SIMMONS CIVIL CONTRACTING

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

Castle Hill Powerhouse MDC – Early Works Carpark Construction

7th September 2021

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1. BACKGROUND

1.1 Introduction

This project is a Simmons Civil Contracting managed project which involves construction works for Castle Hill Powerhouse Museum Discovery Centre (MDC) – Early Works Carpark Construction project.

1.2 Project Description

LOCATION	Castle Hill Powerhouse MDC 2 Green Rd, Castle Hill NSW 2154
CONSTRUCTION OPERATION	• Removal of vegetation, site preparation and earthworks • Demolition of an existing carpark area and construction of new car park on the TAFE site • The construction and operation of a new building (Building J) for the storage of the Powerhouse collection and archives, spaces for education and public programs • Construction of a new accessway connecting the MDC and TAFE sites • Building identification signage, new landscaping, services infrastructure, and a roof mounted photovoltaic system • Site subdivision and consolidation • Implementation of a tree replacement strategy
OPERATING HOURS [refer to DA Condition B27a) (i)]	Monday to Friday: 7am-5pm, Saturday: 8pm-1pm; and No work on Sunday and public holidays
NO AND TYPES OF WORKERS	8 workers approximately, includes site foreman, labourers, plant operators and various subcontractors
PLANT AND EQUIPMENT USED	Excavators, Water carts, bobcats, various trucks, graders, rollers
LOCATION OF SITE FACILITIES	Located near the site entrance

1.3 Context

This environmental management plan will be effective from the commencement of the project. Regular audits and reviews are to be done to ensure the environmental management plan is being followed. Other Simmons Civil environmental control documents should be used within context to assist the understanding and undertaking of this management plan. These documents are located on the Simmons Civil project server, with each file being changed to be project specific. A copy of these files can be provided when requested.

1.4 Objectives

This environmental plan's main objective is to ensure that proper environmental controls are installed to ensure the safety of all workers on site and the surrounding environment.

Project specific objectives:

- Ensure bulk/detail excavation environment is set up properly
- Ensure dust does not spread across site barriers and control system
- Ensure noise is not an issue for neighbours
- Ensure no contamination to ground is caused by refuelling elements or Simmons Civil plant equipment
- Ensure nearby water ways (i.e., nearby creek) are not contaminated with runoff or site materials
- Removal of rubbish regularly on site

1.5 Integrated Management System (IMS) Policy

Our aim is to demonstrate and ensure safety, environmental and quality compliance with legislation using a system that meets AS/NZS ISO 4801, AS/NZS ISO 14001 and AS/NZS ISO 9001, together with the standards specified in relevant contracts, codes of practice and other relevant requirements.

Input and involvement of all staff and stakeholders is essential and must be sought when identifying and mitigating workplace hazards and risks in order to achieve a safe workplace and an environmentally sustainable environment. Management must ensure that all staff and contractors are to be inducted so they become familiar with project processes and risk management techniques.

In order to achieve our objective of promoting safety, environmental and quality awareness and to optimise client satisfaction on our projects, we:

- Set measurable objectives and targets
- Focus on these at every level
- Eliminate work related injuries, illnesses, and pollution
- Ensure that all staff and contractors understand our policy and their responsibility in maintaining the highest levels of performance

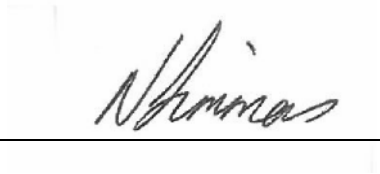
Our core objectives are to:

- Comply with certification criteria and the relevant prequalification requirements with the clients we work with,
- Maintain or target an increase in profit each year by reducing rework and minimising waste in all processes,
- Keep up with technology, plant and equipment changes,
- Target improvement in staff and employee's competency by ongoing training,
- Provide a level of quality in our work, which is not less than that specified within the contract and aims to meet the client's expectations while undertaking risk assessments on design to ensure that the project can be constructed, operated, and maintained safely.
- Have <0 workplace notifiable incidents per year and have <0 lost time injuries.
- Have ongoing consultation with staff in regard to WH&S, environmental and quality matters
- Have zero reportable environmental breaches. To reduce any form of pollution in the vicinity of the project. Work with the client to improve the environmental integrity of the area in which we are to be working.
- Ensure our suppliers and subcontractors operate with the same objectives in mind
- Strive for continual improvement in service delivery through reviews and measurement of defect notices
- Comply with relevant WH&S, environmental and quality legislation and with other requirements placed upon the organisation or to which the organisation subscribes
- Comply with other requirements, including statutory, legal and any other contractor/client requirements.
- Simmons Civil will aim to keep all work areas clean, reducing the amount of rubbish produced on site. If rubbish is reduced, we aim to remove the rubbish properly as per statutory, code of practice and standard requirements.

- Simmons Civil will effectively train/teach their staff in regard to environmental sustainability, WHS and Quality requirements on a project.
- Simmons Civil will aim to keep/improve the environmental integrity of the area of the construction sites before and after work begins/finishes.
- Simmons Civil will aim to review each project to see if the environmental controls placed by us were effective.
- Simmons Civil will ensure continuing satisfaction of its stakeholders.
- Simmons Civil will aim to complete its work and deliver its services in a timely manner.
- Simmons Civil will aim to complete projects in accordance with approved/adjusted plans/specifications.

We continuously monitor the IMS through System, Process and Management Review to ensure its ongoing suitability and improve our operations to achieve excellent safety, environmental, quality and cost standards. This enables us to respond to any client concerns in an efficient and effective manner, ensuring client satisfaction.

Management must regularly review this policy and the IMS to ensure that it remains relevant and appropriate. This policy is available to interested parties on request.

Signed:  Date: 21/05/2021

Managing Director

2. SUB-PLAN REFERENCE DOCUMENTS

Simmons will comply with all sub-plans, standards and guidelines, all client and DA conditions, as nominated within the Hills Shire Council. Prior to the commencement of this project, management sub-plans are implemented according to the DA conditions:

CLAUSE	DESCRIPTION
B27	Prior to the commencement of construction, a **Construction Environmental Management Plan (CEMP)** must be submitted to the Panning Secretary, Council and Certifier. The CEMP must provide / address the following matters: a. Details of: - Hours of work - 24-hour contact details of site manager - Management of dust and odour to protect the amenity of the neighbourhood; - Stormwater control and discharge - Measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the subject site - Groundwater management plan including measures to prevent groundwater contamination - External lighting in compliance with *AS4282-1997* control of the obtrusive effects of outdoor lighting - Community consultation and complaints handling - Detail the quantities of each waste type generated during construction and the proposed reuse, recycling and disposal locations b. Construction Traffic and Pedestrian Management Sub-Plan (see **Condition B28**); c. Construction of noise and Vibration Management Sub-Plan (See **Condition B29**); d. Construction Soil and Management Sub-Plan (see **Condition B30**); e. Construction Waste Management Sub-Plan (see **Condition B31**); f. An unexpected finds protocol for contamination and associated communications procedure; g. An unexpected finds protocol for contamination, Aboriginal and non-Aboriginal heritage, and associated communications procedure; and h. Waste classification (for materials to be removed) and validation (for materials to remain) be undertaken to confirm the contamination status in these areas of the site. i.
B28 **[refer to DA Condition B27 (b)]**	The **Construction Noise and Vibration Management Sub-Plan (CNVMSP)** must address, but not be limited to, the following: (a) be prepared by a suitably qualified and experienced noise expert; (b) incorporate recommendations of the Acoustic Report for *State Significant Development Application* *Powerhouse Museum Discovery Centre* revision 6 prepared by Northrop, dated 20.02.2021 (c) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009); (d) hours of construction in accordance with **Conditions C6** to **C9**; (e) outline regular community liaison with sensitive receivers around the site (f) outline how noise and vibration impacts would be monitored during construction (g) describe the measures to be implemented to manage high noise generating works, in close proximity to sensitive receivers; (h) include a complaints management system that would be implemented for the duration of the construction; and (i) include a program to monitor and report on the impacts and environmental performance of the

	development and the effectiveness of the management measures
B29 **[refer to DA Condition B27 (c)]**	The **Construction Noise and Vibration Management Sub-Plan (CNVMSP)** must address, but not be limited to, the following: (a) be prepared by a suitably qualified and experienced noise expert; (b) incorporate recommendations of the Acoustic Report for *State Significant Development Application* *Powerhouse Museum Discovery Centre* revision 6 prepared by Northrop, dated 20.02.2021 (c) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009); (d) hours of construction in accordance with **Conditions C6** to **C9**; (e) outline regular community liaison with sensitive receivers around the site (f) outline how noise and vibration impacts would be monitored during construction (g) describe the measures to be implemented to manage high noise generating works, in close proximity to sensitive receivers; (h) include a complaints management system that would be implemented for the duration of the construction; and (i) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the management measures.
B30 **[refer to DA Condition B27 (d)]**	The **Construction Soil and Water Management Plan (CSWMSP)** must address, but not be limited to the following: a. Be prepared by a suitably qualified expert; b. Describe all erosion and sediment controls to be implemented during construction as a minimum, in accordance with the publication Managing Urban Stormwater: Soils & Constructions (4th edition, Landcom 2004) commonly referred to as the 'Blue Book'. c. Provide a plan of how all construction works will be managed in wet weather events (i.e. storage of equipment, stabilisation of the Site); and d. Detail all off-site flows from the site.
B31 **[refer to DA Condition B27 (e)]**	Prior to the commencement construction, a **Waste Management Plan (WMP)**, prepared in accordance with Appendix A of Council's DCP, must be submitted to the Planning Certifier, Council and Certifier. The WMP must: a. Detail the quantities of each waste type generated during construction and the proposed reuse, recycling and disposal locations; b. Identify an appropriate area for the storage of garbage bins and recycling containers for all waste and recyclable material generated by the works c. Demonstrate compliance with relevant legislation, particularly regarding the removal of asbestos and hazardous waste, the method of containment and control of emission of fibres to the air d. Require that all waste generated during the project is assessed, classified and managed in accordance with the EPA's "Waste Classification Guidelines Part 1: Classifying Waste".

Table 1 - Sub-Plan Documents

3. ENVIRONMENTAL MANAGEMENT

2.1 Environmental Management Structure and Responsibility

The site will have the following organisation structure **[complies with DA Condition B27a) (ii)]:**

PROJECT MANAGER:	Marc Jamieson (02 9620 6100)
PERSON RESPONSIBLE FOR ENVIRONMENTAL MANAGEMENT:	Marc Jamieson (02 9620 6100) Rhys Jones (02 9620 6100)
NOMINATED SITE PERSONNEL FOR 24 HOUR CONTACT:	Rhys Jones (02 9620 6100)

Table 2 - Contact Details

2.1.1 Roles and Responsibilities

Foreman/Site Manager:

- Ensure that the dust control system is setup and works properly
- Ensure that noise protection measures are in place
- Ensure that work that includes loud noise and or requires specialist measures is conducted during the set hours outlined.
- Implementing the Environmental Management Plan
- Communicating with workers to reduce environmental issues
- Carrying out audits to ensure the environmental controls are correct and maintained
- Leading by example and promoting safety of the environment
- Coordinating incident investigations and reporting to the controller of the workplace and or authorities
- Assisting in the remediation of the environment if required
- Advising others on project specific environmental matters
- Setting up meetings in regard to environmental control
- Actioning environmental reports and carryout workplace inspections
- Carrying out hazard report and inspections

Environmental Coordinator

- Communication to employees on environmental issues and implementation of the environmental issues within the IMS
- Assisting the foreman in regard to environmental requirements for the site
- Monitoring environmental controls where the risk to the environment is serious enough to warrant it
- Provide the foreman/project manager with the sufficient resources to keep the environmental sustainability to the worksite.

2.2 Reporting

After an audit has been carried out, the following reports should be created when required. This includes:

- Non – compliance report with corrective actions

    - Noncompliance reports should list all non-compliances with environmental controls that have occurred on site. These reports should be followed up as soon as possible so that corrective actions can be implemented.
    - After corrective actions have been implemented on site, a follow up to the noncompliance report should be made, stating all corrective actions taken for each specific noncompliance, along with whether they were effective in each case.
    - After the follow up, an action plan should be created for each audit on the site. This action plan shall include the steps that Simmons Civil staff will take to attempt to rectify the non-conformance.
- Monitoring of the environment during work report
    - This report should all information on the current progress of work on the project. This report should be carried out every 6 months and should include events that have occurred due to environmental controls.
- All reports required by government guidelines
- Incident reports in regard to the environment

All reports should be distributed to all stakeholders who request it after top management approval, along with the final copies being given to the office administration staff for recording and storage in the project folders. A copy of these reports should be kept on site.

All reports are to follow the Simmons Civil document control policy located in the Simmons Civil Integrated Management system server.

2.3 Environmental Training

All employees under The Gables Precinct H Stage 4A & 4B Subdivision project should be trained in general environmental awareness and should be informed of their responsibilities under this environmental management plan. All contractors and subcontractors are also to be trained according to this report. Types of training include:

- Site Induction
    - The Site manager/foreman should run through the possible environmental controls located on site, along with the any hazards that may cause danger to the workers. All environmental issues with the site are also to be explained, along with possible environmental outcomes due to the work being carried out on site. This is to be carried out in conjunction with the environmental training procedure provided.
    - All workers in this time should familiarise themselves with the requirements of this environmental management plan
- Emergency response drills and training
    - Emergency response and evacuation drills are to be carried out every 6 months on site where Simmons Civil Contracting is the principal contractor. These emergency response drills, along with the procedures are to be stored in the site office.
    - A record of this training should be noted, using the emergency drill register which should be given to the site manager by the office administration personnel. Once this is completed, it is then to be given to the office for recording and storage.
- Toolbox Talks
    - Toolbox talks, as per the environmental training procedure, shall be used to inform the workers on site about any further environmental conditions that may affect the site. They will also be used to update the workers on changing environmental circumstances on site.
- Environmental Questionnaire
    - Site personnel are quizzed on their ability to identify various environmental contaminations. They are also asked for the procedure that should follow once an environmental incident has occurred. This is done to test the competence of the

workers in regard to identifying and responding to possible environmental incidents on site.

2.4 Emergency Contacts

The emergency contacts for Castle Hill Powerhouse MDC – Early Works project include the following:

- Nicholas Simmons – 0433 183 253
- Marc Jamieson – 02 9620 6100
- Rhys Jones – 02 9620 6100
- Nhat Nguyen – 02 9620 6100
- Emergency Services - 000
    - Ambulance – 000
    - Hospital
        - Lakeview Private Hospital
          17-19 Solent Cct, Castle Hill NSW 2154
          02 8624 500
    - Fire
        - Fire and Rescue NSW Kellyville Fire Station
          Windsor Rd & Poole Rd, Kellyville NSW 2155
          02 9629 3222
    - Police
        - Castle Hill Police Station
          Castle St & Pennant St, Castle Hill NSW 2153
          02 9680 5399

- Hazardous Materials
    - These are located with the appropriate Simmons Civil storage area or storage cage located on site. All Material Safety Data sheets should be accompanied with this.
- Steps to minimise damage
    - If an environmental emergency has occurred, the site manager/relevant site personnel is to isolate the area and contact the relevant emergency personnel
    - The director is to be informed of the situation, along with the principal contractor.
- Authorities
    - Council
        - The Hills Shire Council
          3 Columbia Court
          02 9843 0555
    - NSW Environmental Protection Authority – 131 555
- Services:
    - Water –
        - Sydney Water – 13 20 90
    - Gas –
        - Jemena Gas North – 1300 880 906
    - Communications
        - Telstra – 1800 653 935
        - Optus/Uecomm – 1800 505 777
    - Electricity
        - Endeavour Energy – 02 9853 4161

4. IMPLEMENTATION

3.1 Risk Assessment

All activities which are to be carried out on site include those listed under the SWMS, this includes but is not limited to:

SWMS	**Environmental Impacts/Hazards**
HRCW SWMS - 1	Spillage of toxic/hazardous materials, improper environmental control setup
SWMS 387-1 R3 Refuelling Plant	Spillage of toxic/hazardous materials
SWMS 387-2 R3 Working with Mobile Plant	Spillage of toxic/hazardous materials
SWMS 388-3 R3 Site Establishment	Improper environmental control setup
SWMS 388-5 R3 Bulk and Detailed Excavation	Asbestos contamination, Spillage of toxic/hazardous materials
SWMS 388-3 Bulk Excavation	Asbestos contamination, Spillage of toxic/hazardous materials
SWMS 388-4 R3 Trim and Placement	Spillage of toxic/hazardous materials
SWMS 388-5 R1 Road-base Installation	Spillage of toxic/hazardous materials
SWMS 388-7 R3 Back Filling Retaining Walls	Asbestos contamination, Spillage of toxic/hazardous materials
SWMS 388-7 R1 Rock Wall	Asbestos contamination, Spillage of toxic/hazardous materials
SWMS 388-8 R1 Bonded Asbestos Removal	Asbestos contamination
SWMS 388-9 R3 Bulk Filling	Asbestos contamination, Spillage of toxic/hazardous materials
SWMS 388–10 R2 Asphalt Placement	Spillage of toxic/hazardous materials
SWMS 388-11 R1 Demolition of Structures	Asbestos contamination, Spillage of toxic/hazardous materials, Noise Issues
SWMS 388-12 R2 Stormwater Construction	Contamination of water areas/pits, rubbish
SWMS 388-13 R3 Working around live services, potholing	-
SWMS 388-14 Manual Handling	-
SWMS 388-15 Traffic Control	-
SWMS 388-16 Operating a Smooth Drum Roller	Spillage of toxic/hazardous materials
SWMS 388-17 Operating a small dumper truck	Spillage of toxic/hazardous materials
SWMS 388-18 Operating a mustang Bobcat	Spillage of toxic/hazardous materials
SWMS 388-19 Working in confined space	-
SWMS 388-20 Working in public space	-

SWMS 388-21 Potential Emergency Situations	-
SWMS 388-22 Operating a Pad Foot Roller	Spillage of toxic/hazardous materials
SWMS 388-23 R3 Operating an Excavator	Spillage of toxic/hazardous materials
SWMS 388-24 Operating a 12M Grader	Spillage of toxic/hazardous materials
SWMS 388-25 Asbestos Removal	Asbestos contamination, Spillage of toxic/hazardous materials
SWMS 388-26 Demolition and Construction of Footpaths	Rubbish, noise issues
SWMS 388-29 Saw Cutting	Dust
SWMS 388-35 Concrete Placement	Spillage of toxic/hazardous materials
SWMS 388-36 Concrete Removal or Demolition	Spillage of toxic/hazardous materials
SWMS 388-37 Site Clearance	Improper environmental control setup

Table 3 - SWMS

Potential Environmental Hazards		
No	**Impact/Hazard**	**Level**
1	*Spillage of toxic/hazardous materials*	Medium probability, Catastrophic level of impact. Ensure that all plant and machines are maintained properly, ensure no leaks whilst refuelling and only refuelling in a designated area, or if possible off site.
2	*Asbestos contamination*	No probability, Catastrophic level of impact. If asbestos if uncovered, stop work, isolate area and tell supervisor. Call relevant authorities. If asbestos is a listed probability prior to work, ensure that safety equipment and isolation gear is at the ready prior to work. Follow the appropriate asbestos removal plan if found.
3	*Improper environmental control setup*	Medium probability, medium impact. Controls should be checked regularly to ensure they are performing up to standard.
4	*Runoff*	High probability, medium impact. Runoff is to be controlled via silt fences being installed around site. To be regularly checked to ensure they are working effectively. Kerb pit areas to be protected by infill sock around entrance of kerb pit. Pit areas to be protected by silt fence around pits lower than ground level. All areas near the creek should be fenced off.
5	*Dust* **[refer to DA Condition B27a) (iii)]**	Medium Probability, low impact. Dust to be controlled via use of water cart to wet down soil to ensure particles clump and do not escape into the air in large amounts. Fence shading cloth is also to be put up if dust levels rise due to high winds.
6	*Flora/Fauna*	Low Probability, low impact. There is various type of flora located around the perimeter of the site. Measures should be taken to not endanger them due to construction activities. Trees associated with final landscaping works should be protected.
7	*Noise*	High Probability, Low Impact. As the site is quite isolated, noise is not an issue. However, if the noise goes above the safe 85dB limit, then earmuffs are to be worn in areas where noise may be damaging. If neighbours complain about noise, they shall be consulted.

8	*Rubbish and Recycling*	High probability, Low Impact. All rubbish is to be removed into the bins located on site with the site office and lunchroom/ablution block. Any recyclable materials are to be stockpiled and sorted.
9	*Water Quality*	Low Probability, Medium Impact. Water used for dust control is to be taken from a safe source prior to use. Used water not to be removed into the creek area.
10	*Plant damage to land*	Medium Probability, Medium Impact. Plant are to be cleaned prior to leaving site to ensure no soil is spread across surrounding environment. Paths for plant travel are to be determined prior to use to ensure minimisation of damage to ground in and around site.

Table 4 – Potential Environmental Hazards

All environmental controls for potential environmental issues and hazards that may be caused have controls outlined in their respective SWMS, which is located on site. These SWMS should be consulted conjointly with all Simmons Civil Environmental documentation located on the Simmons Civil server. All environmental aspects and considerations are also located on the project environmental emergency response plan/procedure.

Activities

No	Activity	Impacts/Hazards Associated
1	Site Establishment	1, 3
2	Floating of plant to/out of site	5, 7, 10
3	Bulk/Detail Earthworks to levels	3, 4, 5, 7, 8, 10
4	Demolition and Sawcutting	3, 4, 5, 7
5	Service Trenching	3, 4, 5, 7, 8, 10
6	Stormwater	N/A
7	Service Construction	N/A
8	Concreting	1, 7, 9, 10
9	Asphalting/Paving	1, 4, 7
10	Line marking	1
11	Landscaping	N/A

Table 5 - Environmental Impacts

Risk Matrix					
	Impact/Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	10	16	20	23	25
Likely	7	11	17	21	24
Possible	4	8	12	18	22
Unlikely	2	5	9	14	19
Rare	1	3	6	13	15

Score	Level of Risk
18 to 25	High
10 to 17	Significant
6 to 9	Moderate
1 to 5	Low

Activity	Level of Risk without controls	Level of risk with controls	Overall significance to Project:>

1	11	2	Major Significance
2	17	6	Moderate Significance
3	21	3	Major Significance
4	17	1	Major Significance
5	21	3	Minor Significance
6	21	3	Moderate Significance
7	21	3	Moderate Significance
8	16	2	Minor Significance
9	23	5	Moderate Significance
10	4	1	Insignificant
11	1	1	Insignificant

Table 6 - Environmental Risk Matrix

Environmental risk assessments should be carried out at the start of the project and should be updated during each internal audit/site inspection.

3.2 Environmental Controls

3.2.1 Sediment Control

Objective

The objective is to protect open drains and natural drainage lines from sedimentation deposits by minimising erosion of lands and transportation of sediments during construction **[refer to DA Condition B27a) (iv)].**

Control Measures

The following measures should be undertaken to minimise erosion.

- Set up silt traps to stop sediment laden rainwater going into drains. When sediment traps are up to 1/3 full of silt, the silt should be removed.
- All sediment laden water is not to be discharged to drains.
- Kerb inlet drains and pits to have geotextile sock to stop water from entering/direct water away from pit.
- Keep exposed soil to a minimum
- Avoid highly erodible soils and steep slopes
- The amount of vehicles entering and travelling through exposed soil areas is to be minimised.
- Divert clean stormwater by small levees away from those parts of site where the soil is exposed.
- Cover stockpiles as soon as practicable.
- Where/when practicable, all trenches should be backfilled at the end of the working day.
- Machine activity is to be kept to an absolute minimum.
- Construction Plant and machinery is to remain within the construction site for the duration of the project. If they are required to leave site, they should leave over the cattlegrid rumble bar to negate soils being attached onto the truck wheels as they are leaving the site.
- All drainage channels carrying stormwater runoff are to be stabilised.
- Works which require the use of dirty water or works which could contaminate water should drain the water away from water sources. If possible temporary work actions should occur on the opposite side of the site (e.g. refuelling) to ensure that no hazardous materials escape into the local environment.

3.2.2 Dewatering of Work sites

Objective
To ensure that dewatering operations do not result in turbid water entering natural waterways **[refer to DA Condition B27a) (iv)].**

Control Measures
Treat turbid water to remove sediment prior to being pumped into stormwater system or natural waterway. Treatment may be done by placing turbid water into dam or tank to allow sediment to settle.
De-water by pumping water, wherever practicable on to vegetated areas of sufficient width to remove suspended soil or to sediment control devices.

3.2.3 Erosion & Dust Control

Objective
To minimise / avoid the health risks or loss of amenity due to emission of dust to the environment and the loss of soil from the environment **[refer to DA Condition B27a) (iii and iv)].**

Control Measures
- Ensure that the area of cleared land is minimised.
- Implement dust suppression measures such as promptly watering exposed areas when visible dust is observed.
- Use geotextile fabrics to cover stock piles and unvegetated areas where practical
- Locate stockpiles where they are protected from wind.
- Minimise the number of stockpiles, the areas and the time stockpiles are exposed.
- Smooth surfaces should be deep ripped and left rough and cloddy to reduce wind velocity at the soil surface.
- All sediment laden water is not to be discharged to drains.

3.2.4 Air Quality (Plant Emissions and Other Discharges to Air)

Objective
To ensure there is no health risk or loss of amenity due to emission of exhaust gases or other discharges to air.

Control Measures
- Vehicles and machinery to be maintained regularly and serviced to the manufacturer's specifications.
- Generally if smoke is visible after 10 to15 seconds of engine start-up or during normal operation, the vehicle may need to be serviced.
- Vegetation, building materials (such as timbers) must not be burned off. Vegetation should be mulched. Constructions materials such as timber should be recycled.

3.2.5 Noise and Vibration

Objective
To ensure that nuisance from noise and vibration does not occur.

Control Measures
- Working hours to be in keeping with the local By-laws and EPA Noise Guidelines.
- Limit rock breaking operations to the hours of 8am to 5pm Monday to Friday.
- Advise local residents when unavoidable out of hours work should occur.
- Give site personnel ear muffs to ensure their auditory passages are protected whilst working near plant/machinery that may go over the 85dB safe limit.

3.2.6 Construction Waste Management

Objective
To minimise generation of solid wastes from construction activities and to appropriately dispose of generated solid waste **[refer to DA Condition B27a) (ix) and B27h)].**

Control Measures

- All solid wastes should be placed in appropriately designed storage areas during construction.
- As part of Progressive rehabilitation of areas any solid waste should be removed from site and disposed of appropriately. Work and surrounding areas should be maintained in a tidy condition.
- There should be no vegetation burning. All waste vegetation should be chipped or mulched on-site and reused or appropriately disposed of.
- Weeds are to be disposed of offsite in appropriate disposal facilities.
- Wastes should be collected for recycling and or disposal at designated tip sites.
- Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.
- Sending waste concrete from demolition to a concrete recycler instead of landfill.
- Conduct site clean-up weekly
- Using overburden to construct temporary noise barriers.
- Collecting lubricating oil from the construction vehicle fleet and sending it to a recycler.
- Collect steel, timber, concrete and plastic waste into recycling bins and arrange to be used on other project if possible

3.2.7 Storage of Fuels & Chemicals on Site

Objective

To ensure that chemicals and fuel storage is safe, and that any materials that escape do not cause environmental damage such as groundwater or soil contamination **[refer to DA Condition B27a) (iv and vi)].**

Control Measures

- Minimise chemicals and fuel stored on site.
- Store dangerous chemicals in a roofed and bunded area with an impervious floor, separated and signed as required by relevant codes and standards. (Simmons Civil storage cage)
- Bunds should be impervious to prevent spilled product from escaping.
- Any spillage should be cleaned up immediately.
- Where possible store each type of chemical/ fuel in a separate area so that spilled product can be retrieved and re-used (providing that it has not been contaminated with water or other debris).
- Maintain a record of Material Safety Data Sheets.
- Restrict the area in which hazardous materials can be stored during construction works.
- Have a spill kit which is available on site at all times.

3.2.8 Dirty Roads

Objective

To ensure that roads are kept clean of soil.

Control Measures

- Prevention of soil being deposited on roads is preferable to cleaning them afterwards.
- All loads of soil being transported for off-site disposal should be covered.
- If required, install litter traps lined with filter cloth in entry pits.
- If required, roads are to be swept or washed down.
- Clean vehicles prior to site exit.
- The proposed site egress/exit point will have no exposure to any soils. Therefore, no materials will be tracked onto roadways by trucks, and no wheel washing will be required **[refer to DA Condition B27a) (v)].**

3.2.9 Management of Stockpiles

Objective

To manage soil stockpiles so that dust and sediment in run-off is minimised **[refer to DA Condition B27a) (iii and v)]**.

Control Measures

- Minimise the number of stockpiles, and the area and the time stockpiles are exposed.
- Locate stockpiles away from drainage lines and at least 10m away from natural waterways and where they should be less susceptible to wind erosion.
- Ensure that stockpiles have slopes no greater than 2:1 (horizontal: vertical).
- Stabilise stockpiles if left more than 28 days by covering with anchored fabric or by seeding.
- Establish sediment controls around unstabilised stockpiles.
- Suppress dust generation from stockpiles as circumstance demand via water cart.
- Stockpiles should not be located under the drip line of trees or across drainage lines or gutters.

To detail all of quantities of each waste type generated during construction and the proper reuse, recycling, and disposal locations, 117m^2 of asphalt and 50m^3 of native tree mulch is to be removed. All mulch removed is to be removed and passed through a mulcher chipper for recyclable reuse. A general waste skip bin will be near the asphalting works, adjacent to the site shed. A detailed constriction plan as well as more details on waste management are found through the Waste Management Plan **(see Condition B31)** will be provided for your reference.

3.2.10 Vegetation

Objective

To protect indigenous vegetation and habitat in construction works area and to reinstate vegetation and habitat as the works progress.

Issues

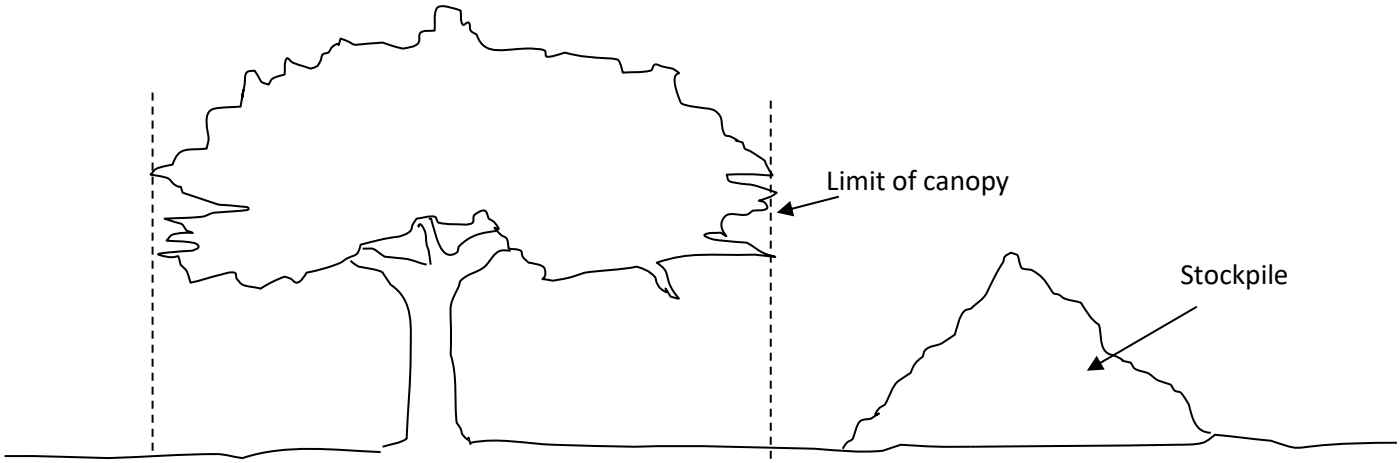
- Weed contamination in construction works area
- Soil compaction especially under tree canopy
- Protection of indigenous vegetation
- Protection of topsoil

Control Measures

- Check site to assess if there are noxious weeds. Contact EPA or visit www.weeds.gov.au to find out what are noxious weeds.
- If there are noxious weeds, you must ensure that any noxious weed part or seed is not taken out of the site.
- To control weed contamination of site, trucks and other construction plant should not move from areas where there is significant weed contamination to areas where there is minimal weed contamination.
- Prior to commencing work on site, all construction equipment and trucks shall be free of weed contamination.
- Works to be programmed to minimise the potential for weed contamination. Trucks should start work in minimal weed contaminated areas and move to areas where there is a higher degree of weed contamination.
- All construction vehicles to be prevented from travelling too close to trees or under a tree canopy (see picture below).
- Vehicular traffic should be prevented from travelling close to trees by placing some star pickets and webbing around the tree
- Appropriate treatment and disposal of removed vegetation.
- Topsoil should be stockpiled and returned to the site from which it was removed with the original contours.
- In pasture or recreation areas, grasses should be sown appropriate to the use of the site in consultation with the local council and landowners.
- Materials for rehabilitation should be from areas which are not infested with weeds or other exotic flora.
- The sources should be checked for weeds prior to transportation to site.
- Any existing trees which form part of the final landscaping plan will be protected from construction activities.
- Trees to be protected with barrier fencing or similar materials installed outside the drip line

- Nothing to be nailed to protected trees.
- Nothing to be paved, graded, sediment washed or stockpiled within drip line unless encroachment occurs only on 1 side and no closer to the trunk than 1.5m or half the distance between the outer edge of the drip line and the trunk.
- Refer to image below for drip line (limit of canopy)

Clearance from tree:



3.2.11 Protection of Fauna

Objective
To protect native vertebrate fauna from being trapped.

Control Measures
- All open trenches should be inspected prior to commencement of work each day for trapped vertebrate fauna such as frogs, reptiles, birds or mammals.
- If it is found that there are trapped vertebrate fauna in open trenches then an appropriate shelter for animals should be contacted to remove it from the trench.
- Wherever possible ensure that all trenches are backfilled each night.
- Before excavating or dumping soil check if there are any animals such as lizards or frogs.

3.2.11 Heritage & Archaeology

Objective
To prevent damage or loss to heritage places and objects which would result in loss of cultural, historic and educational value to the community.

Control Measures
- Fence heritage or archaeological site
- Place signs to indicate area is a "no go" area
- Ensure that the appropriate permits / authorisations have been received prior to commencing work
- Protection of scar trees

Corrective Action
All environmental incidences and breaches should be logged using Environmental Controls Inspection Forms and the Non Conformance Reports. Defects/Suggestion report form (Non Conformance Report Form) should be completed for each environmental breach or incident.

3.2.12 Energy Use

To minimise the use of non-renewable energy.
Control Measures:

- Do not leave machinery or vehicle engines on when this is not necessary.
- Switch off lights when rooms are not used.

3.2.13 Concrete and Masonry

Objectives
To minimise pollution of drains or soil from concreting operations **[refer to DA Condition B27a) (v)]**

Control Measures

- Concrete Pumps operating on roads or near drains must set up bunds to stop any potential spills.
- Dirty water from washing concrete mixers or from concrete or masonry cutting machines must not be allowed to flow into drains. It must be captured and allow sediment to settle. Sediment is then disposed in appropriate waste treatment facility. This should be caught in an appropriate site catchment basin/area.

The following section will identify all environmental management activities with their associated mitigation measures that will be used to minimise the impact upon the environment.

3.2.14 Odour Management

Objectives
To minimise odour pollution from construction works **[refer to DA Condition B27a) (iii)]**

Control Measures

- No general waste is to be collected within the early works of the carpark.
- Odour emissions from all operational machinery are to be reported to the Project Manager immediately.
- Maintenance and handling of construction machinery are to be properly executed.

3.3 External Lighting

During the replacement of the carpark lighting, the control measures of any obtrusive effects on all external lighting is to comply with AS 4282-1997 **[refer to DA Condition B27a) (vii)].** Drawings provided by Northrop (see J-WD-EW-E10.00-[C]).

Impact/Hazard	Time effective	When to Inspect	Controls
Spillage of toxic/hazardous materials	Start to Finish	Every Week	Materials are to be stored in the designated Simmons Civil Contracting material storage area. All hazardous and toxic materials are to be stored further into the area, to ensure they are contained and not out in the open. All hazardous materials are to be accompanied by a relevant MSDS. In regards to refuelling, all machines are to be refuel in designated zones on site only if necessary. It is strongly preferred that all machines are to be refuelled off site. Prior to refuelling, ensure that there are no leakage areas in/on the vehicle. Turn off the vehicle prior to refuelling. Once the vehicle has been refuelled, safely remove all potentially hazardous refuelling material from the area. Ensure that they are properly secured and tightened, so that no spillage can occur from the storage device. Fuel is to be stored in the hazardous material storage area.
Asbestos contamination	When Asbestos is found	Prior to asbestos removal completion to ensure all material has been removed	If there is the potential for asbestos contamination, all safety controls should be put in place prior to starting work. This includes access to safety equipment such as coverall suits, latex gloves and face masks/safety glasses. When asbestos contaminated material has been discovered, work in area is to be stopped and area isolated, with the relevant authorities being called. The site is to be isolated until the asbestos material has been tested and removed by the certified Class A or B licensed asbestos remover. All asbestos material is to be removed and delivered to a nominated licensed asbestos removal dump area, encapsulated or sealed where possible. Asbestos is to be wet down prior to removal, to ensure particles do not escape into the air.
Improper environmental control setup	Site Establishment	Every Week	All environmental controls including those for dust, runoff, noise, rubbish and spillages are to be inspected every week to ensure that all controls are working effective each week. This is to ensure there are no problems for the system. After the initial site establishment, all environmental controls are to be inspected and tested prior to first usage. This is to ensure all controls have been set up properly and are not faulty/have not been damaged.
Runoff	After Site Establishment to Finish	Each Week	Silt fences are to be installed around the boundary of the site according to the site plan/drawings. These fences are to be installed within the site, with the foreman/site manager ensuring that there are no perforations/penetrations in the silt fence which may cause the runoff the escape through. In regards to general pits and kerb pits, they are also to be protected. General pits with grating are to be protected with a silt fence with star posts surrounding all four sides of the pit. Kerb and gutter pits are to be protected using a gravel infill sock around the open area, to redirect flow around the pit to ensure runoff water does not escape into the storm water system.

			All water prior to wetting down of stockpiled soil and work area is to be tested to ensure there are no contaminants in it. Water is only to be taken from trusted sources which have been tested.
Dust **[refer to DA Condition B27a) (iii)]**	After Site Establishment to Finish	Each Week	Removed spoil and excavated ground area is to be wet down via use of a water cart to ensure dust particles do not form in the air and fly away. Prior to ending the day, the spoil in the stockpile area should be checked to see if has been wet down, if not then wetting down of this stockpile is necessary. After that, the stockpile mound is to be covered using a tarp/cloth to ensure winds at night don't blow away excess materials that may create dust particles. This control is to be used in combination with temporary fence mesh so that dust particles do not escape the site. If the above 2 controls do not prove to be effective, then misters are to be installed on the temporary fencing surrounding the site. They are to be connected to a trusted and tested water source. If misters are being used, they are to be tested prior to be used for dust control, to ensure there are no faults in the system. These dust controls should be checked regularly every week. Wetting down of excavated and spoil stockpiled areas should occur before work finishes every day, to ensure that the site will not produce too much dust particles overnight due to wind.
Flora/Fauna	Before Site Establishment	After removal	All flora and fauna hazards are to be identified prior to site establishment. All trees which are deemed to be protected and/or not removed on the site plan are to be marked and kept safe with barriers surrounding the protected vegetation. This includes the insulation of minor silt barriers around trees to ensure that spoil runoff does not affect the trees. All trees/vegetation marked for removal are to be removed by chopping it down in a safe manner. The stump is to be removed and the area checked to see it there are roots left. All leftover root material is also to be removed. If possible, removed trees are to be removed as a whole, with the entire root system so that they can be replanted on site or moved to another area. The remaining area is to be filled with appropriate soil material that may be taken from other areas on the site.
Noise	After Site Establishment to Finish	Each Week	Noise levels are to be kept to as low as possible measurements whilst working. Plant is not to be left unattended and idle if not working as this creates extra unneeded noise. Works are only to be conducted during the allocated working hours unless expressed otherwise. In areas where noise exceeds the 85dB limit, earmuffs are to be worn. When work which may produce loud noise is being conducted, the council and any surrounding neighbours that may be affected are to be informed beforehand. Complaints by neighbours are to be reviewed with top management, with a suitable solution being found as a result of this.
Rubbish and Recycling **[refer**	Start to Finish	Each Day	Construction waste is to be stockpiled into piles which are separated from excavated material. Rubbish should be

to DA Condition B27a) (ix)]			located and thrown into the bins located on site. Any recyclable materials should be gather analysed whether they are able to be recycled.
Water Quality	After beginning to use water cart	Each time related activity occurs	Ensure quality of water/source of water prior to using it. Water that used on the site (i.e. for dewatering) should be clean and not contaminated
Dirty Roads **[refer to DA Condition B27a) (v)]**	Start to Finish	After Works	Prevent soil from entering roads. Ensure that trucks taking soil are covered. Ensure that all sediment that may fall onto the road is cleaned up each day.

Table 7 – Control Measures

3.3 Additional Environmental Guidelines

The environmental controls should follow the principal contractors environmental control plan and or maps. The principal's traffic management plan should be followed in regards to restrictions on traffic movement. In addition to Simmons work, the emergency evacuation plan should be followed in regards to storage areas. All other Simmons documentation regarding guidelines include the following, which can be found on the Simmons server.

Guidelines
Air Quality (Dust Control and Plant Emissions)
Cleaning Plant & Machinery to Minimise the Distribution of Weeds & Seeds
Clean-up after Concrete Delivery
Contaminated Material Found During Site Works
Dewatering & Pumping Wastewater
Disposal of Prescribed Waste
Effect on Water Quality
Excavation Soil Management
Flora & Fauna Protection Before Grubbing & Clearing
Fuel Spill Control & Clean-up
Heritage & Archaeology
Identification of Environmental Aspects & Impacts
Identification & Protection of Flora & Fauna
Identification, Excavation & Disposal of Contaminated Material
Noise Pollution
Recycled Water Use
Site Protection & Restoration of Vegetation

Site Visual Impacts and Amenities
Stopping Sediment in Drains & Waterways
Storage of Fuels & Chemicals on Site
Use of Energy
Vibration Control
Waste Minimisation & Recycling

Table 8 – Additional Environmental Guidelines

3.4 Environmental Schedules

The following files should be used to conduct audits/reports and training in regard to environmental management.

- Toolbox Talk
- Audit Checklist
- AS/NZS 14001
- Environmental Project Review Form
- Non-Conformance Report
- Non-Conformance Report Log
- Simmons Civil Environmental Objective, Target, and Programme Policy
- Environmental Emergency Response Plan
- Simmons Civil Environmental Training Procedure
- Site Induction Form
- Visitor Site Induction Form
- Workplace Inspection Form
- Site Inspection/hazard identification form
- Environmental Training register
- Material safety Data Sheets
- Environmental Control Inspection Form
- Environmental Competence Questionnaire

3.4.1 Monitoring and Review

Environmental Monitoring

All environmental management activities and controls are to be monitored on a regular basis, to ensure that all systems and controls are working suitably and correctly. This includes dust, noise and asbestos control.

These are to be identified on a site environmental control inspection form, which is to be completed weekly by the site manager or foreman.

Dust control is to be created via the use of a watercart. Dry excavated material is to be stockpiled and wet down via a water cart to ensure dust particles do not spread whilst the wind is blowing.

Run off is to be controlled via a silt fence along the boundary of the site, inside the fence area and the specified areas as per the drawings. All pit areas are also to be protected via a geotextile silt fence. In the case of kerb gutter pits, they are to be protected by a geotextile infill sock.

If there are any flora/fauna on site which may be endangered due to excavation activities, they are to be protected. All site documented drawings are to be followed in regard to the removal and protection of trees.

Hazardous materials that are in danger of spilling or that may cause extensive contamination to the surrounding environment are to be stored in the designated hazardous material storage area designed on the site/evacuation plan. These hazardous materials are to be accompanied by the relevant material safety data sheets. These materials are only to be used whilst being supervised by the site foreman/manager and are to be only used by trained personnel.

All environmental controls are the responsibility of the site foreman/managers (Joe Goodacre/Brian McSpadden) to ensure that they are in place and are working correctly.

Monitoring records are to be stored on site, with copies being given to office staff for safe keeping, recording and storage on the Simmons Civil Server.

Environmental Auditing

For all sites where Simmons Civil is a principal contractor including The Gables Precinct H Stage 4A & 4B Subdivision regular audits must be undertaken and implemented every 6 months. The information and results stemming from these audits are to be compiled and put into a report, which can be reviewed. Additional audits should be carried out when required.

All non-conformances found due to the result from an internal audit are to be reported and to be fixed as soon as possible. All audits are to determine whether this environmental management plan is being properly implemented and maintained.

The audit programme should follow the following procedure:

Time	Actions
2 Months prior to audit	Inform Site foreman/manager and director of upcoming audit to site
2 Months prior to audit	Site manager and foreman are to communicate with administrative staff to fix all still existing non-conformances prior to audit during this time
Day of Audit	Site Manager/Foreman to be informed prior to visit of auditor
Day of Audit	Audit begins
Day of Audit	Auditor to inspect all site-specific environmental documentation and controls in place
Day of Audit	Auditor to inspect site via walk a bout with site foreman to identify and see if all controls are in place in regards to environmental management
Day of Audit	Auditor to inspect office documentation for records of environmental management
Day of Audit	Audit ends
Within month after audit	Auditor to produce report detailing and listing all non-conformances, their causes and areas of potential improvement.
Within month after report	Simmons Civil administrative staff to produce action plan for non-conformances.
As soon as possible after audit	Staff are to being fixing non-conformances found by audit

Table 9 - Environmental Auditing

All non-compliances with environmental management controls, environmental incidents and emergencies should be followed up as soon as possible. If the issue is site related, they are to be investigated and fixed by the site foreman (Rhys Jones). After a corrective action has been installed, it is to be reviewed to see if it is effective. This should be added to the corrective actions report for the project.

If the issue is office related, the relative office staff (Kirk Wilson, Nick Simmons, Kathy Binley, Elie Antoun, Benny Ho, or Gerhard Groenewald) are to follow up and investigate the cause of the non-

conformances and fix it as soon as possible. This is to be followed up to see the controls put in to stop the non-conformance have been effective.

3.4.2 Environmental Management Plan Review

This environmental management plan should be reviewed at 6-month intervals following the review schedule set out by the Simmons Civil Contracting Integrated Management system. Unless the project has been completed this document is to be reviewed. If the project has been completed, the success of the project is to be examined and analysed, looking at areas of improvement that may be possible. This is done via the project environmental review form.

All non-conformances should be listed and stored in the Simmons civil integrated management system under "non-conformance reports". These lists are to be reviewed to try to ensure that the environmental non-conformances from The Gables Precinct H Stage 4A & 4B Subdivision project are minimalized in future projects.

This environmental management plan is to be reviewed jointly by the site foreman (Brian McSpadden) and the office administrative staff (Benny Ho). Decisions are to be made conjointly with reasons supporting decisions to be detailed in the changelog, which is located later within this document.

All site staff are to be informed via the weekly toolbox talk held on site. This Environmental Management plan should be submitted to the client, after significant changes have been made, or when this environmental management plan is requested. If a government authority wishes to see the plan. A copy of this plan is to be given via email or post to them immediately. If this environmental management plan is required to be submitted for approval, it is to be submitted immediately after changes have been made to this plan that bring this plan up to standard. These changes are also to be noted in the changelog.

5. LOGBOOK

4.1 Changelog

This changelog will detail all changes to the environmental management plan The Gables Precinct H Stage 4A & 4B Subdivision. It should include the version number starting from 1, with the description of the change and the reasons for the change being recorded.

CHANGE/ VERSION NUMBER	DESCRIPTION OF CHANGE	REASON
1	Document created	Document created

Table 10 - Change Logbook

4.2 Complaints Handling Procedure

The complaints handling procedure **[refer to DA Condition B27a) (viii)]** is to ensure all members within the community can voice their concerns with the ongoing project here at the Castle Hill Powerhouse MDC. All consultations and complaints will be investigated, and measures will be taken to guarantee resolutions. A draft of the complaints handling procedure will be provided below:

DATE	TIME	CONTACT DETAILS	COMPLAINT DESCRIPTION	RESOLUTION	FOLLOW-UP ACTION (IF REQUIRED)
		Name: _____ Contact Number: _____			

Table 11 - Complaints Logbook

4.3 Protocols Procedure

During our early works here at the Powerhouse MDC, an unexpected finds protocol for contamination, Aboriginal and non-Aboriginal heritage is implemented. The associated procedure below will provide the crucial steps taken in order to adhere to certain protocols **[refer to DA Condition B27 (f & g)]**:

1. **STOP WORKS IMMEDIATELY**
2. Coordinate and fence off area of unexpected protocol
3. Notify the Project Manager, HSEQ Manager and Superintendent
4. Wait for further instructions before proceeding
5. Ensure unexpected protocol is to be managed and/or removed by a certified removalist

6. MANAGEMENT SUB-PLANS

Prior to commencement of construction, the Construction Environmental Management Plan (CEMP) must be submitted to the Planning Secretary, Council and Certifier. The CEMP must provide the following sub-plans:

- Construction Traffic and Pedestrian Management Sub-Plan ***(DA Condition B28)***
- Construction Noise and Vibration Management Sub-Plan ***(DA Condition B29)***
- Construction Soil and Water Management Sub-Plan ***(DA Condition B30)***
- Construction Waste Management Sub-Plan ***(DA Condition B31)***

These sub-plans will be provided below and will be respective to the new revision date/submission.

SIMMONS CIVIL CONTRACTING PTY LTD

CONSTRUCTION TRAFFIC AND PEDESTRIAN MANAGEMENT PLAN FOR CASTLE HILL POWERHOUSE MUSEUM DISCOVERY CENTRE (MDC) – EARLY WORKS CARPARK CONSTRUCTION

2nd August 2021

5.0 PROJECT TRAFFIC MANAGEMENT PLAN

5.1 Introduction

This Traffic Management Plan describes how Simmons Civil Contracting proposes to safely manage vehicular, cyclists and pedestrian traffic during the early works of the Powerhouse Museum Discovery Centre (PMDC).

Simmons Civil acknowledges the safety of road users and the effective management of traffic is paramount to the successful day-to-day activities during the construction phase of this project.

This Project Management Plan is applicable to all staff, employees, subcontractors, and any statutory Service Authorities undertaking service relocations throughout the duration of the contract until project completion and its implementation and on-going development will be managed by the senior project team.

5.2 Scope

This plan applies to all parts of the construction of the project works. It does not apply to the maintenance of the road after opening to traffic.

The scope includes:

- The provision for the safe movement of vehicular and pedestrian traffic.
- The protection of workers from passing traffic.

5.3 Project Description

The aim of this project is to successfully create an accessway between the MDC and the TAFE. Other works within this project may include the demolition of the existing car park and construction of a new car park on the TAFE, earth works and site subdivision **[refer to DA Condition B28 (a)].**

All proposed construction hours will be operational through the following hours:

- Monday to Friday: 7am-5pm,
- Saturday: 8am-1pm; and
- No work on Sundays and Public Holidays

5.4 Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP)

The CTPMSP must be prepared to achieve the objective of ensuring safety and efficiency of the road network. The CTPMSP shall be prepared in consultation with TfNSW (Sydney Coordination Office) and shall specify, but not to be limited to, the following:

a) A description of the development.
b) Location for any proposed work zone(s).
c) Location of any crane(s).
d) Haulage routes.
e) A detailed plan identifying all construction vehicle access arrangements.
f) Estimated number of construction vehicle movements, including measures to reduce the number of movements during the AM and PM peak periods.
g) Construction program.
h) Proposed construction hours.
i) Any potential impacts to the general traffic, cyclists, pedestrians, and buses within the vicinity of the site from the construction of the development; and
j) Proposed mitigation measures. Should any impacts be identified, the duration of the impacts and measures proposed to mitigate any associated general traffic, public transport, pedestrian and cyclist impacts should be clearly identified and included in the CPTMSP.

5.5 Project Work Zones

The following figure will show the proposed work zones of the early works at Powerhouse MDC **[refer to DA Condition B28 (b)].**

Figure 1 - Proposed Work Zones

5.6 Hazard and Risk Management

When planning how to mitigate identified hazards the following hierarchy of controls is considered;

1. **Elimination** – remove the hazard altogether – Isolate the hazard
2. **Substitution** – use a different material / product posing a lesser risk
3. **Engineering controls** – changing the process to prevent persons being exposed to the hazard
4. **Administrative controls** – provide a system of work that reduces the possibility of a person being exposed to the hazard
5. **Personal protective equipment** – personal protective equipment is generally used as a short-term control measure. It can also be used to supplement other measures used to control risks

The table below outlines the methodology that shall be used to identify hazards, to calculate the risk associated with the hazard and what the outputs/controls of this analysis will be. Records of assessment must be kept and referred to Risk Assessment.

Inputs	Activity	Output/Records
Identify Hazards and Risks	Collect and review relevant documents relating to the potential project hazards and risks. Consult with and collect relevant information from clients and other stakeholders. Identify the Hazards/Risks and associated with systems, plant, facilities, processes and practices. Use applicable legislation, advisory standards, codes of practice etc.	Hazards and Risks identified
Assess the potential Hazards and Risks	Using Severity x Likelihood determine what the initial potential Risk Rankings are. A register of hazards and risks must be maintained by the management rep for each project	Initial Risk Rating determined and documented.
Develop controls.	Hazard and Risk controls must be identified and documented, assuming no existing controls are to be in place. Residual Risk is calculated after the appropriate control measures have been identified.	Control measures identified and documented. Residual Risk identified and documented.
Implement Hazard and Risk controls.	Hazard and Risk controls implemented, training provided etc.	Controls implemented.
Monitor / Audit	The effectiveness of Hazard and Risk control measures is monitored and reviewed. The audits must be documented for Mgt Review.	Controls monitored and reviewed.

Table 1 – Hazard and Risk Assessment

5.7 Risks & Proposed Responses

No.	Risks	Potential Consequences	Proposed risk treatment
1	Construction may cause disruption to traffic.	Traffic delays causing frustration to all TAFE occupants and travellers.	Consider methods of construction at an early stage during the design to reflect community needs and reduce delay times therefore minimising the impact on traffic.
2	Traffic management inadequate anticipation and communication issues.	Potential community issues causing dissatisfaction and frustration.	Determine traffic routes and engage with community if needed. Confirm pre-existing conditions. Identify any short-term corrective actions.
3	Severe delays to traffic perceived by the community as a direct result of the construction activities.	Community dissatisfaction, claims for loss of trade, time delays.	Establish good public relations from the outset. Early engagement of affected property/business owners to explain process and ascertain needs and potential effects of changed access.
4	Major Traffic Incident.	Local traffic disrupted upsetting locals.	Regular checking of Traffic Management Plan implementation.
5	Access to site for deliveries.	Traffic disruption or interference.	All deliveries to site will enter from Green Rd (second entry) so there are no traffic disruptions.
6	Traffic Speed.	Construction on side road making it dangerous for road users.	Traffic to generally be reduced to 40kph speeds within the construction zone. Construction zone to be in the full length of the Project.
7	Pedestrian Access	Potential disruption to progress causing pedestrians to not comply with pedestrian provisions.	Pedestrians' access will have a walkway on the perimeters of our job site, and no disruptions will be made through the main TAFE carparks.
8	Seasonal traffic variations not allowed for	High volumes during holidays and weekends.	Consider seasonal volumes in programming works. Keep RMS informed and up to date. Be aware of reporting and notification requirements.
9	Damage to local roads due to heavy vehicle movements.	Vehicle damage and potential incidents. Poor community and council relationship.	Allow for heavy vehicle movements in traffic staging and planning to ensure existing, temporary alignment and pavements are suitable during the construction period.

Table 2 – Risks and Proposed Responses

5.8 Strategy for the Project

The road affected by the construction of the project vary greatly on Powerhouse MDC. However, the requirement remains the same as impacts in both cases must be kept to a minimum.

Therefore, Simmons Civil will:

- Design the works to ensure all occupants within the TAFE and the community maintain the one-way entry/exit point in a safe manner.
- Schedule the works to minimise closures during daylight hours
- Schedule the work to minimise the lane, road occupancy and shoulder closures for tie-ins to existing pavements
- Ensure appropriate controls and procedures are implemented during construction activities to address potential traffic impacts
- Incorporate traffic control measures for construction vehicle movements and works programs in order to minimise traffic and transport impacts on local roads and on the lively street (Showground Rd)

5.9 Objectives and Targets

The road affected by the construction of the project vary greatly on PMDC. However, the requirement remains the same as impacts in both cases must be kept to a minimum.

Therefore, Simmons Civil will:

- Design the works to ensure all occupants within the TAFE and the community maintain the one-way entry/exit point in a safe manner.
- Schedule the works to minimise closures during daylight hours
- Schedule the work to minimise the lane, road occupancy and shoulder closures for tie-ins to existing pavements
- Ensure appropriate controls and procedures are implemented during construction activities to address potential traffic impacts
- Incorporate traffic control measures for construction vehicle movements and works programs in order to minimise traffic and transport impacts on local roads and on the lively street (Showground Rd)

5.9 Traffic Control Plans

Simmons Civil Contracting will implement approved Traffic Control measures for any works which disrupt free traffic movement in road related areas on Powerhouse Museum Discovery Centre.

These measures will include Traffic Control Plans (TCP) which have been created by Danny White from CBD Traffic Control as required and will encompass vehicle movement and pedestrian movement for both construction resources and the general public.

TCPs must be designed and implemented to allow for and accommodate the passage of over-dimension heavy vehicles through all the road occupancies.

To provide a safe environment for pedestrians, the Site Foreman will clearly define the boundaries of all work areas, and provide defined walking paths, where required.

Fencing and Jersey Kerbs will be installed to restrict physical access to hazardous areas and for site security, which will be appropriately sign posted. Various types of temporary and semi-permanent fencing may be installed including plastic mesh; water filled plastic delineators, weldmesh pool fencing and chain mesh hire. All physical barriers must be maintained during the Project and appropriately secured to prevent injury to the public

5.10 Location of Cranes

As part of the Early Works of the Powerhouse MDC Carpark Construction, there will be no cranes utilized within this project. Our primary focus is targeted on demolition and construction of the existing TAFE carpark area **[refer to DA Condition B28 (c)].**

5.11 Haulage Routes

The haulage routes refer to the network plan of any heavy freight vehicles entering and exiting the job site. The routes in Figure 2 as well as The Traffic Control Plan (TCP) provided below indicates that all construction personnel have access to the site. There will also be vehicle access/egress route from the second entry point on Green Rd **[refer to DA Condition B28 (d)].**

Figure 2 - Haulage Routes

5.12 Pedestrian Management Plan

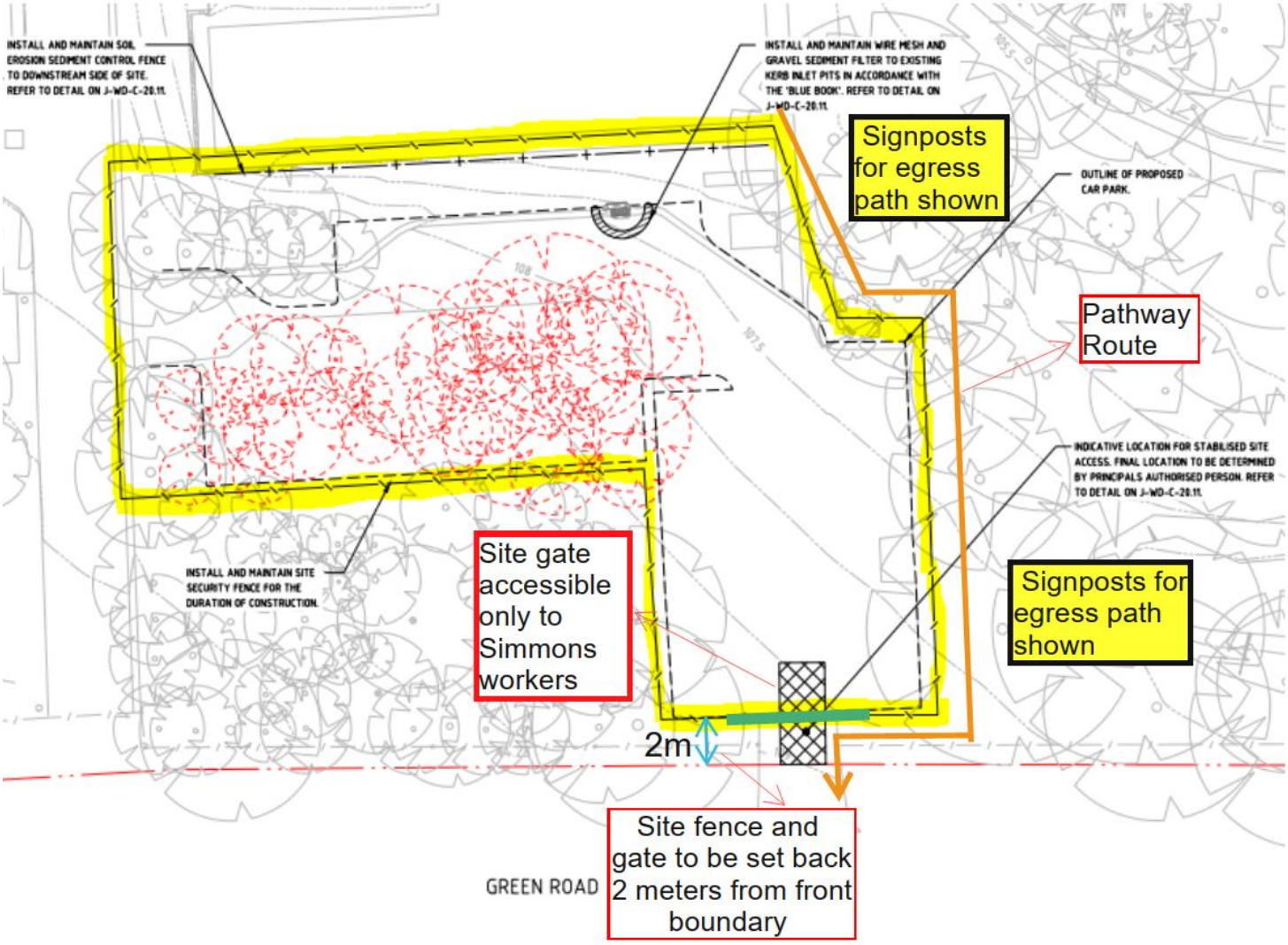


Figure 3 - Pedestrian Pathway Route onto Green Rd

Along with the Traffic Management Plan, the Pedestrian Management Plan must be prepared to achieve the objective of ensuring safety and efficiency of the road network. The proposed mitigation of pedestrian footpaths is identified and must be followed. An emergency evacuation procedure for all pedestrian traffic is also included in the figure below.

5.11 Road Occupancy License (ROL)

Where any work by the Project will or is likely to obstruct or have the effect of restricting, closing, interfering with, or obstructing the free flow of traffic on any lane or shoulder of the existing road, the project team will be required to lodge with RMS or the local council.

Simmons Civil Contracting will obtain the ROLs as part of the consultation with the RMS. When any unplanned closure of a lane or a restriction in the flow of traffic occurs on the existing highway or on specified local roads, the project team will immediately advise RMS of the nature of the closure or restriction and of the schedule for reopening of the lanes.

Simmons consulted with TfNSW to apply for an ROL for the proposed construction traffic exiting site and the approved dates from 25th June to 31st August 2021. These ROLs are contained in Attachment A below. Relevant correspondence for proposed dates are also attached within Attachment A.

5.12 Construction Program

The construction program will consist of a 6 week program and they will consist of, but not limited to the following:

- Week 1: Site Establishment/Site Clearing
- Week 2: Site Clearing + Tree Removal
- Week 3: Base course and installing Kerb and Gutter
- Week 4: Base course and installing Asphalt
- Week 5: Final clean up
- Week 6: Extra week for wet weather conditions and miscellaneous works

The estimated number of construction vehicle movements will be **3-4 trucks per day.** These vehicle movements will be entering and exiting from our job site located on Green Rd (see Figure 2 for haulage routes).

5.13 Proposed Mitigation Measures

Any impacts to the public, cyclists, pedestrians, and buses shall be minimized and managed through the following proposed mitigation measures:

- Any movement and deliveries will be scheduled outside of the AM and PM peak periods
- The construction egress/exit route will minimize the flow of traffic that is ongoing at Showground Rd (see Figure 3)
- No impact on the public domain will be affected due to the works being undertaken wholly within the fenced construction site and the low volume of construction vehicles entering/exiting the site. This will not cause any blockage to accessible bus stops. Pathways on Showground Rd and Green Rd will also be clear of construction for full accessibility for movement for all public transport, pedestrians, and cyclists. (see Figure 4)

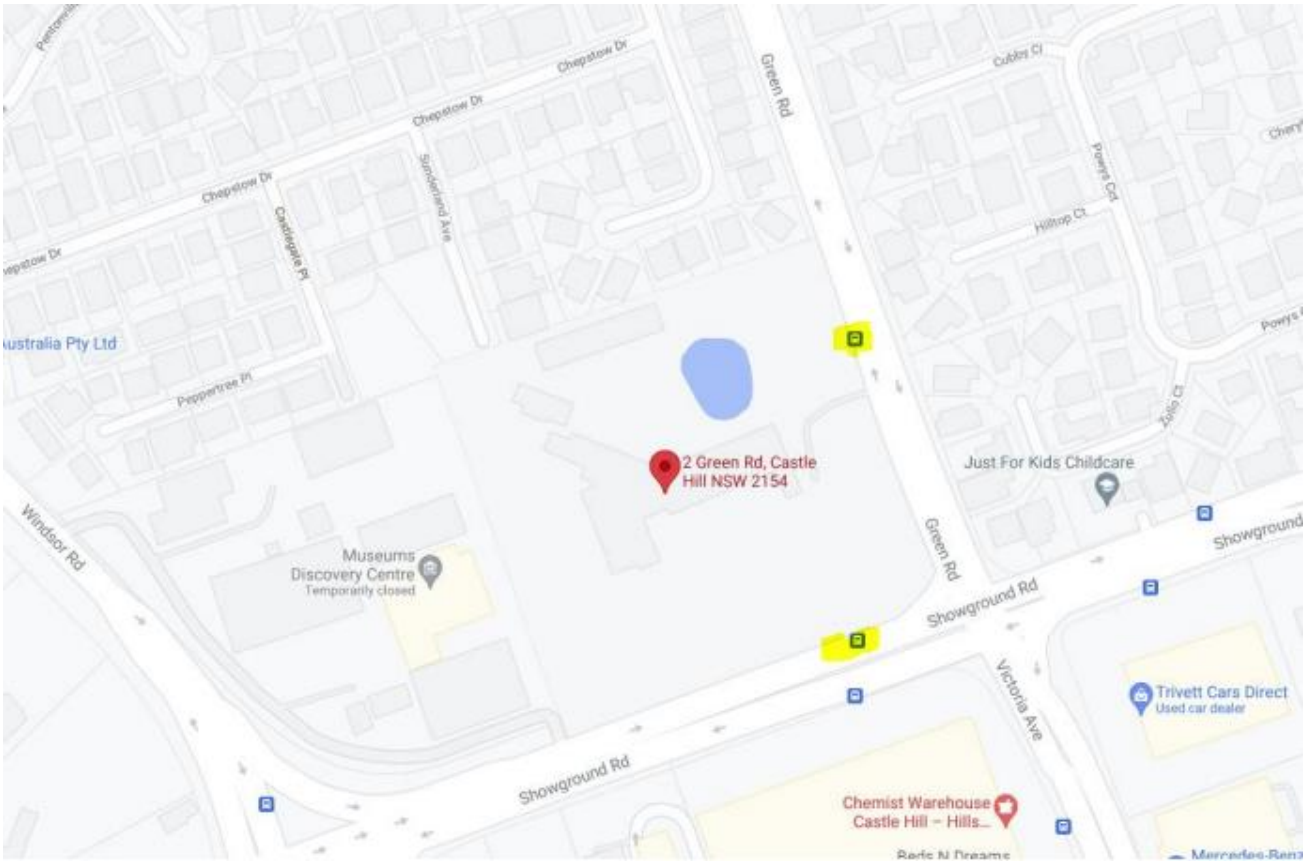


Figure 4 - Bus Stops at Powerhouse MDC

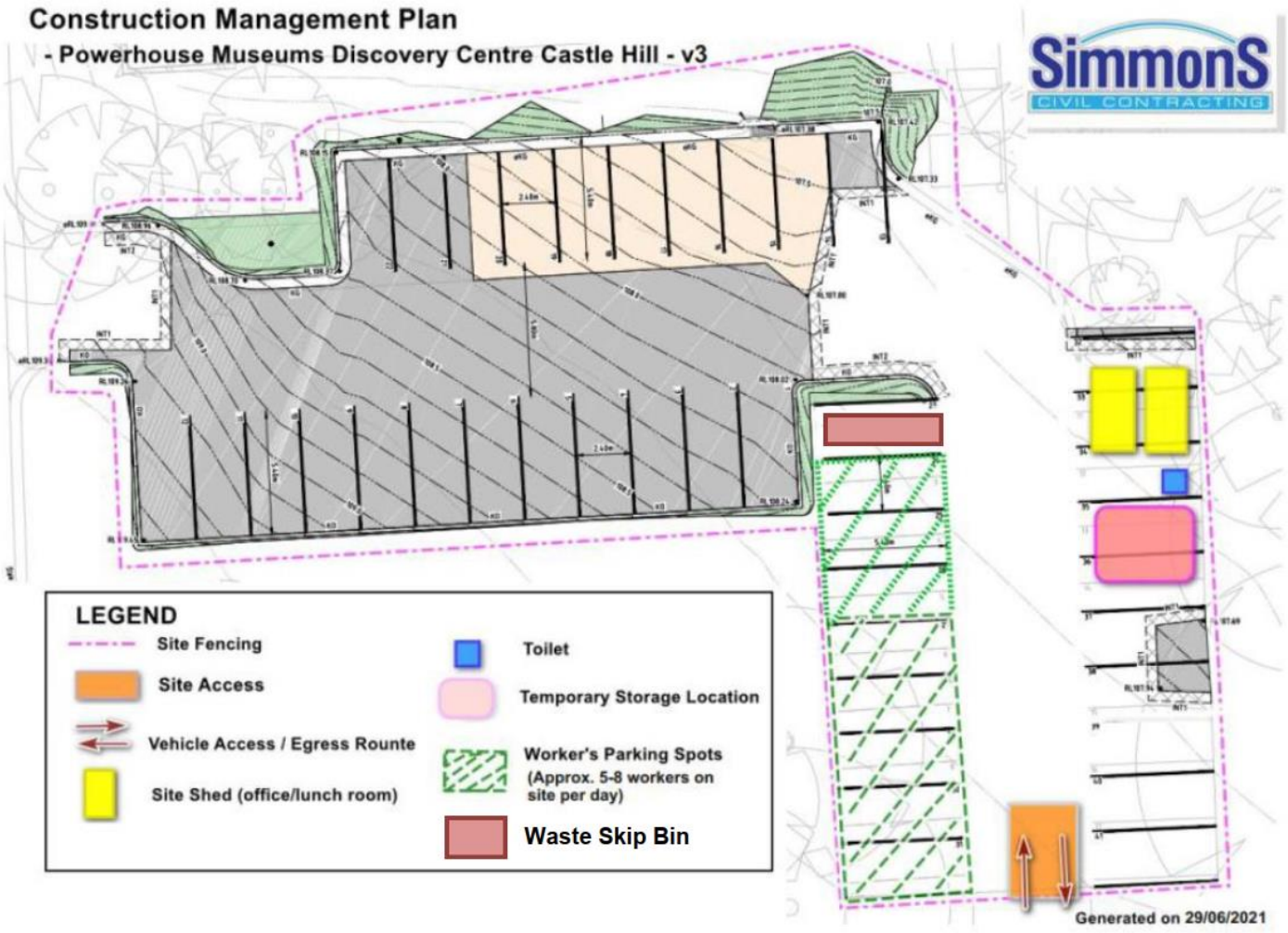


Figure 5 - Construction Management Plan

ATTACHMENT A – CONSULTATION CORRESPONDENCE TO TFNSW

Relevant correspondences will be from 22nd June 2021 and 7th July 2021 for ROL's from 25th June to 25th July, and 26th July to 31st August respectively. This includes the response from TfNSW and the approved ROL for the proposed dates. All details will be provided below.

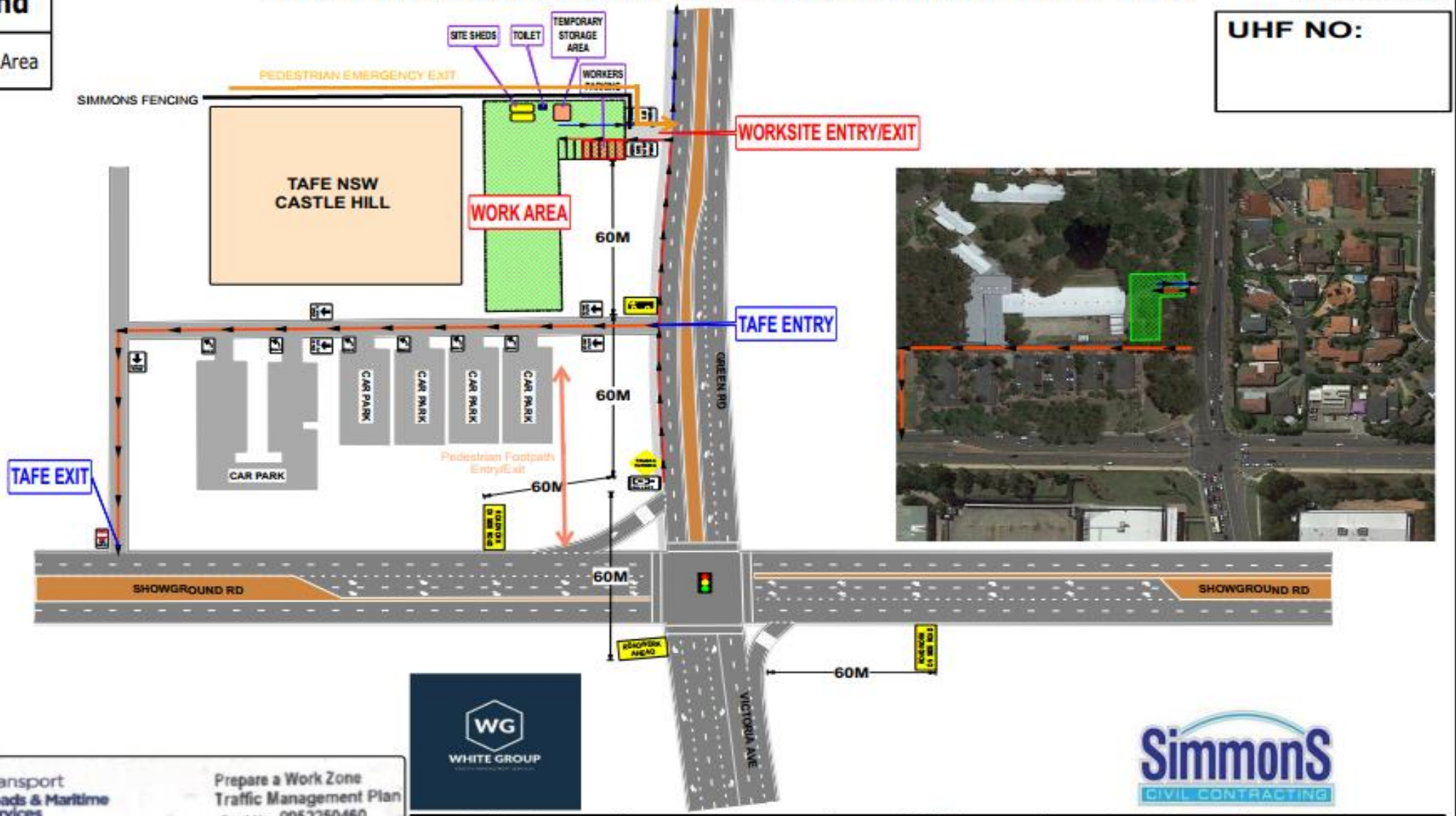
PEDESTRIAN MANGEMENT PLAN & TRAFFIC MANAGEMENT PLAN

www.invarion.com

Legend

Work Area

UHF NO:



WG WHITE GROUP

SimmonS CIVIL CONTRACTING

Modifications By-	Ticket No-	Time Modified-	Date Modified-	Plan No- WG0187

Date: 12/05/2021 **Author:** DANNY WHITE **Project:** POWERHOUSE MDC, GREEN ROAD, CASTLE HILL

Road Type: 2 Way Divided **Road Speed:** 60KM

TRAFFIC CONTROLLER	TEAM LEADER	CREW VEHICLE	C CLASS ARROW BOARD	TMA	AMV	OTHER EQUIPMENT

Prepared & Signed by:
DANNY WHITE
Cert No: 0052250460

Nhat Nguyen

From: White Group <whitegroupops@outlook.com>
Sent: Tuesday, 22 June 2021 4:52 PM
To: Marc Jamieson; Nhat Nguyen
Subject: Fwd: Road Occupancy Licence 1647224 - Approved
Attachments: wewbTMCLogo.jpg; Road Occupancy Licence.pdf

Regards,

Operations
White Group Management Pty Ltd

From: tmc_piu@tmc.transport.nsw.gov.au <tmc_piu@tmc.transport.nsw.gov.au>
Sent: Tuesday, June 22, 2021 4:40:34 PM
To: WHITEGROUPOPS@OUTLOOK.COM <WHITEGROUPOPS@OUTLOOK.COM>
Subject: Road Occupancy Licence 1647224 - Approved

Dear Valued Customer

Your Road Occupancy Licence Application for SHOWGROUND RD, CASTLE HILL has been licensed. The licence number is 1647224.

Please print copies of the Road Occupancy Licence and Speed Zone Authorisations and ensure all copies are kept on site with you at all times whilst the licence is active and produce them upon request by a road authority representative.

TRANSPORT MANAGEMENT CENTRE CHANGES TO ROAD OCCUPANCY LICENCE ACTIVATION AND DEACTIVATION

From the 31st October 2017, the TMC will no longer activate your ROLs via 1800 679 782.

All OPLINC registered organisations must now use the new Shift Activation web address to activate and deactivate your valid work shifts from your approved ROLs.

Please visit:
https://myrol.transport.nsw.gov.au
https://myrol.transport.nsw.gov.au/help.pdf

You may only call the TMC on 1800 679 782 if you require activation/deactivation of TMC field devices such as Traffic Control Signals, Permanent Variable Message signs and Variable Speed Signs (electronic signage).

Kind Regards,
Road Occupancy Unit, Sydney

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Kind Regards,
Road Occupancy Unit, Sydney

ROAD OCCUPANCY LICENCE

LICENCE NO : 1647224

TRANSPORT MANAGEMENT CENTRE (TMC)

Phone: 0283961513 Monday To Friday 8.30 AM - 4.30 PM

To activate and deactivate your approved work shift(s) on your Road Occupancy Licence, please visit: myrol.transport.nsw.gov.au. This licence is for the occupation of the road space only. If you are unable to access myrol.transport.nsw.gov.au, please call TMC on 1800 679 782. For further assistance, please refer to the proponent's user manual here: myrol.transport.nsw.gov.au/help.pdf

NON DEVELOPMENT - NOT KNOWN

Project: Not Applicable
This Activity : SIMMONS CIVIL
Vehicle Exiting Only

LOCATION

Subject Road: SHOWGROUND RD
From: WINDSOR RD, CASTLE HILL
To: GREEN RD, CASTLE HILL
Council: THE HILLS SHIRE

LICENSEE

Organisation: WHITE GROUP MANAGEMENT
Ref No:
Name: DANNY WHITE
Phone: 0427281171

ONSITE CONTACT

Name: Danny White
Phone: 0427281171

TRAFFIC MANAGEMENT

Flow Management: Non-Trafficable Area
Closure Type: None
Closure Lane(s): Shoulder; Median Shoulder
Direction(s): All Directions

LICENCE DURATION

From: 25-Jun-2021
To: 25-Jul-2021

LICENCE CONDITIONS

1. YOU MUST USE SHIFT ACTIVATION WEB ADDRESS https://myrol.transport.nsw.gov.au TO ACTIVATE AND DEACTIVATE YOUR APPROVED ROAD OCCUPANCY LICENCE(S). (TO CHANGE TRAFFIC CONTROL SIGNALS TO FLASHING YELLOW OR TO ACTIVATE PERMANENT VARIABLE MESSAGE SIGNS DIAL 1800 679 782)
2. THIS LICENCE IS NOT AN APPROVAL OF THE PROPONENT'S TRAFFIC CONTROL PLAN. PLEASE NOTE WORKCOVER REQUIRES THAT TRAFFIC CONTROL PLANS COMPLY WITH AS1742.3
3. ALL MATTERS RELATING TO NOISE GENERATION OR OTHER ENVIRONMENTAL FACTORS ON SITE ARE UNDER THE JURISDRICTION OF THE LOCAL COUNCIL AND/OR THE ENVIRONMENTAL PROTECTION AUTHORITY.
4. SHOULD THE PROPOSED WORKS INVOLVE UNDERBORING OR EXCAVATION OF STATE ROAD ASSETS OR THE REMOVAL OF KERB AND GUTTER, DETAILS OF WORKS MUST BE APPROVED BY THE RMS'S ASSET MANAGEMENT BRANCH.
5. NOTIFICATION TO AFFECTED BUSINESSES, RESIDENTS AND OTHER STAKEHOLDERS MUST BE UNDERTAKEN AT LEAST 5 BUSINESS DAYS PRIOR TO WORKS COMMENCING
6. IF ROAD WORKS ARE IN THE VICINITY OF TRAFFIC CONTROL SIGNALS, PEDESTRIAN ACCESS TO PUSH BUTTONS MUST BE AVAILABLE AT ALL TIMES OR ALTERNATE ARRANGEMENTS MUST BE MADE TO ASSIST THE SAFE CROSSING OF PEDESTRIANS.
7. PEDESTRIAN ACCESS AT PRAM RAMPS MUST BE MAINTAINED AT ALL TIMES AND IF ALTERED MUST COMPLY TO RMS TECHNOLOGY STANDARDS AND OTHER RELEVANT AUSTRALIAN STANDARDS OR RELEVANT ROAD AUTHORITY REQUIREMENTS.
8. ANY STOPPAGES OF TRAFFIC RESULTING FROM ACTIVITIES IN THIS LICENCE MUST NOT EXCEED 30 SECONDS PER INSTANCE. ALL TRAFFIC QUEUES MUST BE CLEARED AND TRAFFIC RETURNED TO FREE FLOWING CONDITION BETWEEN STOPPAGES.
9. NO STOPPING OF TRAFFIC DURING PEAK, LEFT IN LEFT OUT ONLY
10. ADEQUATE ADVANCE WARNING MUST BE PROVIDED TO APPROACHING MOTORISTS.

APPROVED DATES & TIMES

From Shift					To Shift			
From	D	M	Time	-	To	D	M	Time
Fri	25	Jun	10:00	-	Fri	25	Jun	15:00
Sat	26	Jun	06:00	-	Sat	26	Jun	10:00
Sun	27	Jun	06:00	-	Sun	27	Jun	10:00
Mon	28	Jun	10:00	-	Mon	28	Jun	15:00
Tue	29	Jun	10:00	-	Tue	29	Jun	15:00
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Thu	01	Jul	10:00	-	Thu	01	Jul	15:00
Fri	02	Jul	10:00	-	Fri	02	Jul	15:00
Sat	03	Jul	06:00	-	Sat	03	Jul	10:00
Sun	04	Jul	06:00	-	Sun	04	Jul	10:00
Mon	05	Jul	10:00	-	Mon	05	Jul	15:00
Tue	06	Jul	10:00	-	Tue	06	Jul	15:00
Wed	07	Jul	10:00	-	Wed	07	Jul	15:00
Thu	08	Jul	10:00	-	Thu	08	Jul	15:00
Fri	09	Jul	10:00	-	Fri	09	Jul	15:00
Sat	10	Jul	06:00	-	Sat	10	Jul	10:00
Sun	11	Jul	06:00	-	Sun	11	Jul	10:00
Mon	12	Jul	10:00	-	Mon	12	Jul	15:00
Tue	13	Jul	10:00	-	Tue	13	Jul	15:00
Wed	14	Jul	10:00	-	Wed	14	Jul	15:00
Thu	15	Jul	10:00	-	Thu	15	Jul	15:00
Fri	16	Jul	10:00	-	Fri	16	Jul	15:00
Sat	17	Jul	06:00	-	Sat	17	Jul	10:00
Sun	18	Jul	06:00	-	Sun	18	Jul	10:00
Mon	19	Jul	10:00	-	Mon	19	Jul	15:00
Tue	20	Jul	10:00	-	Tue	20	Jul	15:00
Wed	21	Jul	10:00	-	Wed	21	Jul	15:00
Thu	22	Jul	10:00	-	Thu	22	Jul	15:00
Fri	23	Jul	10:00	-	Fri	23	Jul	15:00
Sat	24	Jul	06:00	-	Sat	24	Jul	10:00
Sun	25	Jul	06:00	-	Sun	25	Jul	10:00

All pages of this Road Occupancy Licence and associated Speed Zone Authorisation(s) must be available on site at all times and must be produced for inspection when requested by representatives of NSW Police, Roads & Maritimes Services, Transport for NSW and other Government Agencies.

Nhat Nguyen

From: White Group <whitegroupops@outlook.com>
Sent: Wednesday, 7 July 2021 2:16 PM
To: Marc Jamieson; Nhat Nguyen
Cc: Arjun Ramesh
Subject: FW: Road Occupancy Licence 1655740 - Approved
Attachments: Road Occupancy Licence.pdf; wewbTMCLogo.jpg

From: tmc_piu@tmc.transport.nsw.gov.au <tmc_piu@tmc.transport.nsw.gov.au>
Sent: Monday, 5 July 2021 2:08 PM
To: WHITEGROUPOPS@OUTLOOK.COM
Subject: Road Occupancy Licence 1655740 - Approved

Dear Valued Customer

Your Road Occupancy Licence Application for SHOWGROUND RD, CASTLE HILL has been licensed. The licence number is 1655740.

Please print copies of the Road Occupancy Licence and Speed Zone Authorisations and ensure all copies are kept on site with you at all times whilst the licence is active and produce them upon request by a road authority representative.

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Kind Regards,
Road Occupancy Unit, Sydney

ROAD OCCUPANCY LICENCE

LICENCE NO : 1655740

TRANSPORT MANAGEMENT CENTRE (TMC)

Phone: Monday To Friday 8.30 AM - 4.30 PM

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NON DEVELOPMENT - NOT KNOWN

Project: Not Applicable
This Activity : SIMMONS CIVIL
Vehicle Exiting Only

LOCATION

Subject Road: SHOWGROUND RD
From: WINDSOR RD, CASTLE HILL
To: GREEN RD, CASTLE HILL
Council: THE HILLS SHIRE

LICENSEE

Organisation: WHITE GROUP MANAGEMENT
Ref No:
Name: DANNY WHITE
Phone: 0427281171

ONSITE CONTACT

Name: Danny White
Phone: 0427281171

TRAFFIC MANAGEMENT

Flow Management: Non-Trafficable Area
Closure Type: None
Closure Lane(s): Shoulder; Median Shoulder
Direction(s): All Directions

LICENCE DURATION

From: 26-Jul-2021
To: 31-Aug-2021

LICENCE CONDITIONS

1 YOU MUST USE SHIFT ACTIVATION WEB ADDRESS https://myrol.transport.nsw.gov.au TO ACTIVATE AND DEACTIVATE YOUR APPROVED ROAD OCCUPANCY LICENCE(S). (TO CHANGE TRAFFIC CONTROL SIGNALS TO FLASHING YELLOW OR TO ACTIVATE PERMANENT VARIABLE MESSAGE SIGNS DIAL 1800 679 782)

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10 ADEQUATE ADVANCE WARNING MUST BE PROVIDED TO APPROACHING MOTORISTS.

11 THE LICENCEE OF THIS ROL MUST CONTACT THE FOLLOWING PROPONENT(S) PRIOR TO WORKS COMMENCING TO AVOID CONFLICTS WITH THEIR WORKS:,[ISABELLE CURRAN,TRAFFIC LOGISTICS,1300001599]

APPROVED DATES & TIMES

From Shift					To Shift			
From	D	M	Time	-	To	D	M	Time
Mon	26	Jul	10:00	-	Mon	26	Jul	15:00
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ROAD OCCUPANCY LICENCE

LICENCE NO : 1655740

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Project: Not Applicable
This Activity : SIMMONS CIVIL
Vehicle Exiting Only

LOCATION

Subject Road: SHOWGROUND RD
From: WINDSOR RD, CASTLE HILL
To: GREEN RD, CASTLE HILL
Council: THE HILLS SHIRE

LICENSEE

Organisation: WHITE GROUP MANAGEMENT
Ref No:
Name: DANNY WHITE
Phone: 0427281171

ONSITE CONTACT

Name: Danny White
Phone: 0427281171

TRAFFIC MANAGEMENT

Flow Management: Non-Trafficable Area
Closure Type: None
Closure Lane(s): Shoulder; Median Shoulder
Direction(s): All Directions

LICENCE DURATION

From: 26-Jul-2021
To: 31-Aug-2021

APPROVED DATES & TIMES

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Mon	30	Aug	10:00	-	Mon	30	Aug	15:00
Tue	31	Aug	10:00	-	Tue	31	Aug	15:00

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CONSTRUCTION NOISE & VIBRATION MANAGEMENT SUB-PLAN

POWERHOUSE - MUSEUM DISCOVERY CENTRE
NEW CARPARK WORKS

172 Showground Road,
Castle Hill NSW 2154

Simmons Civil Contracting
Attention: Marc Jamieson
5 St James Place
Seven Hills NSW 2147

MONITORING PERIOD

16th – 23rd June 2021

CONTRACT NO. C21 8606
REPORT NO. EMS21 8850-R1

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PREPARED FOR:	**PREPARED BY:**
Simmons Civil Contracting	Environmental Monitoring Services Pty Ltd
5 St James Place Seven Hills NSW 2147	First Floor, 935 Botany Road Mascot NSW 2020
Name: Marc Jamieson	ABN 13 050 039 177
Phone: 02 9620 6100	Phone No: (02) 9317 0100
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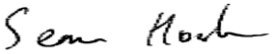
AUTHOR: 	Edward Krasilovsky BEng (Mechanical) Engineer	Date: 09.07.2021
CHECKED BY: 	Sean Hook MArchSci (Audio and Acoustics) Acoustic Consultant MAAS	Date: 09.07.2021
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REVISION HISTORY

Revision No	Date Issued	Reason/ Comments
0	09.07.2021	Version 1
1	30.07.2021	Amendments to Table 4.1

DISTRIBUTION

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1	0	Simmons Civil Contracting
2	0	Environmental Monitoring Services Pty Ltd

1 Introduction

1.1 Project Description

Environmental Monitoring Services Pty Ltd was engaged by Simmons Civil Contracting to provide a Construction Noise & Vibration Management Sub-Plan prior to the demolition of the existing carpark and vehicle accessway along the eastern parts of the site and for the construction of a new at-grade carpark to be constructed on the eastern side of the TAFE site accommodating 24 car parking spaces for the Powerhouse MDC, 172 Showground Rd, Castle Hill (the site).

The project will begin with the clearing of the site and tree removal, followed by the laying of base course with installation of the kerbs and gutters, followed by the final laying of the asphalt along with all necessary final clean-up and any remaining miscellaneous works. Works are proposed to be carried out over 6 consecutive weeks with all works to occur during daytime hours.

The purpose of this plan is to provide procedures to prevent excessive noise being emitted from the onsite works which may cause unreasonable loss of amenity to nearby receivers.

This report will include noise impact predictions based on the sound power level of the proposed onsite plant, tools and equipment for the project and their distance to nearby noise receivers. The purpose of these predictions is to serve as a guideline in preparing suitable noise controls needed for the project.

Recommendations for noise & vibration criteria for the project will be established under the guidance of the Department of Planning, Industry and Environment (DPIE) consent conditions for the site (SSD 10472, 2021), the Acoustic Report for SSDA (Ref: SY181569-AUR01) prepared for the site by Northrop in February 2021, the NSW Department of Environmental & Climate Change (DECC) publication *Interim Construction Noise Guideline* and the NSW Environmental Protection Authority (EPA) *Noise Policy for Industry (NPfI)*.

1.2 Site Location and Noise Receivers

The Powerhouse MDC area of the site is located on the western side of the block bounded by residential property to the north, Windsor Road to the west, Showground Road to the south and Green Road to the east. On the eastern side of the block is the TAFE NSW – The Hills campus. This report pertains to the construction of the new carpark area to the east of the TAFE building.

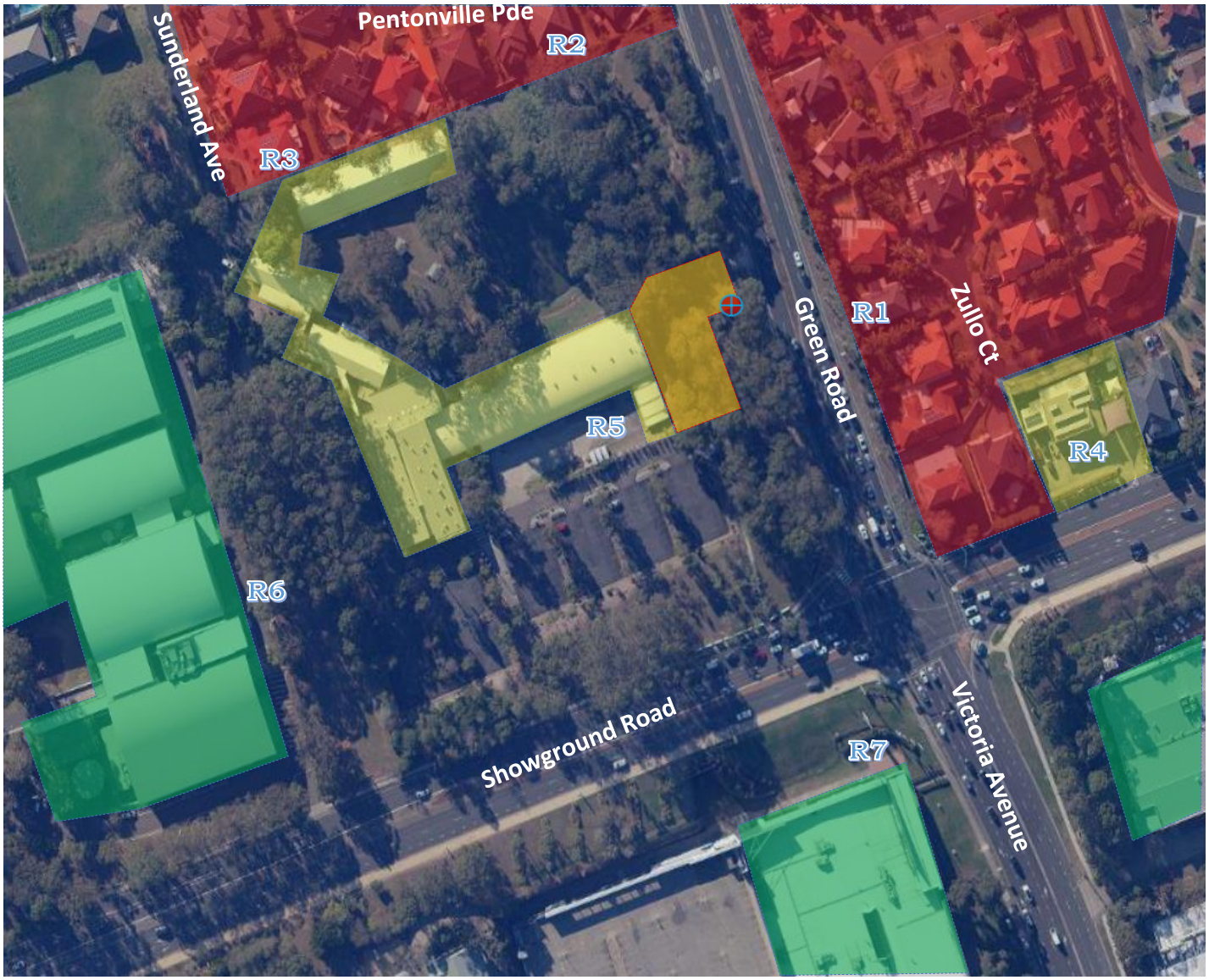
Table 1.1 below details the most affected receivers adjacent to the site.

Table 1.1 – Noise receivers surrounding the site

Receiver	Address	Description
R1	20 Zullo Circuit	Two storey residential dwelling
R2	80 Pentonville Parade	Two storey residential dwelling
R3	10 Sunderland Ave	Two storey residential dwelling
R4	170 Showground Road	One storey commercial building - (Just For Kids Childcare)
R5	Cnr Showground and Green Rds.	TAFE NSW - The Hills campus – Buildings D & F
R6	172 Showground Road	Museum Discovery Centre
R7	16-18 Victoria Avenue	Hills Super Centre

Figure 1.1 below outlines the site's location and the nearby noise receivers.

Figure 1.1 – Site Layout and Noise Receivers



Map Source: SIX Maps

Environmental Monitoring Services

Legends

- Work Site
- Residential Receiver
- Commercial Receiver
- Educational Receiver
- Noise Monitor Location

R1 … Noise Receiver Locations

Site Address: 172 Showground Road, Castle Hill NSW

Contract No.: C21 8606

Report No.: EMS21 8850-R1

2 Noise Monitoring

2.1 Background Noise Measurement

Unattended noise monitoring was conducted at the site between 9:00am 16th and 8:30am 23rd of June 2021, using an ARL 215 noise logger (serial number: 194461), to establish the Rating Background Level (RBL) for the immediate area surrounding the site. The noise logger was field calibrated prior to and after monitoring, and no significant drift was found.

Rating Background Level for the site and for the establishment of a relevant noise criterion. This statistical measurement L_{A90} is the sound pressure level measurement that is exceeded for 90% of the measurement period.

The noise logger also collected the L_{Aeq}; this represents the level of noise equivalent to the energy average of noise levels occurring over a measurement period. The L_{A10} was also obtained; this is the sound pressure level that is exceeded for 10% of the measurement period.

3 Monitoring Results

3.1 Background Noise Results

Table 3.1 outlines the L_{A90} background noise measurement results collected from the noise monitor located at the carpark of 172 Showground Road, Castle Hill. Rain affected noise data was excluded from the calculations as determined by Bureau of Meteorology's Sydney Olympic Park Automatic Weather Station (AWS).

The wind speeds at the microphone height were calculated from the same BOM weather station data using the method described in a paper titled "*Converting Bureau of Meteorology wind speed data to local wind speeds at 1.5m above ground level*".

Table 3.1 – L_{A90} Background Noise Measurement and Rating Background Level

	16th Jun	17th Jun	18th Jun	19th Jun	20th Jun	21st Jun	22nd Jun	**RBL**
Day L_{A90}	-	54	53.5	55.5	53	53.5	53.5	**54**
Evening L_{A90}	50.3	52	53.5	50	47.8	48.5	49.5	**50**
Night L_{A90}	34.5	36	37.8	38	35.5	34.5	32.8	**36**

During the daytime site inspection, it was observed that the dominant noise source was road traffic noise emissions from Green and Showground Roads.

Appendix B of this report shows the time trace of the logged background noise data.

4 Relevant Criteria

4.1 Department of Planning, Industry and Environment

The development consent from the Department of Planning, Industry and Environment for the expansion of the Museums Discovery Centre (MDC), which includes the demolition of the existing carpark and construction of a new one, notes the following Hours of Construction and Construction Noise and Vibration Management conditions:

HOURS OF CONSTRUCTION

C6. Construction, including the delivery of plant, equipment and any materials to and from the site, may only be carried out between the following hours:
(a) between 7 am and 5 pm, Mondays to Fridays inclusive; and
(b) between 8 am and 1 pm, Saturdays.
(c) No work may be carried out on Sundays or public holidays.

C7. Construction activities may be undertaken outside of the hours in Condition C6:
(a) if required by the Police or a public authority for the delivery of vehicles, plant or materials; or
(b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or
(c) where the works are inaudible at the nearest sensitive receivers.

C8. Notification of such construction activities as referenced in Condition C7 must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

C9. Rock breaking, rock hammering, sheet piling, piledriving and similar activities may only be carried out between the following hours:
(a) 9.00 am to 12.00 pm, Monday to Friday:
(b) 2.00 pm to 5.00 pm, Monday to Friday; and
(c) 9.00 am to 12.00 pm, Saturday.

CONSTRUCTION NOISE AND VIBRATION MANAGEMENT

C11. The development must achieve the construction noise management levels detailed in the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009). All feasible and reasonable noise mitigation measures must be implemented and any activities that could exceed the construction noise management levels must be identified and managed in accordance with the CEMP and CNVMP.

C12. If the noise from a construction activity is substantially tonal or impulsive in nature, 5 dB(A) must be added to the measured construction noise level when comparing the measured noise with the construction noise management levels.

C13. Heavy vehicles and oversized vehicles must not queue or idle on surrounding local roads outside of construction zones.

C14. The Applicant must schedule intra-day 'respite periods' for construction activities predicted to result in noise levels in excess of the "highly noise affected" levels, including the addition of 5 dB to the predicted levels for those activities identified in the Interim Construction Noise Guideline.

C15. Where sensitive receivers may be affected, piling activities are to be completed using bored piles. If driven piles are required, they must only be installed where outlined in the CEMP.

C16. Vibration caused by construction at any residence or structure outside the subject site must be limited to:
(a) for structural damage vibration to buildings (excluding heritage buildings), *British Standard BS 7385 Part 2-1993 Evaluation and Measurement for Vibration in Buildings*
(b) for human exposure to vibration, the evaluation criteria presented in *British Standard BS 6472- Guide to Evaluate Human Exposure to Vibration in Buildings* (1Hz to 80 Hz) for low probability of adverse comment
(c) the above limits, unless otherwise outlined in the CEMP.

C17. Any noise generated during the construction of the development must not be offensive noise within the meaning of the Protection of the Environment Operations Act 1997 or exceed noise limits for the site.

C18. The Applicant must ensure that any work generating high noise impact (i.e. work exceeding a NML of L_{Aeq} 75dBA) as measured at the sensitive receiver must only be undertaken in continuous blocks of no more than 3 hours, with at least a 1 hour respite between each block of work generating high noise impact, where the location of the work is likely to impact the same receivers. For the purposes of this condition 'continuous' includes any period during which there is less than one hour respite between ceasing and recommencing any of the work the subject of this condition.

4.2 DECC Interim Construction Noise Guideline

The Noise Criteria will be in compliance with the Department of Environment and Climate Change's *Interim Construction Noise Guideline* is aimed to manage noise from construction work. The main objectives of the guidelines are:

- To protect the majority of residences and other sensitive land uses from noise pollution most of the time;
- Identify and minimise noise from construction works;
- Applying 'feasible' and 'reasonable' work practices to minimise construction noise; and
- Encouraging construction to be undertaken only during least sensitive noise periods.

Table 4.1 below outlines the Noise Criteria for the residential properties near the construction site calculated from the Rating Background Level gathered during the noise monitoring period.

Below this Table 4.2 displays the internal and external noise criteria for sensitive land use properties. Table 4.3, further down, outlines the noise criteria for commercial and educational premises.

Residential Premises

Table 4.1 – Applicable Noise Criteria – Residents surrounding work site

Time of Day	Management Level $L_{Aeq,\ 15\ mins}$	How to Apply
Approved hours of construction as per C6 of the DPIE: Monday to Friday 7:00 am to 5:00 pm Saturday 8:00am to 1:00pm No work on Sundays or public holidays	Noise Affected RBL + 10 dB Based on monitored levels, project specific management level is **Daytime:** **07:00 – 17:00 (M-F)** **08:00 – 13:00 (Sat)** **64 dB(A)**	The noise affected level represents the point above which there may be some community reaction to noise. 1. Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. 2. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected **75 dB(A)**	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside approved hours of construction:	Noise Affected RBL + 5dB **Evening: 18:00 – 22:00** **55 dB(A)** **Night: 22:00 – 07:00** **41 dB(A)**	• A strong justification would typically be required for works outside the recommended standard hours • As per C7 of the DPIE construction activities may be undertaken outside of the hours in Condition C6: a) If required by Police or a public authority for the delivery of vehicles, plant or materials; or b) In an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or c) where the works are inaudible at the nearest sensitive receivers. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5dB (A) above the noise affected level, the proponent should negotiate with the community.

Sensitive Land Use Premises

Table 4.2 displays the internal and external noise criteria for sensitive land use properties.

Table 4.2 – Noise Criteria at Sensitive Land Use Premises

Land Use	Noise Management Level $L_{Aeq(15\ minute)}$
Classrooms at schools and other educational institutions (including childcare centres)	**Internal Noise Level 45 dB(A)** **External Noise Level 65 dB(A)***
Hospital wards and operating theatres	Internal Noise Level 45 dB(A) External Noise Level 65 dB(A)*
Place of Worship	Internal Noise Level 45 dB(A) External Noise Level 65 dB(A)*
Active recreation areas (characterised by sporting activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External Noise Level 65dB (A)
Passive recreation area (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation etc.)	External Noise Level 60dB (A)

* EMS assumes a noise reduction of 20 dB(A) across the closed façade for educational institutions, hospitals and religious receivers.

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, outlined below in Table 4.3. The external noise levels should be assessed at the most-affected point within 50 m of the area boundary.

Table 4.3 – Noise Criteria at Commercial Premises

Land Use	Noise Management Level $L_{Aeq(15\ minute)}$
Industrial premises	External Noise Level 75dB (A)
Offices, retail outlets	**External Noise Level 70dB (A)**
Other businesses that may be very sensitive to noise. Where the noise level is project specific the proponent should undertake a special investigation to determine suitable noise levels on a project-by-project basis; the recommended 'maximum' internal noise levels in AS 2107 Acoustics – *Recommended design sound levels and reverberation times for building interiors* may assist in determining relevant noise levels.	

4.3 Vibration Criteria

The effects of vibration can be divided into concerns over structural damage and human annoyance. This section will outline the relevant vibration criteria for the two concerns.

4.3.1 Structural Damage Criteria

The Acoustic Report for SSDA (Ref: SY181569-AUR01) prepared for the site by Northrop in February 2021 makes reference to the German DIN4150 standard with regards to the damage to dwellings criteria.

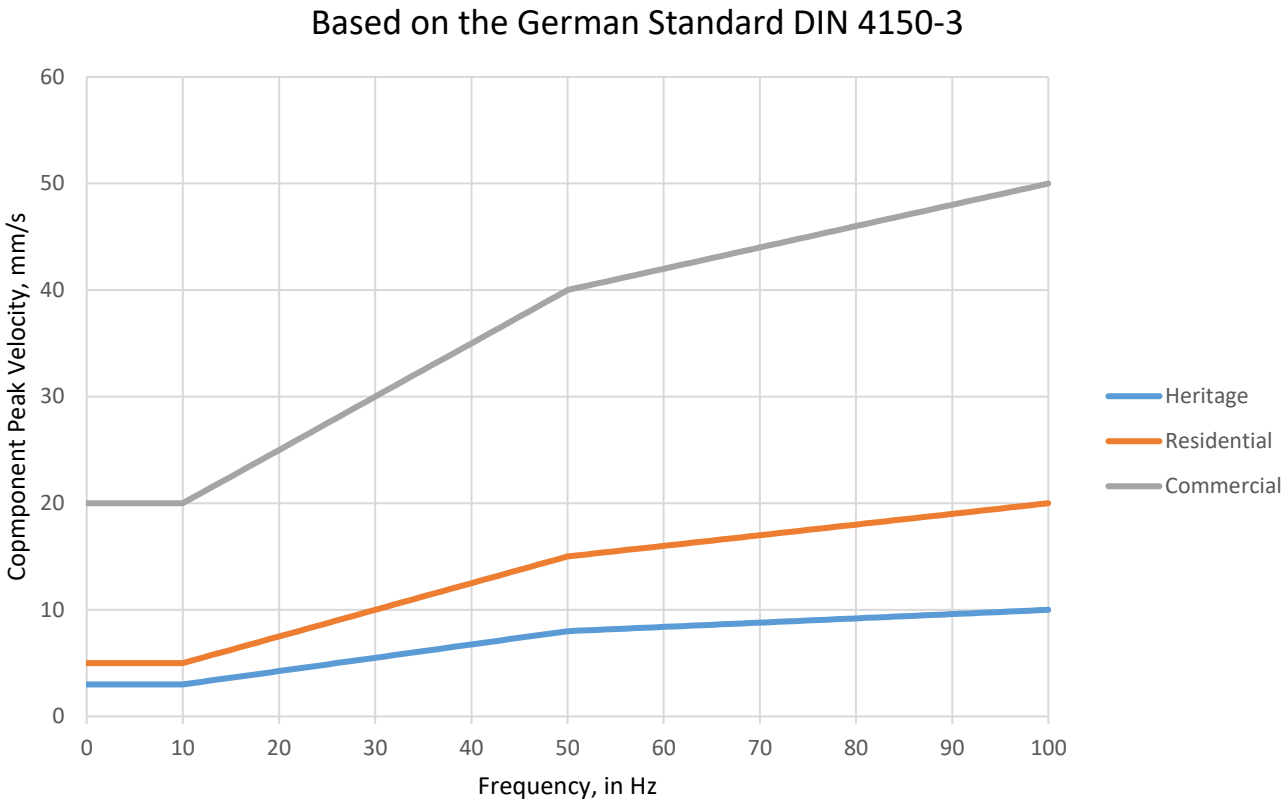
The German Standard DIN 4150-3 (2016) – *Effects of vibration on structures* (below) gives structural damage vibration criteria for vibration affected buildings based on the type of building occupancy and frequency or vibration.

Table 4.4 below gives a guideline value for short term vibration velocity at the foundation. Short term vibration is classified as vibrations which do not occur often enough to cause structural fatigue.

Table 4.44 – Structural Damage – Short Term Vibration (mm/s)

Type of Structure	Velocity values in mm/s at the foundation at a frequency of			Plane of floor of uppermost storey
	Less than 10Hz	10-50Hz	50-100Hz	All frequencies
Building use for commercial purposes, industrial buildings and buildings of similar design	**20**	**20-40**	**40-50**	**40**
Dwelling and buildings of similar design and/or occupancy	5	5-15	15-20	15
Structures that because of their particular sensitivity to vibration and are of great intrinsic value (e.g. heritage listed structures)	3	3-8	8-10	8

Figure 4.1



4.3.2 Human Comfort Criteria

The human annoyance vibration assessment should be undertaken using the EPA's publication 'Interim Construction Noise Guideline' which states that human comfort vibration is to be measured and assessed in accordance with the EPA's *'Assessing Vibration: a technical Guideline',* based on the BS 6472 Standard. This standard is also referenced within the Acoustic Report for SSDA (Ref: SY181569-AUR01) prepared for the site by Northrop in February 2021.

This Guideline covers the appropriate methods and criteria for the assessment of the intrusive vibration on living and working space. The guideline describes the following:

- The characteristics of vibration and associated effects that can cause community disturbance and concern to people, in particular the occupants of buildings.
- Criteria defining values of vibration to protect amenity.
- Procedures for the measurement and evaluation of vibration values and other associated emissions.

The preferred assessment method is the Vibration Dose Value (VDV). A summary of the VDV criteria for human comfort limits are adopted from the EPA's publication *'Assessing Vibration: a technical Guideline* and are presented in Table 4.55 below.

Table 4.55 – Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime		Night Time	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical Areas	0.10	0.20	0.10	0.20
Residents	0.20	0.40	0.13	0.26
Offices, Schools, Educational, institutions and places of worship	**0.40**	**0.80**	**0.40**	**0.80**
Workshops	0.80	1.60	0.80	1.60

The EPA's vibration publication also gives the preferred and maximum vibration limits for continuous (e.g. continuous construction or maintenance activity) and impulsive (e.g. occasional loading and unloading, or dropping of heavy equipment) types of vibration, seen below in Table 4.66.

Table 4.66 7 – Acceptable continuous and impulsive vibration

Location	Vibration Type	Time	RMS Acceleration (m/s^2)		RMS Velocity (mm/s)		Peak Velocity (mm/s)	
			Preferred Value	Maximum Value	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical Areas	Continuous	Day- or night-time	0.005	0.01	0.10	0.20	0.14	0.28
	Impulsive							
Residents	Continuous	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
		Night-time	0.007	0.014	0.14	0.28	0.2	0.4
	Impulsive	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
		Night-time	0.1	0.2	2.0	4.0	2.8	5.6
Offices	**Continuous**	**Day- or night-time**	**0.02**	**0.04**	**0.4**	**0.80**	**0.56**	**1.1**
	Impulsive		**0.64**	**1.28**	**13.0**	**26.0**	**18.0**	**36.0**
Workshops	Continuous	Day- or night-time	0.04	0.08	0.8	1.6	1.1	2.2
	Impulsive		0.64	1.28	13.0	26.0	18.0	36.0

5 Predicted Noise Levels

5.1 Construction Noise Sources

This section will outline the proposed noise sources found in the proposed works on site and outlines the sound power level from each noise source. The Sound Power levels for each noise source was gathered from manufacturer data or were adopted from the Australian Standard 2436-2010 (R2016) – *Guide to Noise Control on Construction, maintenance and Demolition sites* and TfNSW *Construction Noise and Vibration Strategy* (version 4.1 24 April 2019).

The works are proposed to be conducted with the following plant and maximum operating times as advised by Simmons Civil Contracting listed below in Table 5.1.

Table 5.1 – Typical Noise Sources and their Sound Power Levels

Construction Equipment List			
Noise Source	Sound Power Level dB(A)	Data Source	% Time Operated during the 15-minute period
Pavement Profiler	117	TfNSW	75 %
1T Skidsteer Loader	110	TfNSW	70 %
Smooth Drum Roller	107	TfNSW	75 %
10T Vibratory Roller	108*	AS2436–2010:2016	75 %
Medium Rigid Truck (20T)	103	TfNSW	50 %
Bogie Truck (>20T)	107	AS2436–2010:2016	40 %
Asphalt Truck and Sprayer	106	TfNSW	90 %
Asphalt Paver	108	AS2436–2010:2016	90 %
Hand Tools (Electric)	102	AS2436–2010:2016	50 %
Concrete Saw	117*	AS2436–2010:2016	15 %
Small Excavator (8T)	100	TfNSW	50 %
Chain Saw – 4-5hp	114*	TfNSW	40 %
Tree Mulcher 40-50hp	116*	TfNSW	50 %

* 5 dB(A) has been added to the shown SWL of these sources in accordance with C12 of the DPIE consent conditions for the site (SSD 10472, 2021) and DECC's *Interim Construction Noise Guideline* (2009).

5.2 Construction Scenarios

Scenario 1 – Site Establishment and Clearing

- Medium Rigid Truck (20T)
- Hand Tools (Electric)

Scenario 2 – Tree Removal

- Chain Saw
- Tree Mulcher

Scenario 3 – Kerb Demolition

- Excavator
- Concrete Saw

Scenario 4 – Profiler/Miling Machine

- Profiler/Miling Machine
- Bogie Truck

Scenario 5 – Asphalting

- Asphalt Truck and Sprayer
- Asphalt Paver
- 1T Skidsteer Loader

Scenario 6 – Vibratory Rollers

- Smooth Drum Roller
- 10T Vibratory Roller

5.3 Construction Noise Impact Prediction

These impact noise predictions are all conducted on the "worst case" assumption using the scenarios from Section 5.2.

Table 5.2 outlines the noise impact predictions corresponding to the nearby receiver locations as displayed in Figure 1.1.

Table 5.2 – Predicted Noise Level at the Surrounding Noise Receivers in dB(A)

Receivers		Predicted Noise Level dB(A) $L_{Aeq(15minute)}$ (Worst-case)						
		Scenario 1 Site Establishment and Clearing	**Scenario 2** Tree Removal	**Scenario 3** Kerb Demolition	**Scenario 4** Profiling	**Scenario 5** Asphalting	**Scenario 6** Vibratory Rolling	**Daytime NML (7am – 5pm)**
R1 20 Zullo Ct		56	**71**	50	**70**	**67**	**66**	64
R2 80 Pentonville Pde		50	**66**	45	64	60	60	Highly Noise Affected 75
R3 10 Sunderland Ave		35	51	37	**56**	48	52	54[1] Highly Noise Affected 75
R4 170 Showground Rd (Just for Kids Childcare)		37	54	33	52	48	48	65
R5 Cnr Showground & Green Rds (TAFE NSW)	Carpentry Workshop D Block	**71**	**84**	63	**83**	**81**	**80**	70
	F Block	43	58	37	58	55	53	
R6 172 Showground Rd (Museum Discover Centre)		29	45	24	44	40	40	
R7 16-18 Victoria Ave (Hills Super Centre)		44	59	38	58	55	54	

1. The Acoustic Report for State Significant Development prepared by Northrop (Ref: SY181569-AUR01 – Rev7 12.02.2021) measured the RBL for the residential receivers adjacent to Sunderland Ave. The NML for R3 is based on the RBL presented in the Northrop report.

The noise calculations were carried out using the Acoustic Software SoundPLAN (version 8.2), with separate situations for each phase of construction.

The construction noise levels at all residential receivers, immediately to the north of the site along Pentonville Parade and to the east of the site adjacent to Green Road (having residential addresses on Zullo Ct and Hilltop Ct), were modelled with the results from the most affected property and are displayed in Table 5.2.

The SoundPLAN model included the building structures from the area surrounding the site to include the façade correction at the receiver locations and sound reflections from neighbouring buildings. All receivers were placed at the receiver building facades (apart from R4) and positioned at a height of 1.5 metres above the most affected floor level. A reflective ground surface (0.1) was applied to the hard surfaces surrounding the site and the grassed and other soft surfaces were given a 0.9 absorption coefficient.

The noise sources were placed towards the centre of the site. For Scenario 6, only the 10T vibratory roller was modelled as both rollers are not expected to be operating simultaneously during this phase.

As seen in Table 5.2, the residential receiver R1 is likely to be affected by noise levels that are above the Noise Management Level during Scenarios 2, 4, 5 and 6, R2 is predicted to exceed during Scenario 2 and receiver R3 is likely to slightly exceed the NML during Scenario 4.

The Highly Noise Affected level of 75 dB(A) is not predicted to be exceeded at the residential receivers during the daytime works.

The NML is not predicted to be exceeded at the educational and commercial receivers, apart from the D Block (TAFE NSW carpentry workshop) receiver during Scenarios 1, 2, 4, 5 and 6 due to the close proximity of the works. The remaining TAFE blocks will unlikely experience noise levels above the criteria.

Some community reaction may be expected from the residential receivers the tree removal, profiling, asphalting works and vibratory rolling if dynamic rolling is undertaken. Implement all feasible and reasonable noise control measures.

6 Noise Control

The following noise mitigation plan outlined in Sections 6.1 to 6.7 should be implemented where feasible and reasonable to reduce noise levels from the project.

6.1 Development Consent Conditions

C6. Construction, including the delivery of plant, equipment and any materials to and from the site, may only be carried out between the following hours:
(a) between 7 am and 5 pm, Mondays to Fridays inclusive; and
(b) between 8 am and 1 pm, Saturdays.
(c) No work may be carried out on Sundays or public holidays.

C13. Heavy vehicles and oversized vehicles must not queue or idle on surrounding local roads outside of construction zones.

C14. The Applicant must schedule intra-day 'respite periods' for construction activities predicted to result in noise levels in excess of the "highly noise affected" levels, including the addition of 5 dB to the predicted levels for those activities identified in the Interim Construction Noise Guideline.

C17. Any noise generated during the construction of the development must not be offensive noise within the meaning of the Protection of the Environment Operations Act 1997 or exceed noise limits for the site.

C18. The Applicant must ensure that any work generating high noise impact (i.e. work exceeding a NML of L_{Aeq} 75dBA) as measured at the sensitive receiver must only be undertaken in continuous blocks of no more than 3 hours, with at least a 1 hour respite between each block of work generating high noise impact, where the location of the work is likely to impact the same receivers.

6.2 Best Management Practice (BMP) Noise Control

Best Management Practice (BMP) is the adoption of particular operational procedures that minimise noise while retaining productive efficiency. The majority of the proposed noise mitigation recommendations will be adopted from the *Interim Construction Noise Guideline* and the Australian Standard AS 2436:2010 - *Guide to Noise Control on Construction, Maintenance and Demolition Sites*.

All work should implement the following noise mitigation strategies:

- **Implementing quiet work practices –** Using equipment in ways to minimise noise, this includes reducing throttle setting and turning off equipment when not being used, i.e. trucks and saws.
- **Distance –** Provide as much distance from the noise source to the receivers as possible. Stationary machinery, especially, should be located towards the southern border of the site if possible.
- **Maintain equipment –** Regularly inspect and maintain equipment to ensure it is in good working order. Also check the conditions of mufflers and keep the cutting saw sharp.
- **Scheduling –** Sensitive residential receivers surround the site and as per the development consent conditions, time restrictions or respite periods for any intense work should be utilised.
- **Limiting –** Reduce the number of machines or tools operating simultaneously.

6.3 Best Available Technology Economically Achievable (BATEA) Noise Control

BATEA is a noise mitigation strategy based on equipment, plant and machinery modification to minimise noise output. The following BATEA strategies are to be implemented:

- **Substituting quieter equipment** – examining different types of machinery that perform the same function and compare the noise level data to select the least noisy machine, examination includes tyre noise, exhaust and compressor/fan noise. For example, rubber wheeled tractors can be less noisy than steel tracked tractors.
- **Adjusting reversing alarms** on heavy equipment to make them 'smarter' by limiting the acoustic range to the immediate danger area or a broadband style alarm sometimes referred to as a 'quacker' alarm.
- **High Performance Exhaust Mufflers** could be fitted to the excavators working within the site. Silencers/mufflers are likely to reduce noise emission from 5 to 15dB.
- **Pneumatic equipment** is traditionally a problem – select silenced damped bits where possible.
- **Trucks** should be properly maintained and have proper silencers fitted to control the engine and brake noise.

6.4 Acoustic Screens

Acoustic screens or barriers can be an effective way to reduce noise emissions from the site. Barriers can be installed at either the location of the noise source or the location of the noise receiver. The reduction provided by the acoustic screen is determined by how much of the line of sight between the source and receiver is blocked. If the noise source is fully shielded a noise reduction of up to 15 dB(A) can be achieved. When the line of sight is only partially blocked the noise reduction can be up to 5-8 dB(A). Acoustic screens are more effective for stationary plant.

Due to the proposed moving plant onsite, solid non-movable barriers at the site's boundaries will not be effective for this project. Acoustic screens are not practical for chain sawing at heights.

EMS recommends the usage of moveable solid barriers or moveable absorptive barriers such as Echo Barrier H4 or similar acoustic fencing with minimum height of 2m to be situated to block the line of site from noise sources to residential receiver buildings, where possible, as works progress. The eastern façade of the R5 TAFE NSW D Block Building should be lined with an absorptive barrier with minimum height of 2 metres to attenuate reflections towards residential receivers to the east of the site.

The barrier should have the following properties:

- Echo Barrier H4 acoustic fencing or similar for absorptive barriers and solid barriers to have a surface density of at least 10 kg/m^2.
- There should be no gaps or openings at joints or at the bottom of the barrier material.
- Should be located as close as practical to the noise source.

6.5 Noise Monitoring

Due to the nearby noise sensitive receivers, unattended noise monitoring should be undertaken at the nearest adjoining surrounding residential receivers (R1) or (R2). Attended short term noise measurements may also be taken during intense noise stages, to ensure noise levels are complying with the noise criterion at all sensitive receivers. Unattended or attended noise monitoring after a complaint should be undertaken to monitor the noise impact at the affected receiver.

Commentary should be added to the reports which evaluates the performance and effectiveness of management measures during that monitoring period and provides recommendations for any improvements deemed necessary.

6.6 Vibration Mitigation Control

Work that is anticipated to cause elevated vibration levels is vibratory rolling if dynamic compaction is undertaken. EMS was not informed of any excavator hammering taking place during works.

It should be noted that vibrations that are below threshold levels for structural damage may be experienced by the surrounding receivers causing annoyance. If hammering is undertaken, further mitigation measures may need to be explored and employed, should levels increase to such a point that complaints arise due to annoyance.

EMS notes the EPA's Publication *Assessing Vibration: a technical guide* states "The criteria (for human comfort) are non-mandatory: they are goals that should be sought to be achieved through the application of all feasible and reasonable mitigation measures."

The following practices should be implemented to reduce any potential vibrations affecting the surrounding structures:

- Place as much distance, where possible, between the demolition/excavation work and the surrounding properties. Distance is one of the most effective mitigation measures against vibration.
- Organise high impacting operations so they do not to occur in the same time period.
- Conduct lower impact methods wherever possible, including the following:
    - Orientation of hammers (if required) away from property boundaries and into the centre of the site;
    - Operate any required excavator hammering in short bursts only, to reduce amplification of vibrations and the rise of noise; and
    - Restrict the usage of the vibratory function on rollers where possible.

Table 6.1 below shows safe working distances for the onsite plant referenced from the British Standard 7385 Part 2-1993. The minimum working distances are indicative as the situation on each site will vary based on the individual item of plant, geotechnical conditions onsite and the dominant frequency of the construction vibration levels.

Table 6.1 – Recommended Safe Working Distances for Vibration Intensive Plant

Plant Item	Rating Description	Safe working Distances	
		Cosmetic Damage (BS7385)	Human Response (EPA Vibration Guideline)
Jack Hammer	Handheld	1m (nominal)	2m
Vibratory Rollers	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m

6.7 Trial Vibration Measurements

Vibration monitoring trials are recommended at various distances from the TAFE building structure if dynamic vibratory rolling and/or excavator hammering were undertaken to confirm the minimum working distance for each type of intense vibratory equipment that will be used on site.

The results from this trial vibration monitoring run will be the important information that will allow operators of the machinery to work with confidence knowing the safe distances and limits to adhere to with their equipment.

These results will be specific to this site layout, with exact equipment used and would be a typical and more accurate representation of the site, rather than general approximate safe working distances, as shown in Table 6.1 above.

6.8 Vibration Monitoring

Vibration monitoring will be required at the western side of the TAFE NSW D Block Building – receiver (R5) adjacent to the works area. Monitors should be in place whenever dynamic vibratory rolling or excavator hammering is occurring adjacent to the building within 15 and 2 metres respectively.

The sensor of the vibration monitor should be affixed at the founding level of the adjacent structures in question, on a solid building element. Vibration monitoring should be undertaken at any affected receiver location, should complaints arise.

The vibration monitors should be equipped with the ability to send SMS alerts to the plant operator(s) and appropriate staff and supervisors if the vibration limit is exceeded.

Vibration Alarm Procedure

Should the vibration warning alerts be activated the following procedure should be implemented by the site foreman/supervisor:

1. Stop all work immediately and make a note of all work activities that are currently taking place at the vibration alerts. The project geotechnical engineer and/or structural engineers should be informed immediately.
2. Alternative construction methods/use of smaller equipment should be sought in conjunction with the machine operator, geotechnical engineer and/or structural engineer and details of the new procedures documented.

The vibration monitors shall be downloaded at weekly intervals by the acoustic consultant and weekly reports prepared that are to be distributed to the geotechnical and/or structural engineer.

Commentary should be added to the report which evaluates the performance and effectiveness of management measures during that monitoring period and provides recommendations for any improvements deemed necessary.

6.9 Complaint Management

It is also important to interact with nearby receivers and the community to ensure a good working relationship between the proponent and the community and to receive feedback on the project's performance and work cooperatively towards the outcomes of benefit to the project.

Table 6. (below) gives a guideline approach to community consultation, notification and complaint handling. This guide is adopted from the Interim Construction Noise guideline and only some items are suitable for this project and provide measures such as letter box drops, project specific respite offer, phone calls and specific notification.

Communication shall be upheld between the surrounding residential and commercial receivers.

Table 6.2 – Standard consultation and notification guideline adopted from the Interim Construction Noise Guideline

Consultation and Notification
Notification before and during construction
• Provide, reasonably ahead of time, information such as total building time, what works are expected to be noisy, their duration, what is being done to minimise noise and when respite periods will occur. For works outside standard hours, inform affected residents and other sensitive land use occupants between five and 14 days before commencement. • Provide information to neighbours before and during construction through media such as letterbox drops, meetings or individual contact. In some areas, the proponent will need to provide notification in languages other than English. A website could also be established for the project to provide information. • Use a site information board at the front of the site with the name of the organisation responsible for the site and their contact details, hours of operation and regular information updates. This signage shall be clearly visible from the outside and include afterhours emergency contact details. • Maintain good communication between the community and project staff. • Appoint a community liaison officer where required. • For larger projects consider a regular newsletter with site news, significant project events and timing of different activities. • Provide a toll free contact phone number for enquiries during the works. • Facilitate contact with people to ensure that everyone can see that the Site Manager understands potential issues, that a planned approach is in place and that there is an ongoing commitment to minimise noise.
Complaints handling
• Provide a readily accessible contact point, for example through 24 hour toll free information and complaint's line. • Give complaints a fair hearing. • Have a documented complaints process, including an escalation procedure so that if a complainant is not satisfied there is a clear path to follow. • Call back as soon as possible to keep people informed of action to be taken to address noise problems. Call back at night time only if requested by the complainant to avoid further disturbance. • Provide a quick response to complaints, with complaints handling staff having both a good knowledge of the project and ready access to information. • Keep a register of any complaints, including details such as date, time, person receiving complaint, complainant's phone number, person referred to, description of the complaint, work area (for larger projects), time of verbal response and timeframe for written response where appropriate

7 Conclusions

A Construction Noise & Vibration Management Sub-Plan was prepared prior to the demolition of the existing carpark and construction of a new carpark on the eastern side of the TAFE site accommodating 24 car parking spaces for the Powerhouse MDC, 172 Showground Rd, Castle Hill.

The purpose of this assessment is to provide methods to prevent noise and vibration from the site works causing unreasonable loss of amenity to nearby receivers. The report has been prepared in accordance with the DPIE Consent Conditions – Part C "During Construction".

The noise predictions from the site are provided in Section 5 of the report and outline that the noise levels will at times likely be exceeding the Noise Management Level (NML) at the nearby residential receivers during some phases of works.

Of the remaining receivers surrounding the site, the D Block (Carpentry Workshop) TAFE NSW receiver building is predicted to exceed the NML due to the close proximity to the works, however, the remaining TAFE NSW and other commercial and educational receivers are predicted to be within the NML.

At the time of publishing this report, NSW Health COVID-19 rules and restrictions were in force. These restrictions may see less occupants at the commercial and educational areas around the site such as the TAFE NSW campus, the shopping centre across the road and the childcare centre on Showground Rd. Conversely, residential receiver locations will likely have more occupants at home during the daytime hours when works are conducted, therefore increasing the likelihood of annoyance and complains due to the works.

Section 6 outlines noise mitigation controls to be implemented on site.

Appendix A provides for a Noise/Vibration Complaint Form template which can be used as seen fit.

References

Australian Standard AS 2436-2050 (R2016) – *Guide to Noise Control on Construction, Maintenance and Demolition Sites*

Australian Standard 2107-2000 – *Recommended design sound levels and reverberation times for building interiors.*

British Standard (BS 6472–1992) – Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)

British Standard (BS7385: Part 2-1993) - Evaluation and Measurement for Vibration in Buildings — Part 2 – Guide to Damage Levels from Ground-borne Vibration

DECC's *Interim Construction Noise Guideline* (2009)

EPA's *Noise Policy for Industry* (2017)

TfNSW's Construction Noise and Vibration Strategy (2019)

Development Consent – SSD 10472 - Department of Planning, Industry and Environment (DPIE) 2021

Acoustic Report for SSDA (Ref: SY181569-AUR01) prepared for the site by Northrop in February 2021

Construction Drawings & Plans provided by Simmons Civil Contracting

Appendix A – Complaint Form Content Template

Complainant to Detail:

Date: _____

Complainant's Name: _____

Complainant's Address: _____

Complainant's Contact Details: _____

Describe when the noise/vibration problem began, what equipment caused the complaint (if seen/known), which location is the problem noticeable/audible etc:

_____

_____

_____

_____

_____

Simmons Civil Contracting to Detail:

Complaint Received by: _____

Determination of what equipment was used on site and what methods were employed at time of complaint:

_____

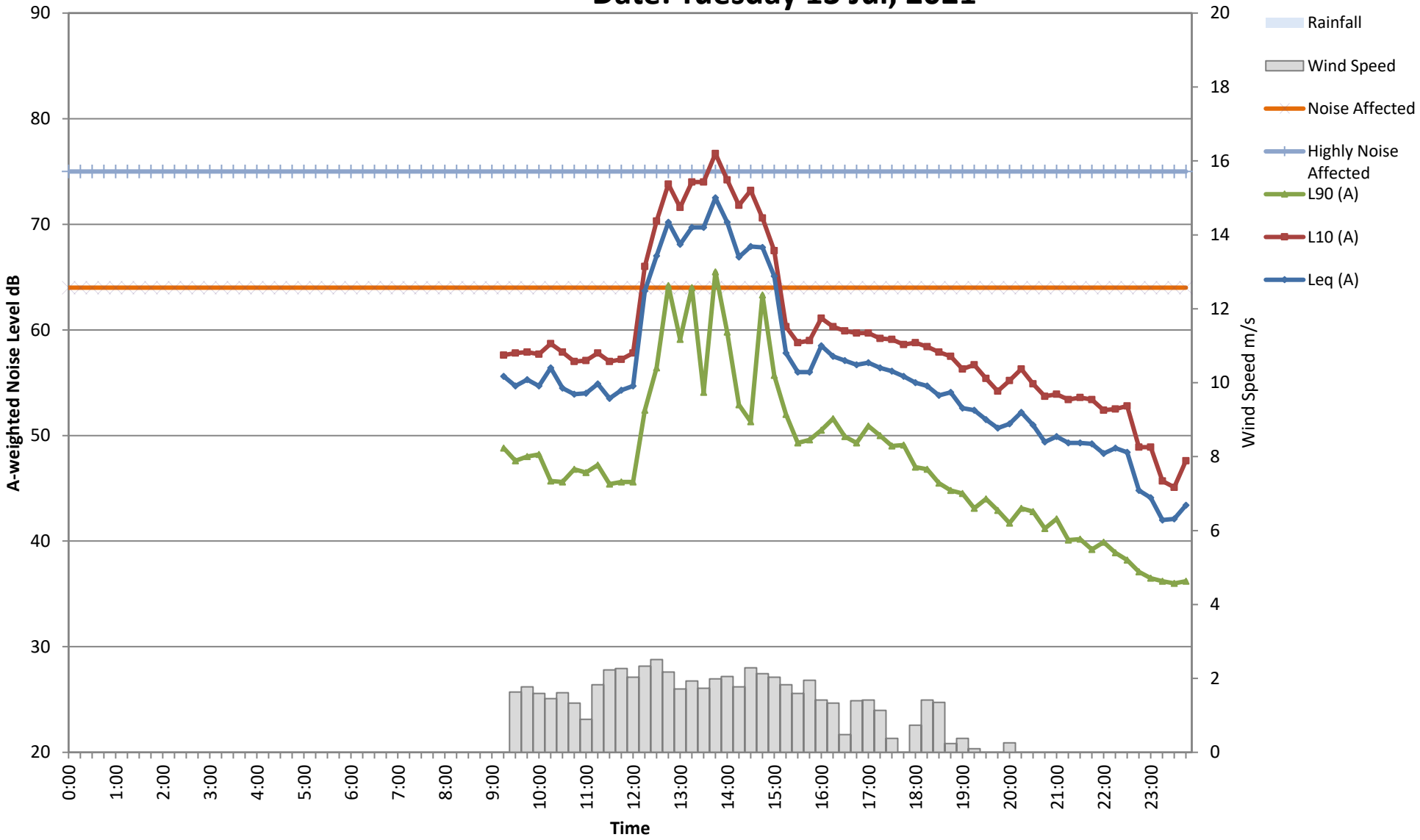
_____

_____

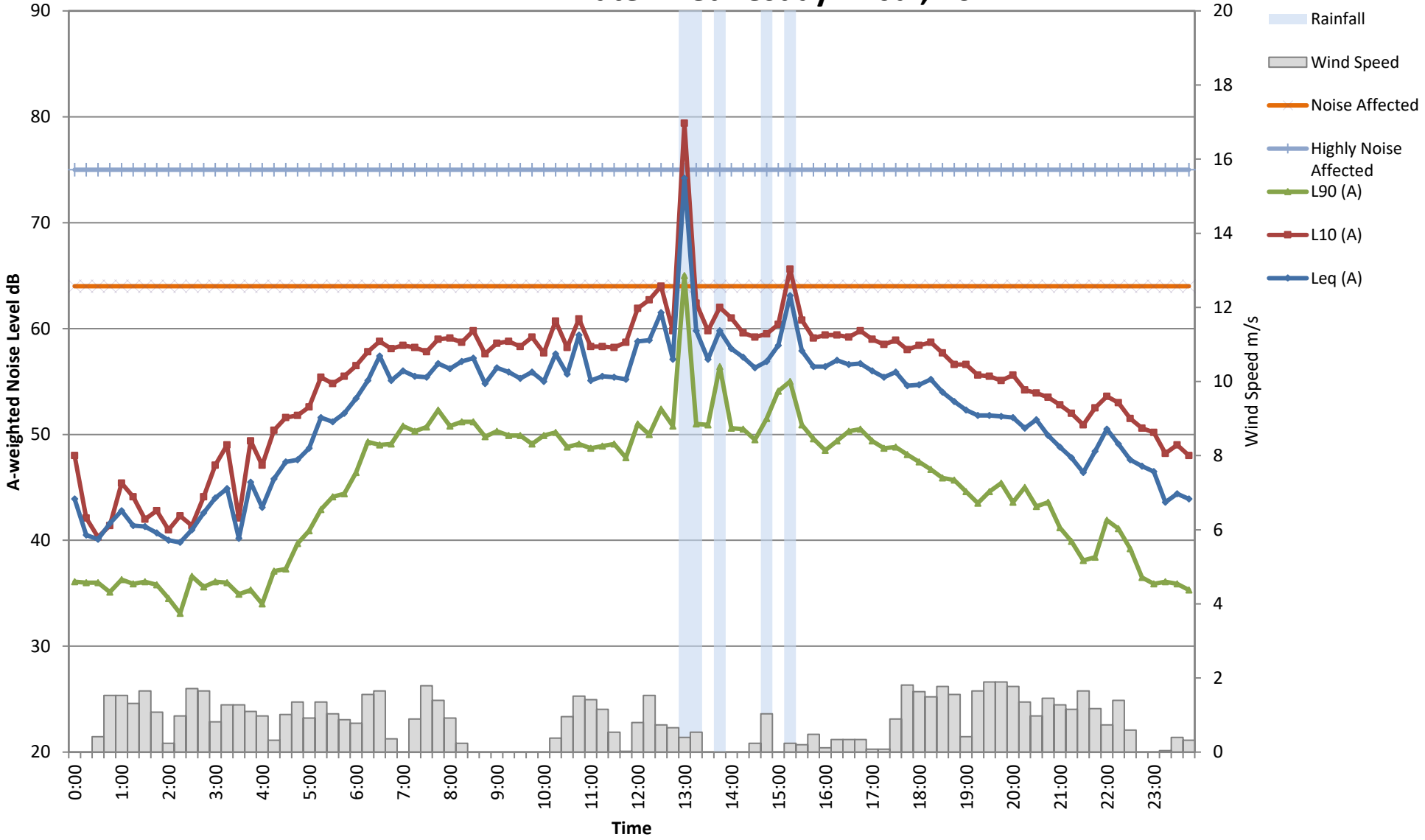
Option to contact Acoustic Consultants to provide attended monitoring or weekly unattended monitoring at complainant's address.

Appendix B – Background Noise Measurement

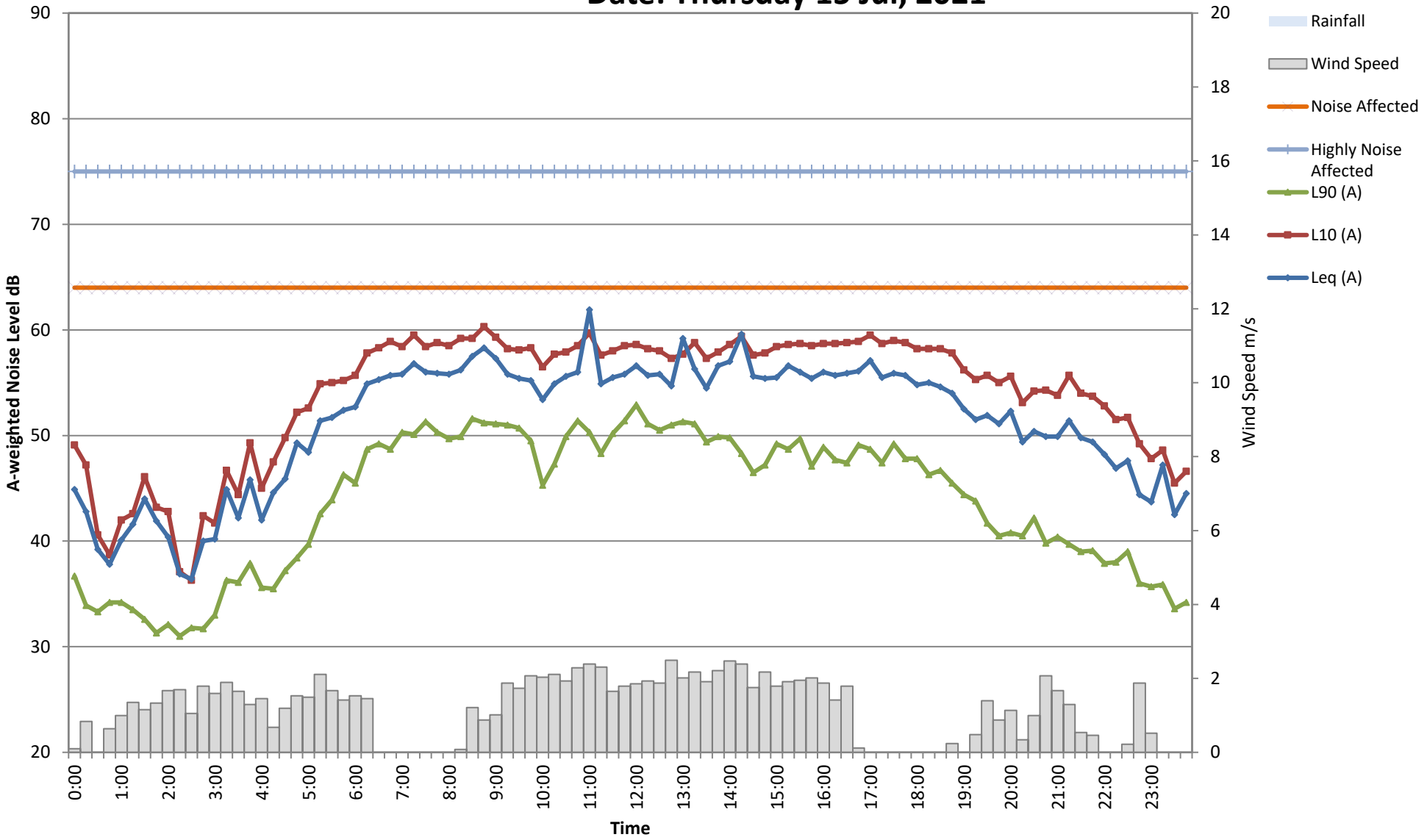
Noise Level Measurements
Monitor Location: Powerhouse MDC - TAFE Grounds - NE
Date: Tuesday 13 Jul, 2021



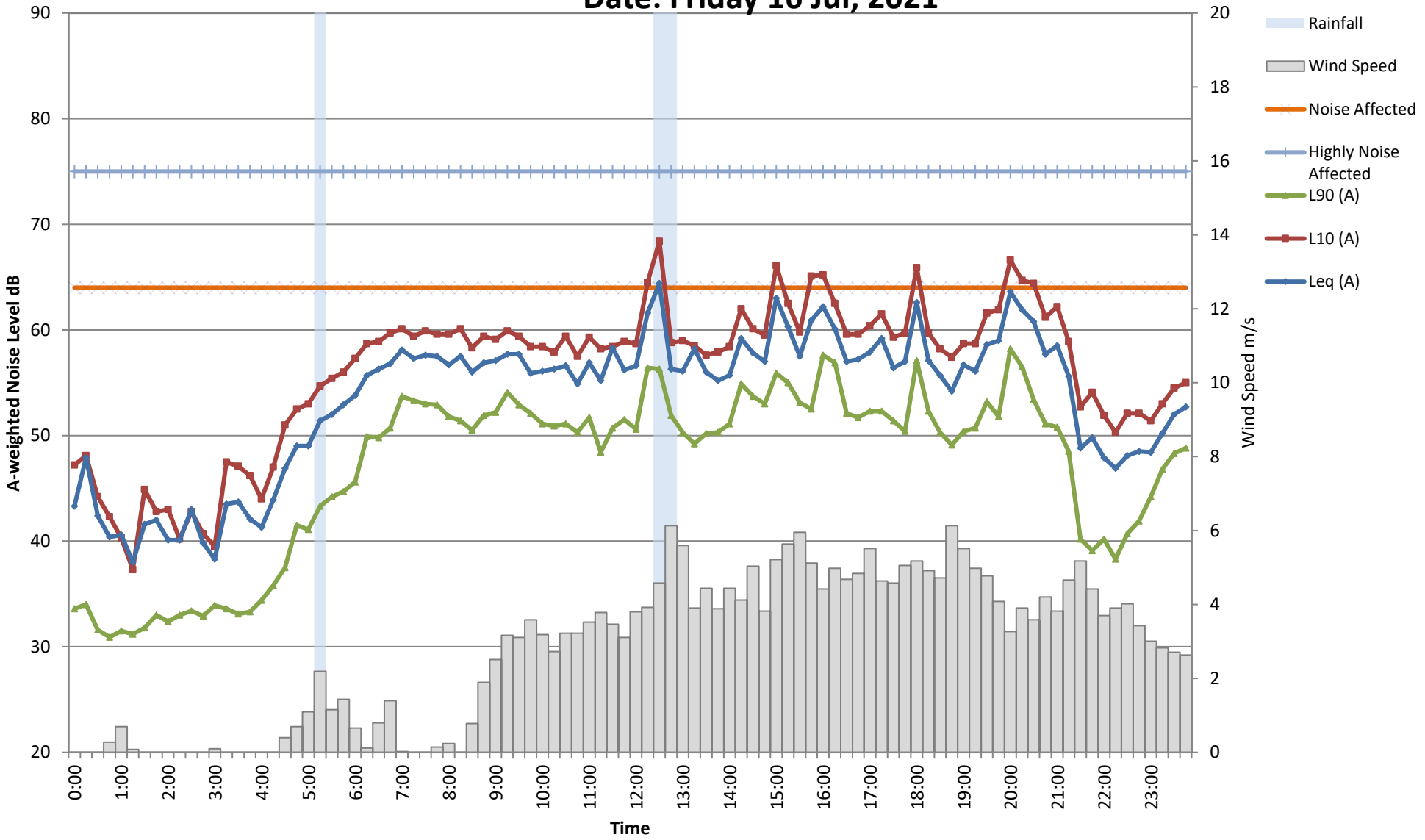
Noise Level Measurements
Monitor Location: Powerhouse MDC - TAFE Grounds - NE
Date: Wednesday 14 Jul, 2021



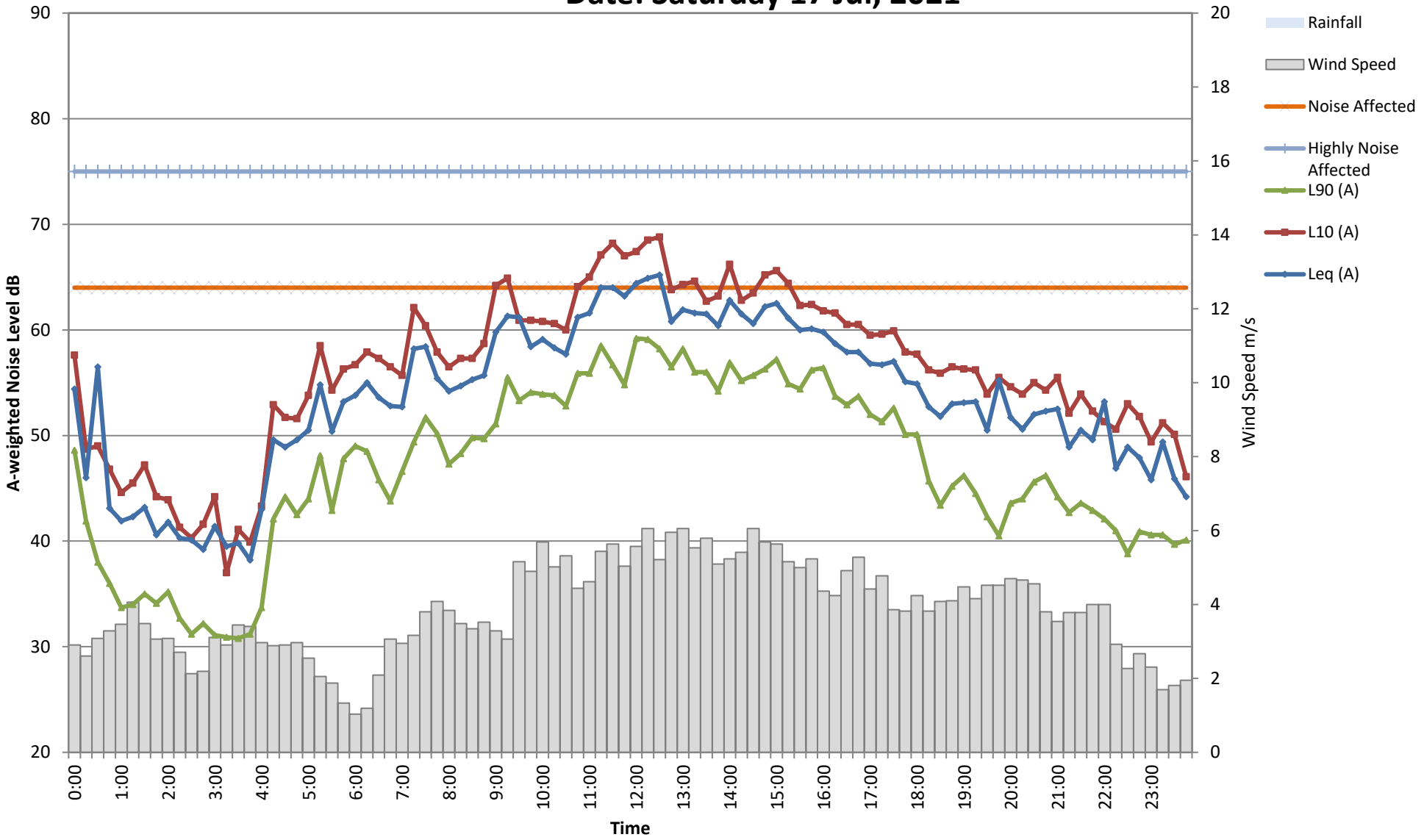
Noise Level Measurements
Monitor Location: Powerhouse MDC - TAFE Grounds - NE
Date: Thursday 15 Jul, 2021



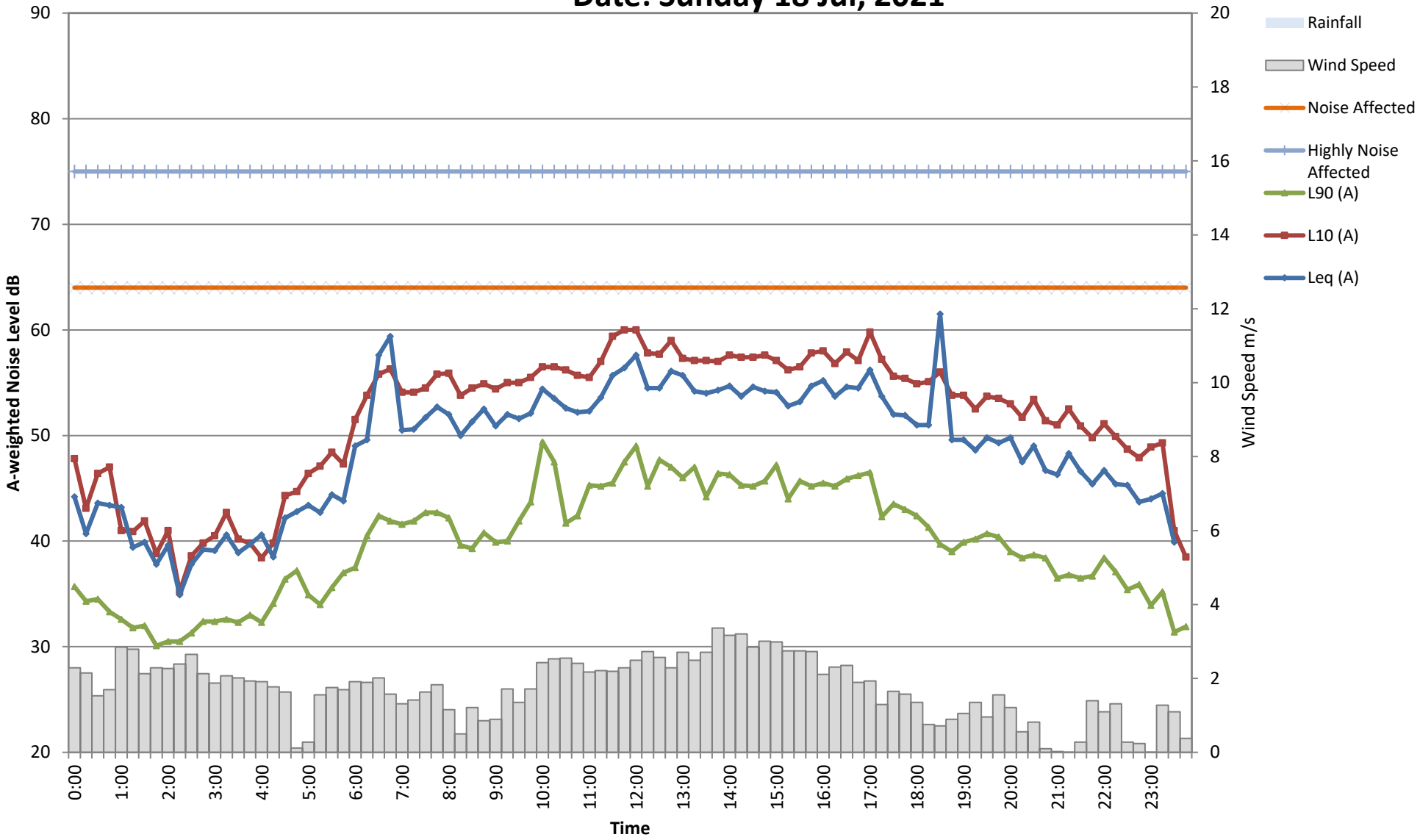
Noise Level Measurements
Monitor Location: Powerhouse MDC - TAFE Grounds - NE
Date: Friday 16 Jul, 2021



Noise Level Measurements
Monitor Location: Powerhouse MDC - TAFE Grounds - NE
Date: Saturday 17 Jul, 2021



Noise Level Measurements
Monitor Location: Powerhouse MDC - TAFE Grounds - NE
Date: Sunday 18 Jul, 2021



CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN (CSWMP)

Castle Hill Powerhouse Museum Discovery Centre (MDC) – Early Works Carpark Construction

2nd August 2021

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1. Introduction

This Soil and Water Management Plan (CSWMP) has been prepared by Simmons Civil for the Powerhouse Museum Discovery Centre (MDC) early works on 2 Green Rd and 172 Showground Road, Castle Hill [Lot 102 DP 11302712 & Lot 1 DP 1066281] to meet the requirements of:

- The Hills Shire Council
- Development Consent Application: SSD 10472

1.1 Purpose

The CSWMP has been developed with specific information to allow for effective soil and water management during the project's works. This plan has been developed taking into consideration the "Integrated Project Management Plan" (IPMP), Simmons Legal and other requirements including but not limited to relevant Acts, Regulations, Codes of Practice and Industry Standards/Guidelines.

In addition to this, the framework for this plan has been prepared to align with the Simmons Management System and the client's requirements. The purpose of the CSWMP is to outline the following:

- Describe the locations and types of all soil, erosion, and sediment controls
- Ensure no erosion of land and prevent sediment controls from entering waterways
- Construction works does not contaminate the soil and water

1.2 Scope

The project involves the expansion of the Museums Discovery Centre (MDC) associated with the Department of Planning Industry and Environment (DPIE) and the Hills Shire Council.

The scope of works required for the project involves the following:

- Removal of vegetation
- Site preparation
- Tree removal
- Reconstruction of new carpark area
- New line markings for the reconstructed carpark area
- Installing new road pavements
- Installing carpark light poles

Other operations may be undertaken by Simmons that is required to deliver the above activities within the projected timeframe. Additional activities may also be requested of the client throughout the duration of the project.

2. Objectives

The key objectives of the CSWMP are to:

- Minimise waste produced on site and the built environment during early works
- Provide a clear framework for contractors to operate in an efficient manner.
- Manage the impacts of soil and water during construction works
- Require that all waste generated during the project is assessed, classified and managed in accordance with the EPA's *"Waste Classification Guidelines Part 1: Classifying Waste"*.

The following soil and water objectives apply to the construction phase of the Project:

- All erosion and sediment controls are to be implemented during construction as a minimum, in accordance with the publication *"Managing Urban Stormwater: Soils & Construction (4th edition, Landcom 2004), commonly referred to as the Blue Book"*.

3. Sub-Plan Reference Documents

Simmons will comply with all legislation, standards and guidelines, client documents and project approvals, as nominated within the Hills Shire of this CSWMP.

3.1 Legislations

Prior to the commencement of this project, management sub-plans are implemented according to the DA Consent Conditions.

CLAUSE	DESCRIPTION
B27	Prior to the commencement of construction, a **Construction Environmental Management Plan (CEMP)** must be submitted to the Panning Secretary, Council and Certifier. The CEMP must provide / address the following matters: a. Details of: - Hours of work - 24-hour contact details of site manager - Management of dust and odour to protect the amenity of the neighbourhood; - Stormwater control and discharge - Measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the subject site - Groundwater management plan including measures to prevent groundwater contamination - External lighting in compliance with *AS4282-1997* control of the obtrusive effects of outdoor lighting - Community consultation and complaints handling - Detail the quantities of each waste type generated during construction and the proposed reuse, recycling and disposal locations b. Construction Traffic and Pedestrian Management Sub-Plan (see **Condition B28**); c. Construction of noise and Vibration Management Sub-Plan (See **Condition B29**); d. Construction Soil and Management Sub-Plan (see **Condition B30**); e. Construction Waste Management Sub-Plan (see **Condition B31**); f. An unexpected finds protocol for contamination and associated communications procedure; g. An unexpected finds protocol for contamination, Aboriginal and non-Aboriginal heritage, and associated communications procedure; and h. Waste classification (for materials to be removed) and validation (for materials to remain) be undertaken to confirm the contamination status in these areas of the site. i.
B28	The **Construction Noise and Vibration Management Sub-Plan (CNVMSP)** must address, but not be limited to, the following: (a) be prepared by a suitably qualified and experienced noise expert; (b) incorporate recommendations of the Acoustic Report for *State Significant Development Application Powerhouse Museum Discovery Centre* revision 6 prepared by Northrop, dated 20.02.2021 (c) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009); (d) hours of construction in accordance with **Conditions C6** to **C9**; (e) outline regular community liaison with sensitive receivers around the site (f) outline how noise and vibration impacts would be monitored during construction (g) describe the measures to be implemented to manage high noise generating works, in close proximity to sensitive receivers; (h) include a complaints management system that would be implemented for the duration of the construction; and (i) include a program to monitor and report on the impacts and environmental performance of the development

	and the effectiveness of the management measures
B29	The **Construction Noise and Vibration Management Sub-Plan (CNVMSP)** must address, but not be limited to, the following: (a) be prepared by a suitably qualified and experienced noise expert; (b) incorporate recommendations of the Acoustic Report for *State Significant Development Application Powerhouse Museum Discovery Centre* revision 6 prepared by Northrop, dated 20.02.2021 (c) describe procedures for achieving the noise management levels in EPA's *Interim Construction Noise Guideline* (DECC, 2009); (d) hours of construction in accordance with **Conditions C6** to **C9**; (e) outline regular community liaison with sensitive receivers around the site (f) outline how noise and vibration impacts would be monitored during construction (g) describe the measures to be implemented to manage high noise generating works, in close proximity to sensitive receivers; (h) include a complaints management system that would be implemented for the duration of the construction; and (i) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the management measures.
B30	The **Construction Soil and Water Management Plan (CSWMSP)** must address, but not be limited to the following: a. Be prepared by a suitably qualified expert; b. Describe all erosion and sediment controls to be implemented during construction as a minimum, in accordance with the publication Managing Urban Stormwater: Soils & Constructions (4th edition, Landcom 2004) commonly referred to as the 'Blue Book'. c. Provide a plan of how all construction works will be managed in wet weather events (i.e. storage of equipment, stabilisation of the Site); and d. Detail all off-site flows from the site.
B31	Prior to the commencement construction, a Waste Management Plan (WMP), prepared in accordance with Appendix A of Council's DCP, must be submitted to the Planning Certifier, Council and Certifier. The WMP must: a. Detail the quantities of each waste type generated during construction and the proposed reuse, recycling and disposal locations; b. Identify an appropriate area for the storage of garbage bins and recycling containers for all waste and recyclable material generated by the works c. Demonstrate compliance with relevant legislation, particularly regarding the removal of asbestos and hazardous waste, the method of containment and control of emission of fibres to the air d. Require that all waste generated during the project is assessed, classified and managed in accordance with the EPA's "Waste Classification Guidelines Part 1: Classifying Waste".

Table 1 - Construction Sub-Plans

4. Roles and Responsibilities

All project personnel including subcontractors have responsibilities in ensuring that the strategic plan of soil and water management is to be implemented during all construction works. The list are as follows:

ROLE	RESPONSIBILTIES
Project Manager	• Ensure appropriate resources are implemented and maintain soil and water management key objectives • Adhering to the soil and water management plan • Carrying out mitigation measures to ensure and promote soil and water controls are properly maintained
Site Foreman	• Carry out reports and inspections • Liasing with the Project Manager of all mitigation measures are taken in accordance with the soil and water management plan
Project/Site Engineers	• Ensure all appropriate measures are implemented and maintained on site
All Construction Workers	• Notifying site foreman of any soil and water management issues that appear

Table 2 - Roles and Responsibilities of All Personnel

4.1 Emergency Contacts

The emergency contacts for Castle Hill Powerhouse MDC – Early Works project include the following:

- Nicholas Simmons – 0433 183 253
- Marc Jamieson – 02 9620 6100
- Rhys Jones – 02 9620 6100
- Nhat Nguyen – 02 9620 6100
- Emergency Services - 000
    - Ambulance – 000
    - Hospital
        - Lakeview Private Hospital
          17-19 Solent Cct, Castle Hill NSW 2154
          02 8624 500
    - Fire
        - Fire and Rescue NSW Kellyville Fire Station
          Windsor Rd & Poole Rd, Kellyville NSW 2155
          02 9629 3222
    - Police
        - Castle Hill Police Station
          Castle St & Pennant St, Castle Hill NSW 2153
          02 9680 5399

- Hazardous Materials
    - These are located with the appropriate Simmons Civil storage area or storage cage located on site. All Material Safety Data sheets should be accompanied with this.
- Steps to minimise damage
    - If an environmental emergency has occurred, the site manager/relevant site personnel is to isolate the area and contact the relevant emergency personnel
    - The director is to be informed of the situation, along with the principal contractor.
- Authorities
    - Council
        - The Hills Shire Council
          3 Columbia Court
          02 9843 0555
    - NSW Environmental Protection Authority – 131 555
- Services:
    - Water –
        - Sydney Water – 13 20 90
    - Gas –
        - Jemena Gas North – 1300 880 906
    - Communications
        - Telstra – 1800 653 935
        - Optus/Uecomm – 1800 505 777
    - Electricity
        - Endeavour Energy – 02 9853 4161

5. Implementation

The potential works during construction of the project which include, earthworks, demolition, stockpiling of materials, are likely to deviate our soil and water management controls planned. The activities associated with the generation of these include:

- Removal of vegetation
- Earthworks
- Demolition of existing areas
- Transport of materials
- Stockpiling
- Plant and vehicle movements on site

This section describes the measures that will be implemented by the Contractors to minimise soil and water impacts produced from the construction activities of this project. All measures must be implemented, and any activities must be identified in accordance with the CEMP and CSWMP. Soil and water controls must be monitored to ensure that these impacts generated because of the early works activities do not create any contaminations to the soil and water within the community and the TAFE. Monitoring these levels will consist of:

- A logbook of complaints and incidents will be maintained.
- An extensive plan to control and manage soil and water must be processed and reported; and
- New upcoming issues must be documented and registered.
- All mitigation measures to be implemented to manage soil and water

5.1 Soil Erosion and Sediment Control Plan

A soil erosion and sediment control plan has been developed for our construction area (refer to *"For Construction Drawing: Civil Set J-WD-C-20.01")* to prevent any contaminations to happen on site. The controls will adhere to the plan and be updated and reviewed frequently. Each control will be managed and installed prior to the beginning of the early works construction. The controls implemented, and will include, as a minimum:

- Use of silt fences, drains and sediment traps as relevant throughout construction works
- Earthworks to be kept at a minimum near waterways and drainage lines
- Weather must be considered when planning day-to-day construction works
- Install and maintain soil erosion sediment control fence to downstream onto the side of the job site
- Install and maintain a wire mesh and gravel sediment filter to existing kerb inlet pits in accordance with the 'Blue Book'
- Other impending soil and water contaminates should be reported to the site supervisor and recorded to implement safe and proper mitigation measures for effective performance.

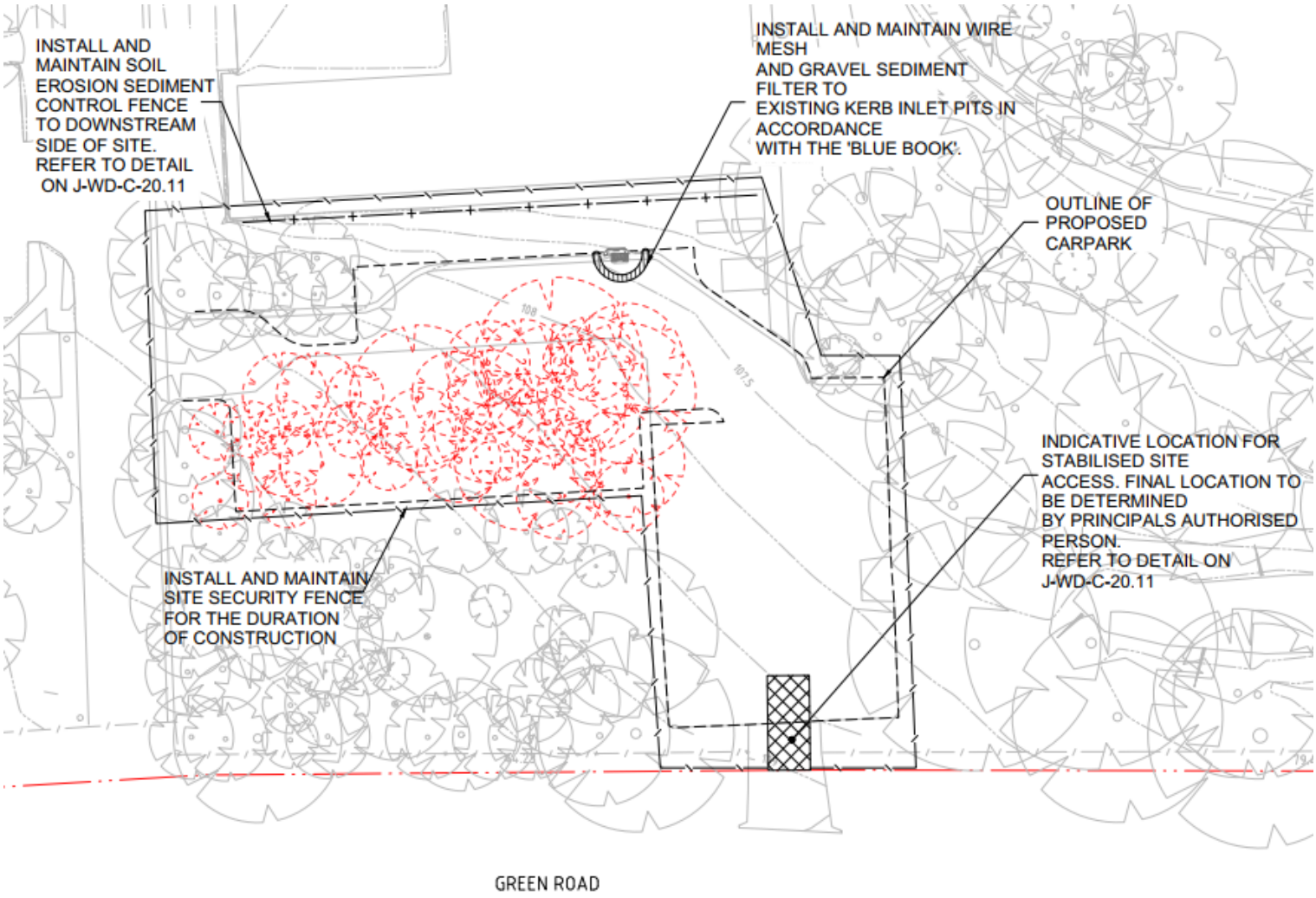
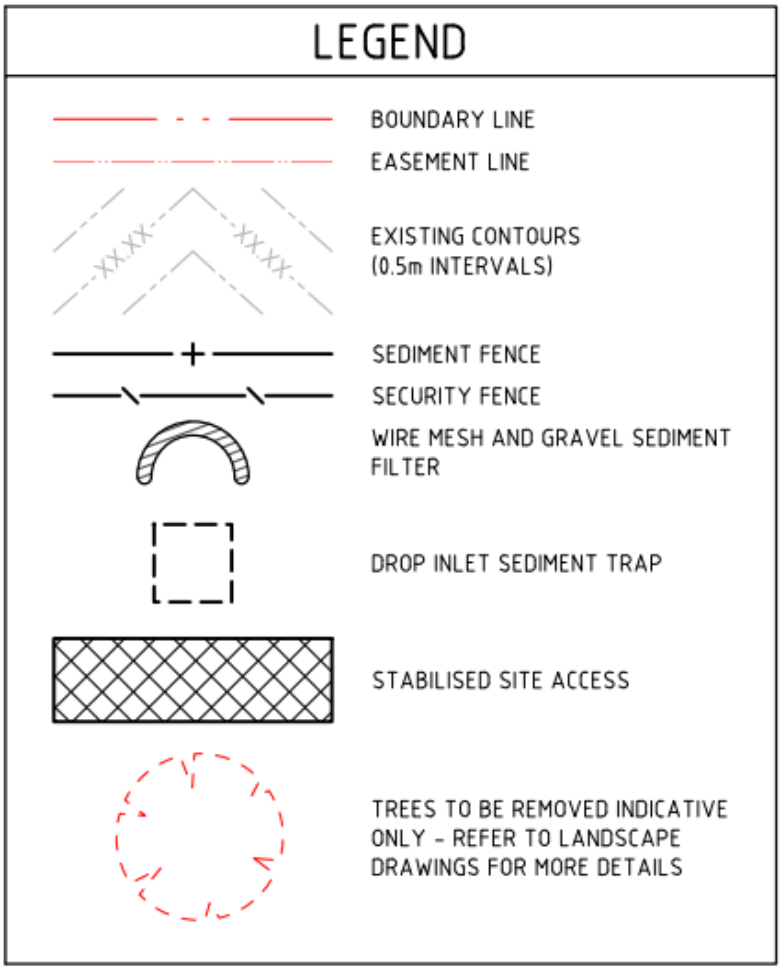


Figure 1 - Sediment and Erosion Control Plan (J-WD-C-20.01)



GENERAL NOTES:

1. REFER SPECIFICATIONS NOTES FOR SEDIMENT AND SOIL EROSION CONTROL GENERAL REQUIREMENTS.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
3. ALL SEDIMENT AND SOIL EROSION CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH THE 'BLUE BOOK'. CONTRACTOR TO ENSURE THESE MEASURES ARE IN PLACE AND MAINTAINED AT ALL TIMES DURING CONSTRUCTION WORKS.
4. CONTRACTOR TO PROVIDE 'WIRE MESH AND GRAVEL SEDIMENT FILTER' TO ALL PAVED / ROAD AREAS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'.
5. CONTRACTOR TO PROVIDE 'GEOTEXTILE INLET FILTER TRAPS' TO ALL STORMWATER DRAINAGE INLETS (BOTH PROPOSED AND EXISTING) IN ACCORDANCE WITH THE 'BLUE BOOK'

Figure 2 Sediment and Erosion Control Legend (J-WD-C-20.01)

5.2 Wet Weather Conditions

A plan must be implemented to control how all construction works will be managed. Using daily weather updates from the Bureau of Meteorology provides information to construction personnel with purpose of implementing productive operations in case of wet weather conditions. The table below indicates the measures taken if weather conditions change:

DESCRIPTION	ACTION
Storage of Equipment	Sufficient storage capacity is available in the event of wet weather conditions which will include: - Controls are correctly in place and maintained - Sheds and containers will be placed in existing handstand pavements
Stabilisation of the site	Rumble bar cattle grid is to be installed as the indicative stabilised site accessway for all construction workers driving into site. This ensures that soil will not attach onto truck wheels and end up on public roads.

Table 3 – Wet Weather Condition Measures

5.3 Water Quality

Water quality and rainfall must be monitored during the early works of the construction to ensure water quality in receiving waterways are not contaminated. The measures listed below ensures all waterways shall be retained in their natural states:

- Construction shall be programmed during dry conditions when wetlands and waterways are dry
- Plant equipment are not to be cleaned, refuelled, or serviced within 20m of stormwater drains/swales/waterways
- Soil or debris that enters waterways shall be removed immediately for any further contamination
- Appropriate erosion controls must be established, inspected, and maintained

5.4 Protection of Flora and Fauna

A scheme for the protection of flora and fauna plan must be identified and implemented in accordance with the CEMP and the Flora and Fauna Management Plan provided by WSP. The requirements that comply to the protection of flora and fauna include:

- Site vegetation adjacent to construction area shall not be impacted by construction works.
- Boundaries are to be fenced off and flora clearly marked prior to the construction works.
- A qualified arborist shall be engaged to undertake tree protection/removal plans (see Tree Protection Plan).
- Native fauna to be handled or harmed and must be protected from being trapped.

-

5.5 Potential Impacts

The potential impacts in relation to the CSVMP are listed in the table below:

ASPECT	POTENTIAL IMPACT
Erosion	• Sediment degrading the surrounding environment • Sediment to be washed into stormwater systems causing pollution to community waters
Contaminated water entering watercourse	• Water quality and ecosystem function significantly decreases • Pollution to waters
Hazardous chemical leakage	• Contamination of watercourse causing pollution • Contamination of soil and environment

5.6 Training, Monitoring, and Reporting

Construction personnel will receive training on the requirements to following the CSWMP on the project. Construction personnel are also responsible to monitor and report any other issues that may appear outside of the control perimeters of the CSWMP. This is to ensure an active soil and water management plan, which will minimise potential impacts to the local community.

ACTIVITY	ASPECT	RESOURCE	RESPONSIBILITIY	ACTION REQUIRED
Visual check-ups	Sediment Control Water Quality Controls	Supervisor Report Log	All construction personnel	Daily monitoring of control plans
Wet Weather Conditions	All soil and water management plans affected on job site	Supervisor Report Log	Supervisor and all construction workers	Supervisor and all construction workers to withhold all construction works

Table 4 – Soil and Water Management Monitoring Register

All erosion and sediment controls are to be implemented during construction as a minimum, in accordance with the publication *"Managing Urban Stormwater: Soils & Construction (4th edition, Landcom 2004), commonly referred to as the "Blue Book".*

5.7 Complaint Handling Procedure

Any complaints from occupants, stakeholders, or authorities in relation to noise and vibration impacts from construction activities shall be recorded and investigated as soon as possible, addressed, and controlled through a coherent management system. This is to be implemented throughout the duration of our construction. All complaints will be investigated, mitigation measures implemented, and resolutions found and documented. A response to the complaint will be made and all actions will be taken to resolve any issues caused by construction activities. A draft complaint register will be provided below as a guide.

DATE	TIME	CONTACT DETAILS	INCIDENT DESCRIPTION	ACTION TAKEN	FOLLOW-UP ACTION (IF REQUIRED)
		Name: _____ Contact Number: _____			

Table 5 - Draft Complaint Register

6. Conclusion

In conclusion, this CSWMP will be achieved by the ongoing evaluation of the management performance in order to target our key objectives of minimising soil and water management impacts onto the local community.

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Sydney's Garden Shire

Waste Management Plan

DEMOLITION, CONSTRUCTION AND ONGOING MANAGEMENT

The applicable sections of the table must be completed and submitted with your Development Application.

Completing this table will assist you in identifying the type of waste that will be generated and in advising Council how you intend to reuse, recycle or dispose of the waste.

The information provided on the form (and on your plans) will be assessed against the objectives of the DCP.

For a copy of the Western Sydney Recycling Directory or if you would like any assistance completing your waste management plan, please contact Council's Resource Recovery Project Officer on Ph. (02) 9762 1112

If space is insufficient in the table, please provide attachments.

OUTLINE OF PROPOSAL

Site address:	
Suburb:	
State:	Postcode:

Applicant's Name:	
Applicant's Address:	
Suburb:	
State:	Postcode:
Phone:	Mobile Phone:
Email:	

Buildings and other structures currently on site: .....

.....

Brief description of proposal: .....

.....

.....

.....

☐ The details provided on this form are the intentions for managing waste relating to this project.	Date:

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Demolition Waste Management Plan

WASTE MANAGEMENT PLAN – DEMOLITION (PLEASE FILL IF APPLICABLE)

DO THE WORKS INVOLVE ASBESTOS REMOVAL?

Tick ☐ if N/A	Tick ☐ if under 10m²	Tick ☐ if over 10m²

(If N/A or under 10m², only complete General Demolition Waste Details)

Work Cover Licence no.

Demolition Contractor Details: .....

Licenced Landfill:

Tick ☐ if a demolition contractor has not been appointed. If approved, a condition of consent may be placed on the Development Application requiring the above details prior to works commencing on site.

GENERAL DEMOLITION WASTE

Please tick appropriate	Amount		How will you manage this waste?		
Type of Material	Less than 10m³	More than 10m³	Onsite	Recycle	Landfill
Bricks					
Concrete					
Tiles					
Timber (clean)					
Timber (Treated)					
Asphalt					
Metals					
Plasterboard					
Green Waste					
Other – Specify:					
Other – Specify:					
Principal Off-Site Recyclers:					
Principal Licenced Landfill Sites:					

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Construction Waste Management Plan

WASTE MANAGEMENT PLAN – CONSTRUCTION (PLEASE FILL IF APPLICABLE)

Will a skip bin hire company be used?	☐	Yes for some work	☐	Yes for all work	☐	No

Estimated total volume or weight of waste:

PLEASE PROVIDE DETAILS OF SKIP BIN HIRE COMPANY USED.

Name:

Address:

State: | Postcode:

Phone: | Mobile Phone:

ABN Number:

Contractor Licence Number:

Tick ☐ if using a skip bin hire company but one has not been appointed. If approved, a condition of consent may be placed on the Development Application requiring the above details prior to works commencing on site.

If using a skip bin hire company for all work, please STOP here.

All Excavation Material including Swimming Pools:	☐	Less than 10m³	☐	More than 10m³		
	☐	Reuse Onsite	☐	Reuse Offsite	☐	Landfill Disposal

Address if reused off site:

Name of licenced landfill:

Address of licenced landfill:

Please tick appropriate	Amount		How will you manage this waste?		
Type of Material	Less than 10m³	More than 10m³	Onsite	Recycle	Landfill
Bricks					
Concrete					
Tiles					
Metals					
Timber (clean)					
Timber (Treated)					
Plasterboard					
Green Waste					
Other – Specify:					
Other – Specify:					
Principal Off-Site Recyclers:					
Principal Licenced Landfill Sites:					

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Ongoing Waste Management Plan

WASTE MANAGEMENT PLAN – ONGOING MANAGEMENT

☐ Residential Development (Section applicable to Multi Unit Dwelling only)	☐ Mixed Residential/Commercial Development
☐ Commercial/ Industrial Development (including Child Care Centres)	☐ Small Business Development in Residential Area

Please stop here if you have selected the commercial/industrial development option. A commercial waste service must be provided. Council does not provide a commercial waste service. Services are available to small businesses in residential areas where a limited amount of waste is generated. Service provision is at the discretion of Council. Please phone Council's Resource Recovery Project Officer on (02) 9762 1112 to confirm if a service is available to your development.

Council typically provides bins to Multi Unit Dwellings at the following rates:	**Number of bins required:** *Note collection frequencies and bin selections are at Council's discretion*
120 litres of garbage capacity per unit. Garbage is typically collected once fortnightly in 240L, 660L or 1100L bins.	
120 litres of recycling capacity per unit. Recycling is typically collected once fortnightly in 240L bins.	
Garden waste bins, on request for use in common areas, typically collected once fortnightly in 240L bins.	

MEASUREMENTS OF A 240L, 660L AND 1100L BIN ARE AS FOLLOWS:

BIN TYPE	HEIGHT	DEPTH	WIDTH
240L	1080mm	735mm	580mm
660L	1250mm	850mm	1370mm
1100L	1470mm	1245mm	1370mm

NOT REQUIRED

STORAGE OF WASTE

1.	Is there sufficient space allocated within each unit for one day's capacity of waste and recycling?	Yes ☐	No ☐
2.	Is there a garbage bin bay storage room(s) provided that can comfortably house the total number of bins above? This includes sufficient space for separation of each bin type, movement of bins and access by residents/ users.	Yes ☐	No ☐
3.	Is there a compactor provided in the garbage room(s)?	Yes ☐	No ☐
a.	Please detail the type of system (i.e. carousel, optic sensor, number of bins, automatic bin exchange, size etc.)		
b.	What is the ceiling height of the garbage room?	metres	
c.	What is the compactor diameter?	metres	
d.	Compaction ratio?		
4.	Is there a garbage chute system installed?	Yes ☐	No ☐
a.	Is there a waste service room provided for each storey?	Yes ☐	No ☐
b.	Is there sufficient space allocated for recycling in the service rooms?	Yes ☐	No ☐
c.	How many storeys will the chute service?		

NOT REQUIRED

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5.	What is the maximum distance from any unit to the garbage disposal point (whether disposal is to a bin bay or chute)?		
6.	Is there a storage area provided for the storage of bulky waste?	Yes ☐	No ☐
a.	What are the dimensions of this room or caged area	..... metres (height) ..... metres (depth) ..... metres (width)	

COLLECTION WASTE

7.	Is there a caretaker onsite responsible for managing waste?	Yes ☐	No ☐
8.	Describe arrangements for access by waste collection contractors to the waste and recycling room.		
9.	What is the maximum distance from the garbage/recycling room to the collection point?	metres	

MIXED RESIDENTIAL/COMMERCIAL ONLY

10.	Is a there separate garbage/ recycling room for residential and commercial waste?	Yes ☐	No ☐

ADDITIONAL INFORMATION:

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Construction Management Plan

- Powerhouse Museums Discovery Centre Castle Hill - v3