



CONSTRUCTION MANAGEMENT PLAN

For

100 Bennelong Parkway, Sydney Olympic Park

Prepared by: Karimbla Constructions Services (NSW) Pty Limited
Builders and Developers
Level 11, 528 Kent Street
SYDNEY NSW 2000

T: 02 9287 2888
F: 02 9287 2777

Client: Meriton Property Services P/L
Level 11, 528 Kent Street
SYDNEY NSW 2000

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1. Introduction

Development Consent ref: **MP10_0148** has been issued by Sydney Olympic Park Authority for a proposed multi-unit high rise residential development at 100 Bennelong Parkway, Sydney Olympic Park.

Meriton Property Services Pty Ltd is the developer and has engaged the services of Karimbla Constructions Services (NSW) Pty Ltd to supervise construction of this project.

2. Site Description

The proposed development construction site comprises of the following land:

- Lot 84 in DP 855929 known as 100 Bennelong Parkway, Sydney Olympic Park

The subject site is located between Bennelong Parkway to the east and Australia Avenue to the west and is known as No. 100 Bennelong Parkway. The site is irregular in shape and bound by Bennelong Parkway and the curved railway line to the west. The site has a frontage to Bennelong Parkway of 106.85m and a total area of approximately 1.504 hectares. The site contains a two storey commercial/light industrial building occupied by Jemena, an Australian infrastructure company that builds, owns and maintains a combination of electricity, gas and water assets. The existing development on the site is proposed for demolition. The existing building includes a narrow undercroft parking area on its eastern side and an attached warehouse on its western side. The building is bounded to the south by a two storey car park comprising a suspended upper concrete slab supported on concrete columns and masonry block walls. A large concrete hardstand area occupies the western portion of the site.



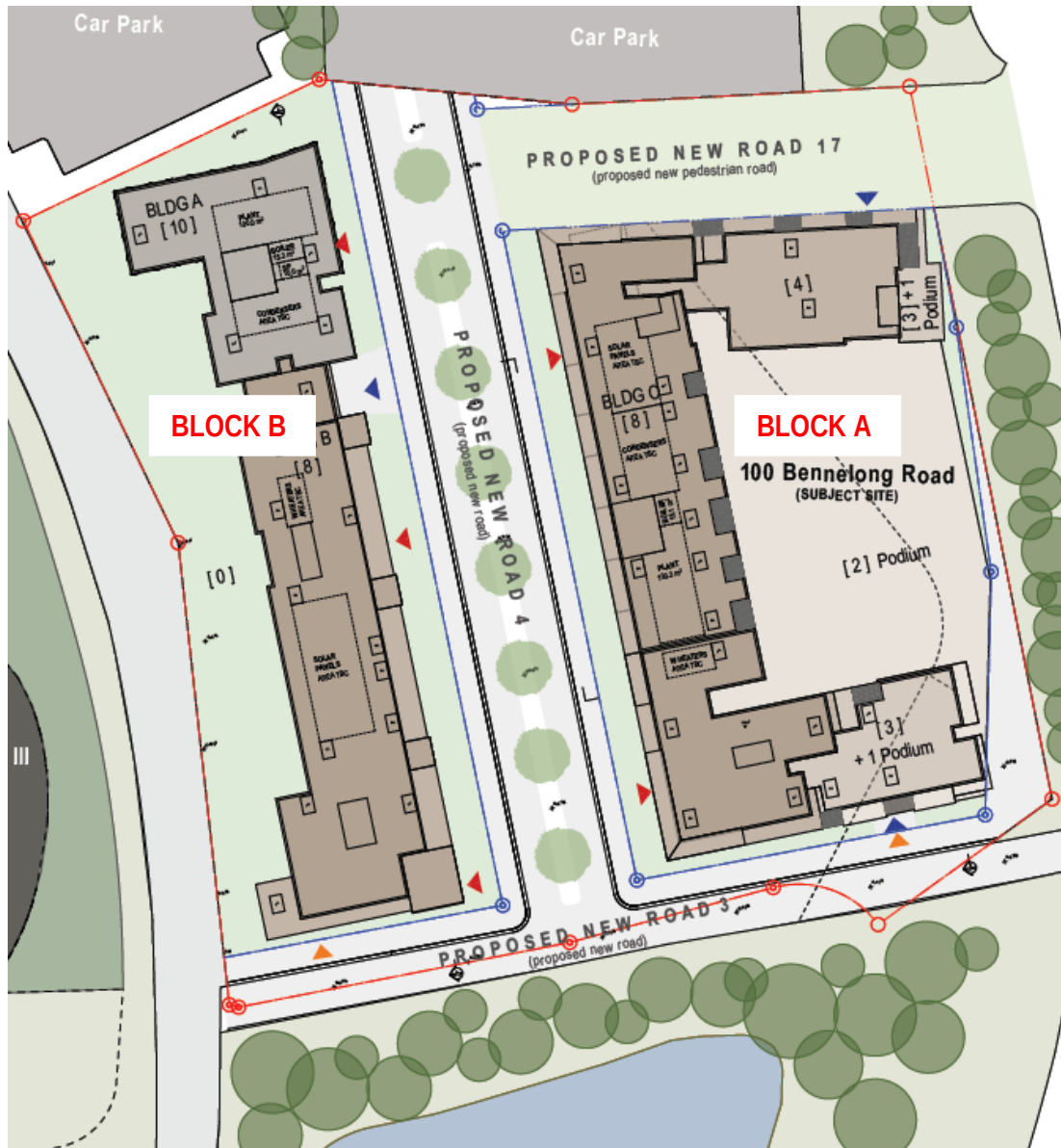
3. Proposed Development

100 Bennelong Parkway, Sydney Olympic Park is a mixed-use development site for up to 342 apartments and a child care centre for 90 children, 504 ground level and basement car parking spaces, including 30 spaces for the childcare centre.

Sydney Olympic Park is approximately 14 kilometres west of the Sydney CBD and 8 kilometres east of the Parramatta CBD. It has been identified as a specialist economic centre in the NSW Government's Metropolitan Strategy for Sydney. Covering 640 hectares, Sydney Olympic Park includes 430 hectares of open space, recreation areas, sporting and recreational facilities, wetlands and waterways. The Park's green spaces and parklands are inhabited by threatened species, protected marine vegetation and endangered ecological communities.

4. Construction Management

4.1 Development Staging, Timing and Approvals



4.1.1 Development Staging

The project will be divided into 4 separate stages this will enable construction activity to be focused in specific areas that are practical in size and manageable.

- Stage 1 = Basement car parking Block A.
- Stage 2 = Basement car parking Block B.
- Stage 3 = Block A structure including landscaping.
- Stage 4 = Block B structure including landscaping.

4.1.2 Timing

The proposed construction timing for the project will be as follows:

Phase 1: Roadwork's to proposed new road through the development. For site access arrangements, please refer to the Construction Traffic Management Plan in

Appendix 2. (3 months)

Phase 2: Demolition (3 months)

Phase 3: Basement excavation and shoring walls (up to 6 months)

Phase 4: Construction of basements up to podium including services upgrades (8 months)

Phase 4: Construction of towers as per development staging detailed above (12-18 months)

Phase 6: Occupation and remaining fit-out works (6 months)

Phase 7: Complete public domain & VPA works (up to 6 months)

A construction program of up to approximately 2.5 to 3 years is typically required for this size and type of development.

4.1.3 Statutory Approvals

It is proposed that the CC's will be approved in the following sequence:

1. Detail excavation Structure for basement car park to podium
2. Structure for podium to roof
3. Fit out

A temporary dewatering permit from the NSW Office of Water may be required in the event that groundwater is required to be pumped from the site during the proposed excavation work.

Due to the size of the development there may also be staged occupation and staged strata subdivision plans required, however, this may be subject to separate applications being made with the relevant authorities.

4.2 Public / Worker Safety, Amenity and Site Security

All site staff, contractors and visitors to the site will be required to undertake a site specific induction course prior to working on the site. This induction course will be supervised by Karimbla's OH&S + WPH&S officer who is:

- Mr James Sykes - phone: (02) 9287 2888 or 0400 300 712

All compliance issues will be coordinated by Karimbla's appointed Site Manager:

- Andrew Fletcher (Spike) 0418 609 340

All public complaints will be directed to Karimbla's Site Manager whose name and number will be displayed on-site. This person will be based on-site and will be responsible for obtaining all relevant information which will then be passed on to Meriton's Project Manager for further action as required.

No workers will be permitted to enter the site if they are under the influence of drugs or alcohol.

It will be the responsibility of Karimbla to obtain Safe Work Method Statements (SWMS) from all contractors, which must also include safety manuals / policies from each company. Karimbla's OH&S Manager, James Sykes, will monitor this.

All contractors will be required to comply with Karimbla's site-specific safety management plan. Regular 'Tool Box' meetings will be held on-site with the trades including the formation of a special on-site safety committee, which will inspect the project on a regular basis.

The site will be enclosed by a suitable construction / security fence with lockable gates and if required patrolled by qualified security guards or the like after hours.

4.3 Excavation Phase

Prior to excavation, a suitable construction fence ('A' type hoarding and mesh / dust screened fence) will be installed within the site boundaries and around the perimeter of the relevant construction stage.

Excavation includes the construction of all shoring walls to enable the basement car park to be excavated safely within the site. Load out of excavated material will be undertaken by trucks and trailers accessing the site via the existing entry off Bennelong Parkway (refer **Appendix 2**).

4.4 Construction Phase

The initial selection of material handling plant and equipment has been based on primarily achieving a timely execution of the construction program and acknowledging the various site access constraints.

4.4.1 Cranes

All construction materials and deliveries will be unloaded in designated areas that will be located entirely within the site. The use of temporary on-site tower cranes will enable these deliveries to be safely moved into position.

It is proposed that 3 temporary construction cranes may be used during the construction phases of this development.

These cranes will primarily provide service to the following on-site activities:

- Formwork delivery
- Reinforcement steel
- Concrete placement
- Precast panel and brick / blockwork delivery
- Gyprock and cladding deliveries

Mobile cranes may be used for initial on-site activities until a tower crane is established. All permits will be obtained from relevant authorities prior to use.

The use of on-site forklift trucks will enable the expedient transfer of smaller supplies from the basement and others parts of the site.

4.4.2 Man and Material Hoist

'Alimac' (or similar) man and materials hoists may be utilised on each of the 4 x above ground buildings whilst under construction. These hoists will service the basement levels and each of the tower floors as each level is completed up to the roof. The decommissioning of each hoist will coincide with the commissioning of the internal lift core (Builder's lift).

4.4.3 Formwork System

The formwork system will be subcontracted as a design and construct package. Typically the traditional re-useable floor formwork / support system or the permanent 'Bondek' formwork system is used so as to enable the timely and cost effective installation of the concrete floor slab structure.

4.4.4 Site Accommodation

Site office and amenities will be initially housed in designated areas around the site until such time as the basement structure is completed to a stage where sheds and amenities can be internally accommodated.

The Karimbla site supervisor will be initially located in the site office located at the site entrance off Bennelong Parkway.

4.4.5 Material Handling and Storage

The use of on-site forklift trucks will enable the expedient transfer of smaller supplies that are delivered to the basement and others parts of the site.

The location of material storage areas within the site will vary to suit the construction requirements. Upon the completion of the basement, areas on the ground podium level will be dedicated for the purpose of unloading all major loads within the site.

5. Environmental Control

5.1 General

The primary objective of this section is to identify the proposed parameters, which should minimise the impact of noise, vibration and maintain air quality for the immediate neighbourhood.

5.2 Noise and Vibration Management

All noise generating equipment associated with the proposed construction activities will be generally in accordance with the NSW EPA environmental noise management criteria.

Please refer to the Construction Noise and Vibration Management Plan that has been specifically prepared for this site by Acoustic Logic Consultancy (refer **Appendix 5**)
Where practical the use of electrical machinery may be used in lieu of mechanical devices.

Major plant and machinery should be regularly serviced and operated by qualified operators so as to ensure that no excess emissions and quiet operation is ensured.

5.3 Work Hours

In accordance with the relevant requirements of Lane Cove Council development consent ref: DA191/13, the hours of on-site construction will be as follows:

- (a) Between 7:00 am and 5.30 pm, Mondays to Fridays
- (b) Between 8:00 am and 12:00 noon, Saturdays
- (c) No work to be undertaken on Sundays and Public Holidays
- (d) There are to be NO heavy vehicle construction movements in the direction of peak traffic flow during peak times
- (e) Internal building work may be carried out at any time outside these hours, subject to noise emissions from the building or works not being audible at any adjoining boundary.
- (f) Or as otherwise that may be approved by Council or relevant Government Authority

5.4 Dust Management

Dust control will be implemented in accordance with relevant Australian Standards and NSW Workplace OH&S Act and regulations.

Excessive dust is most prevalent during the excavation phase. The on-site Forman will monitor the dust emissions during this time and as required implement water suppression during plant movement and/or loading activities.

In order to mitigate the risk of air-borne dust the following procedures may need to be implemented for the following items:

Excavation

Water down all working surfaces as required and install wash out pit for trucks during initial excavation stages (refer **Appendix 4**).

Site Perimeter

Install solid or shade cloth panels to fence as required.

Material Stockpiles

Avoid stockpiles wherever possible, however, if required water down with sprinklers to provide water spray locally.

Materials

All delivered material such as sand to be in bags (no stock piles) where practical.

Scaffold

To be fitted with mesh and dust/shade cloth (as necessary).

Trucks

Cover loose loads prior to leaving site.

Site

Ensure access points are kept clean and free of spoil at all times and have appropriate truck cleaning, shaker grid or ballast pit to remove foreign spoil from trucks

Plant and Equipment

Contractors to service machinery regularly and ensure qualified operators minimise excessive emissions. Operators will maintain the required log books as required by Workcover.

Garbage Chutes

May be used during construction and at the base of these chutes a bulk bin will be used to collect the waste. The chutes will be fitted with devices that hose down the garbage as it is dropped in to the chutes.

Power Tools

Whenever possible, wet processes will be used during cutting, drilling and grinding to limit dust emissions.

5.5 Stormwater and Sediment Control

Sediment control devices will be installed as per the Sediment and Erosion Control Plan and in conjunction with the Blue Book. Collected water from the site catchment will be piped into a temporary sediment pond or temporary filtration bins.

Stormwater quality improvement devices such as flocculent tanks and sediment screens may need to be installed in accordance with the sediment control plans to capture suspended soils prior to their discharge to the local creek.

Maintenance and inspection of the sediment controls will be undertaken by the Site Manager on a regular basis and/or in the event of significant rainfall activity.

5.6 Vehicle Wash Pit

A vehicle wash down pit may be installed at the temporary construction exit driveways onto Bennelong Parkway (refer **Appendix 2**).

A vehicle wash down pit may not be utilised after the excavation phase as all vehicle exiting the site will be devoid of spoil and kept on hardstand road or concrete loading platform areas.

5.7 Paint Wash Out

A dedicated paint wash out system will be established on-site and isolated from stormwater collection areas. If on-site treatment and re-use is not viable then waste will be stored in separate holding tanks. A specialised waste contractor may need to be engaged for the removal of paint fines/solids and similar waste materials.

5.8 Waste Management

Loaded wholly within the property waste materials are to be loaded into skip bins and removed by a licensed contractor. All trucks leaving the site are to be traveling forwards and have traffic supervision where required.

Recycling waste will be carried out if the site constraints permit, as their may be restricted area to store the amount of bins required to effectively carry out this procedure. Karimbla have practical experience in waste recycling from previous projects so implementing a strategy is well within our capabilities. A Waste Management Plan is attached to this CMP (refer **Appendix 3**).

5.9 Soil and Water Management Plan

It may become relevant for part of the on-site works area to be dewatered during the basement excavation phase of works. If so, this activity will be undertaken in accordance with a dewatering permit being obtained from NSW Office of Water.

Silt barriers are installed where necessary to prevent the generation of erosion and sediment during the construction period as described in Appendix 4 of this report and also in accordance with the attached Sediment and Erosion Control Plan (**refer Appendix 4**).

6. Traffic Management Plan

6.1 General

The Traffic & Pedestrian Management has been basis on all construction vehicles loading and unloading will occur within the site. All construction vehicular access will the site via the existing driveways entry and exit via Bennelong Parkway (refer **Appendix 2**). This will have minimum impact to traffic flow on Bennelong Parkway.

The existing exit is not to be used beyond what is necessary during the construction due to the existing safety issue at this location with the mix and pedestrians, cyclists, bus lane and road gradient mixing with large trucks. It is acknowledged that exit via the new driveways cannot occur until they have been constructed. Once this has occurred, all vehicles are to exit via the new driveway to the east of the site and no vehicles are to exit via the existing western right of way.

Consideration will be given in this TMP to ensure that there is minimal disruption to the neighbouring businesses, pedestrian and Bennelong Parkway vehicular traffic.

It is imperative that the TMP ensures that all pedestrian safety and public vehicle movements are maintained during the daily construction activity.

6.2 Pedestrian/Public Safety Management

A suitable construction/security fence and lockable gates will be installed to the site boundary. All public footpaths fronting the site will be kept clear and clean from any construction materials, debris or trip hazards at all times.

Footpath detours and/or closure permits may be requested from Council from time to time to enable construction activity such as service utility adjustments / relocation works and any future footpath reserve restoration.

6.3 Traffic Management

Bennelong Parkway provides the only vehicular access to and from the site with alternative entry and exit driveway points being made available from Bennelong Parkway frontage during the later stages of the development (refer **Appendix 2**).

Traffic controllers will be employed at all times to ensure the safety of the Shared Use Path users who have right of way over the exiting traffic. All vehicles are to exit via the new driveway to the east of the site and no vehicles are to exit via the existing western right of way.

All deliveries to the site will be via Bennelong Parkway and then directed to the designated on-site loading/unloading areas.

Footpath and Road Closures

It is not anticipated that any road closures will be required as part of the construction process, however, temporary footpath closure may be required to enable the installation of services. Relevant permits may need to be obtained from Council by the contractor so as to affect any such temporary closures.

6.4 Construction Loading Zones

There should be sufficient space on-site for the setting down and picking up of all goods and materials being taken to or from the construction site. It is anticipated that on-street loading and works zones will not be required (refer to **Appendix 2**).

The location of material storage areas within the site will vary to suit the construction requirements. Upon the completion of the basement, an area on the ground podium level will be dedicated for the purpose of unloading all major loads.

No on street loading and work zones will be authorised.

6.5 Construction Personnel, Trades and Visitor Parking

All construction vehicle parking will be made available where practical on-site (refer to **Appendix 2**).

6.7 Neighbouring Properties

It is paramount that the safety and existing amenity of neighbouring properties is not compromised during our construction activity.

A number of special considerations are proposed, such as:

- Karimbla Construction Services (NSW) will make contact with the business neighbours prior to on-site construction.
- All main construction vehicular access will be limited to the designated access points proposed on Bennelong Parkway.
- A 24hr contact person for Karimbla Constructions Services (NSW) Pty Ltd will be provided to the business neighbouring.

7. Public Complaints Register

Public complaints will be recorded on Karimbla's standard complaints form and then recorded in the on-site complaints register (**see Appendix 6**) and all records will be kept on-site. A copy is to be made available in the event of a Council request.

8. Conclusion

This Construction Management Plan including Traffic Management Plan and Waste Management Plan confirms that Karimbla Constructions Services (NSW) Pty Ltd will engage 'best practice' work methods on the project to ensure that the safety of the general public and on-site work force is maintained to a high standard at all times.

APPENDIX 1

Site Plan



NOTES
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CLIENT
Meriton
528 Kent Street Sydney NSW 2000

CDL Quality Endorsed Company 190 800 1208, License Number 118
Newcastle Australia, Sydney, Perth, Melbourne, Brisbane, Adelaide, Hobart, Darwin, Canberra, Auckland, Christchurch, Dunedin, Invercargill, Palmerston North, Rotorua, Tauranga, Whangarei, New Zealand

Project Title
Residential Development
100 Bennelong Road Olympic Park NSW 2127

Drawing Title
Site Plans
Site Plan Proposed

For Development Application
Rev. Date Approved by Revision Notes
Scale 1:500 @B1, 40% @A3
Status Development Application
Project No. 13056
Dwg No. A-DA-100-001
Drawn by MP
Rev F
North

turner

Level 1, 410 Crown Street
Sydney NSW 2015
Australia
T +61 2 9668 0000
F +61 2 9668 0001
turner@turner.com.au

APPENDIX 2

Construction Traffic Management Plan

s | b | m | g

Sbmg Pty Ltd
ABN: 34 167 185 560
matt@sbmgplanning.com.au
m: 0467 370 380
f: 02 8834 0752

Traffic Management Plans

Construction Traffic Management Plan

100 BENNELONG PARKWAY, SYDNEY OLYMPIC PARK RESIDENTIAL DEVELOPMENT

Prepared for: Meriton Group

Prepared By: Matthew Young
RTA Design & Inspect Traffic Control Plans
Certificate #: 2243011145 Exp:27/01/2017

Monday, 3 March 2014
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1 Project Details

1.1 Project Summary

Project: Residential Development

Location: 100 Bennelong Parkway, Sydney Olympic Park NSW 2127

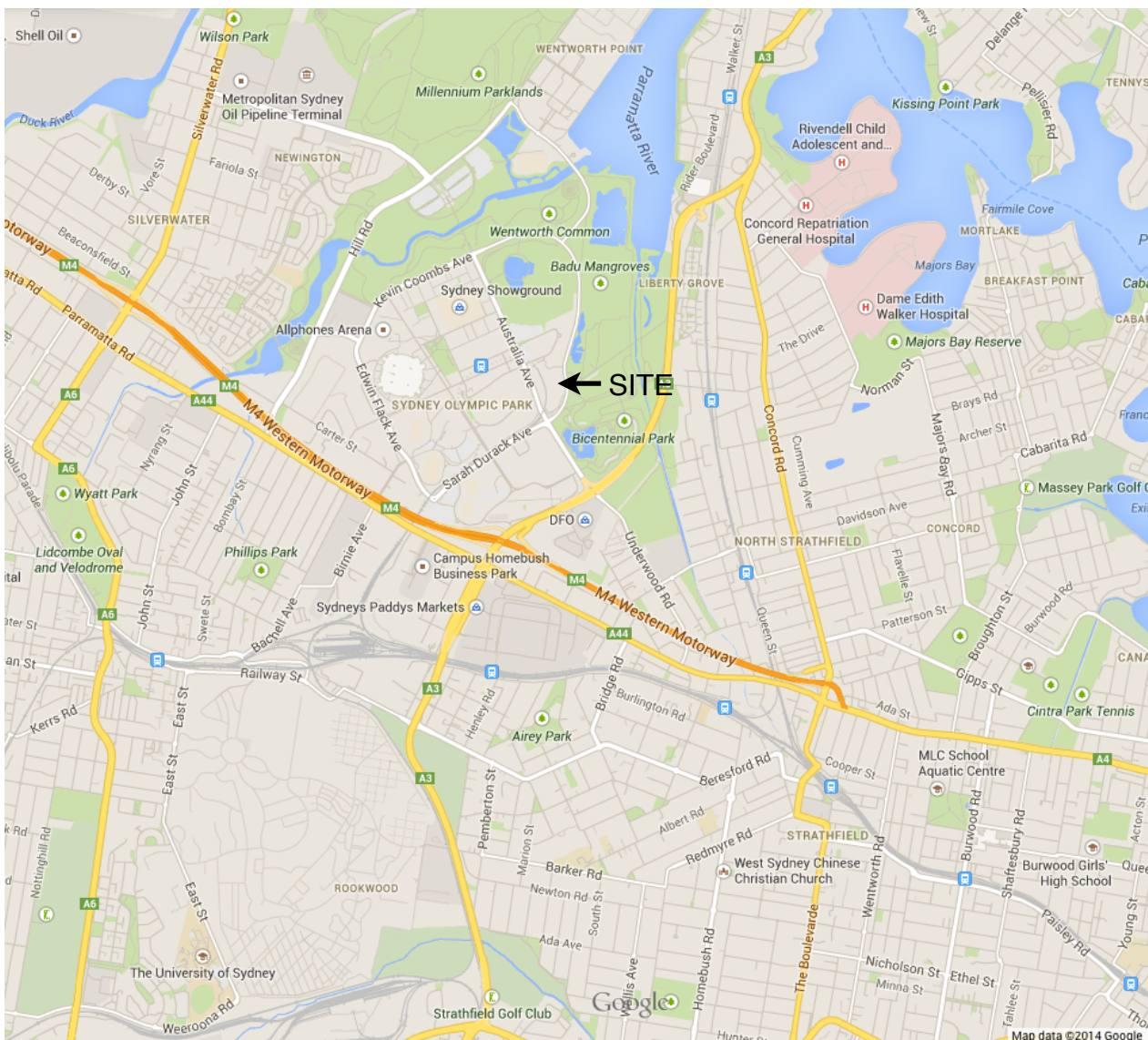
Hours of Operation: All works proposed to be carried out during normal construction hours and or as per council & RMS approved times.

Scope of Works: Demolition of existing buildings and structures. Construction of multi-building residential development with basement parking facilities.

1.2 Revisions

Rev	Date	Description
0	03/03/14	Initial Submission
1		

1.3 Map



1.4 Development Process

This traffic management plan covers the stage(s) listed below, subsequent stages (if any) may require amendments and additional plans to be prepared.

Included Stages / Phases:

Stage / Phase	Duration (Approx)
Demolition	TBA
Excavation	TBA
Construction	TBA

1.5 Demolition Phase

Largest Truck Size: Truck and Dog (tare 20-25 tonne)
Average Daily Vehicle Movements: 70-80

Site establishment and demolition will be the initial phase of the project with boundary fencing to be installed. The existing driveway entry / exit will be used for construction vehicle access during this phase.

1.6 Excavation Phase

Largest Truck Size: Truck and Dog (tare 20-25 tonne)
Average Daily Vehicle Movements: 70-80

Existing crossover will continued to be used for vehicular access to site.

1.7 Construction Phase

Largest Truck Size: Semi Trailer (tare 20-30 tonne)
Average Daily Vehicle Movements: 20 (40-50 on peak days - concrete pour)

Once constructed the new vehicle access point to be used for site access.

2 Proposed Traffic Management

2.1 General

a) Site Vehicles

- Site vehicles enter and exit in a forward facing direction.
- All drivers will be made aware of the approved routes prior to commencing work at the site as part of the site induction.
- Vehicles will be scheduled in such a manner as to not require queuing on the road network surrounding the site.
- Site vehicles to give way to existing traffic along Bennelong Parkway.

b) Road Occupancy

- Approval from council and/or RMS when required will be sought prior to any works requiring road occupancy.
- All Traffic Control Plans (TCPs) associated with this CTMP will comply with relevant Australian Standards and RMS Traffic Control at Worksites Manual.
- Advanced warning signage installed along Bennelong Parkway to notify approaching traffic of truck movements.

c) Parking for Site Workers

- Throughout the project site workers will park within site boundaries only.

d) Public Transport

- Surrounding public transport access unaffected during this project.

e) Surrounding Roads

- Site vehicles are to use approved routes only for access to and from the site.
- Construction traffic to be scheduled outside of peak times such as school zone hours to minimise impact to existing traffic increase.
- Truck queuing on surrounding streets is not permitted or required during this project.

2.2 Demolition

a) Site Entry & Exit Routes

- Entry - From Homebush Bay Drive turn onto Australia Avenue, turn right onto Bennelong Parkway, then turn left into site in a forward facing direction.
- Exit - In a forward facing direction turn right from site onto Bennelong Parkway, turn left onto Australia Avenue and then turn right onto Homebush Bay Drive to head south (M4 Motorway) or turn left onto Homebush Bay Drive to head north (M2 Motorway).

b) Vehicle Movements Within Site

- Vehicles will utilise existing car park area to move within the site boundaries.

c) Loading / Unloading Vehicles

- All Vehicle loading / unloading to be contained within site boundaries (See Appendix A).

d) Road Occupancy

- i. Standing Plant - All plant will be located within site boundaries.
- ii. Works Zone - None proposed
- iii. Parking for Site Workers - All site workers will park within site boundaries only.

e) Storage for Equipment, Materials and Waste.

- All located within site boundaries.

f) Removal of Materials from Site

- All site vehicles to be loaded within site boundaries and will be checked and cleaned prior to exit to ensure surrounding roadways are not contaminated with site materials. Shaker pads to be installed at exits where vehicles are required to transverse areas not covered by existing hard stand areas (i.e. car park).

Note: Vehicle pathways to be swept on an as required basis (weekly as a minimum) to prevent accumulation of demolition debris on public roads.

g) Pedestrian & Cyclists Management

- Boundary fence to limit pedestrian access to site, hoarding is not required as construction is set back from footpath. Pedestrian access maintained throughout this stage with a traffic controller at the site entry point to manage vehicle movement for increased safety to traffic using the pathway.

2.2 Excavation

a) Site Entry & Exit Routes

- Entry - From Homebush Bay Drive turn onto Australia Avenue, turn right onto Bennelong Parkway, then turn left into site in a forward facing direction.
- Exit - In a forward facing direction turn right from site onto Bennelong Parkway, turn left onto Australia Avenue and then turn right onto Homebush Bay Drive to head south (M4 Motorway) or turn left onto Homebush Bay Drive to head north (M2 Motorway).

b) Vehicle Movements Within Site

- Vehicles will require movement within site boundaries to load excavated material for removal from site.

c) Loading / Unloading Vehicles

- All Vehicle loading / unloading to be contained within site boundaries (See Appendix A).

d) Road Occupancy

- i. Standing Plant - All plant will be located within site boundaries.
- ii. Works Zone - None proposed
- iii. Parking for Site Workers - All site workers will park within site boundaries only.

e) Storage for Equipment, Materials and Waste.

- All located within site boundaries.

f) Removal of Materials from Site

- All site vehicles to be loaded within site boundaries and will be checked and cleaned prior to exit to ensure surrounding roadways are not contaminated with site materials. Shaker pads to be installed at exits where vehicles are required to transverse areas not covered by existing hard stand areas (i.e. car park).

Note: Vehicle pathways to be swept on an as required basis (weekly as a minimum) to prevent accumulation of demolition debris on public roads.

g) Pedestrian & Cyclists Management

- Boundary fence to limit pedestrian access to site, hoarding is not required as construction is set back from footpath. Pedestrian access maintained throughout this stage with a traffic controller at the site entry point to manage vehicle movement for increased safety to traffic using the pathway.

2.2 Construction

a) Site Entry & Exit Routes

- Entry - From Homebush Bay Drive turn onto Australia Avenue, turn right onto Bennelong Parkway, then turn left into site in a forward facing direction.
- Exit - In a forward facing direction turn right from site onto Bennelong Parkway, turn left onto Australia Avenue and then turn right onto Homebush Bay Drive to head south (M4 Motorway) or turn left onto Homebush Bay Drive to head north (M2 Motorway).

b) Vehicle Movements Within Site

- Vehicles will use the proposed internal roadway for movement within the site with adequate area to turning as required.

c) Loading / Unloading Vehicles

- All Vehicle loading / unloading to be contained within site boundaries (See Appendix A).

d) Road Occupancy

- i. Standing Plant - All plant will be located within site boundaries.
- ii. Works Zone - None proposed
- iii. Parking for Site Workers - All site workers will park within site boundaries only.

e) Storage for Equipment, Materials and Waste.

- All located within site boundaries.

f) Removal of Materials from Site

- All site vehicles to be loaded within site boundaries and will be checked and cleaned prior to exit to ensure surrounding roadways are not contaminated with site materials. Shaker pads to be installed at exits where vehicles are required to transverse areas not covered by existing hard stand areas (i.e. car park).

Note: Vehicle pathways to be swept on an as required basis (weekly as a minimum) to prevent accumulation of demolition debris on public roads.

g) Pedestrian & Cyclists Management

- Boundary fence to limit pedestrian access to site, hoarding is not required as construction is set back from footpath. Pedestrian access maintained throughout this stage with a traffic controller at the site entry point to manage vehicle movement for increased safety to traffic using the pathway.

3 Project Impact

3.1 Residents / Surrounding Property Owners

Existing driveways, roadways and access points will be maintained throughout the project.

3.2 Pedestrians & Cyclists

Existing pedestrian and cyclists access along Bennelong Parkway to be maintained throughout the project. The existing cycle crossing will also be unaffected and maintained during the project. A traffic controller will increase safety for pathway users by managing the movement of vehicles in and out of the site.

3.3 Emergency Services

Access along Bennelong Parkway to be maintained throughout the project. Priority is given to emergency vehicles as per normal procedure.

3.4 Local Traffic

Access along Bennelong Parkway will remain as per normal conditions. Site vehicles are to exit using normally occurring gaps in traffic to reduce impact to traffic flows. Construction traffic to be scheduled where possible outside of peak times such as school zone hours to minimise impact to existing traffic increases. Peak days of construction will be managed around major events at Sydney Olympic Park so as not to add additional impact to surrounding roadways with event traffic increases.

3.5 Public Transport

Existing public transport facilities along Bennelong Parkway to be maintained throughout the project.

3.5 Impact on Community & Businesses

Impact to the community will be minimal as there are no proposed road closures and with the sites' approach and departure routes being close to state roads and the M4 Motorway existing access will not be interrupted.

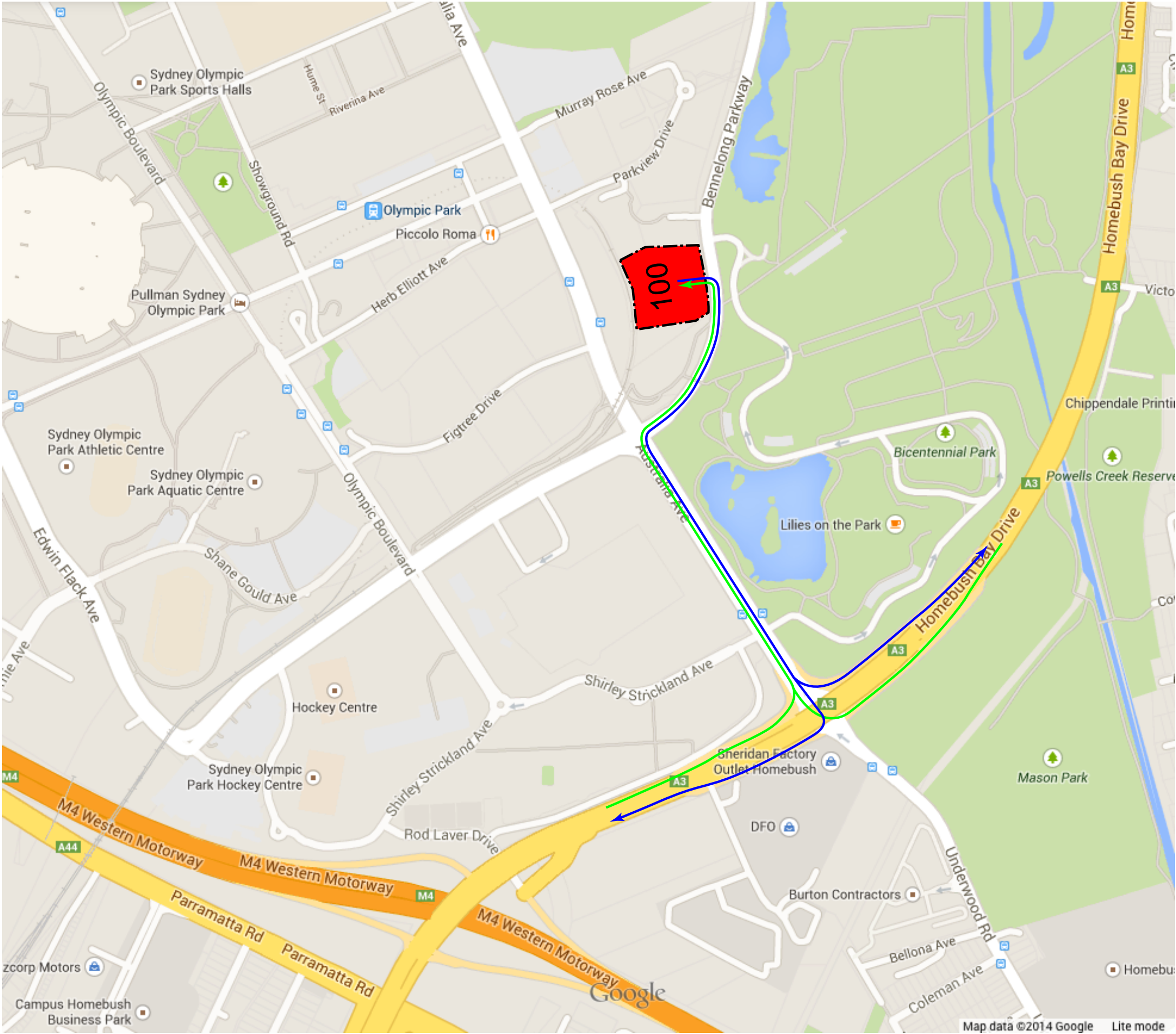
Appendix A - Traffic Control Plans

SBMG14030301 - Vehicle Routes

SBMG14030302 - Site Overview - Demolition and Excavation Phases

SBMG14030303 - Site Overview - Construction Phases

VEHICLE ROUTE
ALL PHASES



- LEGEND:
- SITE BOUNDARY
 - SITE ENTRY ROUTE
 - SITE EXIT ROUTE

- NOTES:
- ALL SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH RTA "TRAFFIC CONTROL AT WORKSITES" MANUAL AND AS1742.3.
 - ALL SIGNAGE AND DELINEATION MUST BE INSTALLED BY RTA CERTIFIED TRAFFIC CONTROLLER(S) ONLY.
 - SITE VEHICLE TO ENTER AND EXIT THE SITE IN A FORWARD FACING DIRECTION ONLY.
 - SITE VEHICLES TO GIVE WAY TO EXISTING TRAFFIC ALONG BENNELONG PARKWAY WHEN EXITING.
 - TRAFFIC CONTROLLER TO ASSIST VEHICLES ENTERING AND EXITING TO ENSURE THE SAFETY OF PEDESTRIAN / BICYCLE TRAFFIC ALONG EXISTING PATHWAY.

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Sbmg Pty Ltd

ABN: 34 167 185 560

matt@sbmgplanning.com.au

m: 0467 370 380

f: 02 8834 0752

Traffic Management Plans

Project/Event:	RESIDENTIAL DEVELOPMENT				
Location:	100 BENNELONG PARKWAY, SYDNEY OLYMPIC PARK NSW				
Client :	MERITON GROUP				
Plan No.	SBMG140030301	A	Date:	3RD MARCH 2014	
SCALE: NOT TO SCALE					



PREPARED BY: MATTHEW YOUNG

RTA DESIGN & INSPECT TRAFFIC

CONTROL PLANS

CERTIFICATE No. 2243011145

Expiry: 27/01/2017

SIGNED:

DATE	DESCRIPTION
E	
D	
C	
B	
03/03/14	A INITIAL SUBMISSION

RECOMMENDED MAXIMUM SPACING OF CONES AND BOLLARDS			RECOMMENDED TAPER LENGTHS				
Purpose an usage	Approach Speed (km/h)	Max Spacing (m)	Approach speed (km/h)	Traffic control at start	Lateral shift taper	Merge taper	
All purposes on residential or commercial streets	<=50	4					
Center-line on approach to Traffic Controller position	All Cases	4					
Outer edge of traffic lane - i.e. working on shoulder	51-70 / >70	18 / 24	< 45	15	0	15	
Separating opposing traffic on 2 lane 2 way road	51-70 / >70	12 / 18	46-55	15	15	30	
separating opposing traffic on a multilane undivided road	51-70 / >70	12 / 18	56-65	30	30	60	
adjacent to a closed lane on a multilane road	51-70 / >70	18 / 24	66-75	N/A	70	115	
Merge tapers	51-70 / >70	9 / 12	76-85	N/A	80	130	
Lateral shift tapers	51-70 / >70	12 / 18	86-95	N/A	90	145	
Protecting freshly painted lines	51-70 / >70	24 / 60	96-105	N/A	100	160	
FIGURES EXTRACTED FROM RTA TOWS MANUAL v4.0 (TABLES 5.1 & 5.2). REFER TO MANUAL FOR FURTHER INFO			> 105	N/A	110	180	

SITE OVERVIEW

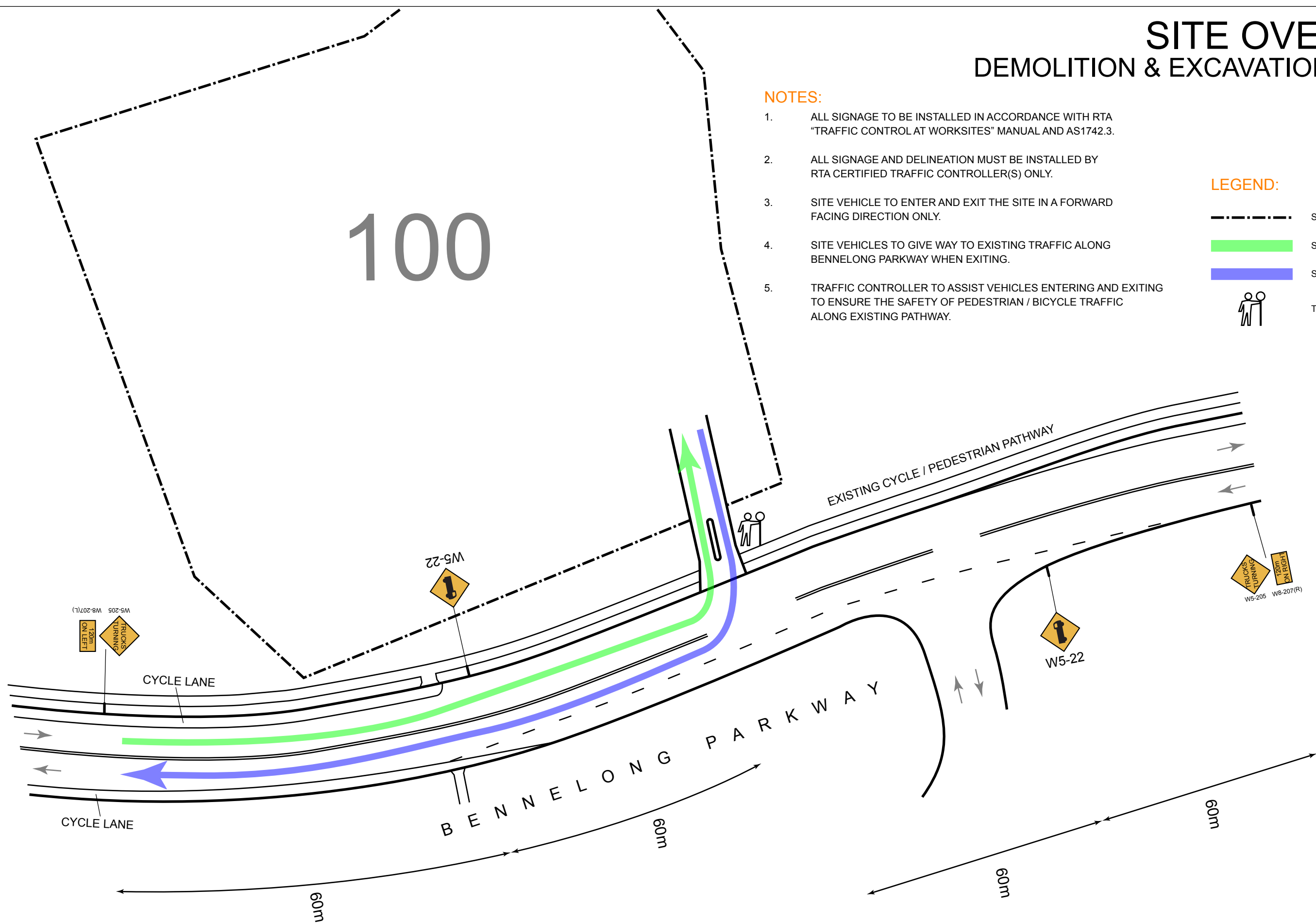
DEMOLITION & EXCAVATION PHASES

NOTES:

1. ALL SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH RTA "TRAFFIC CONTROL AT WORKSITES" MANUAL AND AS1742.3.
2. ALL SIGNAGE AND DELINEATION MUST BE INSTALLED BY RTA CERTIFIED TRAFFIC CONTROLLER(S) ONLY.
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LEGEND:

- | | |
|---|--------------------|
|  | SITE BOUNDARY |
|  | SITE ENTRY ROUTE |
|  | |
|  | TRAFFIC CONTROLLER |



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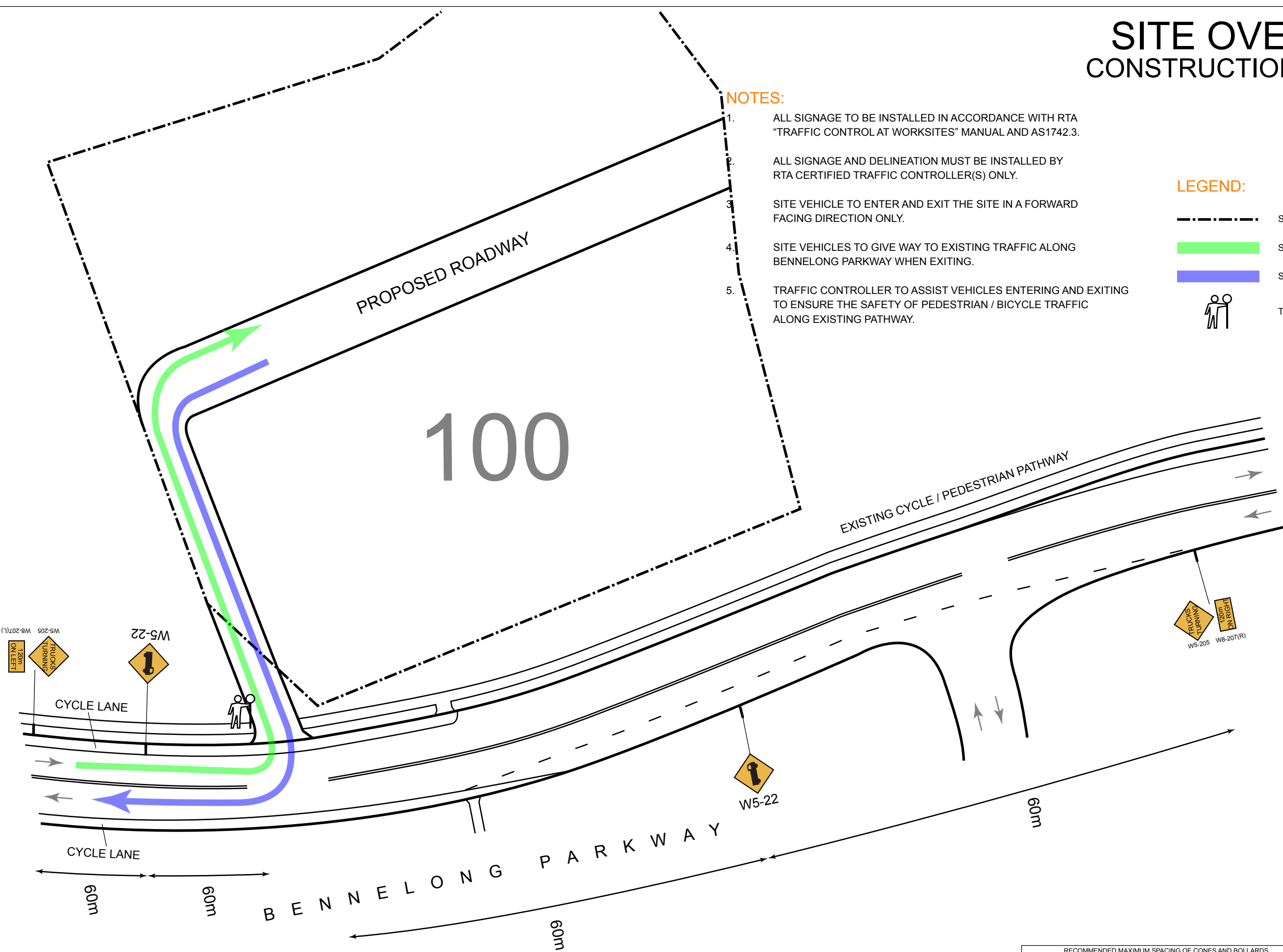
SITE OVERVIEW
CONSTRUCTION PHASES

NOTES:

1. ALL SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH RTA "TRAFFIC CONTROL AT WORKSITES" MANUAL AND AS1742.3.
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LEGEND:

- SITE BOUNDARY
- SITE ENTRY ROUTE
- SITE EXIT ROUTE
- TRAFFIC CONTROLLER



s | b | m | g

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ABN: 34 167 185 560
matt@sbmgplanning.com.au
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f: 02 8834 0752

Traffic Management Plans

Project/Event:	RESIDENTIAL DEVELOPMENT				
Location:	100 BENNELONG PARKWAY, SYDNEY OLYMPIC PARK NSW				
Client :	MERITON GROUP				
Plan No.	SBMG140030303	A	Date:	3RD MARCH 2014	
SCALE: NOT TO SCALE					



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PREPARED BY: MATTHEW YOUNG
RTA DESIGN & INSPECT TRAFFIC
CONTROL PLANS
CERTIFICATE No. 2243011145
Expiry: 27/01/2017

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DATE	DESCRIPTION
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FIGURES EXTRACTED FROM RTA TCWS MANUAL v4.0 (TABLES 5.1 & 5.2). REFER TO MANUAL FOR FURTHER INFO						

APPENDIX 3

Waste Management Plan

CONFIDENTIAL

Waste Management & Recycling Plan

Bingo Group offers a complete, comprehensive solution to the management and recycling of wastes to assure compliance with clients' waste management policy.

Bingo Recycling Centre Auburn and Bingo Recycling Centre St Peters combine bin storage, waste collection, waste recycling and waste transfer to service the building and construction industry and domestic waste management needs in the Sydney metropolitan area. Wastes collected by Bingo Skip Bins are taken directly to either facility where approximately 85 - 90% of wastes are converted to recovered resources.

Bingo Recycling Centre Auburn	Bingo Recycling Centre St Peters
3-5 Duck St, Auburn	6-10 Burrows Rd South, St Peters
EPL No. 10935	EPL No. 13142

As can be expected waste materials inwards vary considerably and are delivered to the Recycling Centres in tipping and non-tipping vehicles or in skip bins. Of the wastes inwards approximately 85 - 90% is recovered and recycled as materials outwards and the balance 10 - 15% to landfill. Waste materials inwards are processed to achieve the maximum recovery of resources and the minimum of un-recoverable material for offsite disposal.

Typical Composition of Bingo's Wastes Inwards

Wastes Inwards	Percentage (approx.)
Heavy Recyclable Materials	45%
Light Recyclable Materials	35%
Metals	10%
Non-Recyclable Materials	10%
Total	100%

Heavy Recyclable Materials:

- Soil
- Dirt
- Sand
- Rubble
- Brick
- Concrete
- Tiles
- Stone
- Asphalt

Light Recyclable Materials:

- Timber
- Green Waste
- Cardboard/ Paper
- Plastic/ Polystyrene
- Plasterboard/ Gyprock

Metals:

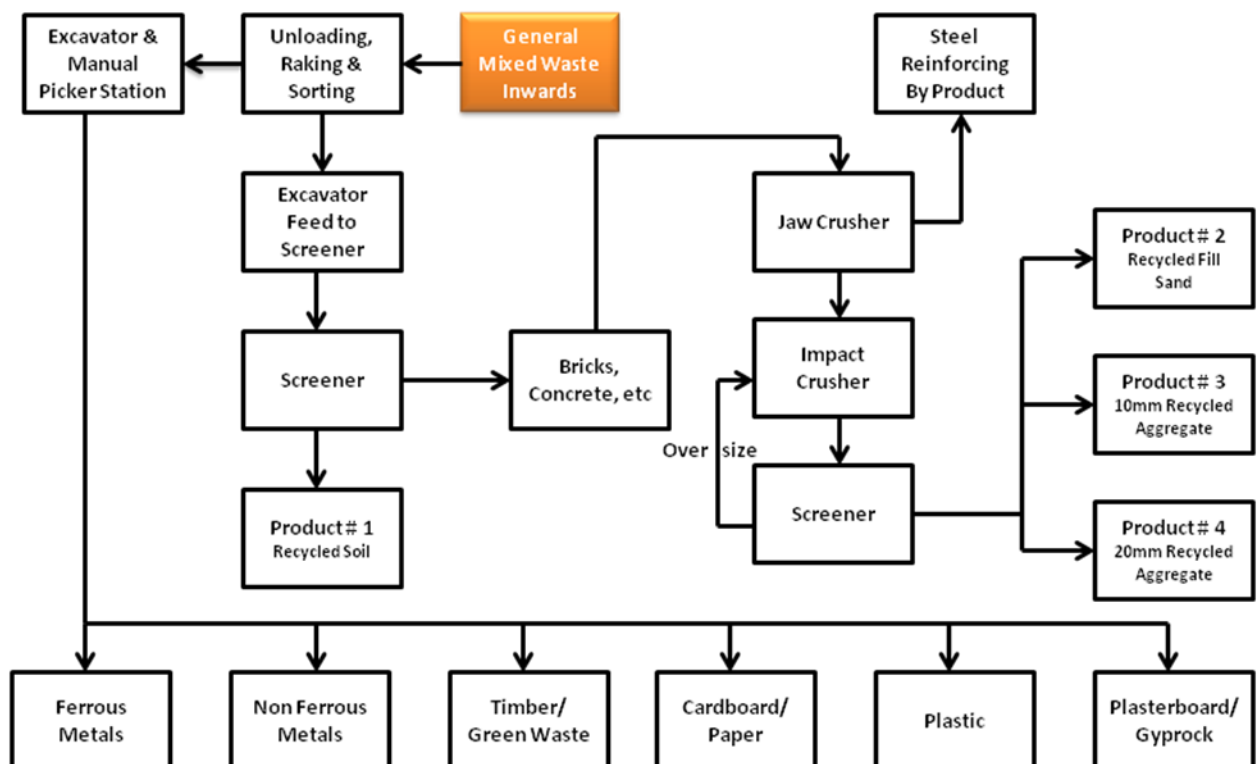
- Ferrous (steel, black iron)
- Non-Ferrous (copper, wire, aluminium, stainless)

At the Resource Recovery Facility a simple and effective waste processing procedure is applied. See Materials Flow Diagram (below). Wastes inwards unloaded onto the sorting area where the waste is raked with a hydraulic excavator to expose the contents and where recyclable materials are hand and machine sorted. The raking process separates the waste into four streams for further processing.

- Stream #1 Non-recyclable materials. These wastes pass to a holding area for off-site disposal.
- Stream #2 Metals and light recyclable materials are removed and stored for off-site recycling.
- Stream #3 Large sized heavy weight brick, concrete and rubble pieces. These wastes pass to the crushers where they are crushed and re-enforcing fabric removed. The output from the crushers passes to the screener where products of different size are separated and stored in stockpiles. Re-enforcing fabric is collected and stored in the general steel bin for off-site recycling.
- Stream #4 Small sized heavy weight soil, sand, brick, concrete and rubble. These wastes pass to the screener where the soil is separated from the brick, concrete and rubble. The brick, concrete and rubble then pass through Stream #3.

Stream #1 wastes are currently not recyclable and are removed from the land for off-site disposal. Stream #2 wastes, recovered metals and light recyclable materials are recycled off-site. Stream #3 and Stream #4 wastes are processed on site by crushing and screening to form saleable products such as soil, sand, and aggregates. These products are retained on site until sold.

Bingo Recycling Centre
Waste Transfer & Materials Recovery Facility
Flow Diagram



In summary, Bingo Skip Bins take all their mixed waste skip bins directly to Bingo Recycling Centres. From there the waste is sorted and separated into the following material classes for processing and recycling.

Type of Material	Where Processed/ Recycled	How Processed/ Recycled
Heavy Recyclable Materials (soil, dirt, sand, rubble, concrete, brick, tiles, asphalt, stone)	Bingo Recycling Centres	Re-processed into recycled products (such as recycled soil, fill sand, aggregates, roadbase) by crushing and screening.
Timber/ Green Waste	Bingo Recycling Centres	Re-processed into woodchip and mulch by shredding.
Metal/ Steel	Sell & Parker	Sent to appropriate recycling plants.
Cardboard/ Paper/ Plastic	Cardboard King	Sent to appropriate recycling plants.
Plasterboard/ Gyprock	ReGyp	Sent to appropriate recycling plants.
General Waste	SITA Landfill/ Genesis Landfill	n/a

- Bingo Recycling Centres**
 3-5 Duck Street, Auburn NSW 2144
 6-10 Burrows Road South, St Peters NSW 2044
- Sell & Parker**
 45 Tattersall Road, Blacktown NSW 2148
- Cardboard King**
 8 Kommer Place, St Marys NSW 2760
- ReGyp**
 Captain Cook Drive, Kurnell NSW 2231
- SITA Landfill**
 Elizabeth Drive, Kemps Creek NSW 2178
- Genesis Landfill**
 Honeycomb Drive, Eastern Creek NSW 2766

APPENDIX 4

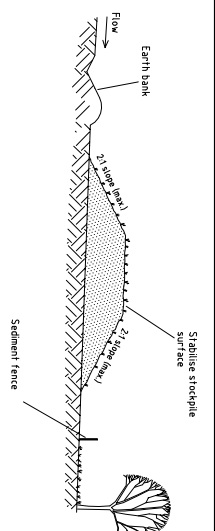
Site Water and Sediment & Erosion Control Management Plan

SEDIMENT & EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL IMPLEMENT ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO THE COMMENCEMENT OF ANY WORKS BEING CARRIED OUT. ALL SOIL AND EROSION MEASURES SHALL BE MAINTAINED AND KEPT IN PLACE FOR THE FULL DURATION OF THE WORKS AND SHALL ONLY BE REMOVED AT FINAL STABILISATION OF THE WORKS WHERE IT IS NECESSARY TO OVERTAKE STRIPING IN ORDER TO CONSTRUCT A SEDIMENT CONTROL DEVICE ONLY SUFFICIENT GROUND SHALL BE STRIPPED TO ALLOW CONSTRUCTION.
2. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED AS INDICATED ON THESE DRAWINGS. LOCATION AND EXTENT OF SOIL AND WATER MANAGEMENT DEVICES IS DIAGRAMMATIC ONLY AND THE ACTUAL REQUIREMENTS SHALL BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT.
3. CONFORMITY WITH THIS PLAN SHALL IN NO WAY REDUCE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT AGAINST WATER DAMAGE DURING THE COURSE OF THE CONTRACT. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT ANY NECESSARY CONTROL IS IN PLACE EVEN THOUGH SUCH CONTROL MAY NOT BE SHOWN ON THE PLAN.
4. THE CONTRACTOR SHALL INFORM ALL SUBCONTRACTORS AND ALL EMPLOYEES OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSTEAM AREAS.
5. APART FROM SEDIMENT BASINS, THE CONTRACTOR SHALL REGULARLY MAINTAIN SEDIMENT AND EROSION CONTROL STRUCTURES AND DESILT SUCH STRUCTURES PRIOR TO THE REDUCTION IN CAPACITY OF 30% DUE TO ACCUMULATED SEDIMENT. THE SEDIMENT SHALL BE DISPOSED OF ON SITE IN A MANNER APPROVED BY THE ENGINEER.
6. THE CONTRACTOR SHALL TEMPORARILY REHABILITATE WITHIN TEN (10) DAYS ANY DISTURBED AREAS PROVIDING A MINIMUM 60% COVER. FINAL REHABILITATION IS TO BE PROVIDED WITHIN A FURTHER 60 DAYS WITH A MINIMUM 70% COVER.
7. THE CONTRACTOR SHALL PROVIDE WATERING OF THE VEGETATED BATTERS FOR MAINTENANCE PERIOD. PLANT MACHINERY AND VEHICLES SHALL NOT BE DRIVEN OVER GRASSSED AREAS UNLESS ON AN APPROVED HAULAGE ROUTE.
8. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED AND STABILISED AS QUICKLY AS POSSIBLE TO MINIMISE RISK OF EROSION.
9. SITE ACCESS SHALL BE RESTRICTED TO THE NOMINATED POINTS. THE CONTRACTOR SHALL PROVIDE STABILISED SITE ACCESS.
10. DUST AND SITE DISTURBANCE MUST BE KEPT TO A MINIMUM DURING WINDY WEATHER. LARGE UNPROTECTED AREAS MUST BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO REDUCE WIND EROSION. ERECT BARRIER FENCING TO MINIMISE LAND DISTURBANCE BY PREVENTING VEHICULAR AND PEDESTRIAN ACCESS TO AREAS BEING REHABILITATED AND LANDS THAT DO NOT NEED TO BE DISTURBED BY THIS PROJECT.
11. STOCKPILE TOPSOILS, SUBSOILS AND OTHER MATERIALS SEPARATELY.
12. TOPSOIL SHALL BE STORED IN LOW MOUNDS NO MORE THAN 2 METRES HIGH AND RE-USED WITHIN TWO MONTHS TO MAINTAIN ACTIVE POPULATIONS OF BENEFICIAL SOIL MICROBES AND SEED.
13. PLACE ALL STOCKPILES AT LEAST FIVE METRES FROM AREAS OF LIKELY CONCENTRATED OR HIGH VELOCITY FLOWS, ESPECIALLY EARTH BANKS AND MOUNDS. IF NECESSARY, EARTH BANKS OR DRAINS WILL BE CONSTRUCTED TO DIVERT LOCALISED RUN-OFF.
14. TURN TOPSOIL STOCKPILES OVER TO AERATE THEM AT MONTHLY INTERVALS. ENSURE VEGETATION IS NOT INCORPORATED INTO THE SOIL.
15. AVOID REVERSING THE SOIL PROFILE MATERIALS DURING FILL OPERATIONS - REPLACE DISTURBED SOILS IN THEIR ORIGINAL ORDER.
16. ON COMPLETION OF MAJOR EARTHWORKS AND BEFORE ADDING TOPSOIL, LEAVE DISTURBED LANDS WITH A LOOSE SURFACE. ALTERNATELY, DISTURBED AREAS PREVIOUSLY COMPACTED BY CONSTRUCTION WORKS WILL BE RIPPED TO MORE THAN 200-mm ALONG THE CONTOUR BEFORE APPLYING TOPSOIL.
17. PROVIDING MATERIALS ARE AVAILABLE, SPREAD TOPSOIL TO A MINIMUM DEPTH OF 75mm IN REVEGETATION AREAS ON SLOPES OF 4:1(H:V) OR LESS AND TO A DEPTH OF 40 TO 60mm IN REVEGETATION AREAS STEEPER THAN 4:1.
18. LEAVE TOPSOIL IN A SCARIFIED OR ROUGH CONDITION ONCE REPLACED TO HELP MOISTURE INFILTRATION AND REDUCE SOIL EROSION.
19. ENSURE SOIL IS THOROUGHLY SOAKED TO A DEPTH OF 75mm (RAIN OR IRRIGATION) IMMEDIATELY BEFORE PLANTING.
20. HANDLE TOPSOIL ONLY WHEN IT IS MOIST (NOT WET OR DRY) TO AVOID DECLINE OF SOIL STRUCTURE.
21. THE CONTRACTOR SHALL MAINTAIN A LOG BOOK DETAILING:
 - RECORDS OF ALL HAND-APPLIED SEDIMENT AND EROSION MANAGEMENT STRUCTURES
 - ANY APPLICATION OF FLOCCULATING AGENTS TO SEDIMENT BASIN
 - VOLUMES OF ALL WATER DISCHARGED FROM SEDIMENT BASINS
 - ANY ADDITIONAL REMEDIAL WORKS REQUIRED.
22. THE LOG BOOK SHALL BE MAINTAINED ON A WEEKLY BASIS AND BE MADE AVAILABLE TO ANY AUTHORISED PERSON UPON REQUEST. THE ORIGINAL LOG BOOK SHALL BE ISSUED TO THE PROJECT MANAGER AT THE COMPLETION OF WORKS.
23. ALL ROAD EMBANKMENTS TO BE STABILISED AS PER LANDSCAPE ARCHITECTS' DETAILS.
24. A SELF-AUDITING PROGRAM SHOULD BE ESTABLISHED BASED ON A CHECK SHEET DEVELOPED FOR THE SITE. A SITE INSPECTION USING THE CHECK SHEET SHOULD BE MADE BY THE SITE MANAGER AT LEAST WEEKLY, IMMEDIATELY BEFORE SITE CLOSURE AND IMMEDIATELY FOLLOWING RAINFALL EVENTS THAT CAUSE RUNOFF.
25. UNDERTAKE THE SELF-AUDIT BY:
 - WALKING AROUND THE SITE SYSTEMATICALLY (E.G. CLOCKWISE)
 - RECORDING THE CONDITION OF EVERY BMP EMPLOYED
 - RECORDING MAINTENANCE REQUIREMENTS (IF ANY) FOR EACH BMP
 - RECORDING THE SITE WHERE SEDIMENT IS DISPOSED
 - FORWARDING A SIGNED DUPLICATE OF THE COMPLETED CHECK SHEET TO THE PROJECT MANAGER/DEVELOPER/SITE OPERATOR FOR THEIR INFORMATION
26. IN PARTICULAR, INSPECT:
 - LOCATIONS WHERE VEHICLES ENTER AND LEAVE THE SITE
 - AREAS OF SOIL EROSION AND SEDIMENT CONTROL MEASURES, ENSURING THEY ARE OPERATING AS INTENDED
 - AREAS THAT MIGHT SHOW WHETHER SEDIMENT OR OTHER POLLUTANTS ARE LEAVING THE SITE OR HAVE POTENTIAL TO DO SO

- ALL DISCHARGE POINTS, TO ASSESS WHETHER THE EROSION AND SEDIMENT CONTROL MEASURES ARE EFFECTIVE IN PREVENTING IMPACTS TO THE RECEIVING WATERS

27. A SITE INSPECTION USING THE CHECK SHEET WILL BE MADE BY THE SITE MANAGER AT LEAST WEEKLY, IMMEDIATELY BEFORE SITE CLOSURE, AND IMMEDIATELY FOLLOWING RAINFALL EVENTS GREATER THAN 5mm IN 24 HOURS.

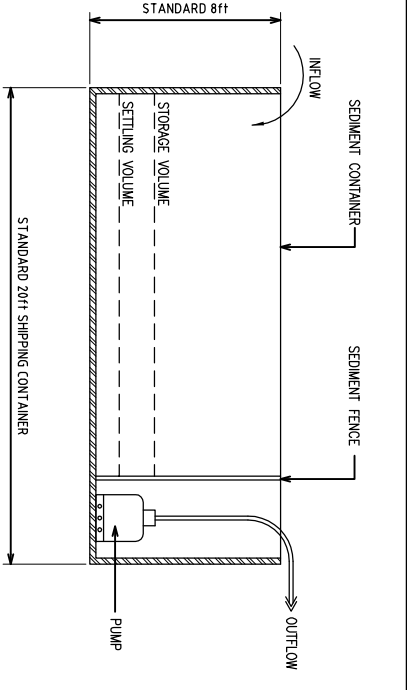


Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-6) 1 to 2 metres downslope.

STOCKPILES

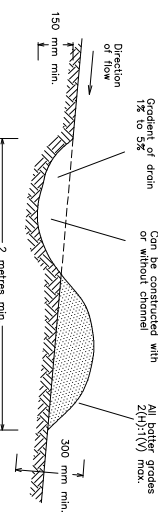
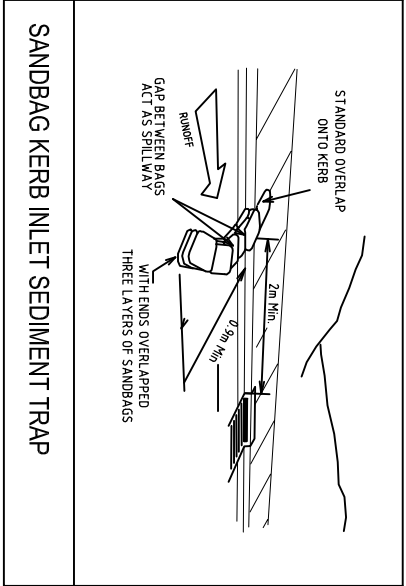
SD 4-1



Construction Notes

1. DISSEMINATE WITH ALUM AT THE RATE OF 3kg per 100m² AND ALLOW TO SETTLE FOR 24 HOURS ON UNTIL WATER IS CLEAR.
2. NOTE THAT STANDARD 20ft SHIPPING CONTAINER HAS A FULL CAPACITY OF 33 CU.M.
3. TEST THAT PH IS WITHIN THE RANGE OF 6.5 TO 7.4 BEFORE PUMPING OUT. IF PH IS LESS THAN 6.0, ADD MORE WATER AND IN FUTURE REDUCE DOSAGE RATE.

PORTABLE SEDIMENT TANK (PST)

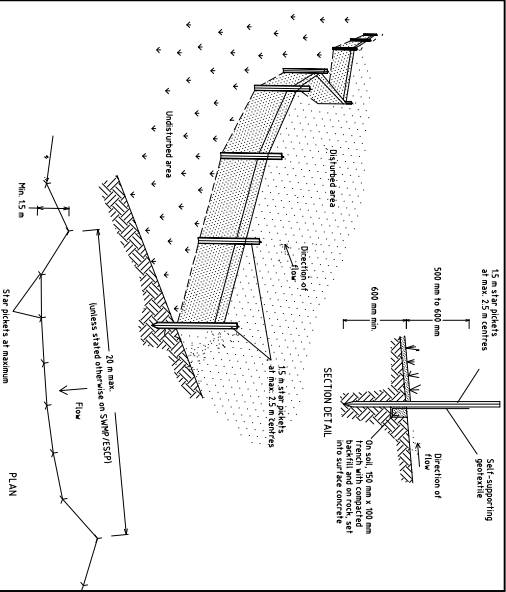


Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

EARTH BANK (LOW FLOW)

SD 5-5

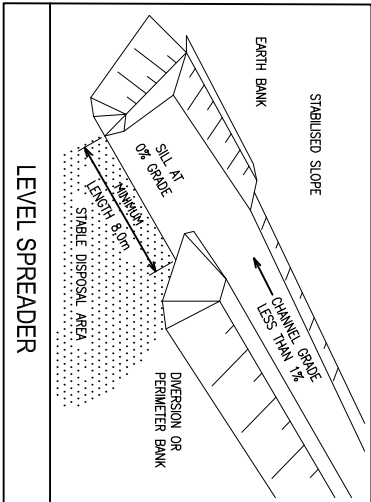


Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrained.
3. Drive 15 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps, goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE

SD 6-8

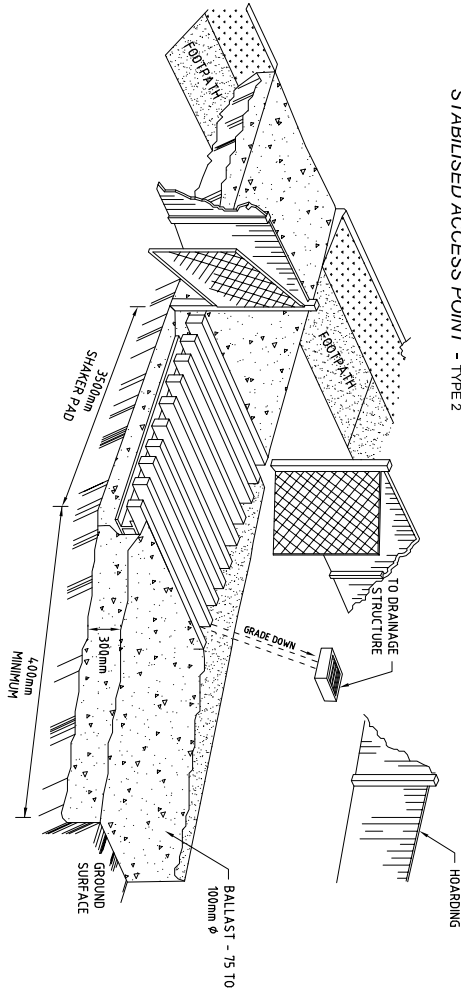


STABILISED ACCESS POINT

TYPE II SAP

THE TYPE II SAP DESIGN IS MORE DEFINED IN THAT IT REQUIRES AN AREA OF BALLAST WITHIN THE SITE COMBINED WITH A SHAKER PAD. ADJACENT TO THE SHAKER PAD AND IN THE PUBLIC WAY IS A TEMPORARY (CONCRETE) VEHICULAR CROSSING. (SEE DIAGRAM)

STABILISED ACCESS POINT - TYPE 2



IN BOTH TYPE I AND TYPE II SAPS, THE TEMPORARY VEHICULAR CROSSING MUST:

- CONNECT TO AN EXISTING GUTTER LAYBACK (WHERE THE KERB AND GUTTER EXIST). IF A GUTTER LAYBACK DOES NOT EXIST THEN THE CONNECTION MUST BE MADE TO THE GUTTER BY REINFORCING THE ADJACENT KERB SECTION ONLY.
- CONNECT TO A DISH CROSSING (WHERE KERB AND GUTTER DOES NOT EXIST). IF A DISH CROSSING DOES NOT EXIST, THEN IT MUST BE CONSTRUCTED IN ACCORDANCE WITH DETAILS CONTAINED IN COUNCIL'S ISSUED FOOTPATH CROSSING LEVELS.

IT SHOULD BE NOTED THAT THESE TYPES OF SAPS ARE CONSIDERED TO BE APPLICABLE FOR THE MAJORITY OF ACTIVITIES HOWEVER SOME SITES MAY REQUIRE SPECIAL CONSIDERATION.

SHAKER PAD (CATTLE GRID)

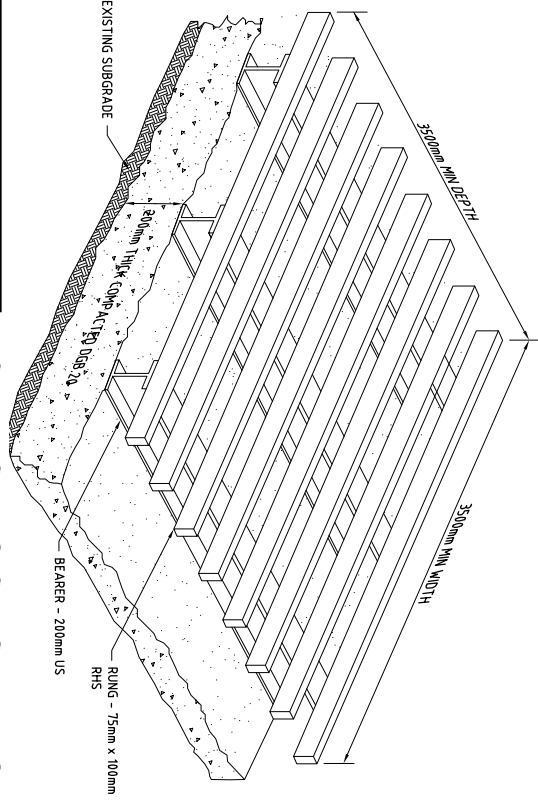
A CORRECTLY DESIGNED AND INSTALLED SHAKER PAD WILL ASSIST IN PREVENTING SEDIMENT TRANSFER FROM A SITE. ANY STABILISED ACCESS POINT (SAP) CAN BE DESIGNED WITH A SHAKER PAD (COMPULSORY IN TYPE II SAP'S)

SHAKER PADS CAN BE DESIGNED AND CONSTRUCTED TO ENABLE RE-USE ON FUTURE PROJECTS.

THE SHAKER PAD:

- CAN BE DESIGNED AND CERTIFIED BY A PRACTISING STRUCTURAL ENGINEER. THE CERTIFIED DESIGN SHOULD BE SUBMITTED WITH THE RELEVANT APPLICATION.
- CAN BE CONSTRUCTED FROM ANY SUITABLE MATERIAL.
- MUST BE LOCATED ON A SUITABLY PREPARED AND COMPACTED SUB-GRADE/BASE MATERIAL.
- MUST BE SITUATED SUCH THAT THE RINGS OF THE SHAKER PAD ARE LEVEL WITH THE ADJOINING NATURAL SURFACE.
- MUST BE A MINIMUM OF 3.5m IN LENGTH.
- MUST BE A MINIMUM OF 3.5m IN WIDTH.
- MUST HAVE CLEAR SPACING BETWEEN RINGS OF 200 - 250mm.
- RINGS MUST HAVE A MAXIMUM WIDTH BEARING AREA OF 75mm.
- MUST HAVE A MINIMUM CLEAR DEPTH OF 300mm IF FORM THE TOP OF THE RING TO THE FINISHED SUB-GRADE/BASE LEVEL.

THE SHAKER PAD MUST BE PROVIDED WITH SUITABLE BARRIERS AT THE SIDES TO ENSURE THAT ALL TYPES OF VEHICLES LEAVING THE SITE TRAVERSE THE DEVICE.



NOT FOR CONSTRUCTION

APPENDIX 5

Construction Noise and Vibration Management Plan

MANAGING DIRECTORS

MATTHEW PALAVIDIS
VICTOR FATTORETTO

DIRECTORS

MATTHEW SHIELDS
BEN WHITE



100 Bennelong Road, Sydney Olympic Park

Construction Noise and Vibration Management Plan

SYDNEY

A: 9 Sarah St Mascot NSW 2020

T: (02) 8339 8000

F: (02) 8338 8399

SYDNEY MELBOURNE BRISBANE CANBERRA

LONDON DUBAI SINGAPORE GREECE

www.acousticlogic.com.au

ABN: 11 068 954 343

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1 INTRODUCTION

Acoustic Logic Consultancy has been engaged to prepare a noise and vibration management plan for the proposed demolition and construction activities at 100 Bennelong Parkway, Sydney Olympic Park. This report has been prepared as part of documentation for the Sydney Olympic Park Authority.

This document presents a discussion of the processes which will be followed in order to manage noise and vibration from the proposed works.

The principal issues, which will be addressed in this report, are:

- Identification of the noise and vibration standards which will be applicable to this project.
- Identify likely sources of noise generation and predicted noise levels at nearby development.
- Formulation of a strategy for construction to comply with the standards identified in the above point.

2 SITE DESCRIPTION

The subject site is located between Bennelong Road and the Sydney Olympic Park Railway line. The proposed development consists of the construction of three residential buildings ranging between 8 and 10 stories in height.

The site is bounded as follows;

- Residential Receiver 1: to the west by a residential development which is currently under construction (across railway corridor)
- Commercial Receiver 2: 6 Parkview Drive, a University Admissions Centre
- Commercial Receiver 3: 108 Bennelong Road, a Scout Hall to the north of the site
- Commercial Receiver 4: to the far east by Bicycle New South Wales
- To the south by vacant land

An aerial photograph of the site is shown below.



Figure 1 Site Map and Noise Measurement Location

Primary noise/ vibration producing construction activities and estimated duration associated with the site as follows:

- Demolition. It is anticipated that demolition works will approximately take 3 months to complete, and will include the removal of the entire existing buildings. Excavators and cranes will be required and it is anticipated that there will be a high level of truck movements for a short period of time to remove the rubble from the site.
- Excavation/Piling Works. It is anticipated that excavation/piling works will approximately take 6 months, and will be predominantly be in sandstone. Auger piling will be utilised (if piling works are required).
- Construction Phase. It is anticipated this construction will approximately take 12-18 months. Once the shell of the new building is constructed, the noise levels of internal works will decrease substantially.

Outside of demolition, excavation and piling works, noise generated will be consistent with typical small scale residential development (hand tools, concrete pump etc).

3 BACKGROUND NOISE MEASUREMENT

A noise monitors were installed on site along the on the western side of the site, nearest to the residential receivers. Unattended background monitoring was conducted on site from the 21st and 28th January 2014 with their locations shown above in figure 1.

3.1 EQUIPMENT USED

Unattended noise measurements were obtained using an Acoustic Research Laboratories Pty Ltd noise logger. The logger were programmed to store 15-minute statistical noise levels throughout the monitoring period. The noises monitors were 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. Refer to Appendix 1 for unmanned noise monitoring data on the eastern side of the site.

3.2 MEASURED BACKGROUND NOISE LEVELS

Measured background noise levels have been processed based on requirements of NSW EPA Industrial Noise Policy and rating background noise levels have been summarised and presented below.

Table 1 - Rating Background Noise Levels

Location	Description	Day Noise Level 7am to 6pm (dB(A)L ₉₀)
See Figure 1	Background L _{90,15min}	47

4 NOISE AND VIBRATION CRITERIA

4.1 NOISE CRITERIA

With no specific noise emission requirement, criteria from the following guidelines will be adopted;

- EPA *Interim Construction Noise Guidelines*
- Australian Standard AS2436:2010

4.1.1 EPA Interim Construction Noise Guidelines

The “quantitative” assessment procedure, as outlined in the Interim Construction Noise Guideline (ICNG) will be used (as opposed to the more simple “qualitative” assessment method outlined in the Guidelines).

The quantitative assessment method requires:

- Determination of noise generation goals (based on ambient noise monitoring).
- Prediction of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission goals is not possible.

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *“Noise affected” level.* Where construction noise is predicted to exceed the “noise effected” level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the “noise effected level”. For residential properties, the “noise effected” level occurs when construction noise exceeds ambient levels by more than 10dB(A)_{L_{eq}(15min)}.

- “*Highly noise affected level*”. Where noise emissions are such that nearby properties are “highly noise effected”, noise controls such as respite periods should be considered. For residential properties, the “highly noise effected” level occurs when construction noise exceeds 75dB(A)_{Leq(15min)} at nearby residences.

To commercial and industrial premises:

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)*

4.1.2 Australian Standard AS2436:2010 “Guide to noise control on construction, maintenance and demolition sites

The Australian Standard AS2436 states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce levels noise levels to within a reasonable and acceptable level.

For the control and regulation of noise from construction sites AS2436:2010 “*Guide to noise control on construction, maintenance and demolition sites*” nominates the following:

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

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaising in the effort to reach realistic compromises between construction sites and potential noise affected receivers.

4.1.3 Summary of Construction Noise Goal

A summary of noise emission goals is presented below.

Table 2 - Noise Emission Goals

Location	“Noise Affected” Level - dB(A)_{Leq(15min)}	“Highly Noise Affected” Level - dB(A)_{Leq(15min)}
Residential Receiver 1	57	75
Commercial Receiver 2	70	-
Commercial Receiver 3	70	-
Commercial Receiver 4	70	-

4.2 CONSTRUCTION VIBRATION CRITERIA

It is proposed to adopt the following vibration guidelines, namely:

- German Standard DIN 4150-3 (1999-02): “*Structural Vibration – Effects of Vibration on Structures*” – which will be used to assess and limit building damage risk.
- EPA (Draft) Construction Noise Guideline – which contains guidelines to assess and limit impacts on building occupant’s amenity.

The criteria and the application of this standard are discussed in separate sections below.

4.2.1 Building Damage Limit

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table 3.

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 3 - 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

Project specific vibration limits have been developed based on:

- The recommendations in Table 4.
- 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 surrounding buildings is 5mm/s PPV for residential building and 20mm/s PPV for commercial properties

4.2.2 Amenity criteria

Table 2.2 of EPA “Assessing Vibration: A technical guideline” specified the following vibration goal for human comfort:

Table 4 - 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
Office	Day time	0.020	0.014	0.040	0.028
Impulsive Vibration					
Residence	Day time	0.3	0.21	0.6	0.42
Office	Day time	0.64	0.46	1.28	0.92

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

Table 5 - Acceptable Vibration Dose Values for Intermittent Vibration (m/s^{1.75})

Location	Day time preferred value	Day time maximum value
Residences	0.20	0.40
Office	0.40	0.80

5 ACTIVITIES TO BE CONDUCTED AND THE ASSOCIATED NOISE SOURCES

Noise impact will be determined from primary processes and equipment. The sound power levels of these activities is presented below.

Table 6 - Sound Power Levels of the Proposed Equipment

STAGE	EQUIPMENT /PROCESS	SOUND POWER LEVEL dB(A) _{L10(15min)}
Demolition	Angle Grinder	114
	Hammering	105
	12t truck	100
Piling	CFA Piling	103
Excavation	Excavator with Pneumatic Hammer	118
	Saw Cutter	114
	Bulldozer	114
	19m Long Truck	118
Construction	Angle grinders	105
	Electric Saw	102
	Drill	95
	Hammering	110
	Air compressor	86
	Concrete Pump	105
	Concrete Vibrator	100
	Cement Mixing Truck	105
	Crane	105

The noise levels presented in the above table are derived from the following sources, namely:

- On-site measurements
- Table D2 of Australian Standard 2436-1981
- Data held by this office from other similar studies.

Typical excavator with pneumatic hammer on concrete has been measured and converted in Sound Power Level in spectrum as below.

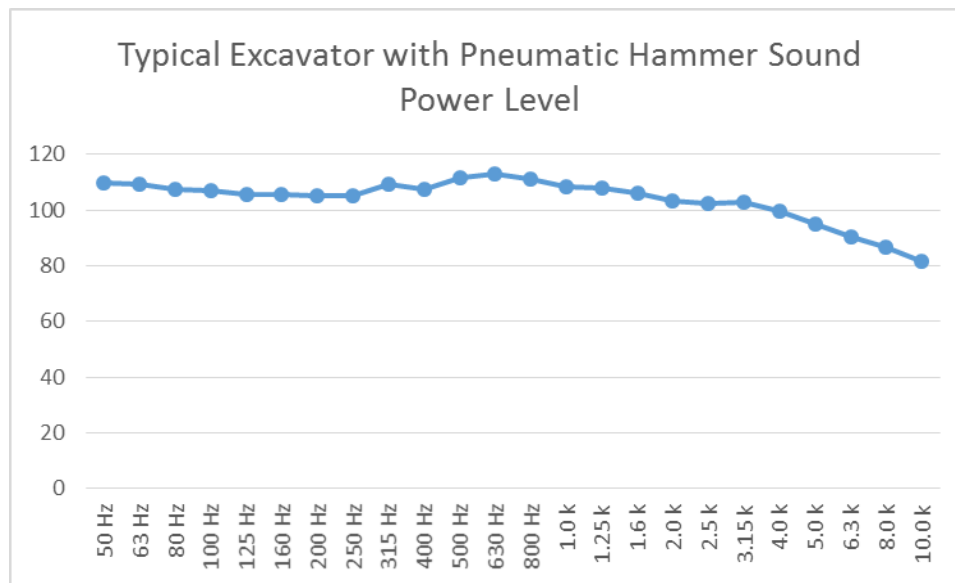


Table 7 - Measured Sound Power Level of Equipment

Frequency	63Hz	125 Hz	250 Hz	500 Hz	1K Hz	2K Hz	4K Hz	8K Hz	A Weight
30 Ton Excavator with pneumatic hammer	114	111	112	116	114	109	105	92	118
CFA Piling	99	96	97	101	99	94	90	77	103
Bulldozer	110	107	108	112	110	105	101	88	114
Concrete Vibrator	85	92	106	97	90	86	82	78	100
Crane	90	97	111	102	95	91	87	83	105

6 NOISE EMISSION PREDICTION

6.1 METHODOLOGY

Noise generated by plant and equipment will be managed to generally comply with the nominated Council criteria, and where this noise goal may be exceeded noise will be managed based on principles consistent with Australian Standard 2436/EPA guidelines.

Noise levels from construction activities have been predicted at nearby residences. Predictions have taken into account:

- The sound power level of the equipment in use, as noted in the table above.
- The distance between the noise source and the receiver.

6.2 RECOMMENDED NOISE CONTROLS

The noise emission to the nearest has been predicted based on the noise data above and recommended noise control in Section 7. The following reasonable noise controls have been accounted for the noise prediction:

- A- Equipment shall be well maintained per noise control methods listed in Section 12 of this report.
- B- Use of 2 hours respite periods during the excavation of the project site, no work before 8am.
- C- Stationed equipment shall be located as far as possible from residence and screened by enclosure.
- D- Install acoustic screening material to the permanent scaffolding erected on the northern and eastern side boundaries. The screening material should consist of loaded vinyl or used carpet. Adjacent layers of material are to be overlapped by a minimum of 50mm.

6.3 NOISE PREDICTIONS

6.3.1 Noise Receiver 1: Residential to the West

The affected residential receivers are located southern to the site. The noise goal complying with Council and EPA guidelines would be 57 dB(A)_{Leq} and the predicted noise levels are as follows:

Table 8 - Predicted Noise Level to Receiver 1 – 1-11 Australia Avenue

Operation				Controls (dB reduction) Refer Section 7.2.2					Prediction		
Plant		Noise Source Data (Sound Power Level) dB(A)	Distance from receiver (metres)	A	B	C	D	Distance Attenuation+ Angle or Barrier Effect or façade attenuation	Predicted noise level (at receiver) dB(A) L _{eq}	Noise goal at receiver dB(A)L _{eq}	Predicted Plant Exceedance dB(A) L _{eq}
Demolition Stage	Angle Grinder	114	47	☒	☐	☐	☒	-41	73	57	16
	Hammering	105	47	☒	☒	☐	☒	-41	64	57	7
	12t Truck	100	47	☐	☐	☐	☐	-41	59	57	2
Piling	CFA Piling	103	47	☒	☐	☐	☒	-41	62	57	5
Excavation	Excavator with Hammer	118	47	☒	☒	☐	☒	-41	77	57	20
	Saw Cutter	114	47	☒	☒	☐	☒	-41	73	57	16
	Bulldozer	114	47	☒	☒	☐	☒	-41	73	57	16
	19m long Truck	118	47	☒	☐	☐	☒	-41	77	57	20
Construction	Angle grinders	105	47	☒	☐	☐	☒	-41	64	57	7
	Electric Saw	102	47	☒	☐	☐	☒	-41	61	57	4
	Drill	95	47	☒	☐	☐	☒	-41	54	57	0
	Hammering	110	47	☒	☐	☐	☒	-41	69	57	12

	Air compressor	86	47	☒	☐	☒	☒	-41	45	57	0
	Concrete Pump	105	20	☒	☐	☒	☒	-41	64	57	7
	Concrete Vibrator	100	20	☒	☒	☐	☒	-41	59	57	2
	Cement Mixing Truck	105	20	☒	☐	☐	☒	-41	64	57	7
	Crane	105	20	☒	☐	☐	☒	-41	64	57	7

The residential receiver to the west of the site is still undergoing construction. It is anticipated that the most noise intrusive works on the project, being demolition, excavation and piling will be complete before occupancy of 1-11 Australia Avenue. Therefore, only during the construction stage will the units to the west be occupied, and noise emission being a potential issue.

Therefore, all works will generally comply with the noise goals at the receiver with some minor exceedances during the construction stage only. However, these equipment / processes are intermittent in nature and would occur for limited periods. Refer to ameliorative measures recommended in section 7.

Furthermore, once the building shell of the project site is complete, a further 10-20 dB(A) reduction can be achieved, where all processes during the construction stage will generally comply with the EPA Guidelines.

6.3.2 Noise Receiver 2: Commercial Receiver – 6 Parkview Drive

These receivers are bounding the project site to the north. The noise goal complying with Council and EPA guidelines would be 70 dB(A), as this is a commercial receiver. Predicted noise levels are as follows:

Table 9 - Predicted Noise Level to Receiver 2

Operation				Controls (dB reduction) Refer Section 7.2.2				Prediction			
Plant		Noise Source Data (Sound Power Level) dB(A)	Distance from receiver (metres)	A	B	C	D	Distance Attenuation+ Angle or Barrier Effect or façade attenuation	Predicted noise level (at receiver) dB(A) L_{eq}	Noise goal at receiver dB(A) L_{eq}	Predicted Plant Exceedance dB(A) L_{eq}
Demolition Stage	Angle Grinder	114	60	☒	☐	☐	☒	-44	77	70	0
	Hammering	105	60	☒	☒	☐	☒	-44	68	70	0
	12t Truck	100	60	☐	☐	☐	☐	-44	63	70	0
Piling	CFA Piling	103	60	☒	☐	☐	☒	-44	66	70	0
Excavation	Excavator with Hammer	118	60	☒	☒	☐	☒	-44	81	70	4
	Saw Cutter	114	60	☒	☒	☐	☒	-44	77	70	0
	Bulldozer	114	60	☒	☒	☐	☒	-44	77	70	0
	19m long Truck	118	60	☒	☐	☐	☒	-44	81	70	4
Construction	Angle grinders	105	60	☒	☐	☐	☒	-44	68	70	0
	Electric Saw	102	60	☒	☐	☐	☒	-44	65	70	0
	Drill	95	60	☒	☐	☐	☒	-44	58	70	0
	Hammering	110	60	☒	☐	☐	☒	-44	73	70	0
	Air	86	60	☒	☐	☒	☒	-44	49	70	0

	compressor											
	Concrete Pump	105	60	☒	☐	☒	☒	-44	68	70	0	
	Concrete Vibrator	100	60	☒	☒	☐	☒	-44	63	70	0	
	Cement Mixing Truck	105	60	☒	☐	☐	☒	-44	68	70	0	
	Crane	105	60	☒	☐	☐	☒	-44	68	70	0	

The main exceedences will occur during the excavation stages when works are outside and affecting the commercial premises to the north.

All other processes generally comply with the noise goal at these receivers. However, these equipment / processes are intermittent in nature and would occur for limited periods. Refer to ameliorative measures recommended in section 7.

6.3.3 Noise Receiver 3: Commercial Receiver - 108 Bennelong Road

These receivers are bounding the project site to the north. The noise goal complying with Council and EPA guidelines would be 70 dB(A), as this is a commercial receiver. Predicted noise levels are as follows:

Table 10 - Predicted Noise Level to Receiver 3

Operation				Controls (dB reduction) Refer Section 7.2.2				Prediction			
Plant		Noise Source Data (Sound Power Level) dB(A)	Distance from receiver (metres)	A	B	C	D	Distance Attenuation+ Angle or Barrier Effect or façade attenuation	Predicted noise level (at receiver) dB(A) L_{eq}	Noise goal at receiver dB(A) L_{eq}	Predicted Plant Exceedance dB(A) L_{eq}
Demolition Stage	Angle Grinder	114	59	☒	☐	☐	☒	-43	71	70	1
	Hammering	105	59	☒	☒	☐	☒	-43	62	70	0
	12t Truck	100	59	☐	☐	☐	☐	-43	57	70	0
Piling	CFA Piling	103	59	☒	☐	☐	☒	-43	60	70	0
Excavation	Excavator with Hammer	118	59	☒	☒	☐	☒	-43	75	70	5
	Saw Cutter	114	59	☒	☒	☐	☒	-43	71	70	1
	Bulldozer	114	59	☒	☒	☐	☒	-43	71	70	1
	19m long Truck	118	59	☒	☐	☐	☒	-43	75	70	5
Construction	Angle grinders	105	59	☒	☐	☐	☒	-43	62	70	0
	Electric Saw	102	59	☒	☐	☐	☒	-43	59	70	0
	Drill	95	59	☒	☐	☐	☒	-43	52	70	0
	Hammering	110	59	☒	☐	☐	☒	-43	67	70	0
	Air	86	59	☒	☐	☒	☒	-43	43	70	0

	compressor										
	Concrete Pump	105	59	☒	☐	☒	☒	-43	62	70	0
	Concrete Vibrator	100	59	☒	☒	☐	☒	-43	57	70	0
	Cement Mixing Truck	105	59	☒	☐	☐	☒	-43	62	70	0
	Crane	105	59	☒	☐	☐	☒	-43	62	70	0

The main exceedences will occur during the excavation stages when works are outside and affecting the receivers along the boundary to the project side.

All other processes generally comply with the noise goal at these receivers with some minor exceedences. However, these equipment / processes are intermittent in nature and would occur for limited periods. Refer to ameliorative measures recommended in section 7.

6.3.4 Noise Receiver 4: Commercial Receiver 4 – Bicycle New South Wales

These receivers are to the east of the project site. The noise goal complying with Council and EPA guidelines would be 70 dB(A), as this is a commercial receiver. Predicted noise levels are as follows:

Table 11 - Predicted Noise Level to Receiver 4

Operation				Controls (dB reduction) Refer Section 7.2.2				Prediction			
Plant		Noise Source Data (Sound Power Level) dB(A)	Distance from receiver (metres)	A	B	C	D	Distance Attenuation+ Angle or Barrier Effect or façade attenuation	Predicted noise level (at receiver) dB(A) L_{eq}	Noise goal at receiver dB(A) L_{eq}	Predicted Plant Exceedance dB(A) L_{eq}
Demolition Stage	Angle Grinder	114	137	☒	☐	☐	☒	-51	63	70	0
	Hammering	105	137	☒	☒	☐	☒	-51	54	70	0
	12t Truck	100	137	☐	☐	☐	☐	-51	49	70	0
Piling	CFA Piling	103	137	☒	☐	☐	☒	-51	52	70	0
Excavation	Excavator with Hammer	118	137	☒	☒	☐	☒	-51	67	70	0
	Saw Cutter	114	137	☒	☒	☐	☒	-51	63	70	0
	Bulldozer	114	137	☒	☒	☐	☒	-51	63	70	0
	19m long Truck	118	137	☒	☐	☐	☒	-51	67	70	0
Construction	Angle grinders	105	137	☒	☐	☐	☒	-51	54	70	0
	Electric Saw	102	137	☒	☐	☐	☒	-51	51	70	0
	Drill	95	137	☒	☐	☐	☒	-51	44	70	0
	Hammering	110	137	☒	☐	☐	☒	-51	59	70	0

	Air compressor	86	137	☒	☐	☒	☒	-51	35	70	0
	Concrete Pump	105	137	☒	☐	☒	☒	-51	54	70	0
	Concrete Vibrator	100	137	☒	☒	☐	☒	-51	49	70	0
	Cement Mixing Truck	105	137	☒	☐	☐	☒	-51	54	70	0
	Crane	105	137	☒	☐	☐	☒	-51	54	70	0

All processes generally comply with the noise goal at these receivers. However, these equipment / processes are intermittent in nature and would occur for limited periods. Refer to ameliorative measures recommended in section 7.

7 AMELIORATIVE MEASURES

7.1 SPECIFIC NOISE EMISSION CONTROLS

Site specific recommendations as follows:

- A- Equipment shall be well maintained per noise control methods listed in Section 10 of this report.
- B- Use of 2 hours respite periods during the excavation of the project site, no work before 8am.
- C- Stationed equipment shall be located as far as possible from residence and screened by enclosure.
- D- Install acoustic screening material to the permanent scaffolding erected on the northern and eastern side boundaries. The screening material should consist of loaded vinyl or used carpet. Adjacent layers of material are to be overlapped by a minimum of 50mm.
- Demolition: Stripping out of structure prior to removing the windows therefore the windows will provide barrier effect for the noise generated from strip out process. The façade of existing building shall be munched off.
- Vehicle Noise:
 - Truck movements should not commence prior to 7:00am.
 - Trucks and concrete trucks must turn off their engines during idling to reduce impacts on adjacent residential/commercial receivers (unless truck ignition needs to remain on during concrete pumping).

7.2 DEALING WITH OFFENSIVE NOISE LEVELS

Should ongoing complaints of excessive noise occur, immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

All complaints or offensive noise received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of offensive noise shall involve where applicable;

- noise measurements at the affected receiver;
- an investigation of the activities occurring at the time of the incident;
- inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to

acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

8 VIBRATION - ACCEPTABLE SAFETY WORK PRACTICES

8.1 SENSITIVE RECEIVERS

Nearest vibration receivers for the demolition/excavation/construction of the project site are:

- Residential Receiver 1: to the west by a residential development which is currently under construction (across railway corridor)
- Commercial Receiver 2: 6 Parkview Drive, a University Admissions Centre
- Commercial Receiver 3: 108 Bennelong Road, a Scout Hall to the north of the site
- Railway to the east of project site.

8.2 VIBRATION PRODUCING ACTIVITIES

Proposed activities that have the potential to produce significant ground vibration include:

- Piling and anchoring.
- Hydraulic hammering.
- Excavator working.

8.3 SAFEGUARDS TO PROTECT SENSITIVE STRUCTURES

It is impossible to predict the vibrations induced by the excavation/construction operations on site at potentially affected receivers. This is because vibration level is principally proportional to the energy impact which is unknown nature of terrain in the area (type of soil), drop weight, height etc.

Acoustic Consult should undertake monitoring of initial demolition/excavation process when conducted near potentially affected receivers to ensure that vibration criteria set out in section 4.2 are not exceeded.

9 CONTROL OF CONSTRUCTION NOISE

As a part of the noise management plan a detailed study has been undertaken of each of the proposed activities that will occur as a part of the construction works on this project. The execution of this work will facilitate the formulation of noise control strategies for this project.

The flow charts below illustrates the process followed to assess construction activities prior to the start of work on site and well as the ongoing investigation into noise during the construction period.

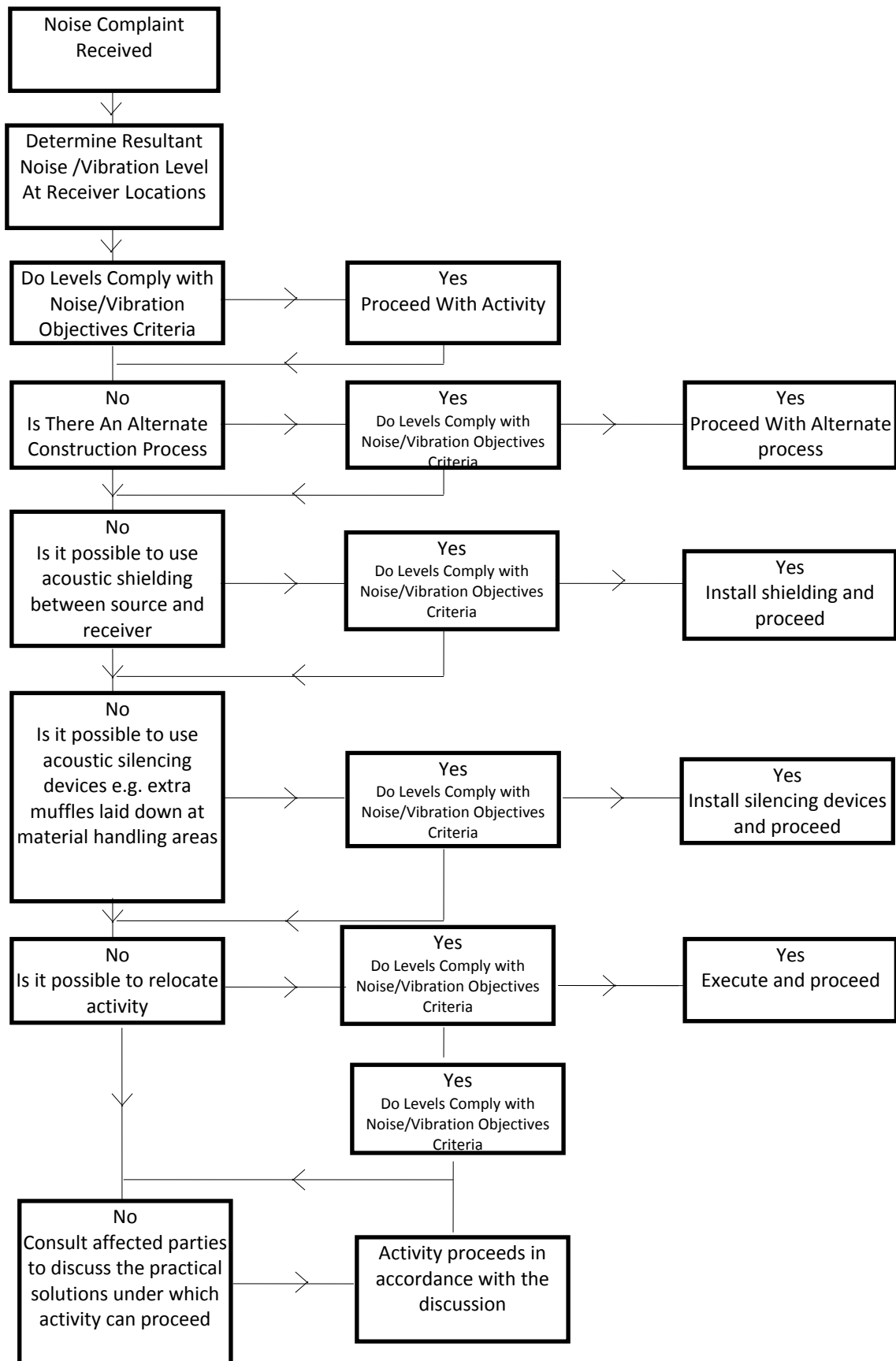


Chart 1 – Ongoing Site Procedures

10 GENERAL NOISE CONTROL METHODS

The determination of appropriate noise control measures will be dependant on the particular activities and construction appliances. This section provides an outline of available methods.

10.1 SELECTION OF ALTERNATE APPLIANCE OR PROCESS

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance. For example; the use of a hydraulic hammer on certain areas of the site may potentially generate high levels of noise. By carrying this activity by use of pneumatic hammers, bulldozers ripping and/or milling machines lower levels of noise will result.

10.2 ACOUSTIC BARRIER

Barriers or screens can be an effective means of reducing noise. Barriers can be located either at the source or receiver.

The placement of barriers at the source is generally only effective for static plant (tower cranes). Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source.

Barriers can also be placed between the source and the receiver.

The degree of noise reduction provided by barriers is dependant on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15 dB(A) can be effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8 dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance which is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10 or 15mm plywood would be acceptable for the barriers.

10.3 SILENCING DEVICES

Where construction process or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

10.4 MATERIAL HANDLING

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

10.5 TREATMENT OF SPECIFIC EQUIPMENT

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

10.6 ESTABLISHMENT OF SITE PRACTICES

This involves the formulation of work practices to reduce noise generation. A noise plan will be developed for this project outlining work procedures and methods for minimising noise.

10.7 STRATEGIC POSITIONING OF PROCESSES ON-SITE

Where practicable, particular processes of activities can be located in particular positions on site to minimise noise to surrounding sensitive receivers.

For example, stationary plant may be positioned where direct line of sight shielding can be achieved using natural barriers or temporary screens, or may maximise the distance to the nearest sensitive receiver. This may also be applicable to the demolition of building structures where the façade closest to residential receivers is left until last to provide barrier screening for the demolition of the other parts of the building.

10.8 REGULAR NOISE CHECKS OF EQUIPMENT

To determine the requirement for silencing devices on machinery it is proposed to undertake fortnightly noise check. Noise levels of all machines on site will be measured and if they 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 will be kept on a form similar to that shown below.

This measure is expected to maintain noise at constant levels, and prevent any increases.

100 BENNELONG PARKWAY, SYDNEY OLYMPIC PARK

Construction Appliance Compliance Certificate

Month

Year

Plant Item

Allowable Noise Level

Measured Noise Level

Complies

Yes

☐

No

☐

Issuing Engineer

Sub-Contractor

Project Manager

11 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

11.1 ESTABLISHMENT OF DIRECT COMMUNICATION WITH AFFECTED PARTIES

In order for any construction noise management programme to work effectively, continuous 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; and
- Ensure that concerned individuals or groups are aware of and have access to the Site Complaints Register which will be used to address any construction noise related problems should they arise.

To ensure that this process is effective, meetings may be required until all issues have been addressed.

11.2 MANAGEMENT TRAINING

All site managers should be made aware of noise and vibration limits, applicable control measures and methods. They should ensure that all practical noise and vibration measures are carried out by employees and sub-contractors.

11.3 DEALING WITH COMPLAINTS

Should ongoing complaints of excessive noise or vibration criteria occur immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration limits all work potentially producing vibration shall cease until the exceedance is investigated.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided);
- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;

- Required remedial action, if required;
- Validation of the remedial action; and
- Setup vibration monitoring system at the location represents the nearest vibration receiver location with alarm device which can inform the project manager on site if the vibration exceedance happened.
- Summary of feedback to the complainant.

A permanent register of complaints should be held.

All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

The investigation of a complaint shall involve where applicable;

- noise measurements at the affected receiver;
- an investigation of the activities occurring at the time of the incident;
- inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines should be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees should be carried out.

Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable.

12 CONTINGENCY PLANS

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers etc where practical.
4. Selecting alternative equipment/processes where practical
5. Setup noise monitoring devices at locations represent nearest noise receivers and provide noise data for each complain time period. Analysis is required and determine suitable noise mitigation measures.

Complaints associated with noise and vibration generated by site activities shall be recorded on a Noise Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the Site Manager to the general public and their contact telephone number.

13 CONCLUSION

A noise, vibration management plan has been undertaken of the proposed demolition, excavation and construction activities at 100 Bennelong Parkway, Sydney Olympic Park.

This report is to form part of the documentation to supply the Sydney Olympic Park Authority to identify whether these construction activities would impact sensitive receivers around the site.

The assessment of demolition, excavation and construction noise and vibration indicates that management and engineering measures will be needed to limit noise impacts to the future residential development adjacent to the site. Noise emissions to the remainder of the buildings surrounding the project site will generally be within the recommended goals.

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

Yours faithfully,

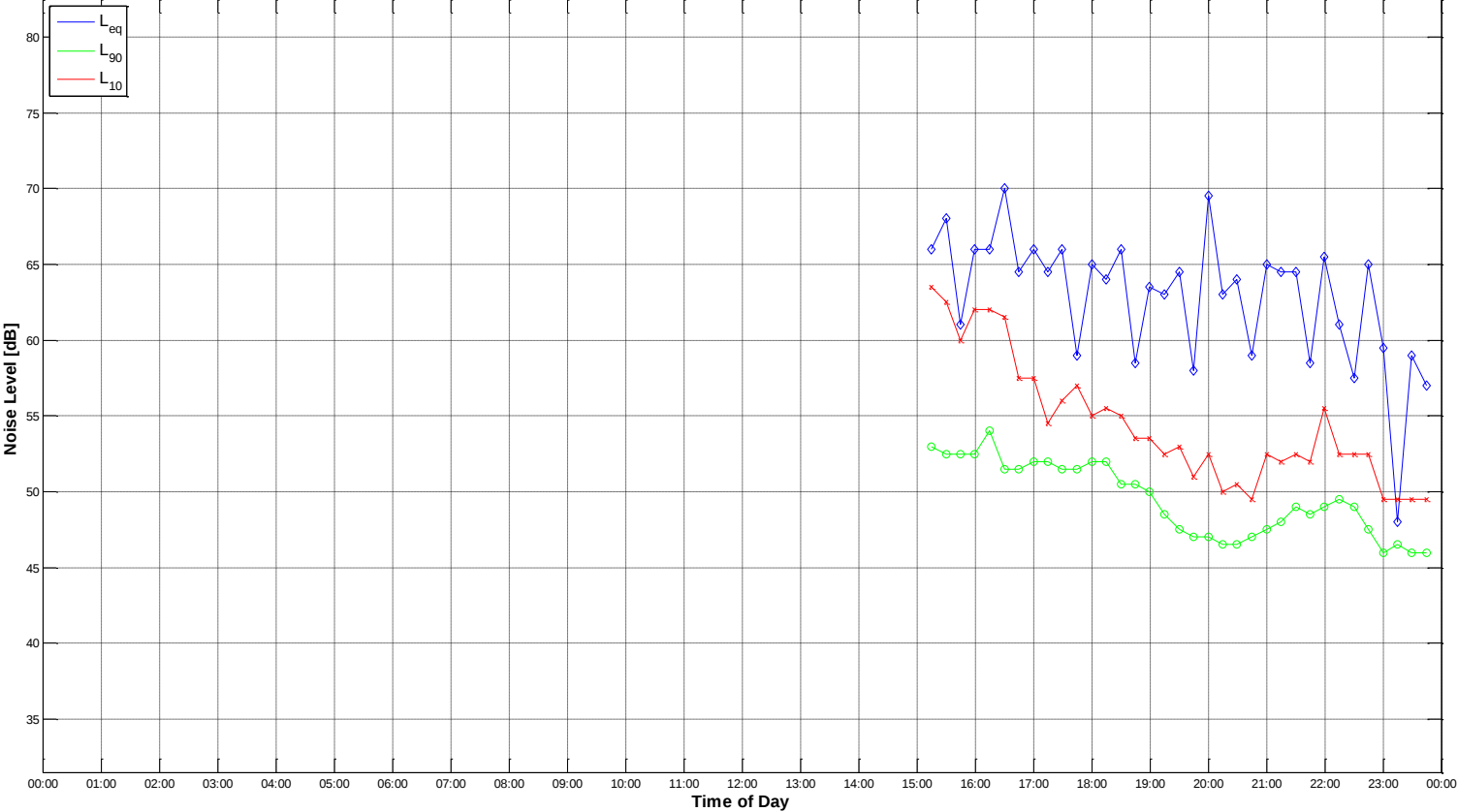
A handwritten signature in black ink, appearing to read 'J. Davydov', with a stylized flourish at the end.

Johan Davydov

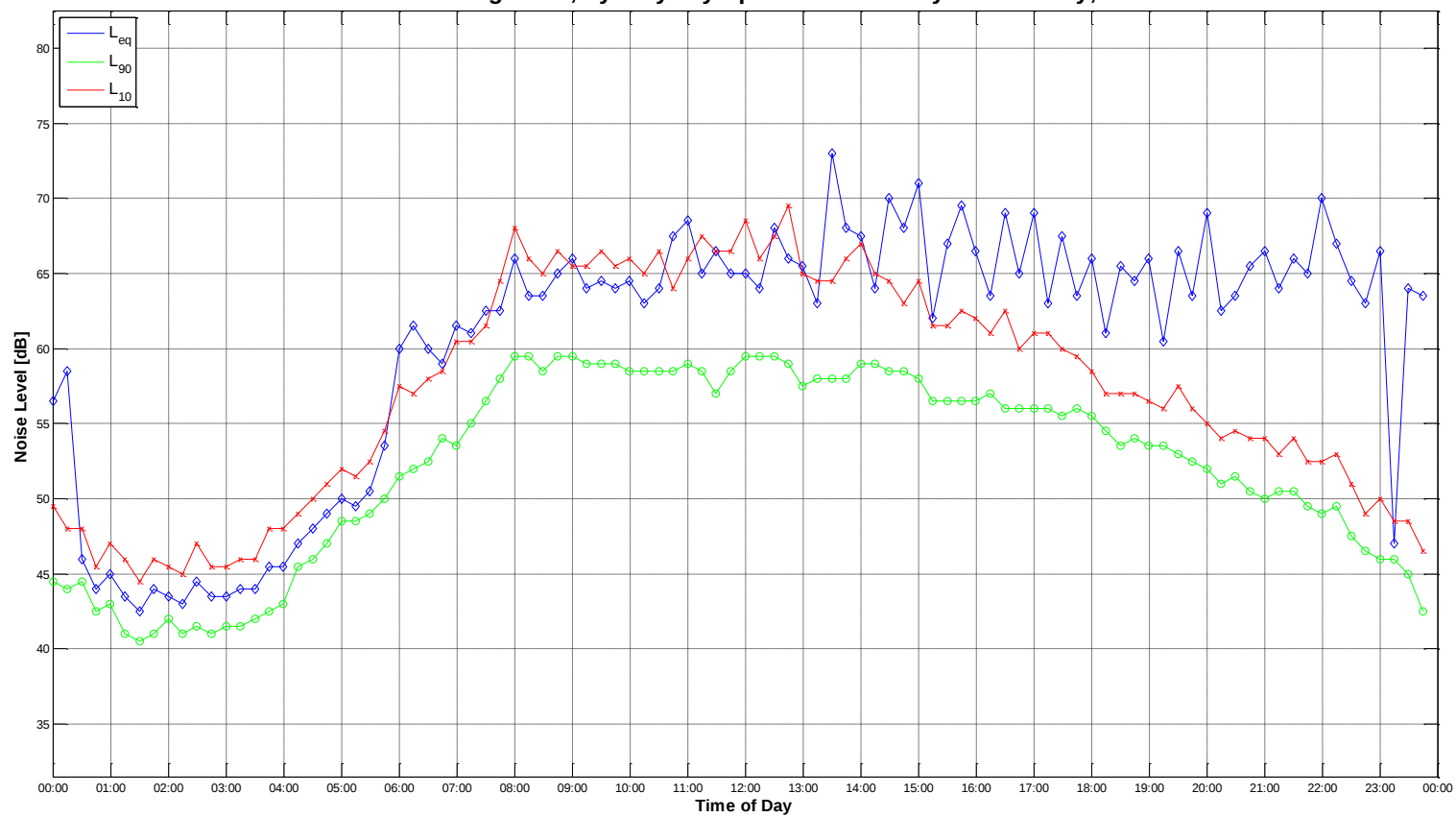
Acoustic Logic Consultancy Pty Ltd

Appendix 1
Unattended Noise Measurements
100 Bennelong Parkway, Sydney Olympic Park

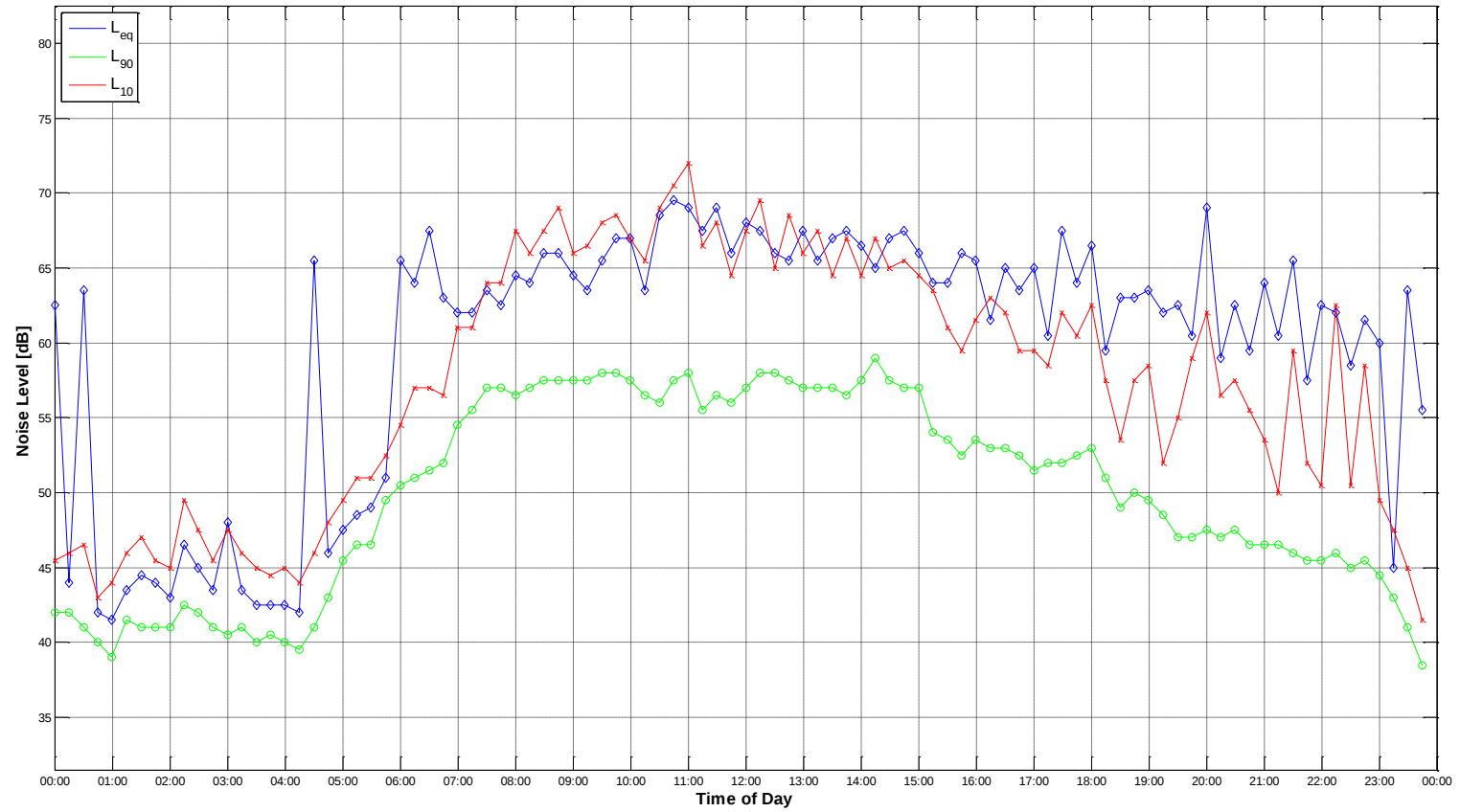
100 Bennelong Road, Sydney Olympic Park: Monday 21 January, 2013



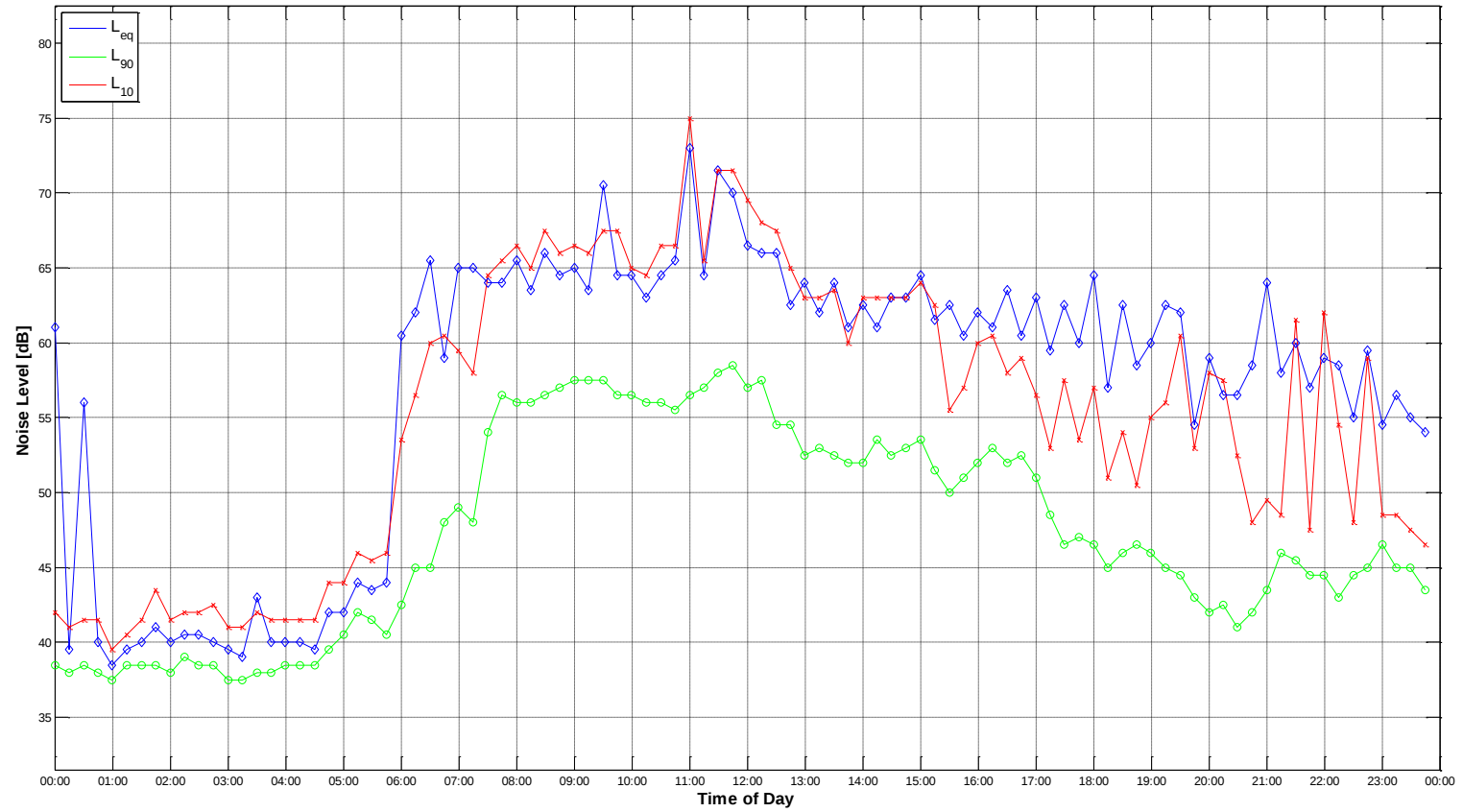
100 Bennelong Road, Sydney Olympic Park: Tuesday 22 January, 2013



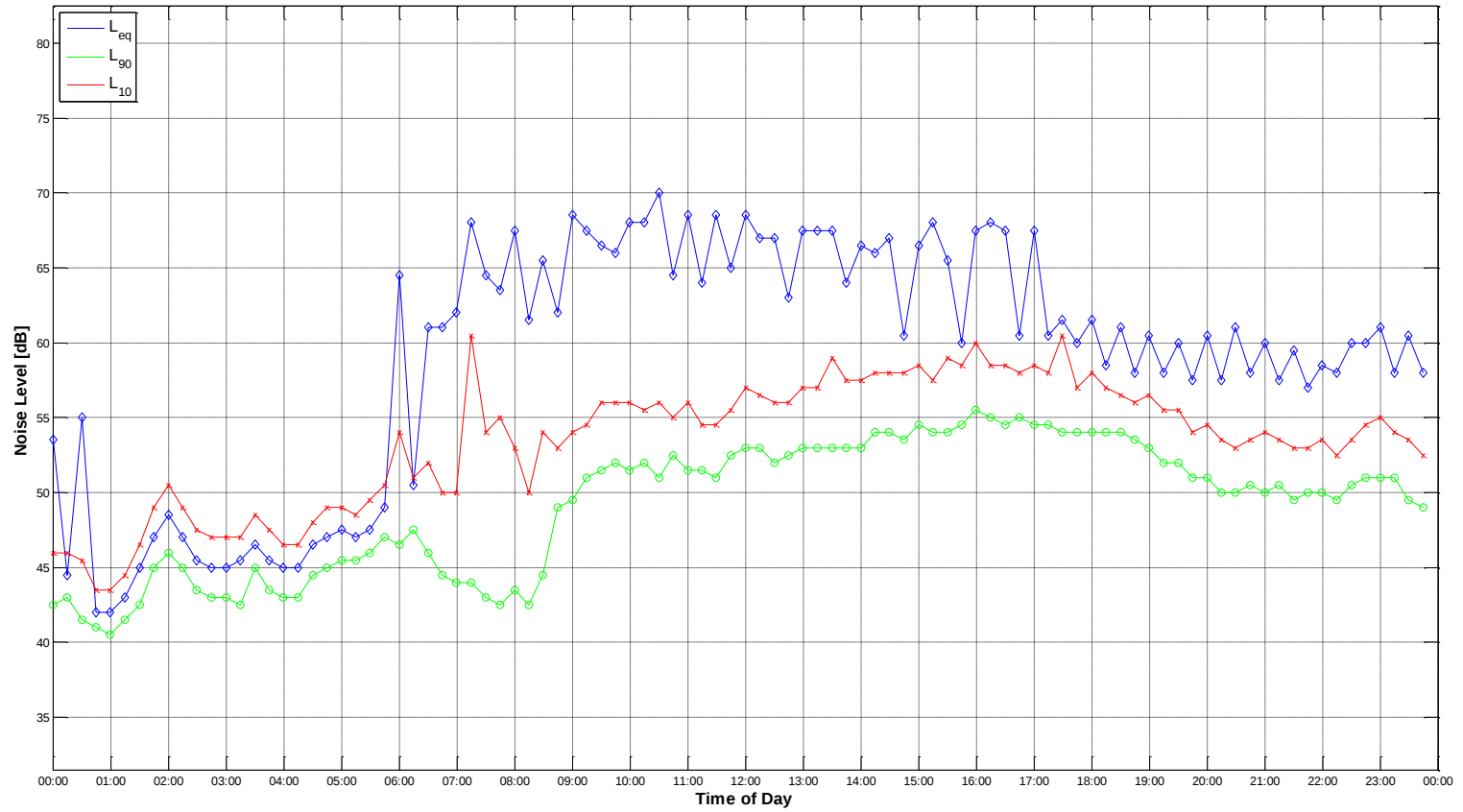
100 Bennelong Road, Sydney Olympic Park: Wednesday 23 January, 2013



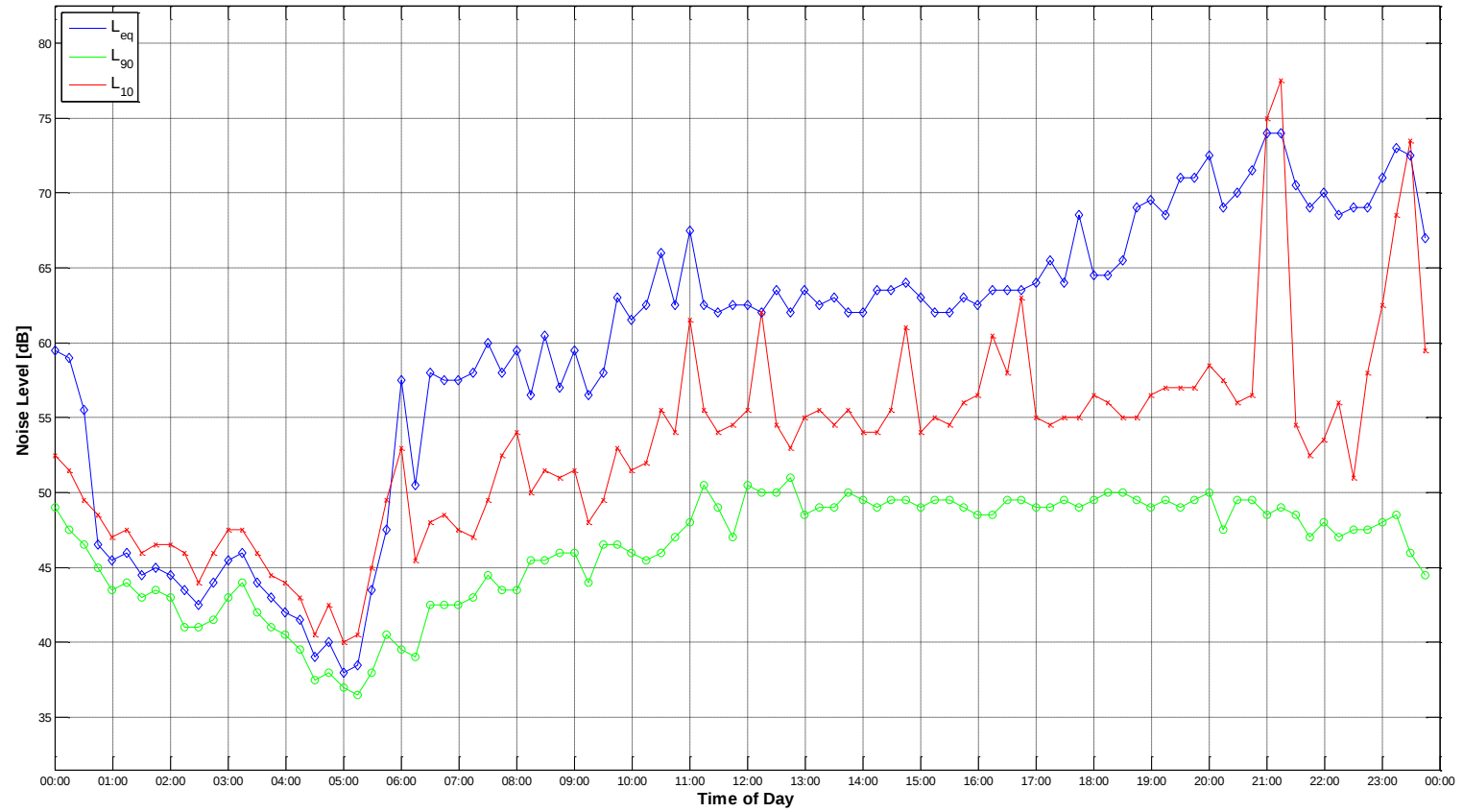
100 Bennelong Road, Sydney Olympic Park: Thursday 24 January, 2013



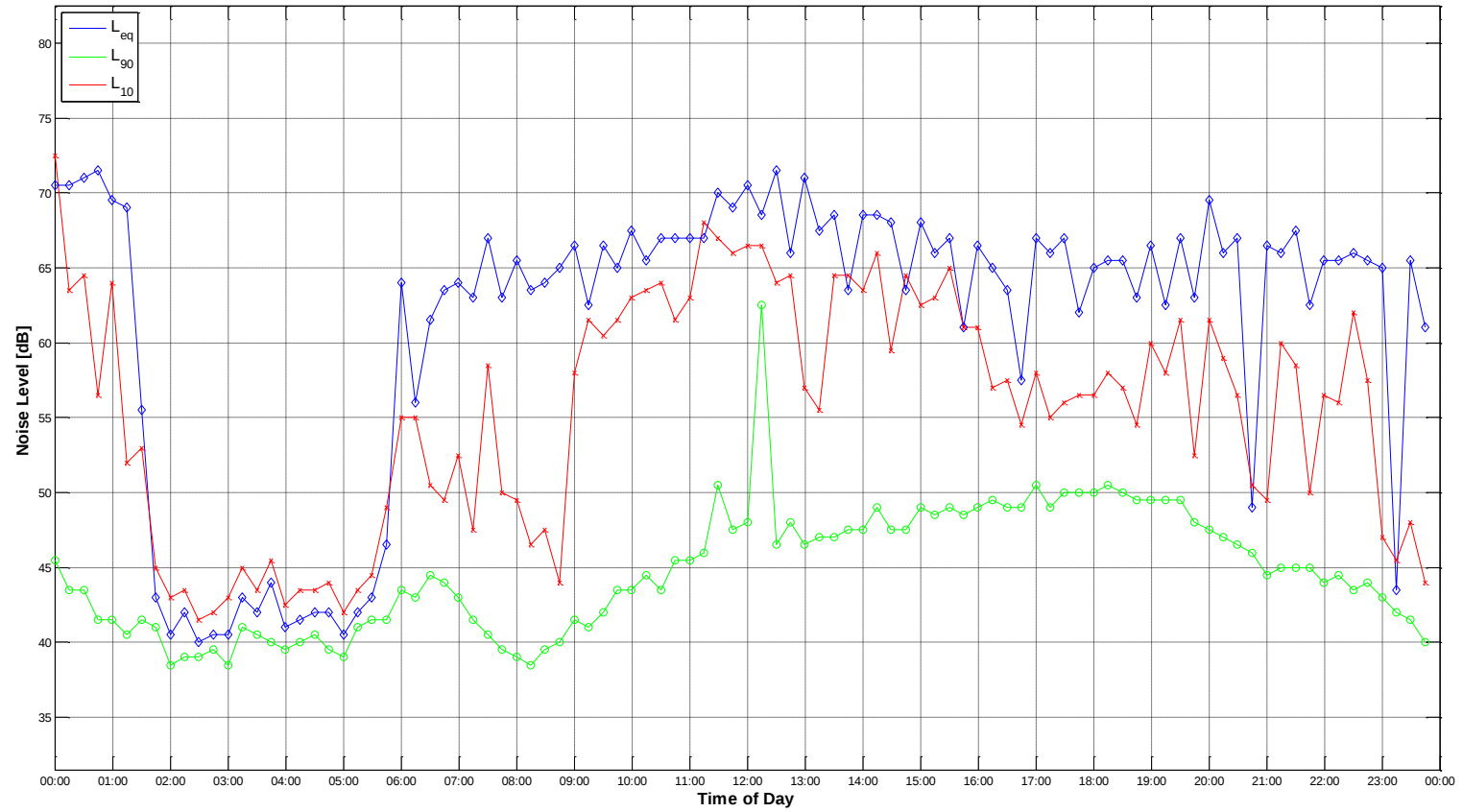
100 Bennelong Road, Sydney Olympic Park: Friday 25 January, 2013



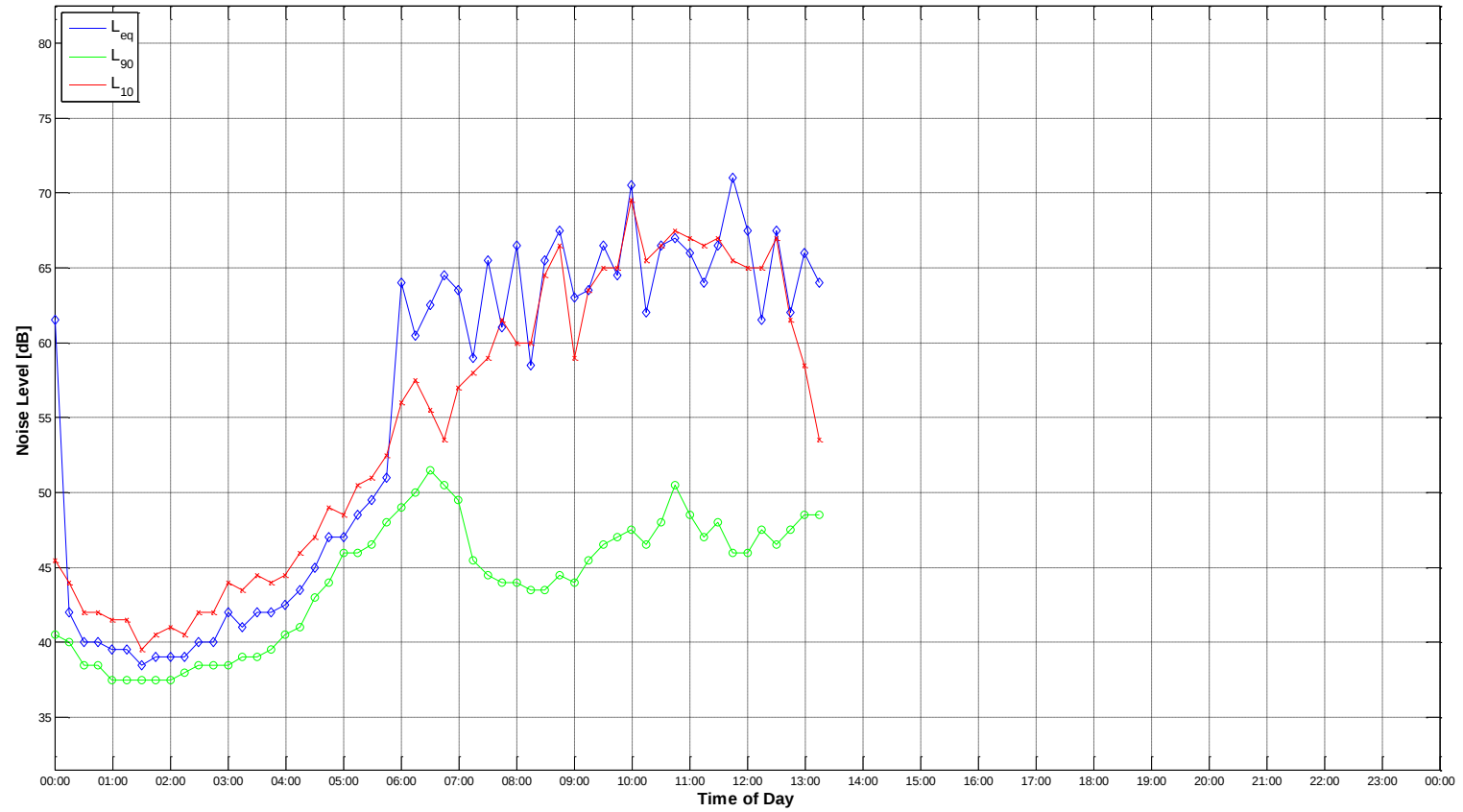
100 Bennelong Road, Sydney Olympic Park: Saturday 26 January, 2013



100 Bennelong Road, Sydney Olympic Park: Sunday 27 January, 2013



100 Bennelong Road, Sydney Olympic Park: Monday 28 January, 2013



APPENDIX 6

Complaints Register



100 Bennelong Parkway, Sydney Olympic Park

COMPLAINTS FORM

COMPLAINANT'S DETAILS

Name: _____

Time & Date: _____

Nature of complaint: (i.e. Noise and time of noise) _____

Recipient of complaint _____

Investigation of complaint _____

Action taken _____

Operations occurring during the time of complaint _____

Remedial action required _____

Validation of remedial action/ implementation of _____

Summary of feedback to the complainant _____

COMPLAINTS REGISTER