Chullora Material Treatment Facility

Noise and Vibration Report

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EXECUTIVE SUMMARY

A noise and vibration assessment has been carried out for the Chullora material treatment facility to assess whether the proposed activities would impact upon sensitive receivers close to the site.

The objective of the noise and vibration assessment is to ensure that all work is carried out in a manner that will minimise noise and vibration emissions to the sensitive receivers surrounding the site.

Adoption of the following controls where feasible and reasonable will ensure that noise impacts will be minimised.

- Equipment shall be well maintained.
- A Polyvinyl enclosure with a minimum wall thickness of 7mm shall be installed.
- The ventilation system serving the enclosure shall be acoustically treated to ensure that the noise emission to the residential properties to the east boundary is less than 51 dB(A).
- Static equipment shall be located as far as possible from receivers (see Figure 2).

Due to the existing industrial nature of the site, the distance of the sensitive receivers from the operating plant, and the use of the noise control listed above the predicted noise emissions will not be in excess of the applicable guidelines for either the residences to the east, nor the workshop to the west.

Any noise resulting from additional traffic generation is within the limits of the applicable guidelines.

The vibration generated by the operating plant will not result in exceedance of human comfort or building damage criteria, so long as the works are performed in accordance with the recommendations in this report.

1 PROJECT INTRODUCTION

This report presents a noise and vibration study for the proposed material treatment facility at the Chullora rail yards. The proposed material treatment works within the Chullora site are part of remediation project being undertaken on another RailCorp site located close to Macdonaldtown Railway Station in Erskineville.

The proposed treatment works at Chullora consist of remediation of impacted soil imported from the Macdonaldtown site and will be performed in a dedicated facility within the rail yards with appropriate environmental controls established on the site. Environmental monitoring of the process will also be undertaken in accordance with the project approval conditions from the NSW Department of Planning and all licenses required under the POEO Act.

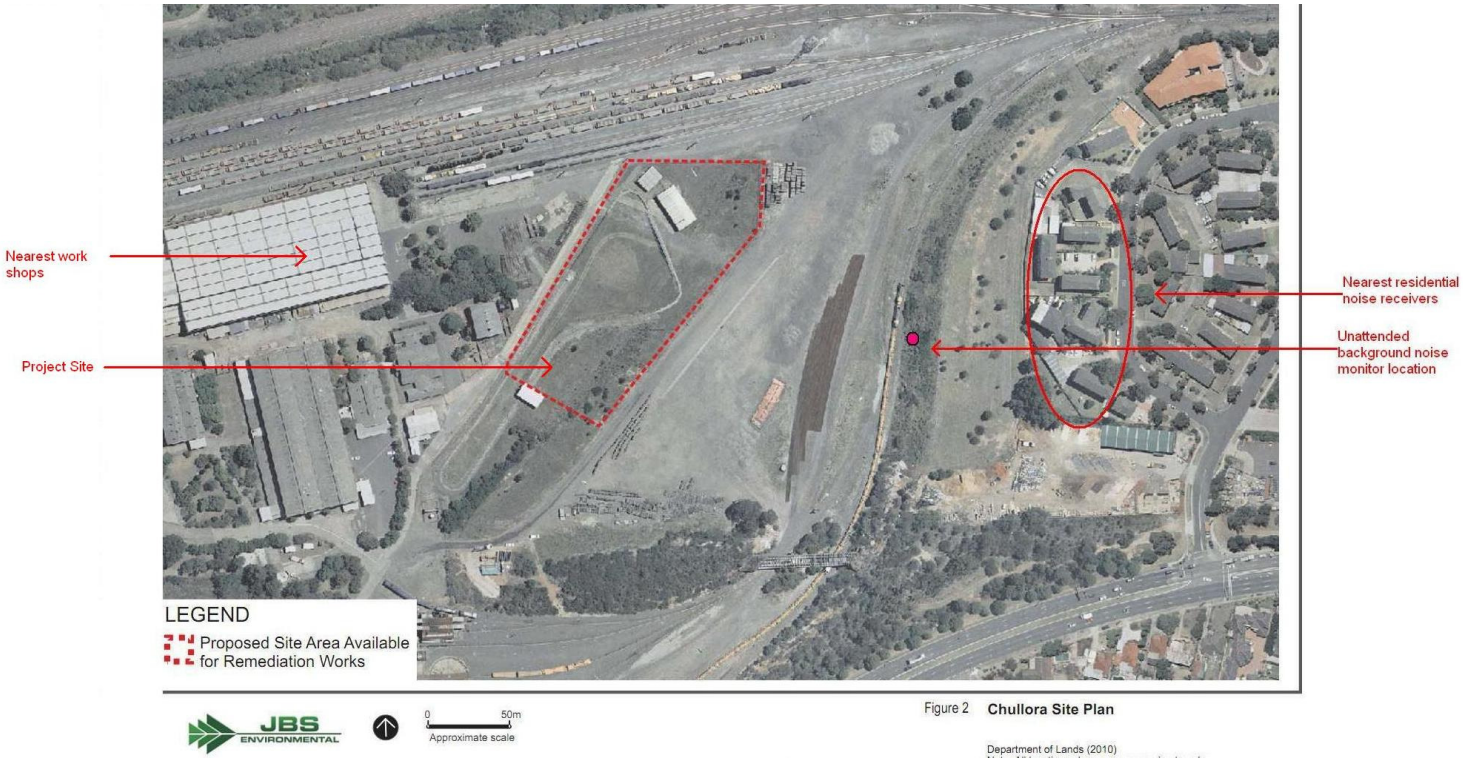


Figure 1 Site Map and Noise Receiver Location

1.1 PROPOSED WORKS

The remediation work is planned to be completed as shown in Figure 2 (from JBS Remedial Strategy, 2011).

In order to minimise odour and noise emissions from selected areas, a section of the site will be covered by a polyvinyl tent with an air supply fan and air extractor to keep the enclosure at negative pressure. Treatment of malodorous soils will occur under the enclosure to minimise noise and odour impacts.

No excavation below ground level is planned to take place at Chullora and all materials treated at the Chullora facility will be removed off site at the completion of works.

The above works will be performed as per the Remedial Strategy prepared for the project (JBS Environmental, 2011). The proposed activities are therein described in detail.

Figure 2 – Proposed Site Plan

1.2 PROPOSED EQUIPMENT

The major equipment proposed for use is detailed in Tables 1 and 2.

Table 1 – Proposed Mobile Plant

Estimated Duration	Description of Works	Proposed Mobile Plant
10 Months	Receipt, Stockpiling, Treatment and Disposal of Soil	• 20T excavators – external to enclosure • 20T excavator – internal to enclosure • Semi trailers arriving and departing from site, entering and exiting enclosure • Water Truck • Tipper trucks

Table 2 – Proposed Static Plant

Estimated Duration	Description of Works	Proposed Static Plant
10 Months	Receipt, Stockpiling, Treatment and Disposal of Soil	• Pug Mill • Supply Air fan • Generator • Extractor fan

1.3 HOURS OF OPERATION

The NSW Department of Planning have advised that the applicable operating hours are as per the DECCW Interim Construction Noise Guideline.

Construction activity will be limited to the hours stated detailed below:

- 7:00am-6:00pm Monday to Friday
- 8:00am-1:00pm Saturday
- No Work Sundays and public holidays

2 GUIDELINES AND STANDARDS

The following section identifies the noise and vibration guidelines applicable to the Project.

2.1 NOISE

The applicable general noise guidelines and standards are:

- Interim Construction Noise Guideline (DECCW, 2009).
  - To the residences to the east, Section 4.1.1 of the guideline applies.
  - To the workshops to the west, Section 4.1.3 of the guideline applies.
- Australian Standard 2436-1981 "Guide to Noise Control on Construction Maintenance and Demolition Site" (In particular the requirements stipulated in Section 3 of the standard).
- NSW Industrial Noise Policy (EPA, 2000) for static plant

2.2 TRAFFIC

The applicable traffic noise guidelines and standards are:

- NSW Industrial Noise Policy (for traffic on private roads).
- Interim Construction Noise Guideline (DECCW, 2009) – For mobile plant truck movements.
- Environmental Criteria for Road Traffic Noise (EPA, 1999) guidelines for "land use developments with potential to create additional traffic on local roads".

2.3 VIBRATION

The applicable vibration guidelines and standards are:

- German Standard DIN 4150-3 (1999-02): "Structural Vibration – Effects of Vibration on Structures" (will be used to assess and limit building damage risk).
- DECC "Assessing Vibration: a technical guideline" DECC, 2006 (contains preferred and maximum vibration criteria for assessing human responses to vibration).

2.4 INTERIM CONSTRUCTION NOISE GUIDELINE (DECCW, 2009) TO RESIDENCES

This guideline nominates acceptable levels of noise emissions above the background noise level. For major construction projects within the recommended standard hours (see Section 1.3) the guideline recommends an acceptable noise level of 10 dB(A) above the background level (RBL).

The noise affected level represents the point above which there may be some community reaction to noise.

- Where the predicted or measured LAeq (15min) 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.

The Interim Construction Noise Guideline also nominates a "highly noise affected" level (being over 75 dB(A) at the receiver). 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 activities can occur, taking into account the following:

- 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.
- If the community is prepared to accept a longer period of construction in exchange to restriction on construction times

2.5 INTERIM CONSTRUCTION NOISE GUIDELINE (DECCW, 2009) TO WORKSHOPS

This guideline nominates acceptable levels of noise emissions above the background noise level.

"Due to the broad range of sensitivities that commercial or industrial land can have to noise from construction, the process of defining management levels is separated into three categories. The external noise levels should be assessed at the most-affected occupied point of the premises:

- *industrial premises: external LAeq (15 min) 75 dB(A)*
- *offices, retail outlets: external LAeq (15 min) 70 dB(A)*
- *other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below."*

As shown above, the applicable guideline for the noise goals at the industrial workshops is 75 dB(A).

2.6 AUSTRALIAN STANDARD 2436

Section 3 of AS 2436 states that care shall be taken in applying criteria that normally would be used to regulate noise emitted from industrial, commercial and residential premises to construction, particularly for those activities which are transitory and of short duration.

For the control and regulation of noise from construction sites AS2436 nominates the following:

- That a reasonable suitable noise criterion is established.
- That all practicable measures be taken on the building site to regulate noise emissions, including siting noisy static processes on parts of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours.
- The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the building site.

2.7 NSW INDUSTRIAL NOISE POLICY (EPA, 2000)

The NSW Industrial Noise Policy provides guidelines for assessing noise impacts from industrial developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The NSW Industrial Noise Policy has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion. In addition, the EPA (in the Environmental Noise Control Manual) state that noise controls should be applied with the general intent to protect residences from sleep arousal.

2.8 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT

The project shall adhere to the requirements for noise generated from mechanical plant concerning the transmission of “offensive noise” under the provisions of the Protection of the Environment Operations Act (POEO Act).

The Sound Pressure Level at the boundary of any receiver should not exceed the background (RBL) LA90 15minutes noise level by 5dB.

All **static** plant required to continually operate during working hours (supply fan, extractor fan, and generators etc) are to be managed to meet the background +5dB requirement.

3 IMPACT ASSESSMENT PROCESS

The process used in completing this noise and vibration assessment is presented below:

1) Measure Background Noise Level (see Section 4)

2) Identify applicable noise and vibration objectives (see Section 4).

3) Predict noise and vibration levels produced by proposed remediation plant at the source (see Section 5).

4) Predict noise and vibration impacts at the receiver. If predicted noise levels at receiver exceeds remediation noise objective, investigate and implement all practical and cost effective controls and techniques to limit noise emissions (see Section 6 and 7).

5) If the noise objective is still exceeded after applying all practical controls to limit noise emissions, investigate management and other techniques to mitigate noise impacts of receivers (see Section 9).

4 BACKGROUND NOISE LEVELS

The existing background noise was measured between 10th and 17th October 2010 by setting up an unattended background noise monitor to the east of the proposed treatment facility at the base of an escarpment adjacent to the nearest residential receivers (refer to Figure 1).

4.1 MEASUREMENT EQUIPMENT USED

Measurements were obtained using an Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period and a number of 15 minute noise recordings were made at each location between 7am to 5pm weekdays The equipment was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode. There were no significant periods of adverse weather conditions during the measurement period.

4.2 RATED BACKGROUND NOISE LEVEL

The recorded background noise data was processed and is attached at Appendix 1. Weather affected noise data has been excluded during noise analysis. The day-time (7am-6pm) Rating Background Noise Level (RBL) is presented in Table 3.

Table 3 –Monitored Rating Background Noise Level (RBL) –Day (7am to 6pm)

Measurement Location	Rating Background Noise Level dB(A) $L_{90\ <15min>}$
Eastern Boundary (see Figure 1)	46

4.3 REMEDIATION NOISE OBJECTIVE

Based on the applicable guidelines in Section 2, the following objectives have been set for remediation work noise emissions:

Table 4 –Remediation Noise Objective

Noise Receiver	Type of Plant	Applicable Guidelines	Objective
Western Workshop Facade	Mobile	DECCW Interim Construction Noise Guideline(Section 2.5 of this report)	75 dB(A) $L_{eq\ 15minutes}$
	Static	NSW Industrial Noise Policy (Section 2.7 of this report)	75 dB(A) $L_{eq\ 15minutes}$
Eastern Residential Boundaries	Mobile	DECCW Interim Construction Noise Guideline(Section 2.4 of this report)	RBL +10 = 56 dB(A) $L_{eq\ 15minutes}$
	Static	NSW Industrial Noise Policy (Section 2.7 of this report) POEO Act (Section 2.8 of this report)	RBL +5 = 51 dB(A) $L_{eq\ 15minutes}$

5 NOISE IMPACT ASSESSMENT

5.1 PROPOSED PLANT NOISE

The proposed plant and equipment have been separated into the following classifications:

- **Static** Plant (required to operate the remediation polyvinyl enclosure and air treatment system) which does not change location on the site; and
- **Mobile** Plant (required to perform remediation tasks at various locations around the site).

5.1.1 Static Plant Noise Data

For static plant and equipment, test measurements were previously taken at a similar remediation project in Alexandria NSW. The remediation techniques used, and the plant required (negative pressure enclosure etc) are similar to those proposed for use in this project. These measured noise levels have been used to predict the noise impact from the similar static plant proposed for this project.

The remediation work noise was tested between 3pm and 5pm on 25th May 2010. No adverse weather conditions were present during the measurement period.

Noise measurements were obtained using a Norsonic type SA140 Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonics Sound Calibrator type 1251. No significant drift was noted.

5.1.1.1 Measured Noise Levels

The measured noise levels of the static plant (at the source and without any controls applied) have been converted into Sound Power Levels and are presented in Table 5.

Additional to the static plant noise data measured at the Alexandria project, a pug mill will also be required to operate within the enclosure.

Table 5 –Static Plant Noise Sound Power Level

EQUIPMENT	MEASURED SOUND POWER LEVEL dB(A)L_{eq}
Supply Air fan	109
Generator	98
Extractor	90
Pug Mill	114

The sound power levels measured above are applicable to a specific type of equipment. Acoustic treatments such as silencers on the air intake and discharge sides, external cladding for the fan case, etc can be specified if required once the equipment is selected by the remediation contractor.

5.1.2 Mobile Plant and Equipment Noise Data

For mobile plant and equipment, measured data held from previous studies of a similar nature, and data presented in Table D2 of Australian Standard 2436-1981 have been used to predict the noise levels for the mobile plant proposed for this project.

The A-weighted sound power levels for the proposed mobile plant and equipment (at the source and without any controls applied) are outlined in Table 6.

Table 6 - Mobile Plant Sound Power Level

EQUIPMENT / PROCESS	SOURCE SOUND POWER LEVEL dB(A) L_{eq}
20 Ton Excavator with bucket	107
Truck with Dog trailer (max 19 metres long)	108
Angle grinders	114
Electric Saw	111
Drilling	94

5.2 PROPOSED TRAFFIC NOISE

For the purposes of this noise assessment, the following traffic has been considered:

- Private traffic (traffic on the site, and traffic along site access road linking the site to Worth Street, Chullora).
- Public traffic (traffic on the Hume Highway).

The assessment of the traffic generated by the project has been prepared in "Traffic and Pedestrian Management Plan" (Transportation and Traffic Planning Associates, September 2010). Relevant excerpts are presented below.

> *TRUCK MOVEMENTS*
>
> *The transfer of material between Macdonaldtown and Chullora will be carried out through the use of single unit of trucks with a 'dog trailer'. Articulated vehicles will not be utilised due to road geometry constraints when exiting the site at Macdonaldtown and at the intersection of Erskineville Rd and Wilson St.*
>
> *On the assumption that it takes up to 10 minutes to manoeuvre, load and release a truck and dog trailer, the theoretical maximum number of trucks which could be loaded in a 10 hour period would be in the order 65-70 vehicles. With the time taken to travel between Macdonaldtown and the potential treatment site at Chullora and return between Macdonaldtown and the potential treatment site at Chullora and return being approximately 2 hours, a fleet of 12 trucks would be required to remove up to 1,000m^3 in a single day. With the rate at which vehicles can be located on to trucks, dictating the amount of material which can be removed from the site, it is apparent that maximum number of truck daily movements generated by the proposed activity will be between 65-70. This level of activity will not have any measurable impact on the surrounding road network.*

For the purposes of this assessment, it has been assumed that all of the material excavated from the Macdonaldtown site will be sent to the Chullora site for treatment however it is likely that some material will be sent directly to landfill. Consequently, the traffic generation numbers at Chullora are conservative and it is likely that a lesser amount of truck movements will occur.

5.2.1 Private Road Guideline

The traffic noise generated by traffic along the private road along the southern boundary of the site shall comply with the requirements of the NSW Industrial Noise Policy which has been detailed in Section 2. There are 2 criteria which apply; Intrusiveness and Amenity.

5.2.1.1 Intrusiveness Criterion

The NSW Industrial Noise Policy is intended to limit the audibility of noise emissions at residential receivers. It requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5 dB(A).

Where applicable, the intrusive noise level can be penalised (increased) to account for any annoying characteristics such as tonality.

5.2.1.2 Amenity Criterion

The NSW Industrial Noise Policy is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment and sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates the appropriate categories for the receivers close to the site.

Table 7 provides the recommended ambient noise levels for the receivers near the site for the day period. For the purposes of this condition, Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays.

Table 7 – DECCW INP Recommended Acceptable Noise Levels

Type of Receiver	Time of day	Recommended Acceptable Noise Level dB(A) Leq
Residential	Day	60
Industrial	When in use	70

If the existing amenity noise levels due to industrial noise are close to or above the recommended acceptable noise levels, the operation of the site shall be designed to a lower level than the acceptable noise level.

5.2.1.3 Private Road Objectives

Table 8 provides a summary of the NSW Industrial Noise Policy criterion and the private road traffic noise objective based on background noise monitoring conducted for the subject site (see Section 4).

Table 8 – Private Road Traffic Noise Objectives dB(A)

Time of day	Rating Background Noise Level dB(A) L90	Amenity Criteria dB(A) L_{eq} Residential	Amenity Criteria dB(A) L_{eq} Industrial	Intrusiveness Criteria RBL + 5 dB(A) L_{eq}	Noise Objective dB(A) L_{eq}
Day	46	60	70	51	51

5.2.2 Public Road Guideline

The applicable guidelines are:

- "Interim Construction Noise Guideline" (DECCW, 2009). This guideline nominates Environmental Criteria for Road Traffic Noise.
- The ECRTN guidelines for "land use developments with potential to create additional traffic on local roads" are presented in Table 9.

5.2.3 Public Road Objective

The objective for public road noise impacts are presented in Table 9.

Table 9 - Public Road Traffic Noise Objectives

Type of Development	Day (7am to 10pm)	Night (10pm to 7am)	Where Criteria Are Already Exceeded
Land use developments with potential to create additional traffic on local road	55 dB(A)$L_{eq(1\ hour)}$*	50 dB(A)$L_{eq(1\ hour)}$*	Where feasible and reasonable, existing noise levels should be mitigated to meet noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using' quiet' vehicles; and use barriers and acoustic treatments. In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB

*Measured outside residential façade containing a window

6 NOISE CONTROLS

This section describes general and specific noise control methods.

6.1 GENERAL NOISE CONTROLS

6.1.1 Silencing Devices

Where construction equipment generates unacceptable noise levels the use of silencing devices is to be employed. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

In certain cases it may be possible to specifically treat a piece of equipment to dramatically reduce the sound levels emitted.

6.1.2 Reversing Alarms

All trucks are to be fitted with a reverse alarm that is automatically activated when reverse gear is selected. Alarms which vary the output in response to changes in the surrounding noise level, i.e. self-adjusting type alarms (e.g. “Smart Alarm”) are preferred.

If smart alarms are to be employed, they must be mounted with an unobstructed ‘vision’ to the rear of the truck. All alarms must be clearly audible above the noise level of the truck.

Fixed output reverse alarms originally fitted by the truck manufacturer are acceptable. Truck and trailer combinations must be fitted with a reverse alarm at the rear of the rear most trailer.

6.1.3 Restricted Operating hours

Operating hours can be restricted to limit the impact on amenity of nearby receivers. The operating hours applicable to this project are detailed in Section 1.3.

6.1.4 Location of Plant

The location of static plant can be sited as far as practical from surrounding noise sensitive receivers at all times.

6.1.5 Noise Monitoring and Checks of Equipment

Noise monitoring of the site shall be undertaken to determine the effectiveness of controls which have been implemented. The monitoring results are to be used to devise further control measures

It is also recommended to undertake fortnightly noise checks of specific plant and equipment. If noise levels are found to be higher than nominated for that equipment type, items such as mufflers and engine shrouds will be examined to ensure they are in good working order.

A record of these measurements should be kept on a form similar to that shown below. This control is intended to maintain noise at constant levels, and prevent any increases throughout the life of the project.

CHULLORA TEMPORARY MATERIAL TREATMENT FACILITY

Construction Appliance Compliance Certificate

Month .....

Year .....

Plant Item .....

Allowable Noise Level .....

Measured Noise Level .....

Complies Yes ☐ No ☐

Issuing Engineer .....

Sub-Contractor .....

Project Manager .....

6.2 TASK SPECIFIC NOISE CONTROLS

In calculating the predicted noise levels in Section 7, the following noise controls have been applied.

Table 10 – Stage Specific Noise Controls

Control	Control Description	Potential Noise Reduction
A	Equipment shall be well maintained	Variable
B	Selected plant to operate within the Polyvinyl enclosure.	3-8 dB(A)
C	Distance attenuation	Variable

In some cases two or more control measures have been implemented in combination to achieve noise targets (see Tables 11 and 13).

6.3 NOISE CONTROL DETAILS

6.3.1 A - Maintenance

All plant and equipment is to be maintained to a high standard with no worn or chipped gear teeth, dry bearings, loose or worn parts or drive belts, poor lubrication or damaged silencers etc.

6.3.2 B - Enclosure

A minimum wall thickness of 7mm (with all gaps sealed) has been specified in assessing the acoustic shielding properties of this control. This enclosure has been calculated to provide a 3-8dB reduction in noise emissions across a range of operating frequencies from plant inside the enclosure.

A 12mm wall thickness could also be used if additional shielding is required, pending cost and practicality considerations. A 12mm enclose has been estimated to provide a 3-13dB reduction across a range of frequencies.

6.3.3 C – Distance Attenuation

Distance attenuation has been applied to the proposed plant and equipment based on the site plan in Figure 1.

7 PREDICTED NOISE LEVELS

7.1 PLANT NOISE PREDICTION

Tables 11 and 12 present predicted noise levels from plant which may occur at the **residences located to the east.**

Tables 13 and 14 present predicted noise levels from plant which may occur at the **workshops located to the west.**

7.1.1 Static Plant Noise Impact Prediction

The noise emissions from the **static** plant required to operate the enclosure were measured at a similar remediation site (see Section 5). The ventilation system is separated into 3 noise emitting components; Supply air fan, generator and extractor fan. The effectiveness of the controls applied to each component is presented in Tables 11 and 13.

7.1.2 Mobile Plant Noise Impact Prediction

The noise emissions from **mobile** plant (at the noise source, and at the receiver with controls applied) are presented in Tables 12 and 14.

Table 11 – Static Plant Noise Impact Prediction at Residences to the East

Plant	Noise Source Data (Sound Power Level) dB(A)	Source	Control	Control Reduction (dB)	Source Reduction (dB (A)Leq)	Plant Reduction (dB)	Predicted Plant noise level dB(A) at receiver	Noise goal at receiver dB(A)Leq	Compliant with Guideline
Supply Air Fan	109	Air intake point	Distance attenuation (300m distant from receiver)	58	63	63	46	51	Y
			Barrier effect (enclosure between source and receiver)	5					
		Fan motor	Distance attenuation (300m distant from receiver)	58	73				
			Motor case / shroud	10					
			Enclosure (fan motor is within the enclosure)	5 (3-8, frequency dependant)					
		Air discharge point	Distance attenuation (300m distant from receiver)	58	63				
			Enclosure (supply discharge point is within the enclosure)	5 (3-8, frequency dependant)					

Table 11 – Static Plant Noise Impact Prediction at Residences to the East (Cont.)

Plant	Noise Source Data (Sound Power Level) dB(A)	Source	Control	Control Reduction (dB)	Source Reduction (dB (A)Leq)	Plant Reduction (dB)	Predicted Plant noise level dB(A) at receiver	Noise goal at receiver dB(A)Leq	Compliant with Guideline
Extractor	90	Air intake point	Distance attenuation (300m distant from receiver)	58	63	58	32	51	Y
			Enclosure (extractor intake point is within the enclosure)	5 (3-8, frequency dependant)					
		Fan motor	Distance attenuation (300m distant from receiver)	58	73				
			Motor case / shroud	10					
			Enclosure (extractor fan motor is within the enclosure)	5 (3-8,frequency dependant)					
		Air discharge point	Distance attenuation (300m distant from receiver)	58	58				

Table 11 – Static Plant Noise Impact Prediction at Residences to the East (Cont.)

Plant	Noise Source Data (Sound Power Level) dB(A)	Source	Control	Control Reduction (dB)	Source Reduction (dB (A)Leq)	Plant Reduction (dB)	Predicted Plant noise level dB(A) at receiver	Noise goal at receiver dB(A)Leq	Compliant with Guideline
Generator	98	Generator	Distance attenuation (300m distant from receiver)	58	58	58	40	51	Y
Pug Mill	114	Pug Mill	Distance attenuation (300m distant from receiver)	58	63	63	51	51	Y
			Enclosure (Pug Mill is within the enclosure)	5 (3-8,frequency dependant)					

Table 12 –Mobile Plant Noise Impact Prediction at Residences to the East

				Controls (dB reduction) Refer Section 6.3						
Works	**Plant Required**	**Noise Source Data (Sound Power Level) dB(A)**	**Distance from receiver (metres)**	**A**	**B**	**C**	**Total reduction from controls (dB range)**	**Predicted noise level (at receiver) dB(A) Leq**	**Noise goal at receiver dB(A)Leq**	**Compliant with Guideline**
Receipt, Stockpiling, Treatment and Disposal of Soil	20T Excavator with bucket (outside enclosure)	107	210	☒	☐	☒ (55)	55	52	56	Y
	20T Excavator with bucket (inside enclosure)	107	300	☒	☒ (5)	☒ (58)	63	44	56	Y
	Truck with dog trailer	108	210	☒	☐	☒ (55)	55	53	56	Y

Table 13 – Static Plant Noise Impact Prediction at Workshops to the West

Plant	Noise Source Data (Sound Power Level) dB(A)	Source	Control	Control Reduction (dB)	Source Reduction (dB (A)Leq)	Plant Reduction (dB)	Predicted Plant noise level dB(A) at receiver	Noise goal at receiver dB(A)Leq	Compliant with Guideline
Supply Air Fan	109	Air intake point	Distance attenuation (90m distant from receiver)	47	52	52	57	75	Y
			Barrier effect (enclosure between source and receiver)	5					
		Fan motor	Distance attenuation (90m distant from receiver)	47	62				
			Motor case / shroud	10					
			Enclosure (fan motor is within the enclosure)	5 (3-8, frequency dependant)					
		Air discharge point	Distance attenuation (90m distant from receiver)	47	52				
			Enclosure (supply discharge point is within the enclosure)	5 (3-8, frequency dependant)					

Table 13 – Static Plant Noise Impact Prediction at Workshops to the West (Cont.)

Plant	Noise Source Data (Sound Power Level) dB(A)	Source	Control	Control Reduction (dB)	Source Reduction (dB (A)Leq)	Plant Reduction (dB)	Predicted Plant noise level dB(A) at receiver	Noise goal at receiver dB(A)Leq	Compliant with Guideline
Extractor	90	Air intake point	Distance attenuation (90m distant from receiver)	47	52	47	43	75	Y
			Enclosure (extractor intake point is within the enclosure)	5 (3-8, frequency dependant)					
		Fan motor	Distance attenuation (90m distant from receiver)	47	62				
			Motor case / shroud	10					
			Enclosure (extractor fan motor is within the enclosure)	5 (3-8,frequency dependant)					
		Air discharge point	Distance attenuation (90m distant from receiver)	47	47				

Table 13 – Static Plant Noise Impact Prediction at Workshops to the West (Cont.)

Plant	Noise Source Data (Sound Power Level) dB(A)	Source	Control	Control Reduction (dB)	Source Reduction (dB (A)Leq)	Plant Reduction (dB)	Predicted Plant noise level dB(A) at receiver	Noise goal at receiver dB(A)Leq	Compliant with Guideline
Generator	98	Generator	Distance attenuation (90m distant from receiver)	47	47	47	51	75	Y
Pug Mill	114	Pug Mill	Distance attenuation (90 distant from receiver)	47	52	52	62	75	Y
			Enclosure (Pug Mill is within the enclosure)	5 (3-8,frequency dependant)					

Table 14 –Mobile Plant Noise Impact Prediction at Workshops to the West

				Controls (dB reduction) Refer Section 6.3						
Works	**Plant Required**	**Noise Source Data (Sound Power Level) dB(A)**	**Distance from receiver (metres)**	**A**	**B**	**C**	**Total reduction from controls (dB range)**	**Predicted noise level (at receiver) dB(A) Leq**	**Noise goal at receiver dB(A)Leq**	**Compliant with Guideline**
Receipt, Stockpiling, Treatment and Disposal of Soil	20T Excavator with bucket (outside enclosure)	107	90	☒	☐	☒ (47)	47	60	75	Y
	20T Excavator with bucket (inside enclosure)	107	90	☒	☒ (5)	☒ (47)	52	55	75	Y
	Truck with dog trailer	108	90	☒	☐	☒ (47)	47	61	75	Y

7.2 PLANT NOISE IMPACT

As shown above, with the appropriate application of a selection of noise controls, the predicted noise levels do not exceed the applicable noise goals.

The controls listed above should be included in the remediation contractors Noise and Vibration Management Plan (see Section 9).

For works which continue to produce elevated levels of noise with all feasible and reasonable controls in place, respite periods and/or limited operating hours shall be used as detailed in the remediation contractors Noise and Vibration Management Plan (see Section 9).

7.3 TRAFFIC NOISE PREDICTION

7.3.1 Public Road Impact

The traffic report states:

> *"It is apparent that maximum number of truck daily movements generated by the proposed activity will be between 65-70. This level of activity will not have any measurable impact on the surrounding road network."*

The existing traffic volume along Hume Hwy is estimated approximately 12,000 vehicles per day (RTA Year 2003 data). It is assumed that 10% are heavy vehicles which will result in 1,200 trucks daily. The estimated truck movements generated by the project is 70 trucks / day. This results in a traffic noise Increase of up to 0. 2 dB(A) which is below the applicable criteria.

Table 15 –Predicted Public Road Noise Impact

ECTRN Criteria	Predicted Traffic Noise Increase on the surrounding road network	Compliance
traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB	< 0.2dB(A)	Yes

7.3.2 Private Road Impact

The following items have been considered for the prediction of traffic noise generated by the private road:

- 8km/h speed limit.
- Typical Sound Power Level of truck with a 'dog trailer' movements measured by this office 108 dB(A).

The following controls have been applied to the sound power level to determine the predicted noise level:

- Distance attenuation.

With the application of the above considerations and controls, FHWA software has predicted the traffic noise impact on the noise receivers (shown in Table 16).

Table 16 – Predicted Private Road Noise Impact

		Controls				
Noise Receiver	**Source Sound Power Level dB(A)**	**Control**	**Reduction due to Controls dB(A) Leq**	**Predicted Traffic Noise Level dB(A) Leq**	**INP Criteria dB(A) Leq**	**Compliance**
Residents to the East	108	Distance attenuation (280 distant from receiver)	64	44	50	Y

The truck movements along the private road do not exceed the applicable noise criteria.

8 VIBRATION

Vibration limits have been established for both human amenity, and damage to buildings.

The criteria and the application of the German Standard DIN 4150-3 standard is discussed below.

8.1 DAMAGE LIMITS

DIN 4150-3 provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 are presented in Table 16.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 17 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

8.2 DAMAGE VIBRATION OBJECTIVE

Project specific vibration limits have been developed based on:

- The recommendations shown in Table 17 above.
- The vibration sources producing the highest vibration levels would not generate significant vibration at frequencies of less than 10Hz.

The appropriate vibration limit for the building is **5mm/s PPV for residential building and 20mm/s PPV for nearest rail track**.

8.3 HUMAN COMFORT LIMITS

Table 2.2 of DECCW "Assessing Vibration: A technical guideline" specified the following vibration goal for human comfort:

Table 18 –Preferred and Maximum Weighted rms values Vibration Acceleration (m/s2) 1-80 Hz

Location	Assessment Period	Preferred Values Z-axis	Preferred Values X & Y-axis	Maximum Values Z-axis	Maximum Values X & Y-axis
Continuous Vibration					
Residences	Day time	0.010	0.0071	0.020	0.014
Impulsive Vibration					
Residence	Day Time	0.3	0.21	0.6	0.42

Acceptable values for intermittent vibration shall comply with the requirements in Table 2.4 of DECCW "Assessing Vibration: A technical guideline" detailed as below.

Table 19 – Acceptable Vibration Dose Values for Intermittent Vibration (m/s1.75)

Location	Day time preferred value	Day time maximum value
Residences	0.20	0.40
Workshops	0.80	1.60

8.4 PROPOSED VIBRATION INDUCING PLANT

The following pieces of plant have the potential to produce excessive vibrations:

- Excavators inside and outside of enclosure.
- Pug mill inside the enclosure.

8.5 VIBRATION CONTROLS

8.5.1 Excavator

As shown in the site plan (Figure 1) all works involving an excavator are at least 44m distant from the nearest rail track.

The vibration levels to the rail track around the project site have been analysed based on previous vibration test results of typical excavator operations which represent the worst vibration scenario. The predicted vibration levels are significantly lower than 20mm/s PPV therefore any vibration generated by Excavators at the project site shall not adversely affect the existing rail track system.

Additionally, excavators can operate closer than the 44m proposed under the current site plan. In order to meet the vibration objectives in Section 8.2, all excavators should operate at least 10m distant from the nearest rail track. In the event that excavator operation is required within 10m, vibration measurements shall be conducted to ensure that the vibration objectives are not exceeded.

8.5.2 Pug Mill

The location of the pug mill is approximately 90m distant from the nearest rail track. The siting of the pug mill inside the enclosure will ensure that it is at least 10m distant from all rail track in order to comply with the vibration limits in Section 8.2.

8.6 PREDICTED VIBRATION IMPACTS

If the above vibration controls are employed, the works should not impact on rail infrastructure or residential receivers adjacent to the project site.

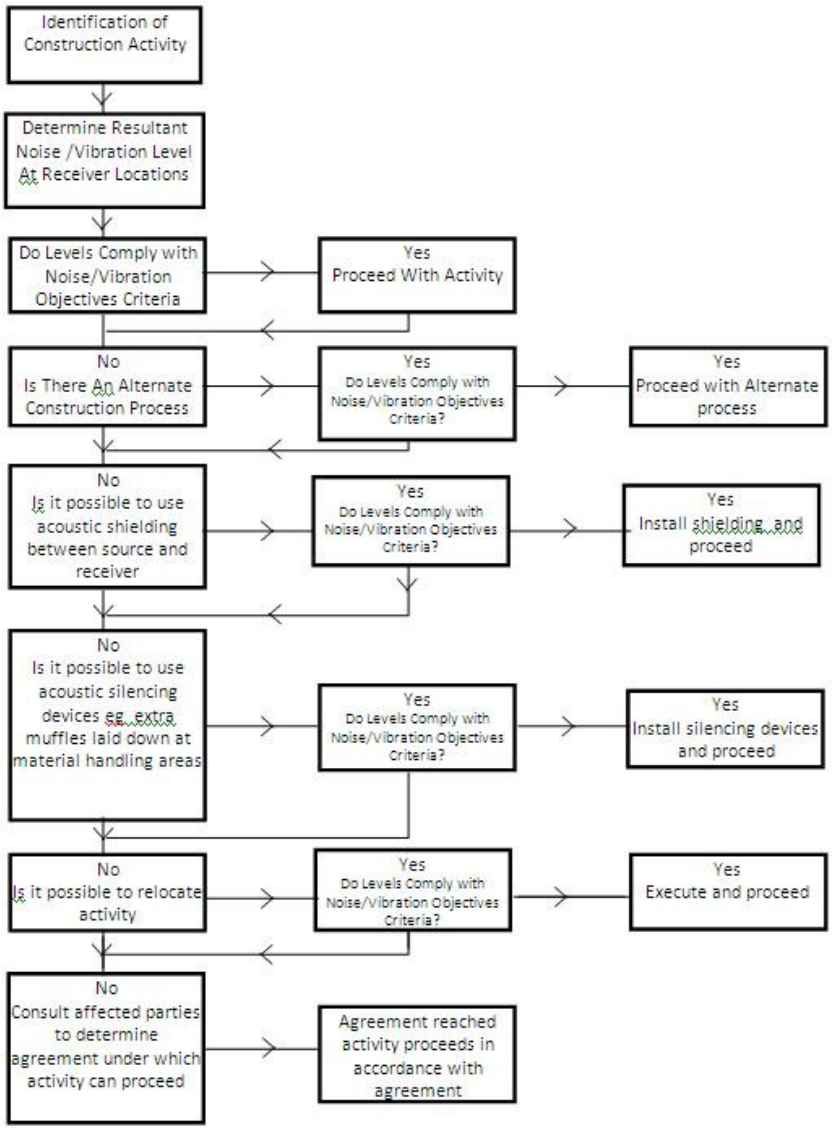
The controls listed in Section 8.5 should be included in the remediation contractors Noise and Vibration Management Plan (see Section 9).

9 MANAGEMENT OF REMEDIATION IMPACTS

9.1 NOISE AND VIBRATION MANAGEMENT PLAN

Further to the controls listed in Sections 6 and 8.5, it is recommended that a noise and vibration management plan be implemented by the remediation contractor. The purpose of the plan is to review the predicted noise levels from the works taking into account any changes to plant and equipment, provide greater detail on expected noise and vibration levels from the works where relevant, document all feasible and reasonable work practices which will be applied to manage noise (including vibration where relevant) from the works and provide a methodology for evaluating performance and compliance with the plan.

A flow chart which illustrates the process to be followed in assessing construction activities is presented below.



Further, hazard identification for noisy equipment/work practices should be undertaken by the remediation contractor to ensure best practice is followed resulting in lower noise levels at the western boundary.

At times, direct negotiation with affected residents may be required in order to establish additional noise controls. More restrictive operating hours can be applied to plant which exceed the relevant noise criteria by scheduling works at times which receivers are less sensitive to noise, e.g. mid morning or mid afternoon for works near residences.

The remediation contractor should incorporate this requirement into the Noise and Vibration Management Plan and submit the plan to the Director General for approval and comment prior to the commencement of any works on-site.

9.2 ESTABLISHMENT OF DIRECT COMMUNICATION WITH AFFECTED PARTIES

In order for any construction noise management programme to work effectively, continual communication is required between all parties which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation processes is to:

- Inform and educate the groups about the project and the noise controls being implemented.
- Increase understanding of all acoustic issues related to the project and options available.
- Identify group concerns generated by the project, so that they can be addressed.
- Ensure that concerned individuals or groups are aware of and have access to the remediation contractor's complaints register/Site Manager's number which will be used to address any construction noise related problems should they arise.

A sign is to be erected on the boundary fence at the Chullora site (if utilised) throughout the remediation works which should advise the following:

- Contractor details; and
- 24 hour emergency contact details.

To ensure that the communication with residents is effective, regular scheduled meetings between the remediation contractor and local residents may be required until all noise and vibration issues have been addressed and the evidence of successful implementation of mitigation processes has been acknowledged by all parties.

RailCorp are committed to keeping the community abreast of the progress of the project. Newsletters informing residents of the progress of the works and the upcoming construction activities may be issued as required, and meetings with residents may be held to communicate the progress of the project and measure the success of the control measures.

10 CONCLUSION

This noise and vibration assessment has been undertaken for the proposed material treatment facility at Chullora to identify whether these activities would impact sensitive receivers around the site. The assessment of noise and vibration indicates that:

- The works processes should not generate noise levels that will require additional management other than the controls listed above. Adoption of the elements of these controls will ensure that any noise impacts will be minimised.
- Noise as a result of traffic generation will not impact on sensitive receivers.
- The suggested noise controls for the static plant will meet the noise objectives if appropriately specified and installed by the remediation contractor.
- Ground vibration goals and equipment setbacks have been set to safeguard structures close to the project site and to protect human comfort and amenity.
- The remediation contractor should prepare a Noise and Vibration Management Plan and submit the plan to the Director General for approval and comment prior to the commencement of any works on-site.

We trust this information is satisfactory. Please contact us should you have any further queries.

Prepared by

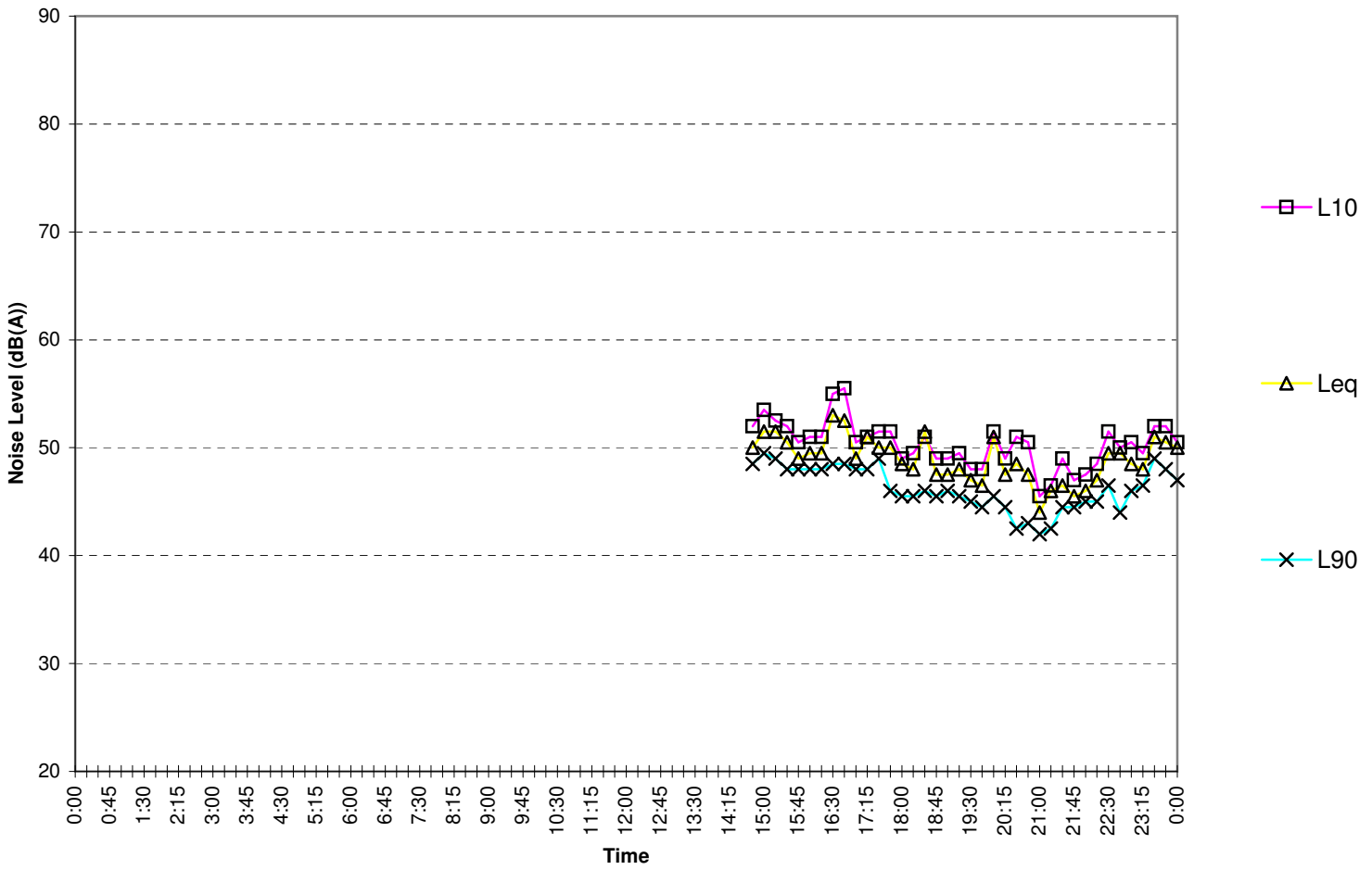
Acoustic Logic Consultancy Pty Ltd
George Wei

Senior Acoustic Engineer

Appendix 1: Unattended Ambient Noise Monitoring

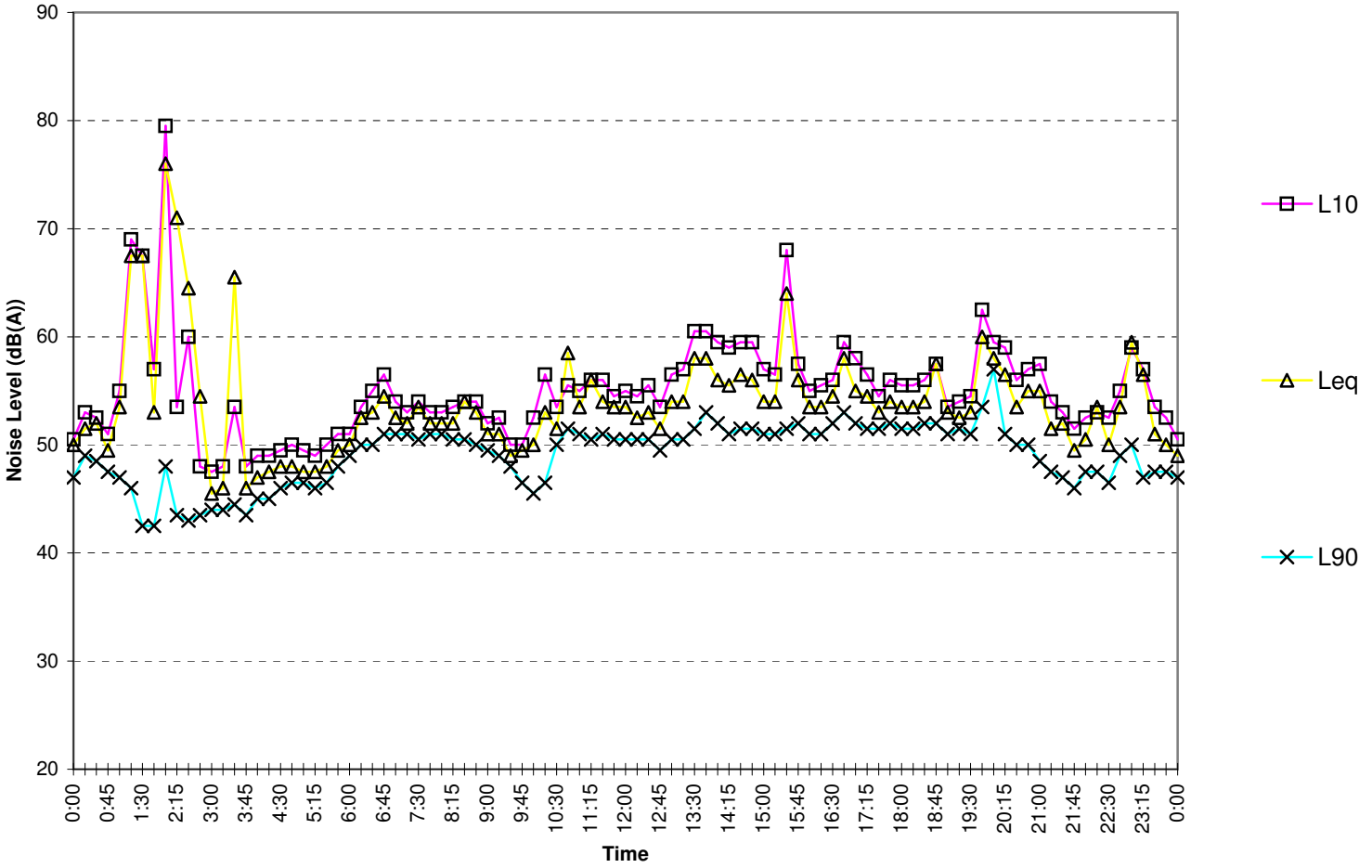
Chullora Site

Monday May 10,2010



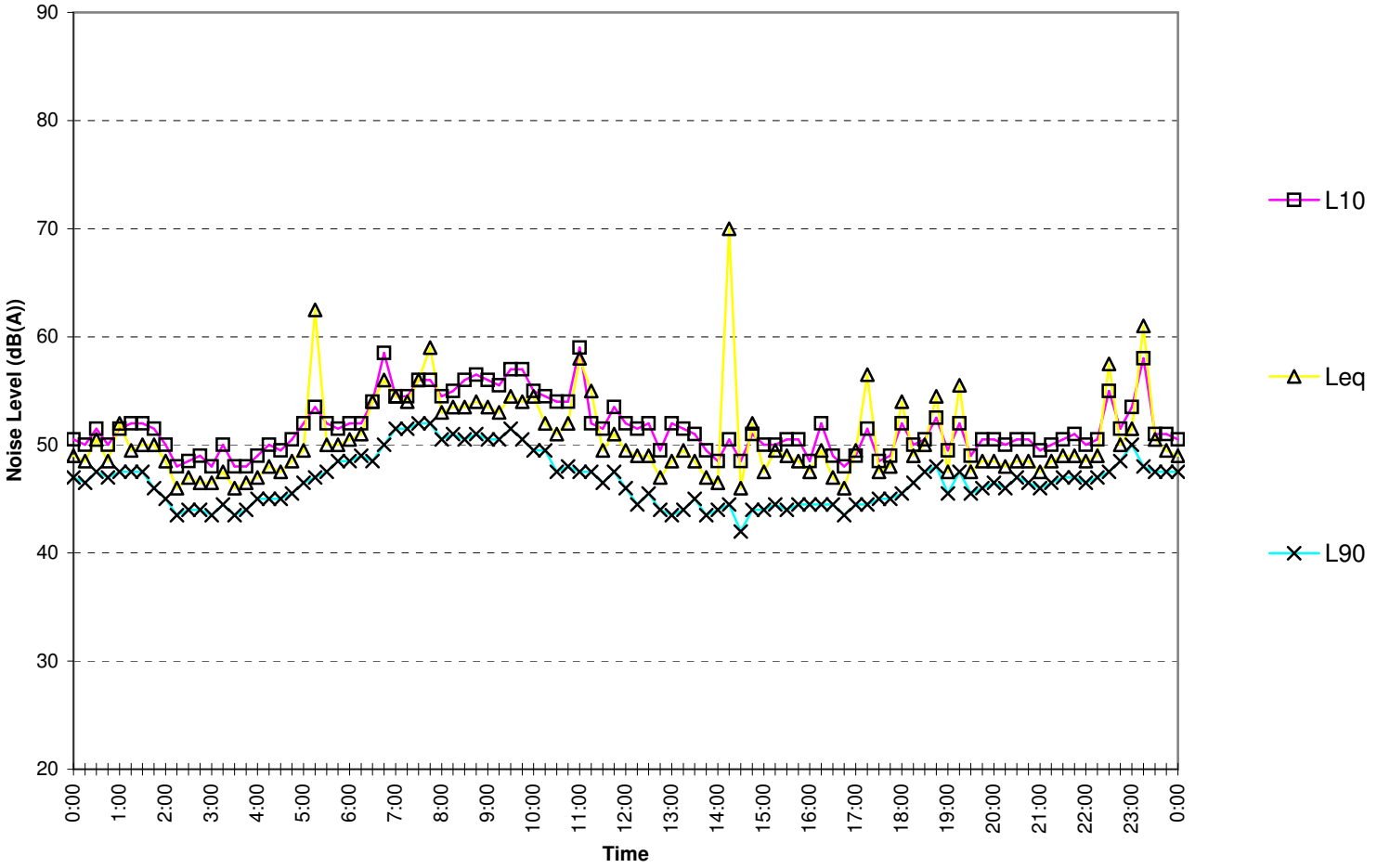
Chullora Site

Tuesday May 11,2010



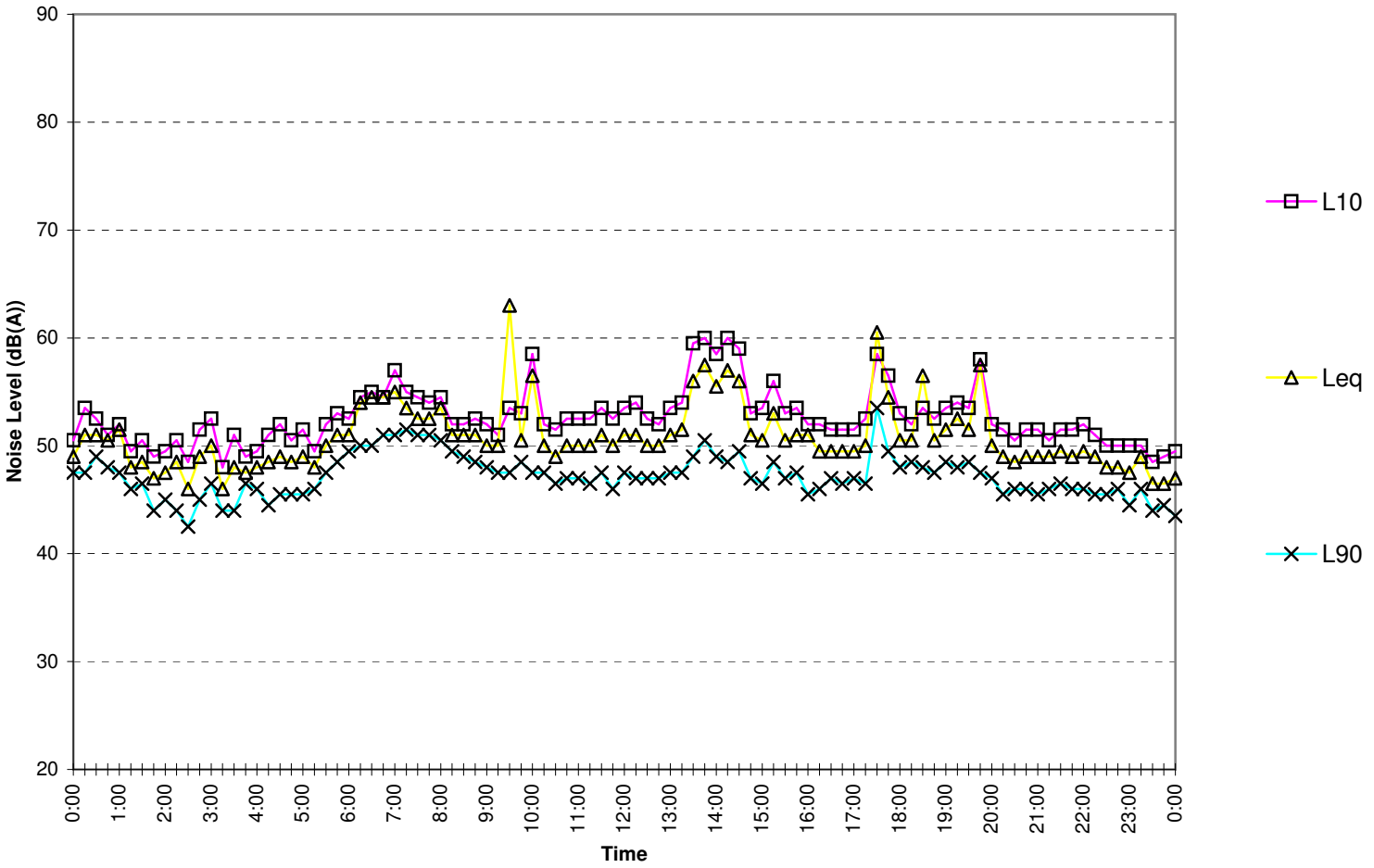
Chullora Site

Wednesday May 12,2010



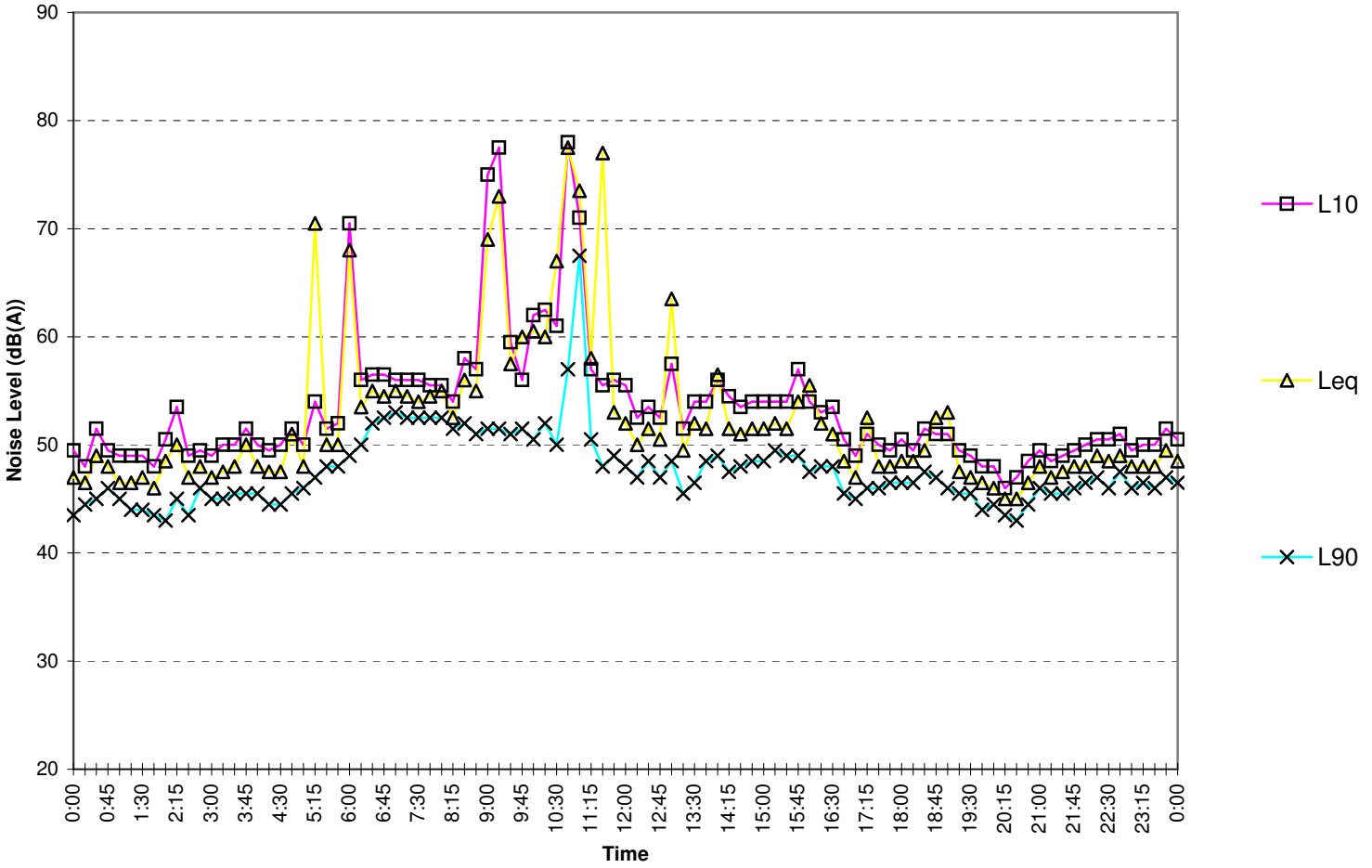
Chullora Site

Thursday May 13,2010



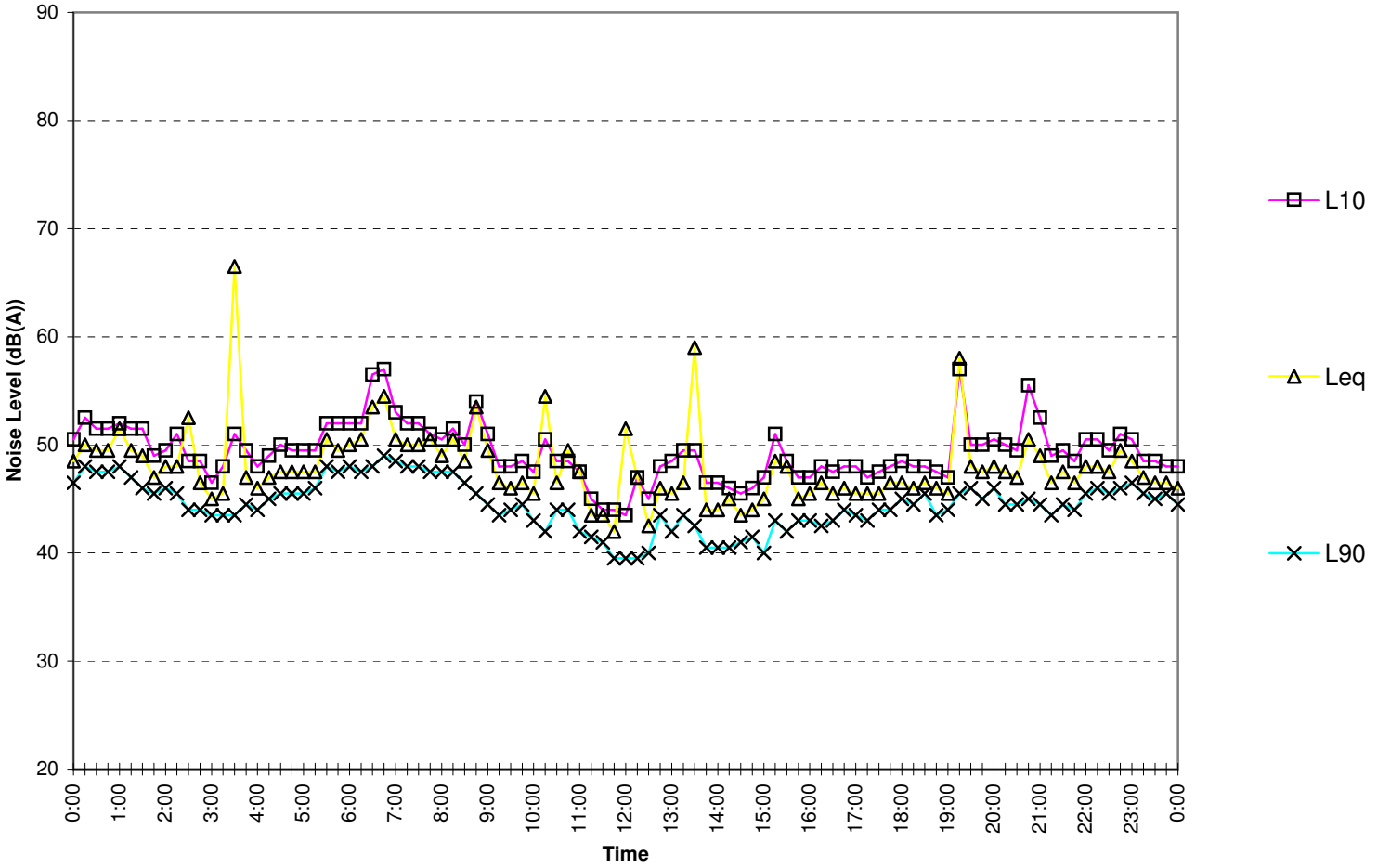
Chullora Site

Friday May 14,2010



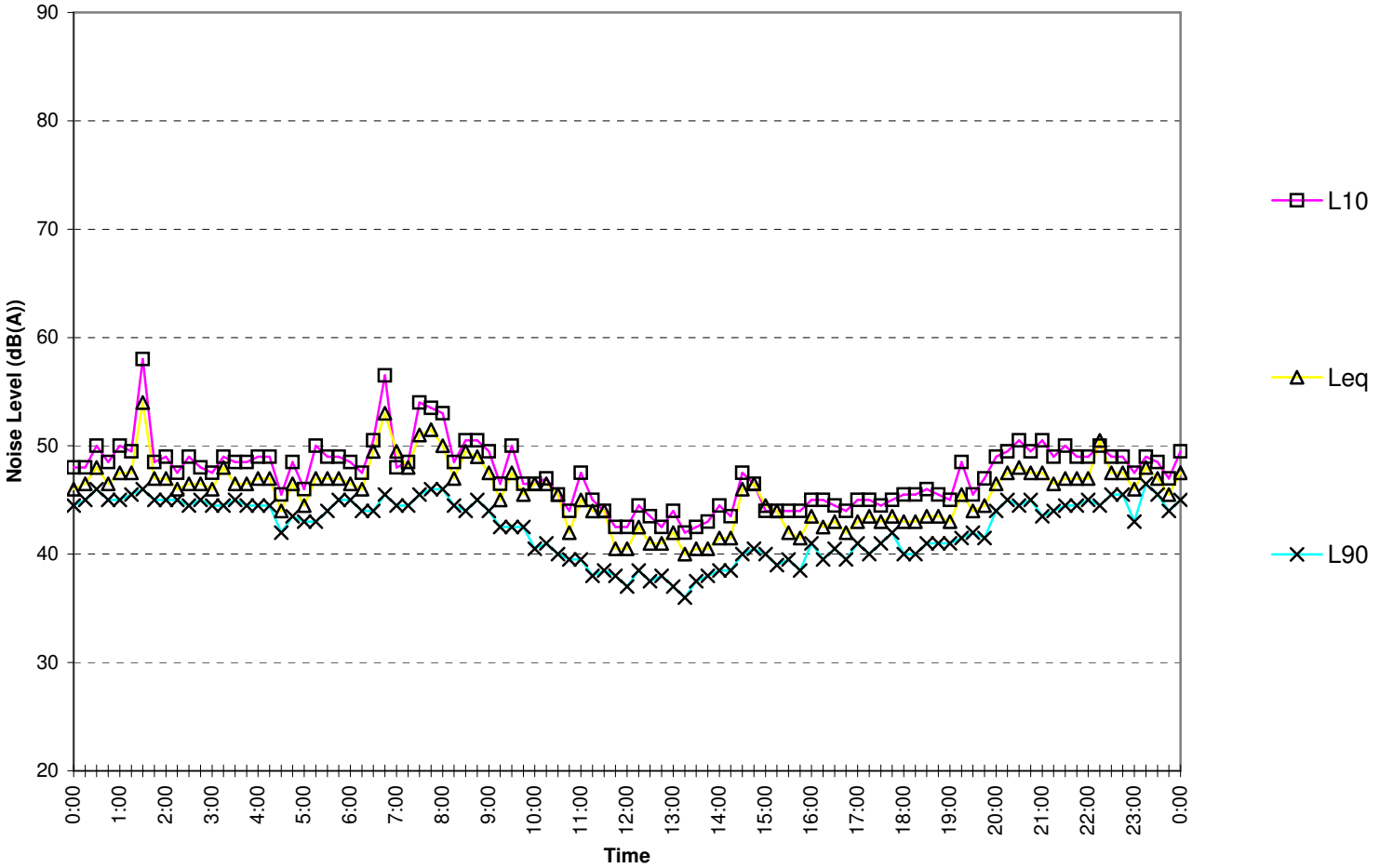
Chullora Site

Saturday May 15,2010



Chullora Site

Sunday May 16,2010



Chullora Site

Monday May 17,2010