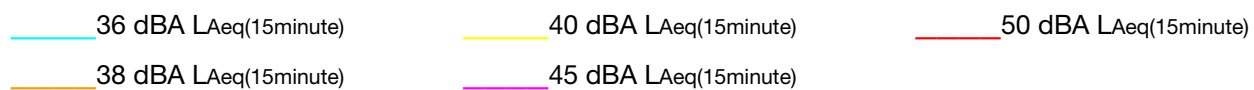
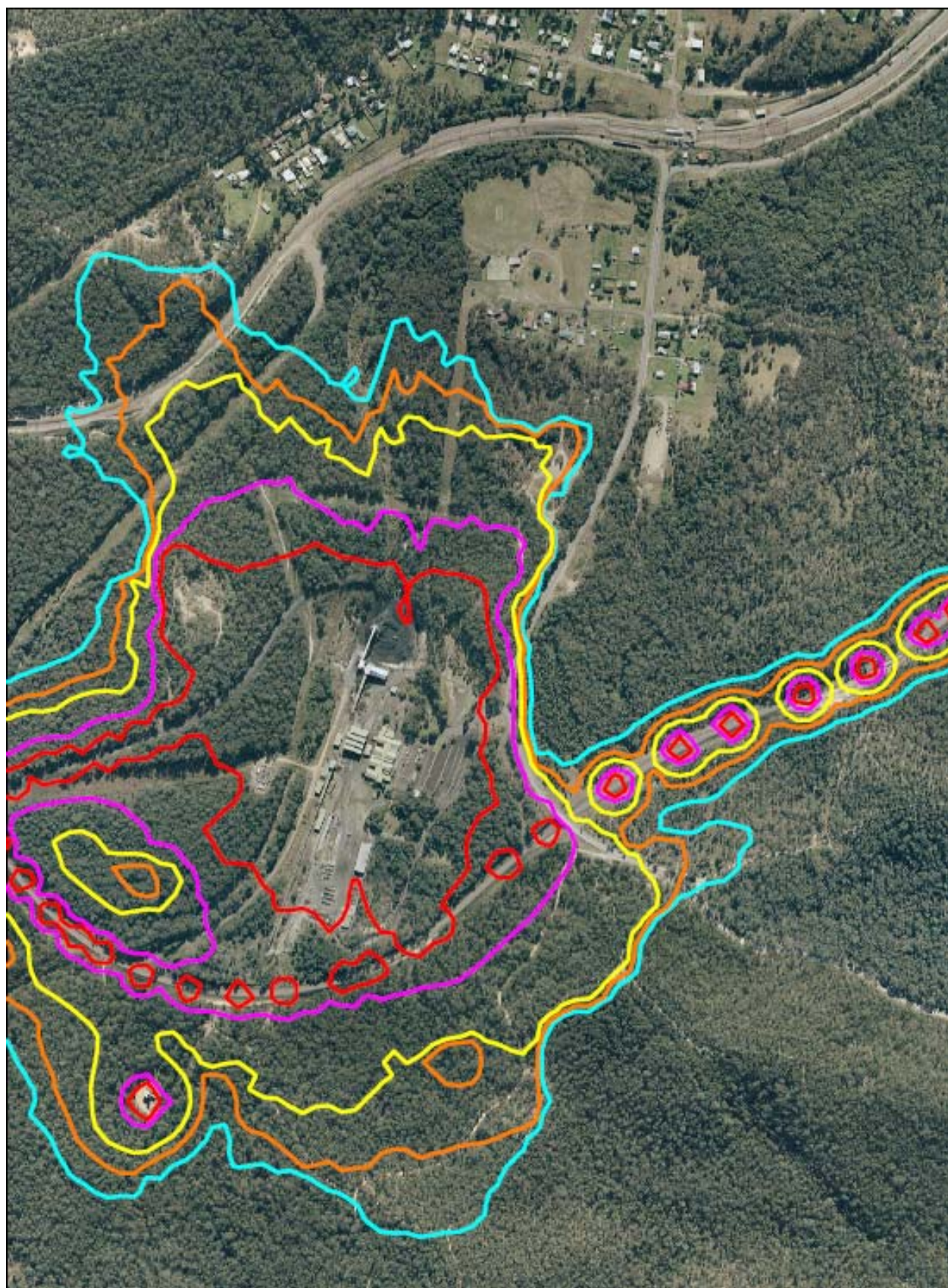


Appendix B1

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Operational Noise Contours - Calm Meteorological Conditions

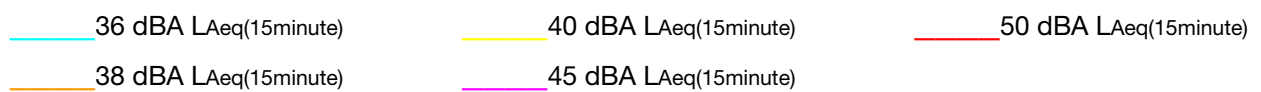
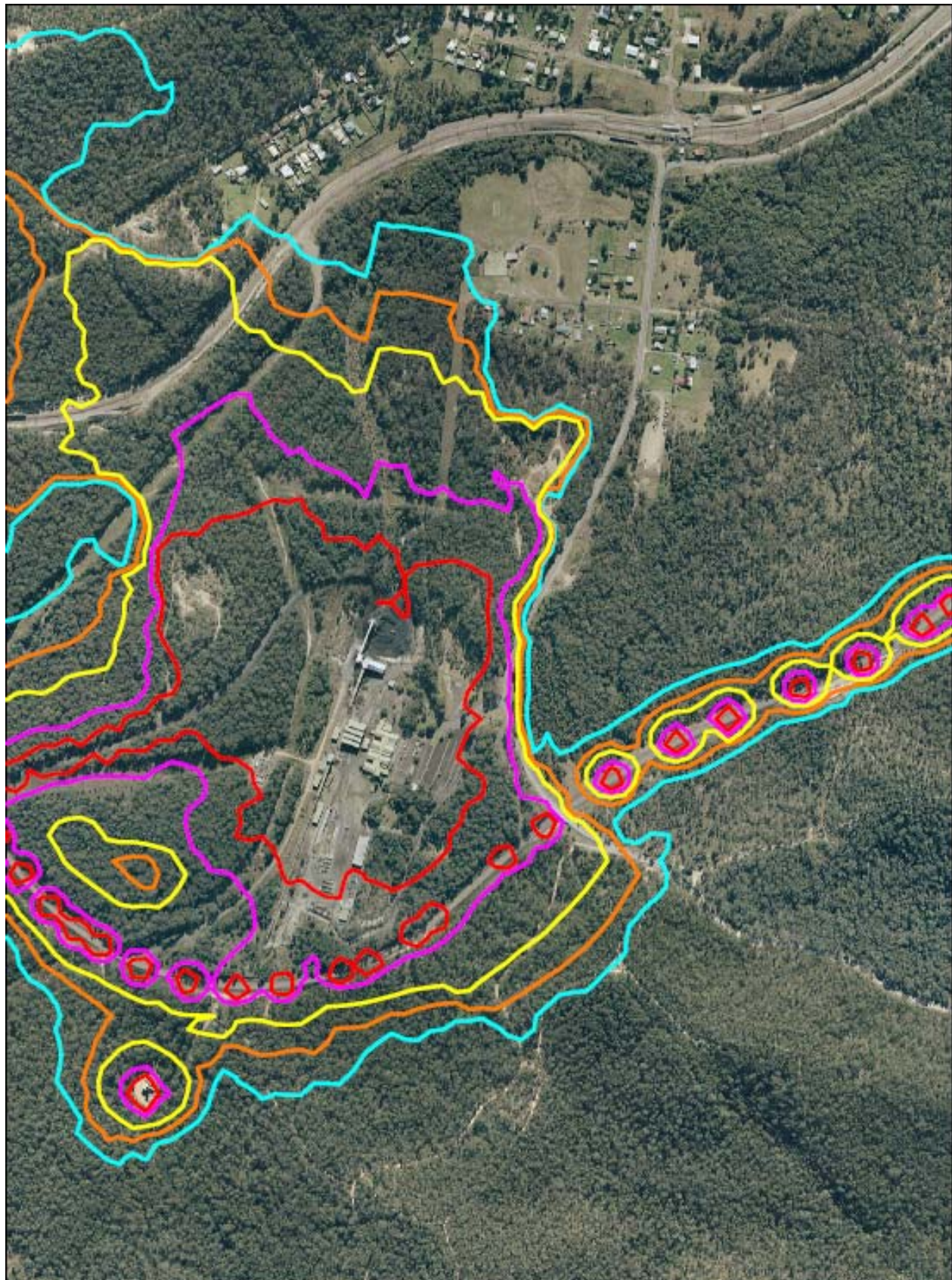


Appendix B2.1

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Operational Noise Contours - 3m/s Southerly Wind - Daytime

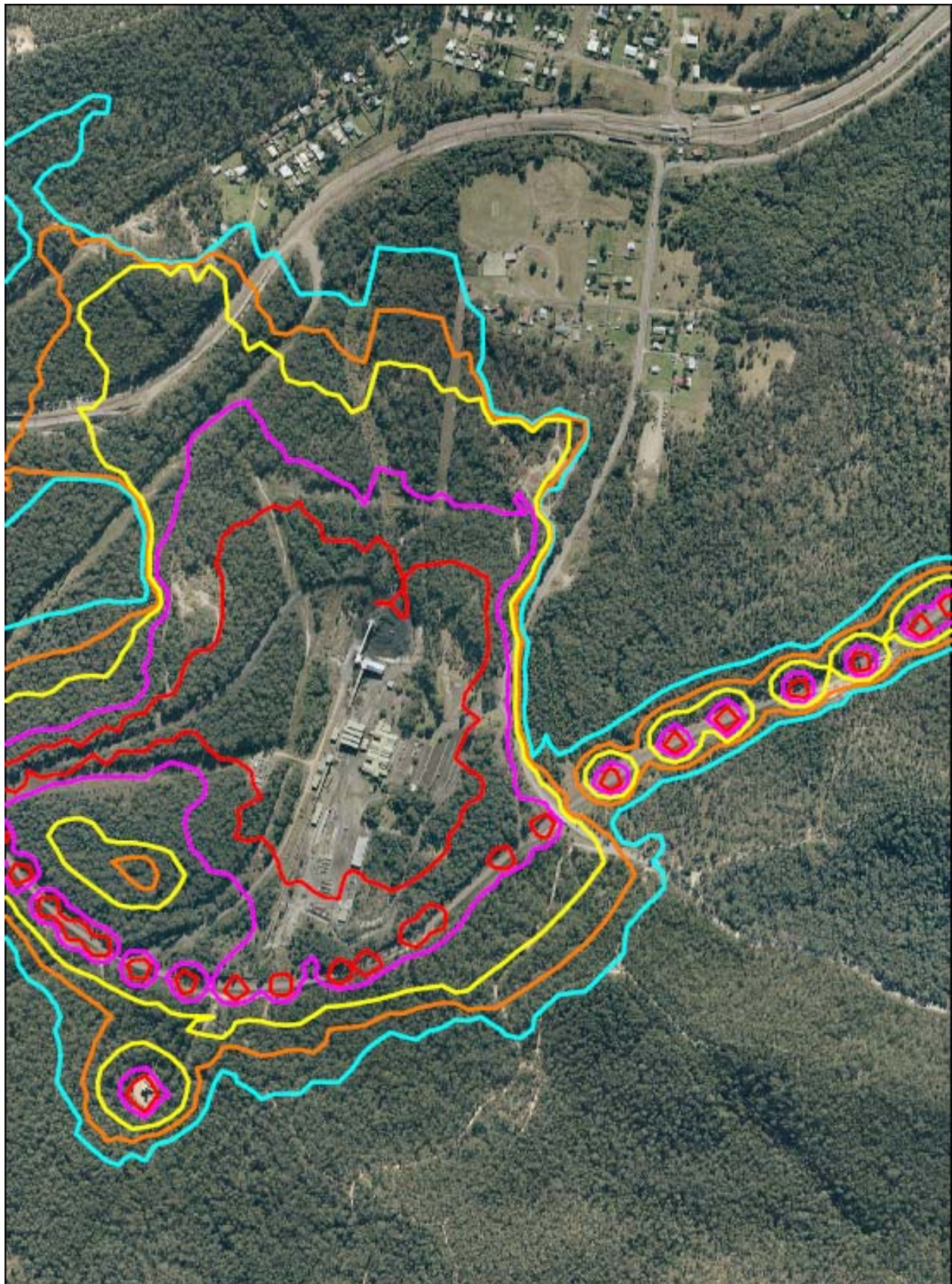


Appendix B2.2

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Operational Noise Contours - 3m/s Southerly Wind - Evening & Night



36 dBA LAeq(15minute)

40 dBA LAeq(15minute)

50 dBA LAeq(15minute)

38 dBA LAeq(15minute)

45 dBA LAeq(15minute)

Appendix B3

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Operational Noise Contours - Temperature Inversion

