ENVIRONMENTAL MANAGEMENT PLAN

PARRAMATTA NRL CENTRE OF EXCELLENCE AND COMMUNITY FACILITY

AUTHORISATION AND REVIEW

The project manager shall prepare this *Environmental Management Plan EMP* and authorise for implementation.

Each person who is to carry out construction work on this project will be made aware of relevant content from this EMP during the induction process. The EMP is available to download from the project webpage on the electronic software titled Hammertech.

Doc Title	Rev	Issue Description	Authorised By	Position	Sign	Date
EMP	1	First Issue Authorised for use	Project Manager		4/12/23	EMP
EMP	2	Updated Enviro	Project Manager		22/03/24	EMP
EMP	3	Risk Assessment Complete & Reference to Hammertech	Project Manager		21/05/24	EMP
EMP	4	System Update / Alignment (NSW v1)	Project Manager		15/8/24	EMP

The WHSMP is reviewed by the project manager to ensure it remains up-to-date. The review frequency will not exceed 3 months. Ad-hoc reviews and changes to this EMP may result from e.g. audits, design changes, changes to work methods, incidents including near-miss (on-site, other Kane sites, outside of Kane), complaints, alerts, changes to legislation/standards/codes, system updates etc. All reviews shall be recorded within Hammertech or in the table below.

Kane will utilise toolbox talks to inform persons carrying out construction work on this project of relevant revisions made to this EMP.

Date Reviewed	Title of Document Reviewed	Change Description	Authorised By
21/03/24	EMP	Update plan	Michael Wright
20/05/24	EMP	Update plan following SSD Environmental Audit	Michael Wright
14/08/24	EMP	System Alignment and update to refect current proiject staff	Michael Wright

CONTENTS

INTRODUCTION

The *Protection of the Environment Operations Act 1997 (NSW)*. The object of the Act is to achieve the protection, restoration and enhancement of the quality of the NSW environment. The Act repealed and consolidated a number of existing Acts to rationalise, simplify and strengthen the regulatory framework for environmental protection in NSW.

This plan (working in collaboration with the Work Health Safety Plan) outlines processes and procedures to eliminate or reduce the risks of harm to human health and the environment so far as is reasonably practicable from the scope of works. It is intended to:

- Encourage best practice environmental management through the planning, development, implementation and continuous improvement of environmental management procedures during the works,
- Prevent and minimise adverse impacts on the Environment, and
- Recognise and protect any special environmental characteristics of the Site (including cultural heritage significance).

This plan addresses:

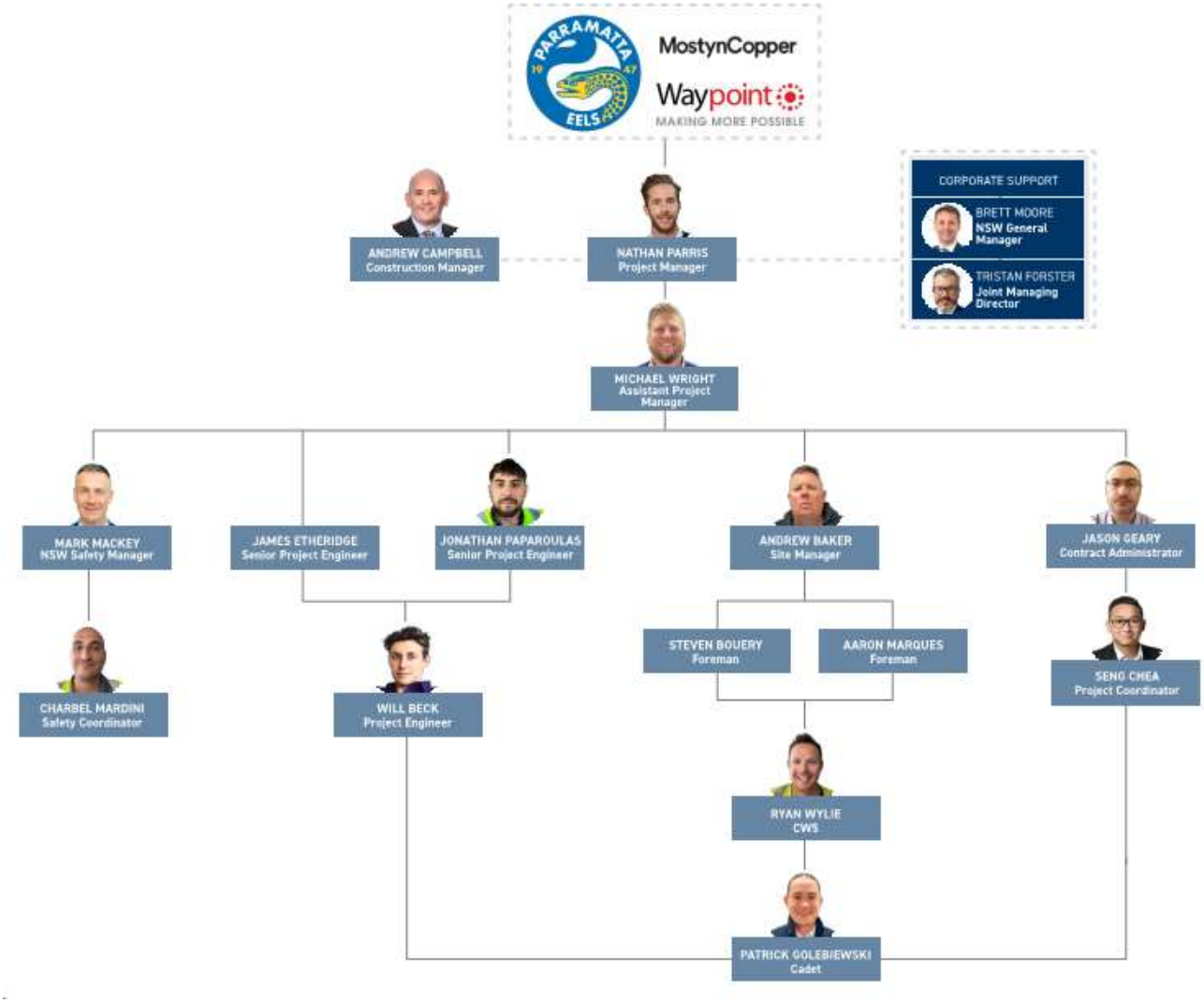
- Environmental Requirements,
- Statutory Requirements,
- Environmental Objectives,
- Roles and responsibilities of all Kane and subcontractor engaged to undertake work on the project,
- Consultation, cooperation and coordination of activities,
- Training and awareness programmes to reduce risk of harm to health and the environment,
- Hazard identification and risk control
- Duty to notify EPA of Contaminated Land and Groundwater
- Management of Contaminated Land and Groundwater including Unexpected Finds,
- Erosion, sedimentation and waterway management
- Waste management,
- Threatened or protected vegetation and habitats heritage-listed buildings, precincts or assets,
- Cultural heritage artefacts,
- Incident Management including near misses,
- Complaints Management, and
- Auditing or other monitoring to confirm the effectiveness of this Plan.

NOTE – FOR MANAGEMENT OF ALL IDENTIFIED SAFETY RISKS, PLEASE REFER TO THE PROJECT WORK HEALTH AND SAFETY PLAN

When implemented, this plan facilitates a systematic approach to site environmental management by applying the processes, checklists and forms of the Kane Environmental Management System to achieve compliance with relevant Environment Protection Legislation.

The project team is identified in the chart below. Note – The chart is not intended to illustrate the reporting from the Project Manager to senior management (refer to clause 3.3.1 of the Kane WHSMS corporate organisation chart for management reporting).

PROJECT TEAM CHART



KEY STAKEHOLDERS:

Client Company Name:	Parramatta National Rugby League Club Pty Ltd
Client's Address:	Cnr Kennedy Avenue & Stone Mason Drive Kellyville NSW 2155
Superintendent Company Name:	Mostyn Copper Group Pty Ltd
Superintendent's Address:	Suite 2, 95 Pitt Street, Sydney NSW 2000
Principal Contractor:	Kane Constructions
Principal Contractor's Address	2 John Street, Waterloo NSW 2017
Principal Contractor's Representative	Nathan Parris
Project Name:	PNRL Centre of Excellence and Community Facility
Site Address:	Kellyville Memorial Park Cnr Kennedy Avenue & Stone Mason Drive Kellyville NSW 2155
Anticipated Project Start Date:	August 2023
Anticipated Project Finish Date	March 2025

PROJECT SCOPE OF WORKS

This EMP will be implemented during the contracted works associated with the PNRL Centre of Excellence and Community Facility at Kellyville Memorial Park

The Parramatta Eels CoE will provide a state-of-the-art dedicated year-round rugby league training and administration facility

The new facility will service the Parramatta Eels National Rugby League (NRL), National Rugby League Women's (NRLW) and pathway programs, as well as providing a community facility that will support community rugby league competitions and sport, social, health and educational programs.

The works include but are not limited to:

Community Facility

Construction of a Community Facility, including a grandstand with approximately 1,500 seats which will also incorporate:

- Change rooms,
- Gymnasium
- Café/Kiosk
- Warm shell tenancy
- Multipurpose community function room.
-

Centre of Excellence

Construction of high-performance Centre of Excellence facility in the northeast of the site comprising:

- Elite level gymnasium
- Rehab Facilities
- Recovery and Rehab Pools
- Lecture Theatre
- Meeting Rooms
- Administrative Offices
- Café
- End of Trip Facilities.
-

Associated Site Works

Associated site works include construction of;

- 40 on grade car parking spaces
- Site wide Infrastructure.
- Hard and Soft Landscaping.
-

ENVIRONMENTAL RESPONSIBILTIES

The allocation of sufficient resources is essential for producing, maintaining and improving our EMS. Appropriate external resources, by way of specialist consultants, will be made available where required. The environmental responsibilities of Kane staff on this project is attached (must be read in conjunction with the Kane EMS responsibilities). The priority, order and timeframes in which the responsibilities are implemented may differ as determined by the Project Manager to suit the project construction programme and the findings of the risk assessment.

The responsibilities and associated timeframes of key environmental management positions are summarised in the Kane EMS and WHSMS Schedules (refer Who/When/How table at the top of each schedule). The attached

responsibilities table defines how such system responsibilities will be satisfied by the positions held on this project. (refer to the project team chart for names and position abbreviations).

STAKEHOLDER CONSULTATION, COORDINATION and CO-OPERATION

Kane will provide stakeholders appropriate consultation, coordination and cooperation opportunities to enable their input into the environmental management strategies implemented on the project.

Site Management workshop with major stakeholders prior to commencing works on site to establish a shared appreciation of the project, the risks involved and to identify and to develop a collaborative risk mitigation solution.

Consultation, coordination and cooperation of activities associated with many aspects of the project including Quality, Safety and Environmental Management occurs at (not limited to);

- Client Meetings
- Design Meetings
- Project Team Meetings,
- Subcontractor Meetings,
- Pre-start Meetings,
- Toolbox Meetings,
- Health, Safety and Environment Committee Meetings

TRAINING AND COMPETENCY

Kane provides our employees with relevant training so they have the necessary competency and skills to deliver their project environmental management responsibilities. This includes induction training into the Environmental Policy, Environmental Management System and procedures.

Kane ensures ongoing training for all employees based on identified skill gaps. This targets the needs of individual employees and provides access to training most relevant to their roles and responsibilities. Certificates of competency are maintained and available to validate skills and competency upon request.

Kane seek Environmental advice and assistance and keep updated with changes to Environmental legislation, regulations and guidelines through the below listed sources (not limited to);

- EPA email Updates/Bulletins,
- Master Builders Association Member Bulletins
- Environmental Consultant email updates
- Legal representatives email updates
- Standards Australia Update emails etc.

Access to Acts, Regulations Australian Standards and Codes applicable to the work tasks is made available to all workers on site. Workers who wish to view such information must report to site management.

Induction training is mandatory for all Workers. Each Worker is required to complete a two stage induction process.

Stage 1, General Induction – The General induction covers Kane culture, values, key safety and environmental management expectations, risks and controls that applies across all Kane sites. The individual must successfully answer randomly selected multiple choice questions to demonstrate their understanding of the information presented, competency and the knowledge that is expected of them before progressing to stage 2.

Stage 2, Site Specific Induction – The Site induction is delivered by Kane Site Management and is an opportunity to build a positive relationship between the worker and Kane. This induction educates the individual of key safety and environmental management expectations, risks and controls specific to the site.

Employers of workers with limited English skills are required to provide interpreter assistance. The interpreter must translate the induction and sign a declaration on the worker's induction profile to verify their understanding of the information presented.

The information presented is unique to each site subject to the hazards being managed most commonly covering;

- Site Team Introduction
- Project Scope of Work
- Site Rules
- Emergency Procedure and Evacuation Plan
- Key locations on site
- Environmental Risk Controls
- Permit to Work Requirements
- Safe Work Method Statement SWMS
- Site Specific and Client Requirements
  - Traffic Management
  - Live Services
  - Hazardous Building Materials
  - Contaminated Soil
  - Chemicals, Dangerous Goods & Hazardous Substances
  - Confined Spaces

The information presented during the site induction is specific to the hazards, risks and controls at the site. During the induction, site management confirm all inductees are task specific procedures trained, current holders of the Construction Induction Card, and Certificates of Competency where applicable.

HAZARD IDENTIFICATION AND RISK CONTROL

The Act and Regulations impose duties on Kane/arete to manage risks by eliminating risks so far as is reasonably practicable, and if it is not reasonably practicable, to minimise and control those risks so far as is reasonably practicable.

Risk is the possibility that harm (environment damage or loss, injury or illness to people) might occur when exposed to a hazard.

A hazard means a situation or thing that has the potential to harm the environment or a person.

Risk control means taking action to eliminate risks so far as is reasonably practicable, and if that is not possible, minimising the risks so far as is reasonably practicable. Eliminating a hazard eliminates risks associated with that hazard.

When deciding what is 'reasonably practicable' to protect the environment and people from harm, Kane will take into consideration the following (not limited to):

- The likelihood of the hazard or risk concerned occurring
- The degree of harm that might result from the hazard or risk
- Knowledge about the hazard or risk, and ways of eliminating or minimising the risk
- The availability and suitability of ways to eliminate or minimise the risk, and
- After assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk. The cost of controlling a risk may be taken into account in determining what is reasonably practicable, but will not be used as a reason for doing nothing.

The risk management process adopted by Kane involves the 4 steps below (in the order listed):

1. **identify hazards** – find out what could cause harm
2. **assess risks** – understand the nature of the harm that could be caused by the hazard, how serious the harm could be (severity of risk) based on the likelihood of it happening
3. **control risks** – implement the most effective control measure that is reasonably practicable in the circumstances
4. **review control measures** to ensure they are effective and working as planned.

MAJOR ACTIVITIES AND ANTICIPATED HAZARDS (ENVIRONMENTAL ASPECTS)

An Environmental Risk Assessment is prepared to identify environmental aspects associated with the activities to be undertaken (refer Schedule R). The risk of those aspects occurring and causing environmental impact is rated, and control measures identified to reduce the risk. The overall project risks have been compiled through the conduct of a Risk Workshop taking into consideration the duties relevant to demolition, building and civil construction industries outlined below.

Potential for harm from	Description	Potential sources or work activity
Contaminated Soil or groundwater	Uncontrolled disturbance of contaminated soil or groundwater can harm the environment i.e. ▪ by entering clean soil and groundwater ▪ through industrial waste not being properly managed, transported or disposed ▪ contaminating waterways damaging marine ecosystems	Excavation of contaminated soil or groundwater
Solid Waste	Poorly managed waste can harm the environment i.e. ▪ waste becoming airborne spreading litter ▪ by entering the atmosphere ▪ by entering the soil and groundwater ▪ through hazardous industrial waste not being properly managed, transported or disposed ▪ contaminating waterways damaging marine ecosystems	All activities that generate waste on site including waste uncovered during excavation
Dust	Nuisance Dust can have a negative impact on environment i.e. ▪ the surrounding built environment ▪ causing the spread of infection ▪ human respiratory and cardiovascular systems irritating eyes, throat and skin	Demolition Soil disturbance and excavation Vehicle movements on unsealed roads Vehicles with muddy tyres driven onto sealed roads Dry cutting Grinding steel and cement products Fireproofing
Glues, Chemicals, Oils, Fuels, Substances	Glues, Chemicals, Oil and Fuel spills can; ▪ contaminate soil, groundwater and nearby waterways ▪ contaminate the air ▪ harm human health	Uncontrolled escape, spillage or leakage of a substance including dangerous good Plant/machinery refuelling/servicing Waterproofing Tiling Vinyl Laying Painting Caulking and Sealant works Cleaning
Waste water	Waste water can carry harmful pollutants contaminating soil and the stormwater system discharging into nearby creeks, rivers, wetlands, lakes and bays	Wet cutting of concrete, brick/blocks, pavers Concreting/grout core filling Cementitious Floor grinding/levelling Painting Plastering Soil/sediment loss and erosion
Stormwater, erosion and sediment	Rainwater falling on disturbed soil including un-vegetated land can carry harmful pollutants e.g. contaminating soil and sediment off site causing erosion and pollution entering the stormwater system discharging into nearby creeks, rivers, wetlands, lakes and bays	Heavy Rainfall on disturbed and un-vegetated soil Vehicles with muddy tyres driven onto sealed roads Any work involving soil disturbance Any work removing vegetation Any work requiring soil to be stockpiled Landscaping
Noise	Excessive noise can; ▪ Disturb the community and wildlife	Demolition Piling Rock excavation

	▪ Disturb sleep patterns of individuals sleeping during times when noise is permitted	Saw-cutting Plant/machinery use Rattle gun use
Odour and air pollution	Odour and air pollution can cause; ▪ Disturbance to the community from unwanted smells ▪ Nausea/headaches	Emissions from plant/machinery engines Overflowing septic tanks Chemical use Waste skip bin Contaminated soil Metal welding, grinding, cutting
Pathogens	Pathogens i.e. bacteria, viruses or other microorganisms can cause disease and harm human health	Animal waste and carcasses Used syringes Poor personal hygiene (not washing hands) Overflowing septic tanks Unhygienic amenities
Flora loss (affecting Fauna)	Damage and loss of plants/vegetation (including those protected under conservation strategies) that fauna rely on for food, shelter (habitat) etc. can affect harm the ecosystem critical for fauna survival.	Civil/earthworks Any work involving soil disturbance Any work removing trees, vegetation Any work within tree root zones
Damage to Heritage sites Cultural Heritage Harm	Damage and loss of the built environment that is heritage listed Harm caused to Traditional Land Owner (Aboriginal or Torres Strait Islander) cultural heritage	Alterations, additions and refurbishment on sites with known heritage significance. Tree removal e.g. of scarred trees. Earthworks potentially uncovering e.g. ancestral remains, stone arrangement, mound site etc. as identified in an Environmental Impact Statement.

The project Risk Assessment Worksheet RAW developed and authorised for implementation on this site. A risk rating tool (refer 5x5 matrix on page 1 of the RAW) is used to plot the likelihood of a hazard occurring against the consequence of the hazard on people and the environment.

The Rating tool determines extreme to low risk. Risks assessed to be extreme (after implementation of controls) have potential for catastrophic consequences. For any such risks, the Kane RAW requires the implementation of a Risk Control Priority to elevate the importance of giving priority to the task and placing more stringent controls.

The Hierarchy of Risk Control is used to determine the most effective control measure that is reasonably practicable in the circumstances. Each activity or hazard listed in the RAW identifies a series of controls in the order of the hierarchy.

The project RAW identifies, if elimination of the hazard and associated risk is not possible or practicable, a combination of the highest possible controls from hierarchy is selected. They are;

2. **Substitute** the hazard with a safer alternative (e.g. replace solvent-based paints with water-based)
   Use **engineering** controls (e.g. containing potential pollution using bunding, burst protection valves)
3. Use **administrative** controls (hazard not controlled at the source – e.g. training, procedures, permit systems)
   Use **personal protective equipment PPE** and **spill kits** (hazard not controlled at the source – e.g. protective gloves if individuals could be directly exposed to harmful pollution or waste)

Kane recognise the importance of supporting control measures with:

- Safe Work Method Statements SWMSs - describes the task, identifies the hazards and controls, and documents how the task is to be performed to minimise the risks (refer Kane Safety Management System)
- Training – to ensure workers involved are able to recognise the hazards, risks and controls
- Supervision - The level of supervision required will depend on the level of risk and the experience of the workers involved. Higher levels of supervision are necessary where inexperienced workers are expected to follow new procedures or carry out difficult and critical tasks.

Kane undertake regular proactive reviews of implemented control measures. **Environment Walks** or inspections are undertaken weekly to confirm controls are implemented, effective and working as planned. Such inspections are completed using Hammertech online Health, Safety, Environment, and Quality HSEQ software. Any actions are photographed and assigned to those responsible for close-out and tracked on the issues dashboard.

Failed and/or inadequate controls can become evident from incidents, near misses and non-conformances. Following an incident, near miss and non-conformance, the Risk Assessment shall be reviewed to confirm hazards, risks and controls are appropriate giving due consideration to the root causes and corrective actions determined in the incident investigation or non-conformance findings.

Monitoring and measurement may be allocated to an external consultant where required e.g. water testing, soils testing, air monitoring, noise and vibration etc. Kane shall ensure that all testing is analysed in a NATA accredited laboratory by a competent person using calibrated testing equipment.

CONTAMINATED LAND MANAGEMENT *Act 1997*

Many forms of contamination are dynamic in nature. They can migrate in groundwater or from surface run-off or wind, generate harmful vapours and cause onsite or offsite impacts to ecosystems. Contamination can also pose unacceptable health risks. If left unmanaged, contamination can become increasingly challenging and costly to address, particularly where the use of the land changes. These sources of harm require proactive action to ensure the use of contaminated land and groundwater does not place the community or the environment at risk of harm. This means ensuring the current use of land and groundwater is managed to minimise these risks of harm. Where land use changes are proposed, it also means that remediation of contaminated land is to a level 'fit for purpose' for its intended future use. The Act introduces new duties for contaminated land. These apply to harm that has already occurred or is continuing to occur - even in the absence of the harmful activities. *(EPA publication 1915)*

The **duty to manage** contaminated land requires a person in management or control of land to minimise risks of harm to human health or the environment from the presence of contamination in land or groundwater:

- A person can fulfil their duty based on what is known about contamination at the site, including the potential for contamination to be present, and when it is reasonable to expect a person (in management or control of the site) to have that knowledge.
- As knowledge on the potential for contamination increases, then the scope of a person's duty also increases, whether to assess risks or to manage them.

The Regulations set out circumstances where contamination may need to be reported to EPA under the duty to report of contamination (Act 1997 section 60). The **duty to report of contamination** promotes transparency of information, to continuously improve the available knowledge for all parties and improve the management of contaminated land risks.

What is contaminated land?

Section 5 Part 1 of the Contaminated Land Management Act 1997 (N0 140) defines:

Contamination of land, for the purposes of this Act, means the presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

It would be reasonable to assume land is not contaminated when:

- *a person has no direct knowledge of contamination being present or likely to be present: for example, no information in reports or site assessments disclosed as part of a sale of land, and no visible evidence of contamination (such as demolition waste, soil stains or signs of leaked substances); and*
- *there is no reasonable indirect knowledge that contamination could be present: for example, where, based on reasonable consideration of the use and historical uses of the site, its location and proximity to polluting activities, there is no information reasonably available to indicate likely contamination.*

ACTION - Determine if the site is contaminated (land and groundwater)

Search the following to determine knowledge of site contamination (land and groundwater);

- *site assessments prepared during the land acquisition process,*
- *site assessments prepared for the planning permit approval process or planning scheme processes,*
- *the physical site i.e. site inspection for e.g. tanks, stained soil, dumped waste and for the smell of odours*
- *the land adjacent to the site for existing contaminating activities*
- NSW EPA Website – *Contaminated Land Management Act 1997*
- NSW EPA Website – *Contaminated Land Management Regulation 2013*
  or Nationally
  - *Priority Sites Register* (PSR – Sites which EPA has formalised the management of contamination)
  - *EPA Environmental Audits* – EPA Audits assessing the suitability of a site for the proposed use
  - *Groundwater Quality Restricted Use Zone* - area, site or property where an environmental audit has been conducted and was found to have residual groundwater contamination

Where the above search process identifies land that is or may be contaminated, the circumstances of the contamination that make it notifiable to the EPA must be assessed in accordance with *NSW EPA Guidelines.*

The contamination of land is often complex requiring highly technical environmental knowledge. The assistance of contaminated land or environmental consultants is to be utilised where required to seek direction on complying with the risk management obligations.

https://www.epa.nsw.gov.au/your-environment/contaminated-land/managing-contaminated-land/engaging-consultant

The consultant engaged shall measure, evaluate and confirm;

- Whether notification to EPA is required (not all contamination is notifiable to the EPA)
- Provide guidance (or establish procedures) to manage protection of human health and the environment

Expectations outline implementation of the following risk management principles.

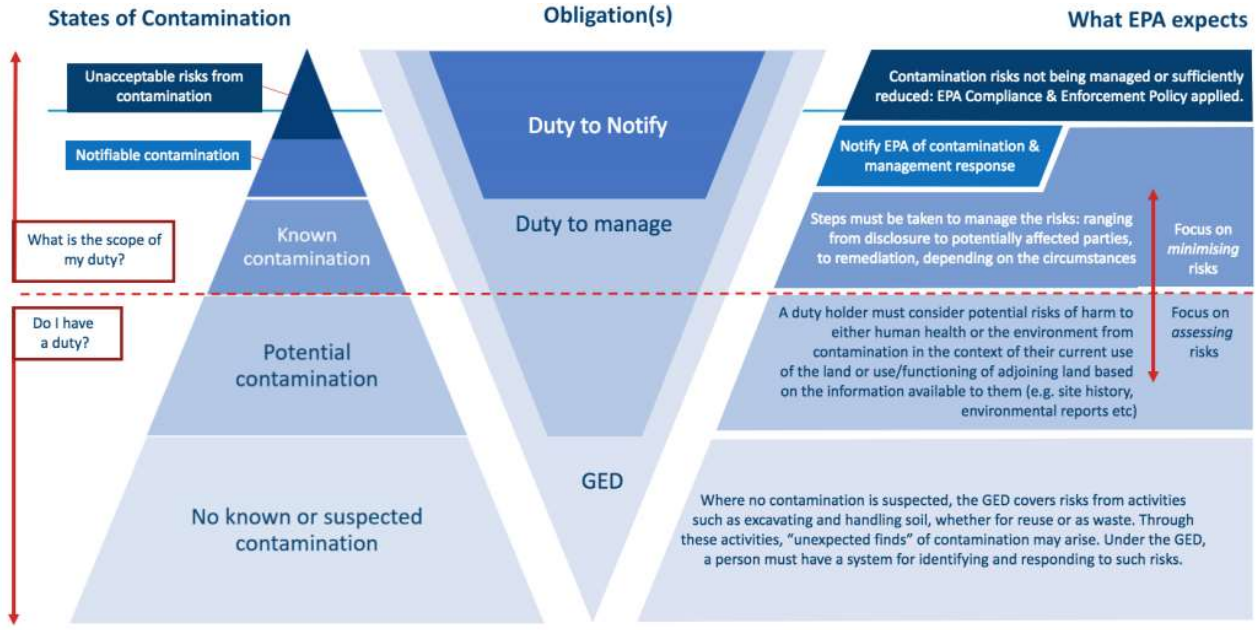


Figure 1 Contaminated land obligations and the knowledge of site contamination

CONTAMINATION THAT IS NOTIFIABLE TO EPA – *Guidelines on the Duty to Report Land Contamination under the Contaminated Land Management Act 1997.*

The following flowchart is used to determine the decision process for person/s responsible for reporting potential contamination to the EPA.

6. Appendix 1: Decision process and checklist for persons responsible for reporting potential contamination to the EPA

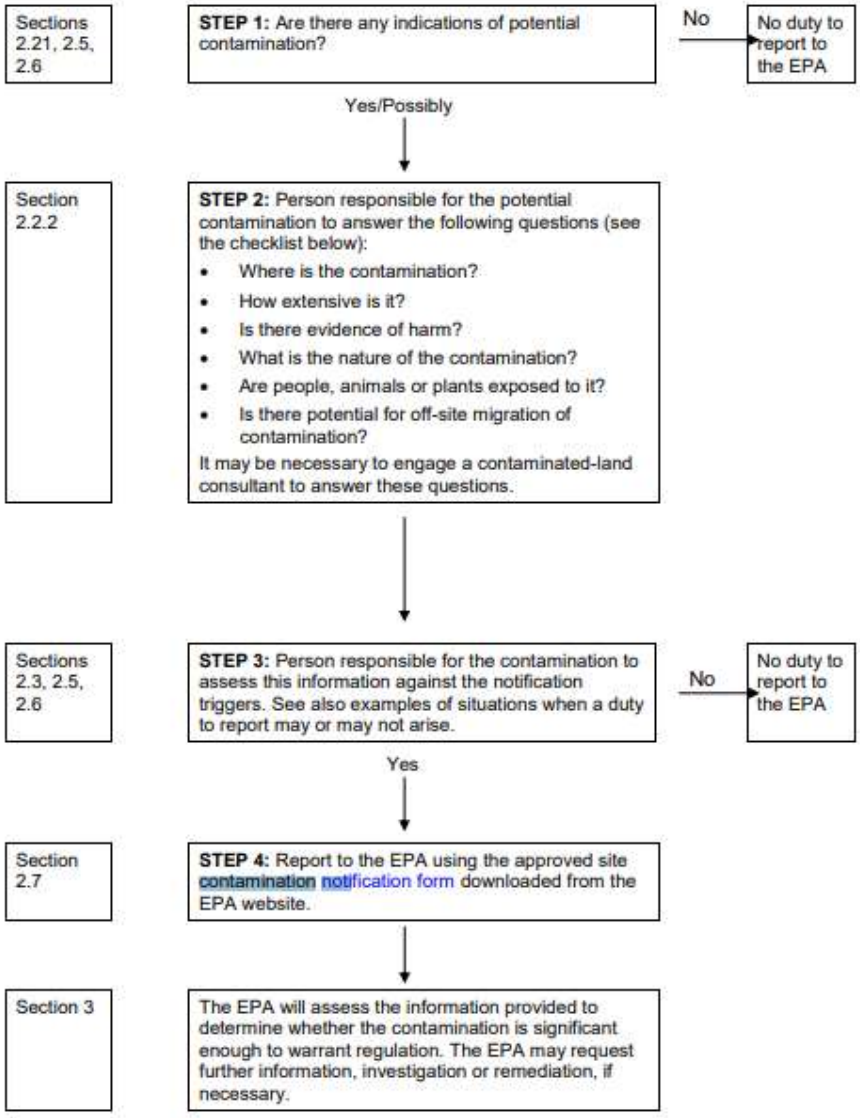


Figure 1: Decision process for use by persons responsible for reporting contamination to the EPA under the *Contaminated Land Management Act 1997*.

The following contamination is notifiable to EPA NSW. If the below listed contamination is suspected or known; the assistance of contaminated land or environmental consultants is to be utilised where required to review and interpret the circumstances of the contamination that make it notifiable.

Note – Notification exemptions apply.

Where notification is required to the EPA, the following information must be provided.

- location of the land;
- the activity resulting, or suspected as resulting, in the contamination;
- the nature and extent of the contamination;
- the nature of the risk of harm to human health and the environment from the contamination; and
- any other prescribed information, which includes information on the management response, or proposed management response, to the notifiable contamination.

Contamination	Reg Ref	Description
On-site soil contamination	Sect 2.3.1	▪ The contaminant is in or on soil on land under the management or control of a person; ▪ A person is, or is likely to be, exposed to the contaminant; and ▪ The concentration of the contaminant is, and is likely to remain, at a concentration that is: o above the average threshold for that contaminant; or o equal to or above localised elevated value threshold for that contaminant
Contamination of adjacent land	Sect 2.3.3	▪ The contaminant is in or on soil on land adjacent to land under the management or control of a person; ▪ The contaminant has entered / is likely to have entered from land under the management or control of the person; ▪ The concentration is or likely to remain, at a concentration: o above the average threshold for that contaminant; or o equal to or above the localised elevated value threshold for that contaminant
Foreseeable contamination of adjacent land	Sect 2.3.3	▪ The contaminant is in or on soil on land under the management or control of a person: o The contaminant is likely to enter and remain on land adjacent to that land; and o The concentration is likely to be above the health investigation levels (HIL) listed in Schedule B1 to the NEPM for that contaminant for the current use of the adjacent land.
Asbestos in or on soil	Sect 2.3.4	▪ There is a presence of friable asbestos in or on soil on land under the management or control of a person and a person is, or is likely to be, exposed to airborne asbestos fibre levels above 0·01 fibres per mL by means of inhalation
Actual or foreseeable contamination of surface water	Sect 2.3.5	▪ Entry or likely entry of a contaminant into surface water from land that is under the management or control of a person; and ▪ The contaminant in the surface water: o Is, or is likely to be, above the default guideline value / the guideline value for that contaminant; and o Is likely to continue to remain above the specified concentration.
Vapour inhalation pathway (vapour intrusion)	Sect 2.3.6	▪ The contaminant concentration: o —on average, in soil vapour samples from the land, is above the interim soil vapour HIL for volatile organic chlorinated compounds for the current use of the land; o —in an individual soil vapour sample from the land, is equal to or above 250% of the interim soil vapour HIL for volatile organic chlorinated compounds for the current use of the land or any land adjacent to the land; o —in soil vapour samples from the land, is above the soil vapour health screening levels listed in Schedule B1 to the NEPM (HSL) for vapour intrusion for the current use of the land or any land adjacent to the land;

		○ —in an individual soil vapour sample from the land, is equal to or above 250% the soil vapour HSL for vapour intrusion for the current use of the land or any land adjacent to the land; ○ —on average in soil samples from the land, is above the soil HSL for vapour intrusion for the current use of the land; ○ —in an individual soil sample from the land is equal to or above 250% of the soil HSL for vapour intrusion for the current use of the land or any land adjacent to the land; ○ —on average in groundwater samples from the land, is above the groundwater HSL for vapour intrusion for the current use of the land or any land adjacent to the land; ○ —in an individual groundwater sample from the land that is equal to or above 250% of the groundwater HSL for vapour intrusion for the current use of the land; and ▪ The contaminant concentration remains, or is likely to remain, above the concentration specified above; and ▪ A person is, or is likely to be, exposed to the contaminant or any by-product of the contaminant.

Waste *includes any of the following – (Waste Classification Guidelines – Part 1 Classifying Waste)*
This part of the Waste Classification Guidelines (the Guidelines) covers the classification of wastes into groups that pose similar risks to the environment and human health.
The following classes of waste are defined in clause 49 of Schedule 1 of the Protection of the Environment Operations Act 1997 (POEO Act):

- *special waste*
- *liquid waste*
- *hazardous waste*
- *restricted solid waste*
- *general solid waste (putrescible)*
- *general solid waste (non-putrescible).*

Industrial Waste *means*

(a) waste arising from commercial, industrial or trade activities or from laboratories; or
(b) waste prescribed to be industrial waste for the purposes of this definition

NEPM *National Environment Protection (assessment of site contamination) Measure 1999 means a Measure made under section 14(1) of the National Environment Protection Council Act 1994 (Commonwealth Act) and the equivalent provisions of the corresponding Acts of participating States and Territories.*

INCIDENT NOTIFICATION TO EPA

Schedule M details the incident classifications (Class 1, 2 and 3) used by Kane/arete to provide guidance on the type of incidents, their notification and investigation requirements.

Call 000 to report major pollution incidents.

Call **EPA NSW** on 131 555

(Notification Facts sheet can be found via the link below)

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/reporting-and-incidents/21p2833-reporting-to-the-epa.pdf

Once the incident has been reported to EPA, you will be given a case number where a EPA field officer will be in contact to review your report in a timely manner.

A Notifiable incident means;

a) a pollution incident that causes or threatens to cause material harm to human health or the environment; or
b) a prescribed notifiable incident

Pollution Incident

A pollution incident means an incident or a set of circumstances—

a) that causes a leak, spill or other unintended or unauthorised deposit or escape of a substance; and
b) as a result of which, pollution has occurred or is occurring—

but does not include an incident or a set of circumstances that solely involves the emission of noise.

The link below guidance information is obtained from the EPA website

https://www.epa.nsw.gov.au/reporting-and-incidents/incident-management/reporting-and-managing-incidents

INCIDENT INVESTIGATION, CORRECTIVE AND PREVENTATIVE ACTION

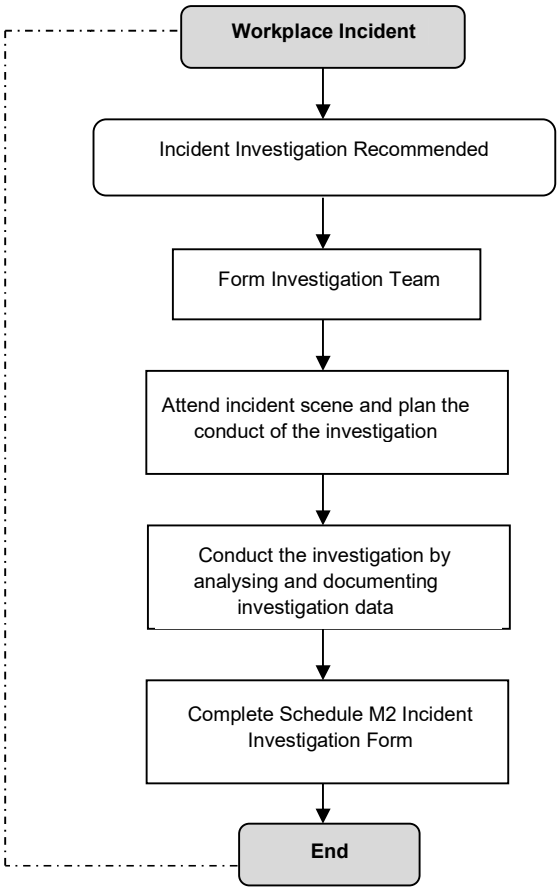
During the site induction, all workers are informed of their responsibility to immediately report all incidents and non-compliances to site management.

Incidents are investigated to identify the root causes and prevent further such incidents occurring at the workplace and other workplaces. The circumstances triggering notification from the project team to the state HSE Team is detailed in Schedule M of the WHSMS. The Site Manager (or any member of Kane/arete Management) at the workplace must use Schedule M as a reference tool to determine;

- If the circumstance is reportable to the Kane/arete HSE Team
- Who to contact and by when
- What to do immediately (i.e. Preservation of a regulator notifiable incident scene is a legal requirement)
- If the circumstance meets notification requirements to the regulator
- Actions needed for the incident investigation

Schedule M details the incident classifications (Class 1, 2 and 3) used by Kane/arete to provide guidance on the type of incidents, their notification and investigation requirements. An investigation is undertaken in accordance with the below chart and documented using Schedule M2. The findings of the incident investigation are reviewed by the HSE Team with a view to disseminating the lessons learnt to all projects.

Procedural and/or legislative Non-conformances are identified, investigated, corrected and prevented by raising an Improvement Notice or Non-conformance. The notice recipient must document the action taken to rescind the notice, including how to prevent recurrence. Kane Site Management determines if the rectification is satisfactory.



Comments / Notes

1. Refer to Schedule M to confirm if the circumstance is reportable to the Kane/arete HSE Team
2. Determine the Incident Classification Class 1,2 or 3
   - Class 1 – External Investigation Team
   - Class 2 - HSE Team Internal Investigation
   - Class 3 - Site Team Internal Investigation
3. System Manager/WHS Manager to liaise with Project and Site Manager. Include subcontractors, subject matter experts and consultants as required to form an Investigation Team.
4. Familiarise with environment, equipment and plant associated with the incident. Gather facts and photographs. Investigation team determines
   - Who to be interviewed
   - When to conduct interviews
   - What questions to ask
   - What information or evidence to collect
   - What photographs are required
5. Analyse data to find root cause/s of the incident and propose recommended actions
6. Project Manager finalises report and consults with Systems Manager/WHS Manager and Director, General / Construction / Operations Manager

UNEXPECTED FINDS – *Uncovering previously unknown or undetected contamination*

Contamination can be 'hidden' in structures and beneath surfaces that were previously not accessible for inspection and testing. This includes contamination beneath the soil surface e.g. from past practices of burying waste. The possibility of an 'unexpected find' can arise during works that uncover such hidden areas e.g. during excavation work and demolition of structures on or beneath the soil surface.

Step	Description	Action
1	Potential contaminated soil, groundwater or surface water, or ACM, is encountered during construction activities.	Cease work in the potentially impacted area as soon as it is safe to do so and move away from the area. Assess the potential immediate risk to worker health and surrounding environment posed by the unexpected find and assess if evacuation or assistance of emergency services is required.
2	Environmental management and Work Health Safety Management	Delineate an exclusion zone around the impacted area using fencing and/or appropriate barriers and signage. Additional control measures may be required for: • Odours and/or volatile compounds: odours suppression and no flames/sparks signage. • Potential asbestos containing materials: if area is small cover with weighted plastic sheeting or geofabric. For larger areas, use regular dust suppression as conditions require – refer to the project risk assessment. • Install environmental controls around the site to contain the contaminated material including diversion of water to minimise potential spread. • Personal Protective Equipment (PPE) will be worn if conditions have changed as per the relevant Material Safety Data Sheet (MSDS).
3	Assess the Un-Expected Find	A Contaminated Land Consultant should assess the unexpected find and provide: • Preliminary assessment of the nature of suspected contamination and immediate management controls if needed. • Advise what further assessment and/or remediation works are required and how such works are to be undertaken in accordance with contaminated site regulations and guidelines – refer to the CEMP or associated management plan. • The assessment may include a requirement to undertake a targeted site investigation to sample and analyse contaminated media. Suspected or identified contamination will be characterised with consideration of the Waste Classification Guidelines (NSW EPA, 2014).
4	Management or mitigation action and reporting	Based on advice of the Contaminated Land Consultant, implement necessary management or mitigation actions to minimise risk to human health and the environment and to allow the construction activities to recommence. Record details of the unexpected find and the actions undertaken, including the following, and notify the auditor, landowner; local council and/or NSW EPA: • Location, nature and extent of unexpected find • Scope, methodology and results of any investigation. • Scope, methodology and outcomes from any remedial activities completed. • Results of any validation sampling or clearance certificates (i.e. for asbestos). • Implemented changes to risk control measures.
5	Recommence Works	The Contaminated Land Consultant (if req'd) will provide relevant information and recommendations to the Kane Project Manager in accordance with the WHSE Manager particularly for considering any changes to existing site management plans. Recommence construction works once mitigation or remediation works have been implemented, sampling has validated that the remediation strategy has been successful and if it is then deemed safe to do so by Kane Constructions.

Kane/Arete Site Management will notify the State HSE Team in accordance with Schedule M

Kane/arete Site Management will consult with the State HSE Team and take action to protect human health and the environment in accordance with local Laws, Standards and Guidelines. The assistance of professional consultants is to be utilised where required to seek direction on measuring, evaluating and establish procedures to manage the protection of human health and the environment associated with unexpected finds.

DUTY TO MANAGE INDUSTRIAL WASTE

Waste must be classified before disposal.

The Regulations places the following **duties on persons depositing, transporting and receiving industrial waste**.

- **Industrial waste must only be deposited at a lawful place**
- **Receivers of industrial waste must be authorised**
- **Generators of industrial waste must take reasonable steps to ensure the waste will be transported to a lawful place**
- **Transporters must take all reasonable steps to ensure the waste is transported to a lawful place**

Lawful places require authorisations or permissions to process industrial waste.

The three main types of authorisations are;

Licence Holder

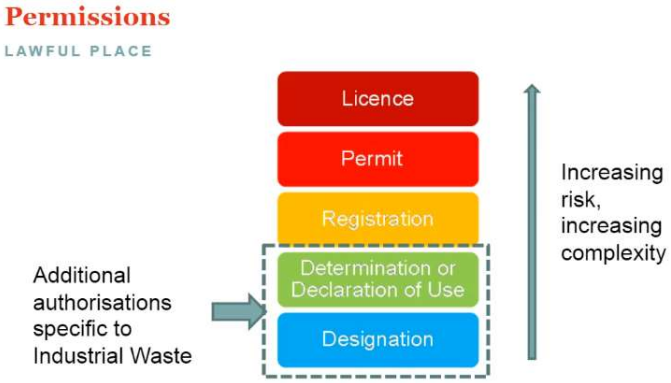
EPA Licence holder for high risk activities.

Permit Holder

Simplified form of EPA licence designed for less complex, less risky activities.

Registration

Form of notification to the EPA informing you are undertaking the activity which is described in the regulations.



FILL MATERIAL (Industrial Waste)

Fill material or soil from greenfield sites or sites previously used for residential is considered clean due to the historical use of the site being free of polluting activities.

Fill material or soil from brownfield sites, sites previously used for industrial or commercial purposes or sites with heavy pesticide use will be classified industrial waste irrespective if sampling and analysis determines concentrations.

An appropriately qualified person, such as an Environmental Consultant, should be engaged to complete a Preliminary Waste Classification, which will provide the information required to identify where the waste can be legally disposed of.

The Preliminary Waste Classification needs to be completed in accordance with relevant EPA sampling and assessment requirements. The findings from the Preliminary Waste Classification should be presented in a report.

The three steps to satisfy waste duties is outlined below.

Step 1: Classifying the Waste

Classification of waste is the process of identifying the category of the waste or soil and what subsequent management strategies are needed for its transportation off-site, including where it can be lawfully disposed.

As a minimum, the Waste Classification needs to include:

- A site history investigation, to identify the potential contaminants of concern.
- Soil sampling for the potential contaminants of concern at the required appropriate sampling density; and
- Comparison of the results against the EPA Waste disposal categories –

Where soil contains known or reasonably expected contaminants exceeding the upper limits for fill material in.*2* the soil will be classified as contaminated soil (A Priority Waste).

Soil Sampling

Soil sampling conducted in accordance with the EPA *NSW Sampling Design Guidelines which* is summarised below.

A Preliminary Waste Classification is completed to categorise soils for off-site reuse or disposal. This targets areas and depths of potential contamination and identifies potential contaminants of concern PCoC.

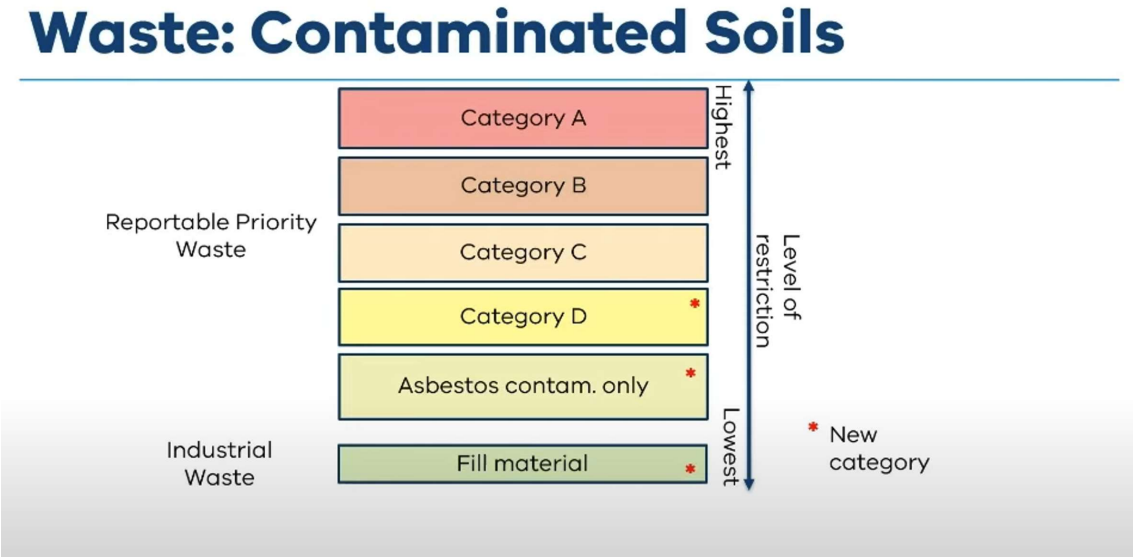
When the extent of PCoC and potential areas/depths of concern is known, the soil is divided into domains (e.g. fill, natural, stockpiles etc),

Sampling may first be completed to provide indicative results, however additional samples may be required in order to meet the minimum sampling density required for varying soil volumes.

Categorising Soils – National Reference (For guidance use)

Categorisation of soils can be based on either in-situ or stockpiled soil samples. Values used to determine soil categorisation can be either highest sample result or the 95% UCL $_{average}$ value for each contaminant.

There are five waste categories for soil as outlined below.



To determine the hazard category for each domain, contaminated soil must first be considered and excluded from Category A, then considered and excluded from Category B before it can be considered as Category C and so on. Any material receiving a category above Fill Material is considered a **Reportable Priority Waste** and must be transported using permitted / registered transporters and disposed of legally to appropriately licenced receiving facilities (refer Step 2).

Additional sampling may be required in instances where reportable priority waste is identified, in order to meet minimum sampling requirements, and waste codes will be allocated to the material.

It should be noted that multiple waste categories may be applied to soils within the same soil domains and will therefore require segregation and potential further sampling to validate appropriate waste category segregation.

The Environmental Consultant can direct Site Management to areas requiring segregation and any additional sampling where required.

Soil classified as fill material can be reused onsite;

- Not exceeding the upper limits for fill material contaminant concentrations or
- Can be received and reused onsite subject to satisfying the EPA Fill Material Determination or
- Deposited at a lawful place offsite in accordance with a relevant *EPA Licence, Permit, Registration or Determination*

Excavated material becomes surplus when it cannot be used by the project because of its physical, chemical or biochemical characteristics and location, and more material being available than is required. Surplus excavated materials are considered a waste unless reclassified as clean fill or determined suitable to be used onsite.

Step 2: Transport the Waste

Producers of reportable priority waste must use EPA's waste tracking system – Waste Locate. A secure login must be created on the EPA NSW website before Waste Tracker can be used.

https://www.epa.nsw.gov.au/your-environment/waste/tracking-waste-mla Classification information, approximate volumes and relevant waste codes are needed before the waste transporter can transport reportable priority waste. The Environmental Consultant can assist with this.

It is important that all information provided is correct to allow the waste transport company to determine if they themselves have appropriate EPA permissions to transport the waste and also that the receiving facility is appropriately licenced to accept the waste.

Checking the EPA Permissions Register

Waste transport companies must hold the appropriate EPA permissions to cart reportable priority waste in accordance with the soils waste categorisation and corresponding waste codes. Waste transport company permissions can be verified via the EPA Registered Permissions Portal.

Tip: If it's a company (e.g. Lantrak), just type the name into the "Duty Holder" box and press search…….. then scroll down the page.

Record Keeping

The waste transport company must provide transaction records confirming each waste pick up was deposited at a lawful place. These records are maintained by Kane and accompany the Waste Classification report.

Step 3: Disposal of Waste to a Lawful Place

Producers of reportable priority waste also have a duty to ensure that the waste has been correctly classified and is deposited at a lawful place. A lawful place is somewhere authorised to receive industrial waste under the Act, such as permissioned resource recovery facilities, transfer stations and landfills.

When giving your reportable priority waste to a transporter, you will need to fill out a waste transaction record in EPA's online Waste Tracker database as outlined in **Step 2** above. Waste Tracker verifies your waste is being taken to a lawful place and is transported appropriately to the facility. An Environmental Consultant engaged on the project can also assist in verifying the waste is reportable priority waste and lawfully deposited.

Copies of the waste transaction should also be retained from the waste transporter from the waste tracker portal, which show where the waste has been deposited. The waste transaction should include:

- the date and time of delivery,
- waste description, and waste amount,
- a name and address of the facility, facility ABN, and
- the transporter vehicle registration

***Reportable priority waste** is defined in the Environment Protection Regulations 2021 Division 3, Schedule 5 Waste Classification Table Columns 7 and 8. The EPA must be informed each time a reportable priority waste changes hands using the EPA's electronic waste tracker. Waste tracker replaces the Waste Transport Certificates system (refer https://www.epa.vic.gov.au/for-business/business-forms-permits-online-tools/waste-tracker).*

Action

- Include Waste Tracker login to Att 3 of this plan and check in the Setup for Success
- Check the audit includes
  - vehicles collecting and transporting reportable priority waste (transport) generated from sites owned / managed by Kane hold the permission to transport such waste
  - any waste facility where the industrial waste is delivered is authorised to receive such waste.

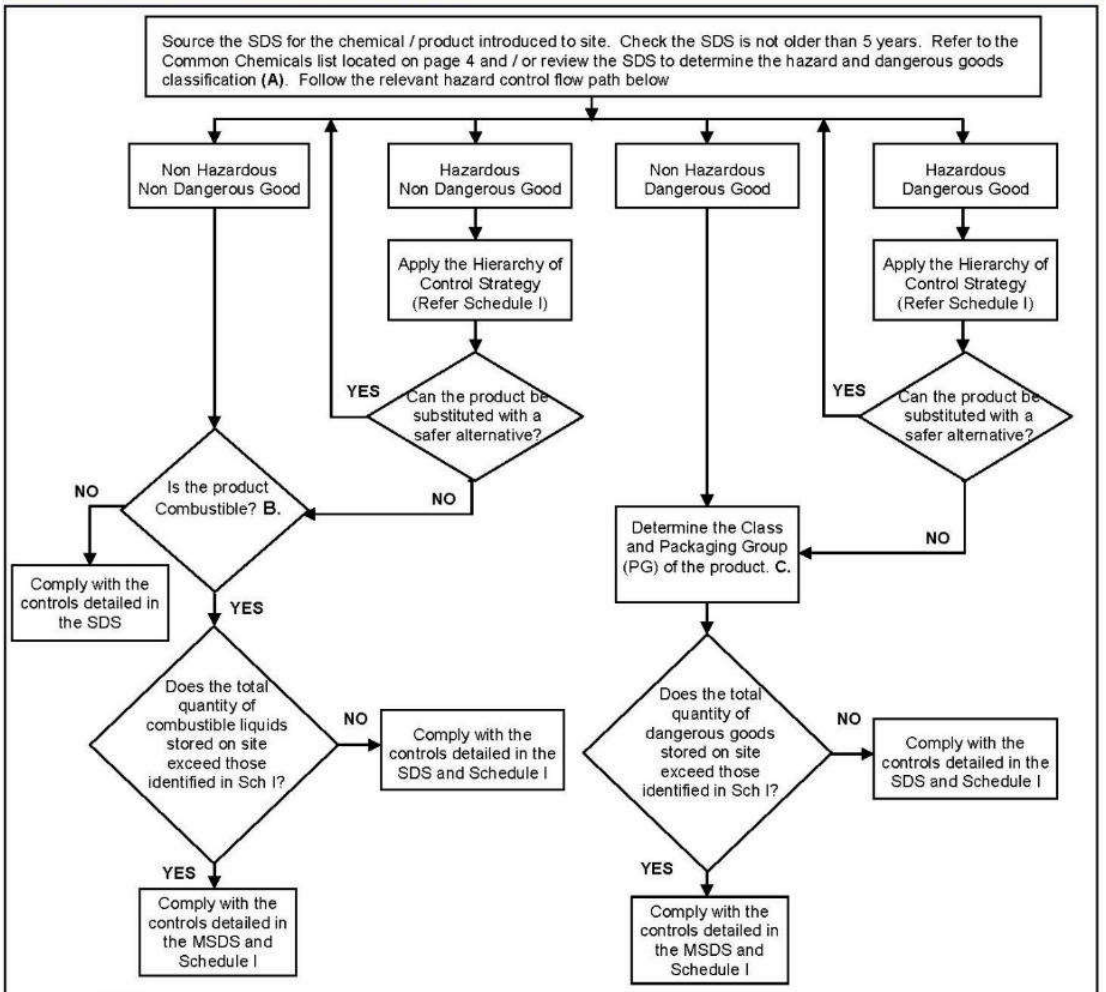
RISKS FROM CHEMICALS, DANGEROUS GOODS AND HAZARDOUS SUBSTANCES

A register of hazardous chemicals is maintained at the workplace and readily accessible to workers involved in using, handling or storing hazardous chemicals including anyone else who is likely to be affected by a hazardous chemical at the workplace. Kane use Schedule I/2 Chemical Register to satisfy this requirement. The register is accompanied by the current (not more than five years old) safety data sheet SDS for each chemical listed. A SDS is a document that provides information on the properties of hazardous chemicals, how they affect health, safety and environment in the workplace and how to manage the hazardous chemicals in the workplace.

The hazardous and/or dangerous good classification of a chemical / product helps determine how to safely use and store it. Kane implement the flowchart below to manage dangerous goods and hazardous substances. It is an excerpt from Schedule I of the Kane WHSMS and used as a detailed guide on how to;

- Determine if the chemicals/products introduced to site is classified hazardous and/or dangerous
- Safely store chemicals/products introduced to site classified hazardous and/or dangerous
- Safely store gas cylinders

Diagram 1: Chemical / Product Control Flow Paths



EMERGENCY PREPAREDNESS AND RESPONSE

Emergency preparedness and response procedures are developed after an assessment of:

- The hazards at the workplace,
- The possible consequences of an incident occurring as a result of those hazards
- The number of workers and other people at the workplace
- Remoteness or isolation of the workplace from emergency services

The documented assessment of emergency procedures and equipment is attached (refer Attachment 1).

If the Kane building site is within an area occupied by the client or immediately adjacent where an emergency in either occupied space may affect the other space, the Kane project manager shall chair a Prestart Meeting to agree and develop a coordinated emergency response procedure. This ensures the procedure in each occupied space is understood by each occupant and more likely to complement (work in unison) when emergency response is necessary. The documented prestart meeting is attached.

After careful consideration of the emergency preparedness/response assessment, and the outcome of the prestart meeting held with the client to coordinate emergency response, the project emergency procedures and evacuation plan is developed. When authorised for use by the Project Manager, the attached emergency procedures and the evacuation plan is:

- Communicated to all workers during the site induction
- Displayed in prominent locations
- Regularly reviewed to ensure it remains appropriate for the changing work site
- Practiced or tested and evaluated for effectiveness

Testing of the emergency procedures is important since it provides practical on-site training for those with responsibilities for specific actions in an emergency to practice their skills. It is equally important for site worker's involvement in practice drills so they receive training in the site specific emergency procedures including the opportunity to provide feedback on the effectiveness of the emergency procedure practiced.

The emergency procedures developed for this project include;

- Medical
- Evacuation of Site
- Personal Threat
- Arcing or Contact with Electrical Assets
- Escaping Gas
- Rescue from a Trench or Excavation or engulfment
- Rescue of a person suspended at height
- Electric Shock Rescue (Low Voltage Current)
- Drowning / Near Drowning Rescue
- Hazardous Material Localised Emergency
- Tower Crane Operator Rescue
- Bomb Threat
- Rescue of a person working in or on a roof area

Schedule O/4 Emergency Procedures Test – Record of Meeting is used to place structure around testing of select emergency procedures and details the outcome of the test.

Where a proprietary evacuation siren is required, an approved service agent of the manufacturer is engaged to install and provide training on the system use. The evacuation siren shall be tested and maintained in accordance with the manufacturer recommendations.

Where aerosol can type sirens are used, the instructions printed on the can shall be followed to ensure maximum effectiveness.

Kane engage first aid suppliers to maintain first aid cabinets (replenish first aid consumables) and fire service agents to inspect and maintain fire extinguishers (6 monthly and after each use).

AUDIT AND REVIEW

Kane undertake regular proactive audits and reviews to confirm compliance with this Environmental Management Plan. They include but not limited to:

Process Description	Hammertech System Reference	Minimum Implementation Frequency
Environment Walks	HSEQ Inspection Schedule F	Weekly
Safety Walks	HSEQ Inspection Schedule F	Weekly
Workplace Inspections	HSEQ Inspection Schedule F1	Monthly
Safety & Environment Audits	HSEQ Inspection Schedule C	Quarterly

Incidents, near misses and non-conformances can also trigger reactive audits and more stringent reviews. The following system documents prompt the review of controls post any incident including any test exercises:

Process Description	Hammertech System Reference
Improvement Notice and/or Non-conformance	HSEQ Inspection Schedule L
Incident Investigation	Incident Module Schedule M2
Workplace Injury and Disease Record	Incident Module Schedule N
Emergency Procedures Test	HSEQ Inspection Schedule O4

The Safety and Environment Audit form is used on site by the Project Manager to audit effective implementation of this EMP. Points are awarded for effective implementation and points taken where improvement is required. The audit facilitates recognising good practice safety and environmental management and requires corrective actions be raised where improvement is necessary. Each site is audited quarterly (minimum) to align with end of quarter reporting determined by the State HSE Team. The audit report is issued to the State HSE Team to review against company objectives/targets and identify trends that may appear (positive and negative). The audits are scheduled at the middle of the following months (or otherwise scheduled to avoid holiday and extremely busy periods i.e. lead up to Christmas)

- February (Jan – Mar)
- May (Apr – Jun)
- August (Jul – Sept)
- November (Oct – Dec)

Random internal audits are undertaken by the State HSE Team members. Reports are prepared and distributed to all staff on the project identified in the project team chart for actioning.

External audits are undertaken by the Federal Safety Commission, ISO9001, ISO14001, ISO45001 Third Party Certification auditors, and various consultants where the head contract specifies.

Federal Government WH&S Scheme projects are audited by Federal Safety Officers. The Federal Safety Commission Audit team schedule audits during periods where high risk work tasks are undertaken. Audit reports are prepared and submitted to Kane for actioning.

Kane Constructions certification to Standard ISO9001, ISO14001, ISO45001 requires third party surveillance audits be undertaken on annually. Projects are selected randomly. Each audit confirms if the company certification should remain. Corrective action must be promptly closed where identified.

Where head contracts require external audits of projects, the auditor is commonly required to have Lead Auditor competency. Audit frequency and reporting requirements differ based on client audit criteria, project complexity and risk.

ARCHIVING

Project archives are maintained electronically using Hammertech.

Records containing details listed under Regulation 69 must be retained for 2 years from the date on which the waste was classified.

All data and records will be available via secure log-in post-project completion.

DEFINITIONS, KEY TERMS AND ABBREVIATIONS

WHS	Work, Health and Safety
WHSMS	Work, Health and Safety Management System
EMS	Environmental Management System
ISO 14001	Australian and New Zealand Standard for Environmental Management Systems
ISO 45001	Australian and New Zealand Standard for Occupational Health and Safety Management Systems
WHSMP	Work Health and Safety Management Plan
Hammertech	Hammertech is an online Health, Safety, Environment, and Quality HSEQ database customised to include Kane accredited management system forms and processes. Accessible on any smart device, it integrates Kane management, sub-contractors and workers together into a real time HSEQ data gathering and sharing environment. The database facilitates gathering and review of subcontractor compliance information well before the task is due to commence on site and has proven to be more efficient than previous paper based systems. https://hammertechglobal.com/en_au/
SWMS	Safe Work Method Statement
PCBU	Person in Control of a Business or Undertaking
CSI	Critical Safety Incident A “Critical Safety Incident CSI” at the workplace is an event which does or has a high likelihood of traumatic effects on the individuals at the workplace. It has or is likely to cause strong emotional reactions, which have the potential to interfere with the ability of the individual, group or the workplace to function either at the time of the event or later. Examples of critical incidents include an event causing death or serious injury, suicide, major structural collapse, acts of terrorism, hold-up, hostage situation, shooting and assault at the workplace, including harm to people or damage to property caused by a natural disaster.
RAW	Risk Assessment Worksheet
PPE	Personal Protective Equipment
SDS	Safety Data Sheet (previously called a Material Safety Data Sheet MSDS)
EPA	Environment Protection Authority

ATTACHMENTS

- Schedule of Acts, Regulations, Standards and Guidance
- Environmental Responsibilities
- Project Risk Assessment Worksheet RAW (refer to the Environment section of Schedule R)

ATTACHMENT 1 - Schedule of Acts, Regulations, Standards and Guidance

The EPA uses three tiers of legal instruments and guidance to protect the environment:

- Acts
- Regulations,
- EPA guidance

PUBLICATION	SOURCE *Search using the title for each if unable to find*
Acts Protection of the Environment Operations Act 1997 Contaminated Land Management Act 1997 Protection of the Environment Administration Act 1991 Water Act 2007 (Commonwealth)	NSW EPA - Acts https://www.epa.nsw.gov.au/licensing-and-regulation/legislation-and-compliance/acts-administered-by-the-epa/act-summaries NSW Legislation https://legislation.nsw.gov.au/browse/inforce
Regulations Protection of the Environment Operations - Clean Air Regulations 2021 - General Regulations 2021 - Noise Control Regulation 2021 - Waste Regulation 2021	NSW EPA - Regulations https://www.epa.nsw.gov.au/licensing-and-regulation/legislation-and-compliance/acts-administered-by-the-epa/regulation-summaries

ATTACHMENT 2 – Environmental Responsibilities

The table below identifies the responsibilities of the positions held on this project. (refer to the project team chart for names and position abbreviations).

Description	PD/GM/ OM/CM	PM	SM	CM / CA	SE	FREQUENCY	COMMENTS
Review the contract for State, Local, client and site specific environment requirements including permits and approvals		R		P		Before project start Ongoing subject to staged approvals	
Search if the land & groundwater is contaminated *(refer Duty to Manage Contaminated Land in this plan)*		R		P		Before project start. Ongoing, if an Unexpected find is uncovered	Consultants are utilised where required to seek direction on measuring, evaluating and classifying the contamination
Notify the HSE Team if contamination exists *(refer Contamination Notifiable to EPA in this plan)*				I		Before project start Ongoing, if an Unexpected find is uncovered	
Review authorisations / permissions required to process anticipated waste including fill			I	P, I	I	Before project start. Ongoing, if an Unexpected find is uncovered	Consultants are utilised where required to seek direction on measuring, evaluating and classifying waste
Develop this EMP incorporating the outcome of the contract review and contamination status and authorise for use		P, R	I			Before project start. Reviewed minimum quarterly	Consultants are utilised where required to seek direction on measuring, evaluating, classifying waste and developing procedures to manage risk
Complete Sch R Risk Assessment incorporating the outcome of the contract and contamination review	R	P, R	I			Before project start Reviewed minimum quarterly	Prepared and updated by PM, reviewed by the PD / Construction Manager, implemented by the entire team
Prepare the Site Specific Induction		R	I, R	P, I	I	Before project start. Reviewed minimum quarterly	Deliver the content at each induction. Inductions to be shared between SM, CM, CA & SE
Inspect the Enviro Risks and controls for Compliance			I	I	I	Minimum weekly	Actions assign and closed using hammertech
Notify the HSE Team of any notifiable circumstance as listed in Schedule M and participate in incident investigation		I	I	I	I	If a notifiable circumstance as listed in Schedule M occurs	Investigation may uncover additional site specific controls and responsibilities
Audit and Implement Corrective Actions		I, R	R			Minimum quarterly	HSE Team may undertake random internal audits

P – Prepare, R – Review, I – Implement

The project staff responsible for environmental management is assessed for competence, understanding and acceptance of their environmental responsibilities. Confirmation of this is provided below.

Each individual shall complete the table to verify the items listed below. Write either Yes or No (alongside the item in your column only) sign and date to confirm.

Item 1 I understand my responsibilities identified in this Environmental Management Plan EMP

Item 2 I was consulted and given opportunity for input in the development of this EMP

Item 3 I am competent to carry out my responsibilities identified in this EMP

Item 4 I will carry out my responsibilities identified in this EMP

Name	**Position**	**Item 1** Yes/No	**Item 2** Yes/No	**Item 3** Yes/No	**Item 4** Yes/No	**Item 5** Yes/No	**Sign**	**Date**
Nathan Parris	PM							
Michael Wright	Assistant PM							
Andrew Baker	SM							
Jonathan Paparoulas	SPE							
Jason Geary	CA							
Will Beck	PE							
Seng Chea	PC							
Patrick Golebiewski	Cadet							
James Etheridge	SPE							
Aaron Marques	Foreman							
Steven Bourey	Foreman							
Jason Farrugia	WHS Manager							

- Refer Hammertech for staff sign onto this project plan.

ATTACHMENT 3 – Environment Management Meeting

ENVIRONMENT MANAGEMENT MEETING Agenda No 1

DATE:

HELD AT:

NEXT MEETING DATE

	COMPANY	EMAIL
PRESENT:		
Name	Kane Constructions Pty Ltd	@kane.com.au
Name	Kane Constructions Pty Ltd	@kane.com.au
Name	arete Australia	@arete.com.au
Name	arete Australia	@arete.com.au
APOLOGIES/ DISTRIBUTION:		
Name	Kane Constructions Pty Ltd	@kane.com.au
Name	Kane Constructions Pty Ltd	@kane.com.au
Name	arete Australia	@arete.com.au
Name	arete Australia	@arete.com.au

1. GENERAL **ACTION**

This meeting is held upon contract award by the construction team with input from Estimating and the Design Manager (DM for Design & Construct Projects ONLY). Note

The site team shall meet monthly so actions are monitored for close-out in a timely manner. The frequency of meetings may vary subject to project duration, results of risk control monitoring and risks associated with activities on site.

This agenda is mandatory. It is intended to deliver the following;

a) Consultation between the estimating and construction team at project commencement to highlight key environmental management risks and commitments made during the tender process

b) Kane Specific Environment Management requirements are captured in the Project Environment Plan e.g. from previous lessons learnt

c) Project Specific Contract requirements are thoroughly reviewed and summarised into key deliverable processes e.g. subcontract scope, risk assessment, weekly inspections, Audits etc

d) Applications and ongoing review for Permits or Approvals e.g. removal of native vegetation, changing a heritage register, working within a conservation area

e) Project Specific sub-plans are prepared to satisfy the contract

f) Environment management software is prepared e.g. Hammertech

g) The key environment management strategies are included in the Project Environment Plan.

h) Key members of the team and their responsibilities are clearly identified

i) The final draft revision of Project Environment Plan is issued to the client for approval

j) The first revision of Project Environment Plan is approved for implementation

2. HANDOVER FROM ESTIMATING TO THE CONSTRUCTION TEAM

a) Communicate, list or provide; — Estimator
   - Major Activities and Anticipated Hazards (environmental aspects/risks)
   - Environment management commitments made during the tender process
   - Key environmental management strategies
   - Environment related contract deliverables i.e. Permits or Approvals e.g. removal of native vegetation, changing a heritage register, working within a conservation area, protected species, cultural/archaeological sensitivity
   - Project specific sub-plans prepared to satisfy contract deliverables

b) Other

ACTIONS

1. Incorporate major activities, anticipated hazards, environmental aspects/risks and controls into the Project Environment Plan and Risk Assessment (Sch R)
2. Incorporate relevant environment management commitments and strategies into the Project Environment Plan and Risk Assessment (Sch R)
3. List any contract deliverables most appropriate to incorporate into subcontracts

3. DUTY TO MANAGE CONTAMINATED LAND (and groundwater)

a) **Review what is known and what you ought reasonably to know** — Project Manager
Complete the Hammertech Contamination Inspection.

b) Review the elapsed time since the soil contamination and groundwater investigation was undertaken. *Has any contaminating activity occurred on the land since the soil contamination and groundwater investigation was undertaken?*
If yes or an inspection determines additional contamination is suspected, seek guidance from an environmental consultant if additional testing is required
If no, or an inspection determines additional contamination is not suspected, the information from the soil contamination and groundwater investigation is considered the current state of contamination knowledge — Site Manager

c) Seek the opinion and guidance from an environmental consultant to;
   a. Determine if land/groundwater contamination **is notifiable to EPA**
   b. Provide guidance (or establish procedures) to manage the protection of human health and the environment from known contamination

ACTIONS

1. Complete the Hammertech Contamination Inspection — Contracts Manager
2. Determine if any contaminating activity has occurred on the land since the soil contamination and groundwater investigation was undertaken
3. Determine if land/groundwater contamination is notifiable to EPA
4. Develop procedures to manage the protection of human health and the environment from known contamination

4. DUTY TO MANAGE INDUSTRIAL WASTE

a) **Seek feedback from the Environmental Consultant on waste classification** Review the Waste Classification report completed to categorise soils for on-site reuse, off-site reuse or disposal — Project Manager

- Can fill material can be reused onsite?
  Note : Multiple waste categories may be applied to soils within the same soil domains and will therefore require segregation and potential further sampling to validate appropriate waste category segregation.
- Must the soil removed from site be deposited at a lawful place?
  Note : Any material receiving a category above Fill Material is considered a Reportable Priority Waste and must be transported using permitted / registered transporters and disposed of legally to appropriately licenced receiving facilities
- other

b) **Is the general waste company engaged authorised by EPA to receive the industrial waste / comingled waste from site?** i.e. permissioned resource recovery facilities, transfer stations and landfills

c) Other

ACTIONS

1. Determine the Waste Classification of soil
2. For Reportable Priority Waste removal, obtain documented verification that;
   a. Transporters are registered (have EPA permissions)
      Search Waste transport company permissions via the EPA website https://www.epa.vic.gov.au/about-epa/public-registers/permissions
   b. Receiving facilities are appropriately licenced
      Request the Receiving Facility provide a copy of their licence
   c. EPA Waste Tracker is activated. A secure login must be created on the EPA website before Waste.
   d. The waste transport company must provide transaction records confirming each reportable priority waste pick up was deposited at a lawful place. These records are maintained by Kane attached to the Waste Classification report.
3. Obtain documented verification (EPA authorisation licence/permission) from the waste company engaged to confirm they are authorised to accept the general comingled waste material from site
4. Other

5. REVIEW ENVIRONMENTAL RESPONSIBILITIES OF THE POSITIONS HELD ON THIS PROJECT

a) Are responsibilities relevant/appropriate? — Project Manager
b) Are any site specific responsibilities required to accommodate key deliverables?
c) Are responsibilities understood by the positions held on the project?
d) Are responsibilities being achieved/delivered on the project?
e) Do responsibilities need to be shared between staff or assigned to others?
f) Have staff signed the responsibilities matrix *Attachment 2*?

ACTIONS

1. Update the responsibilities *Attachment 2* subject to the review and agreement reached
2. List each action/decision reached

6. RISK CONTROL MONITORING

a) Review the hazards and risks to the environment from current and upcoming works against Project Risk Assessment Schedule R. Are the Major Activities and Anticipated Hazards (environmental aspects/risks) identified in Schedule R? — Project Manager
b) Are the environmental risk controls identified in Schedule R current?
c) Are the environmental walks undertaken weekly as required by the EMP?
d) Are the environmental controls effective?
e) Other

ACTIONS

1. List actions

7. ENVIRONMENTAL INCIDENT MANAGEMENT, REPORTING AND CORRECTIVE ACTION

a) Have all reportable circumstances as listed in Schedule M been notified to the state HSE Team? — Project Manager

- *Escape or leak of a harmful chemical or substance*
- *All unexpected finds of suspected contaminated soil, hazardous building materials, and items of heritage or cultural or archaeological significance*
- *Any pollution incident that causes or threatens to cause material harm to human health or the environment – pollution that causes a leak, spill or other unintended or unauthorised deposit or escape of a substance*
- *Land, Groundwater or surface water contamination*
- *Prohibition/Improvement/Infringement Notice*
- *Warnings or fines issued for breaches of state and local laws*
- *Unauthorised flora, habitat loss, Cultural Heritage/archaeological harm*
-

b) Are environmental incidents classified/investigated in accordance with Schedule M?

- Are community complaints associated with e.g. noise, dust, waste, mud on road, odour, and traffic management investigated
- Are incident learnings/corrective actions/ agreed improvements etc completed?

ACTIONS

1. List actions
2.

8. AUDITS

a) Review the most recent Environmental Audit Report — Contract Admin

- Identify the audit date
- Identify the type of audit (Internal/external)
- Identify the auditor name
- Did the audit identify any corrective actions?
  - If YES, are the corrective actions closed
- Did the audit identify any system improvement needs?
  - If YES, have you informed the State HSE Team?

b) Identify the date of when the next audit is due

c) Do any incidents, near misses and non-conformances warrant delivering a reactive audit i.e. rather than waiting for the next scheduled audit?

d) Other

ACTIONS

1. List actions

ATTACHMENT 4 – Environmental Resource Library – Guidance Sheets

Guidance Sheet 1: Working within or adjacent to waterways

Guidance Sheet 2: Managing stockpiles

Guidance Sheet 3: Managing truck and other vehicle movement

Guidance Sheet 4: Litter

Guidance Sheet 5: Surplus excavated material

Guidance Sheet 6: Hazardous waste

Guidance Sheet 7: Masonry and other solid material wastes

Guidance Sheet 8: Drilling mud

Guidance Sheet 9: Historic buried waste

Guidance Sheet 10: Sewage

Guidance Sheet 11: Wastewater

GUIDANCE SHEET 1 : Working within or adjacent to waterways

Works within or near waterways arise whenan activity changes the existing condition of a waterway or riparian area.

Works within a waterway can consist of:

- constructing a waterway crossing such as a bridge or culvert
- removing debris or material that is restricting waterway flow
- planting vegetation on embankments
- removing invasive vegetation
- rehabilitating wetlands.

Ensure you have obtained the appropriate permits from the relevant authority before conducting any works within a waterway.

Step one: identify hazards

Common hazards associated with works within a waterway include:

- increased erosion and sediment release into waterways and riparian areas
- increased waterway flow
- uncontrolled release of chemicals, hydrocarbons and waste by vehicles and construction equipment.

Step two: assess risks

To help assess the risk of generating environmental impacts from works within or adjacent to waterways, you can:

- consider the size, scale, and location of the proposed works
- understand the physical properties and soil characteristics of the waterway and riparian zone in the area of works
- assess the seasonal variations in waterway flow
- identify the impacts of construction techniques and methods for works
- within or near a waterway. Due to the size and scale of larger construction vehicles, unwanted erosion and sediment can be generated if construction equipment and vehicles are not managed appropriately
- understand the loading impacts of excavators, plant equipment and vehicles on soils and embankments
- identify entry and exit points and the limitations of access for construction works
- consider the chemical properties of lubricating oils used by excavators and plant equipment
- consider potential impacts to nearby sensitive receivers including aquatic ecosystems and riparian habitat.

Step three: implement controls

Consider implementing the following controls, appropriate for your activities, to limit the impacts to waterways and riparian areas at your site:

- Follow and comply with all permit and approval requirements obtained for your works.
- Minimise the duration of works within a waterway or floodplain.
- Schedule works to occur during drier months of the year and lowest flow of the waterway.
- Avoid works during times of the year when aquatic animals are likely to be under pressure, particularly during migration or spawning.
- Stabilise waterways to minimise erosion using non-invasive grass, vegetation, stabilisation matting or rock armour.
- Design and construct rock filter dams, modular sediment barriers, or silt curtains (see Figure 1) to assist in the reduction of sediment entering the waterway downstream.
- Minimise access by vehicles and people to the waterway, restricting access to essential works only and prevent access to unstable areas.
- Reduce the movement of sediment by encouraging deposition in specific areas of the waterways considering the size of the waterways using one or a combination of:
    - working on one bank
    - creating new channels/channel works
    - discharge pipes into creeks.
- Remove excavated material and debris from the project site or place it in a stable area above the high-water level of the waterway, or as far as possible from the waterway.
- Use bio-degradable lubricants and oils on excavators and plant equipment that work within or adjacent to waterways.
- Prevent livestock from accessing the waterway. If livestock are prevented from accessing a waterway, provide an alternative water supply.
- Monitor surface water quality regularly upstream and downstream from the works area. If monitoring shows a change in water quality, stop the works. Confirm if works are the cause of these changes, assess for any adverse impacts on aquatic ecosystem and modify work practices.
- Develop contingency measures for works within a waterway or floodplain. Your contingency measures should consider the consequences to the environment allowing for recurrence intervals of potential floods, and address:
    - methods to prevent water entering excavations
    - controls to be implemented when a storm event is forecast
    - measures to ensure that waterways and floodplains retain sufficient flood detention capacity to moderate peak water flows
    - a flood warning system
    - clean up procedures, including disposal of excess water
    - notification of relevant authorities if unplanned incidents occur that could pose a risk to the environment (see *Incident Notification* above).

- Plan reinstatement measures that may include:
  - proposed changes to the waterway including temporary short-term bypass pumping or temporary diversion channels
  - impacts to existing vegetation
  - erosion and sediment controls
  - proposed methods for reinstatement of the waterway bed and banks
  - a revegetation plan, including proposed species and locations, methods for weed control and ongoing maintenance until native species have established.

Figure 1. Engineered silt curtain installed to prevent migration of sediment for construction works within a waterway.

Step four: check controls

Monitoring controls you put in place can help you to ensure they operate effectively and as planned. For the management of works within or adjacent to waterways, this could include:

- regularly monitoring the strength and effectiveness of waterway stability measures (non-invasive grass, vegetation, stabilisation matting or rock armour) and reinforcing the installed stability measures as required
- regularly monitoring the strength and effectiveness of rock filter dams, modular sediment barriers, and floating silt curtains and performing maintenance to the associated controls and reinforcing the infrastructure as required
- monitoring the variations in waterway flow throughout the project
- monitoring the operation and effectiveness of bypass pumping and diversion channels.

GUIDANCE SHEET 2 : Managing stockpiles

Sediment and dust can be generated from unmanaged stockpiles.

Stockpiles in civil construction, building and demolition activities can include:

- excavated soils
- structural soils and backfill material
- demolition and waste materials stockpiles.

Figure 1. Silt curtain used to control sediment loss

Step one: identify hazards

Uncontrolled release of dust and sediment into the environment from stockpiling soil, construction, building and demolition materials.

Step two: assess risks

To help assess the risk of sediment and dust transport from stockpiling, you can:

- identify key stockpiling areas on your site
- understand how sediment and dust on site can be transported offsite and into the environment
- consider nearby sensitive receivers.

Step three: implement controls

The controls below may assist you to manage your stockpiles to prevent potential adverse impacts to the environment.

- Design and designate an area for stockpiles before site works commence. Locate stockpiles away from residential areas, other sensitive receivers and in a location where they are protected from prevailing wind.
- Shape stockpiles, taking into consideration width to height ratio, nature of stockpiled material, location, access and available area for the stockpile. Limit stockpile heights based on stability, manageability, dust and amenity impacts. More gentle slopes may be required for unstable soils.
- Divert storm water away from stockpiles using a catch drain or earth bank.
- Cover small stockpiles with tarpaulins or stabilisation matting (see Figure 2). Anchor covers to prevent them from blowing away.
- Contour stockpiles within floodplains to minimise erosion during high rainfall events.
- Minimise period of stockpile inactivity. For stockpiles to be left inactive for longer periods, establish vegetation or grass. Subsoil stockpiles may require an outer layer of topsoil to assist grass establishment.
- Surround stockpiles with sediment control fences to minimise run-off of material. Remove sediment when it is halfway up the sediment control fence, return the material to the stockpile and consider implementing additional controls for effective management.
- Use machinery to contour or scarify the surface of stockpiles to assist in the reduction of run- off

velocity and erosion.

- Suppress dust from small stockpiles using water or chemical dust suppressants, applying using a water truck or hand-held hose.

Figure 2. Covered stockpile

Step four: check controls

Monitoring controls you put in place can help you to ensure they operate effectively and as planned. For the management of works within or adjacent to waterways, this could include:

- Measuring and monitoring the size and geometry of the stockpiles. Adjust the height and dimensions of stockpiles as required to attain the desired stability and to control dust and amenity impacts.
- Monitoring of storm water catchment diversion controls. Ensure catch drains and earth banks are adequately diverting storm water.
- Removing accumulated stockpile material adjacent to sediment control fences and reinforce fences as required.

GUIDANCE SHEET 3 : Managing truck and other vehicle movement

On civil construction, building and demolition sites, vehicles regularly travel on unsealed surfaces and roads containing soil and mud, resulting in the generation and transport of sediment and dust.

Trucks and trailers that haul soil and other materials without a cover can lose materials in transport and generate sediment and dust.

Step one: identify hazards

Uncontrolled release of dust and sediment into the environment from vehicle movement.

Step two: assess risks

To help assess the risk of sediment and dust generation from truck and vehicle movements, you can:

- identify the planned movement and traffic routes of vehicles on your site and develop a traffic management plan
- identify entry and exit points, and high traffic areas on your site
- understand how sediment and dust onsite can be transported offsite and into the environment
- consider nearby sensitive receivers.

Step three: implement controls

Consider implementing the following controls to limit the sediment and dust generation at your site:

Manage site access

- Minimise site access to limit the impact from vehicles to roads.
- Stabilise site entry and exit points with a sealed road, aggregate or road base.
- Divert surface water run-off away from site access points so sediment is not washed or tracked offsite.

Manage road use

- Minimise the number of access roads used by vehicles.
- Seal roads with asphalt or a spray seal, or stabilise with aggregate, gravel or road base. Aggregate or gravel may need to be replaced periodically.
- Locate unsealed roads to avoid erodible areas of the site, such as sloping terrain or unstable soils.
- If roads are not stabilised or sealed, minimise dust using water or chemical dust suppressants.
- Provide sealed or stabilised car parks for site workers to park their vehicles.
- Restrict vehicles to defined roads and site entry and exit points. Fence the site to prevent vehicles bypassing designated site access points.
- Limit vehicle speeds onsite to minimise the generation of dust. Ensure roads are signposted and site workers are aware of designated speed limits.

Machinery hygiene

- Avoid and minimise mud, soil and dust entering on site from incoming trucks and vehicles.
- Identify and assess invasive plants that may be present and the feasibility of controlling the spread.
- Avoid driving in areas that may contain invasive plants and maintain clean machinery on site.

Manage dirt and mud on access roads/routes

- Cover trucks transporting loose materials with fitted canopies. Ensure all loads are covered before trucks leave site.
- Remove soil from the rim of trucks before they leave site. Place scraped material in a location where it won't be washed offsite. This control may only be suitable on projects with a small number of vehicles leaving site.
- Install rumble grids at site exit points to shake soil off trucks, taking care not to position them in or over a drainage line. Ensure the road between rumble grids and the site exit is stabilised and with adequate distance and wheel rotations (recommended minimum three-wheel rotation).
- Submerge rumble grids in water so tyres are washed as the truck crosses the rumble grid. Prefabricated rumble grid/wheel baths are available for purchase or hire. Drain and replace the water in the wheel bath periodically. Water from wheel baths should be treated as 'waste' and managed in accordance with the waste hierarchy (see section 8.2.1).
- Minimise use of a wheel wash or hand-held hose to wash vehicle tyres due to the large volume of wastewater generated. If a wheel wash or hand-held hose is used, treat the water as 'waste' and manage in accordance with the waste hierarchy, preferably capturing and treating the water (see section 8.2.1).
- Clean sediment off roads as soon as possible. This can be undertaken using a broom and shovel, water or street sweeper. Treat the water as 'waste' and manage in accordance with the waste hierarchy, preferably capturing and treating the water (see section 8.2.1).

Step four: check controls

Controls you put in place to prevent or mitigate risks must be monitored to ensure they operate effectively and as planned. For the management of truck and vehicle movement, this could include:

- monitoring of site entry and exit points and performing maintenance as required
- monitoring the driver compliance of speed limits and the canopy use on trailers
- monitoring of the condition and effectiveness of rumble grids and periodically removing built-up sediment and soil from under the rumble grids.

GUIDANCE SHEET 4: Litter

Litter onsite can generally comprise of:

- building material which is small enough in size or weight to be blown away in windy conditions or washed away during a storm and deposited into waterways
- general rubbish thrown away by construction workers.

Litter commonly includes solid wastes and putrescible wastes and is often caused by staff and the unavailability of suitable bins on the construction site.

Some litter can be particularly hazardous and is considered 'dangerous litter', such as glass, cigarette butts, and greasy rags.

Step one: identify hazards

Uncontrolled release of litter into the environment.

Step two: assess risk

To help assess the risk of litter entering the environment, you can:

- Identify the potential sources of litter on your site.
- Understand how litter generated onsite can travel offsite and into the environment.
- Consider nearby neighbours, drains and local waterways.

Litter can block storm water drains, impact the environment by contaminating local waterways and eventually the coast, and can create an amenity issue.

Step three: implement controls

Implementing the following controls may assist you with managing your litter onsite:

- Ensure materials are not left where they can be blown or washed away.
- Provide covered litter or skip bins:
    - Small bins are suitable for small rubbish like paper, food wrapping and drink containers that may be blown off site.
    - Skips with a closable lid are suitable for larger items like cardboard boxes, plastic wrapping and polystyrene (see Figure1).

Figure 2. Example of a recycling skip bin.

- Provide small litter bins for construction workers and staff at locations where they consume food or beverages.
- Provide separate recycling bins for recyclable litter.
- Arrange for an authorised contractor to collect skip bins to prevent overflow and transport to a site that is lawfully able to receive it.
- Collect scattered litter on the site daily, or whenever litter is observed on the site.
- Install temporary fencing around the site to help prevent litter from being carried offsite.
- Store waffle pods (used in some concrete pouring activities) in ‘scrap bags’, i.e. which are large transparent bags, and secure to the site fencing or other structure as appropriate. Arrange for collection of the waffle pods by an authorised contractor for it to be taken to a lawful place where it can be recycled.
- Notify staff of importance of litter avoidance via onsite induction or other training activities

Note: council bins may not be used on some building sites. You should check this with your localcouncil.

Step four: check controls

Controls you put in place to prevent or mitigate risks must be monitored toensure they work as planned – and improved if they do not.

For the management of litter, this could include:

- inspecting litter bins during daily site walks
- emptying the litter bin regularly and not allowing bins to overflow
- checking for litter generally.

GUIDANCE SHEET 5: Surplus excavated material

Excavated material becomes surplus if:

- the physical, chemical or biochemical characteristics of the material prevents it from being used by the project
- there is more material available than required for the project
- it is located too far from where it is required to make its use practical.

Note surplus excavated materials are considered a

waste unless reclassified as clean fill (see Step three) or determined suitable to be used onsite.

We look at surplus water from dewatering activities in Chapter 5: Erosion, sediment and dust and Chapter 6: Contaminated land and groundwater.

Step one: identify hazards

Uncontrolled release of surplus excavated material into the environment.

Step two: assess risk

To help assess the risk of surplus excavated material entering the environment, you can:

- identify the potential sources and locations of excavated material on your site – this can be undertaken through an assessment of soil, including determining the site history and soil sampling.
- understand how surplus excavated material generated onsite can leave the site and impact the environment
- consider nearby neighbours, drains and local waterways.

  Excavated material has the potential to block storm water drains and reduce water quality, whichcan harm human health and the environment.

Step three: implement controls

Implementing the following controls may assist you with managing yoursurplus excavated material on your site:

- Remove construction and demolition waste such as concrete, bricks, pipe and organic matter from or near excavated material, to maximise clean fill material classification so it may be used onsite as fill. See Waste classification assessment protocol (EPA publication 1827) which will take effect with new environment protection laws.
- Stockpile surplus excavated material separately to any clean fill (see section 6.3).
- Where excavated material has been identified as having naturally elevated levels of metals or other contaminants, seek approval from EPA before using it as fill material. Use excavated material onsite for site filling / levelling as appropriate and authorised.

Step four: check controls

Controls you put in place to prevent or mitigate risks must be monitoredto ensure they work as planned – and improved if they do not.

For the management of surplus excavated material, this could include reviewing the effectiveness of how surplus excavated material is storedonsite.

GUIDANCE SHEET 6: Hazardous waste

Hazardous wastes have a known risk to human health and the environment. Some hazardous wastes resulting from civil construction, building and demolition activities include asbestos, polychlorinated biphenyls (PCBs), lead,and acid sulfate soils (ASS).

Per-and poly-fluoroalkyl substances (PFAS) are an environmental contaminant of concern which may posea risk to human health and the environment.

Asbestos

Asbestos is a group of naturally occurring fibrous silicate minerals that were commonly used in the production of insulation and construction materials such as cement sheeting and piping due to its thermal and chemical stability.

It was also used in the manufacture of vinyl floor tiles, electrical components, brake linings, disc pads, paints and sealants, and a variety of other materials, for a wide variety of industrial, manufacturing, building and construction applications. When disturbed, the materials may release asbestos fibres which if breathed in can cause a range of health problems including asbestosis, lung cancer and mesothelioma.

For more information, see Safe Work NSW's Asbestos: A handbook for workplaces.

PCBs (Polychlorinated biphenyls)

PCBs are a stable group of chemical substances that do not degrade easily and are resistant to temperature changes, acids and alkalis.

PCBs may be encountered in old electrical equipment including transformers, capacitators, fluorescent light fittings, concrete caulking compounds, and a range of other products that take advantage of its chemical stability. Due to the serious health concerns associated with PCBs and their persistence in the environment, the importation and manufacture of PCBs in Australia has been banned since the 1960s.

PCB exposure can lead to human health affects including cancer, liver damage, neurological and immunological changes.

Lead

Lead is likely to be present in older structures, occurring in paint, old water pipes and other plumbing fittings, sheet lead, solders, lead flashing, lead light windows and glass. One of the major sources of lead in the environment are lead-based paints which are commonly used on window frames, doors, skirting boards, kitchen and bathroom cupboards, exterior walls, gutters and fascia and metal surfaces. Lead-based paint in good condition is usually not a problem, except in places where painted surfaces are subject to friction or impact such as windows and doors.

Exposure to lead through inhalation or consumption can result in harm to the brain and nervous system, particularly with unborn babies and young children, with symptoms including fatigue and poor coordination, depending on the type of exposure.

ASS (Acid sulfate soils)

ASS are naturally occurring and contain elevated levels of metal sulphide minerals. They typically occur in coastal areas, and inland waterways, wetlands and drainage channels which are waterlogged and have saline and anaerobic properties, as well as in mine spoil. When exposed to air, acid and heavy metals such as arsenic and aluminium can be mobilised and leach into the environment, contaminating groundwater and surface waters, posing a risk of harm to human health and the environment, and engineering works. However, ASS can be generally considered safe and harmless when not disturbed.

PFAS (Per-and poly-fluoroalkyl substances)

PFAS are a group of chemicals manufactured since the mid-20th century that have historically been used in firefighting foams and other industrial and consumer products including mist suppressants, non-stick cookware and food packaging. There are many types of PFAS, including perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS). PFAS can build up in food chains and may pose a risk to human health and the environment.

PFAS residues may be present in construction materials and therefore wastewater generated through construction and demolition also has the potential to contain PFAS. In addition, PFAS residues can be present in soil, sediments, groundwater and landfill leachate due to historical industrial activities.

While scientific research continues to be undertaken, EPA, consistent with federal guidelines from the Environmental Health Standing Committee (enHealth), takes a precautionary approach and advises people to reduce their exposure to PFAS. EPA's Interim position statement on PFAS (EPA publication 1669) reflects the most up-to-date information from the 2019 enHealth Guidance Statement and is supported by additional assessments by EPA.

Duty holders should familiarise themselves with their overarching obligations under the EP Act and supporting regulations, along with EPA Position Statements as issued from time to time. More information can be found at www.epa.vic.gov.au/for-community/environmental- information/pfas/pfas-and-epas-role.

Step one: identify hazards

Entry of hazardous wastes into the environment.

Step two: assess risk

To help assess the risk of hazardous wastes entering the environment, you can:

- Identify the potential sources of hazardous waste on your site.
    - For asbestos, prior to demolition works, review any asbestos registers and consider the location, quantity and condition of asbestos present and identify a suitable method for demolition.
    - For buildings suspected of containing PCBs or lead-based paints, sampling may be required prior to demolition.
    - If PFAS is present, undertake risk identification and assessment in accordance with the PFAS National Environmental Management Plan.
- Understand how hazardous waste generated onsite can travel offsite and into the environment via waterways, soil, groundwater or the air.
- Consider nearby neighbours, drains and local waterways that may be impacted if hazardous wastes were to enter the environment.

Step three: implement controls

Implementing the following controls may assist you with managing your hazardous wastes onsite:

Asbestos

- Take all reasonable steps to minimise the risks of handling, transporting and disposing of materials containing asbestos.
- Ensure those handling, transporting and disposing of materials containing asbestos are authorised to do so.
- For guidance relating to managing asbestos during demolition work,
- Notify Safe Work NSW before any asbestos removal work is carried out, as they may issue licenses which place restrictions on removal of specific types of asbestos-containing material or asbestos-contaminated dust.
- Ensure your asbestos waste is taken to a site that is lawfully able to receive it. This is not only the asbestos removalist's responsibility – it is also your responsibility (see section 8.6).

PCBs

- Equipment or parts containing PCBs must be placed into a sealed container which is then stored in a marked secondary sealable metal container (e.g. steel drum) containing absorbent (e.g. diatomaceous earth) until it can be taken to a site that is lawfully able to receive it.

Lead

- Minimise the generation of lead dust and fumes, including by cleaning work areas before and after demolition activities.
- Do not sand or burn off lead-based paint.
- For guidance relating to lead management prior to and during demolition, refer to Safe Work NSW.

Acid sulfate soils

- Prepare an ASS management plan for the site, including measures to:
    - avoid and minimise disturbance
    - prevent oxidation
    - neutralise acidity
    - dispose offsite.
- Restrict where possible the disturbance and excavation of ASS.
- Where excavation is required, ensure that treatment pads consisting of a clay liner and bund are present to manage the excavated soil.
- Add bagged lime, at appropriate levels, to excavated material onsite prior to backfilling.
- Collect acidic surface water using drains or shallow basins and treat before discharging.
- If removing and disposing of ASS offsite, either:
    - dispose of at a lawful place that already has an EPA-approved EMP for managing ASS.

PFAS

- Isolate PFAS-contaminated materials from the surrounding environment by providing appropriate barrier systems such as a primary (upper) and secondary (lower) composite liner, a primary leachate collection system and a secondary leachate detection and collection system
- For management of contaminated water, see Guidance sheet 11: Wastewater.

Use an accredited consigner. This is a professional approved by the EPA with knowledge on how to properly manage specific types of waste and ensure they are sent to a place that is lawfully able to receive them.

Step four: check controls

Controls that are put in place to prevent or mitigate risks must be monitored to ensure they work as planned – and improved if they do not.

For the management of hazardous waste, this could include:

- inspecting hazardous waste containers to ensure they are sealed and free of cracks or leaks
- undertaking offsite monitoring to ensure hazardous wastes are not entering the environment - this may involve monitoring water quality
- upstream and downstream of the project site for chemicals which are present in the onsite hazardous waste.

GUIDANCE SHEET 7: Masonry and other solid material wastes

Masonry and other solid material wastes foundon civil construction, building and demolition sites consists of:

- building rubble
- concrete
- asphalt
- bricks
- timber
- plastic
- glass
- metals
- bitumen
- trees
- shredded tyres
- e-waste (EPA website).

Step one: identify hazards

Entry of masonry and other solid material waste into the environment.

Step two: assess risk

Masonry and other solid material wastes have the potential to block storm water drains and contaminate land and local waterways.

To help assess the risk of masonry and other solid material wastes entering the environment, you can:

- identify the potential sources of masonry and other solid material wastes on your site
- understand how masonry and other solid material wastes generated onsite can be transported offsite and into the environment
- consider nearby neighbours, drains and local waterways.

Step three: implement controls

Implementing the following controls may assist you with managing masonry and other solid material waste generated from your activities:

- Store solid waste in a designated stockpile area or waste bin (sorted by type of solid waste) until a sufficient quantity has accumulated for removal.
- Have the waste taken to a site lawfully able to take that waste, which may include waste and resource recovery facilities and landfills.

Use an accredited consigner. This is a professional approved by the EPA with knowledge on how to properly manage specific types of waste and ensure they are sent to a place that is lawfully able to receive them.

Step four: check controls

Controls that are put in place to prevent or mitigate risks must be monitored to ensure they work as planned – and improved if they do not.

For the management of masonry and other solid waste material wastes,this could include:

- regularly inspecting rubble and other solid waste material stockpiles to ensure they are of appropriate dimensions, and that they are secured with tarps, fencing or other appropriate methods to prevent loose material from falling
- inspecting rubble and other solid material waste bins during daily site walks for any overflow or incorrect sorting
- inspecting the site to identify any masonry and other solid material waste that have not been placed in the correct storage location.

GUIDANCE SHEET 8: Drilling mud

Drilling mud is the liquid or sludge residue generated during drilling through soil or earth. It may comprise of a mixture of:

- naturally occurring rock and soil including sand, silt, gravel and clay
- naturally occurring organic matter including tree roots, grass and shrubs
- water and drilling fluid (which primarily consists of water and may also contain non-synthetic additives such as bentonite).

  Drilling mud may also contain contaminants from within the soil and groundwater being excavated /drilled or as a result of the drilling process.

Step one: identify hazards

Entry of drilling mud into the environment.

Step two: assess risk

To help assess the risk of drilling mud entering the environment, you can:

- Identify where drilling mud is being generated and stored on your site.
- Understand how drilling mud generated onsite can move offsite and into the environment.
- Consider nearby neighbours, drains and local waterways.

  Drilling mud has the potential to pollute land and, in particular, waterways.This can harm human health and the environment.

Step three: implement controls

Implementing the following controls may assist you with managing drillingmud generated from your activities:

- Ensure that additives or contaminants (for example, oil lubricants) are not introduced during the drilling or excavation operation.
- If use of oil-based additives cannot be avoided, use biodegradable oils where possible.
- Contain the drilling mud temporarily in pits or sumps onsite, or in clearly labelled drums.

- Have the drilling mud taken to a site that is lawfully able to receive it or remediate onsite depending on level of contamination (see Chapter 6: Contaminated land and groundwater).
- Consider any viable reuse options of the mud dependent on its level of contamination e.g. fill material, composting, road construction.
- Dewater the drilling mud naturally or allow to air-dry, or direct to a dewatering facility.
- If the drilling mud can remain safely onsite (see Chapter 6: Contaminated land and groundwater), you should develop and implement an ongoing management plan for the drilling mud. This can be incorporated into the site environmental management plan.
- Transport the drilling mud in a vehicle that is safe, secure and leak-free, with no contaminated residue in the tanker / tanker trailer.
- See section 8.7 on keeping drilling mud management records.

Use an accredited consigner. This is a professional approved by the EPA with knowledge on how to properly manage specific types of waste and ensure they are sent to a place that is lawfully able to receive it.

Step four: check controls

Controls that are put in place to prevent or mitigate risks must be monitored to ensure they work as planned – and improved if they do not.

For the management of drilling mud, this could include:

- inspecting drilling mud storage areas and containers to ensure there are no leaks or run-off
- regularly reviewing the management plan for drilling mud, to ensure controls are updated based on their effectiveness.

GUIDANCE SHEET 9: Historic buried waste

Historic buried wastes may become uncoveredduring excavation works on construction sites.

These wastes are often associated with closed landfills or illegal dumping grounds and can contain:

- Masonry and other solid material waste – consists of building rubble, concrete, asphalt, bricks, timber, plastic, glass, metals, bitumen, trees, shredded tyres and e-waste (see Guidance sheet 7: Masonry and other solid material wastes)
- Hazardous wastes – consists of asbestos,
- polychlorinated biphenyls (PCBs), lead, and acid sulfate soils (ASS) and any other material waste that has a known risk to human health and the environment (see Guidance sheet 6: Hazardous waste)
- Putrescible wastes – those that can be decomposed by bacterial action. They usually consist of discarded food, domestic garbage, animal carcasses, grass and garden clippings and prunings.

The presence of historic buried waste may indicate existing land and groundwater contamination.See Chapter 6: Contaminated land and groundwater for guidance on managing contamination.

Step one: identify hazards

Presence of buried wastes.

Step two: assess risk

To help assess the risk associated with buried wastes, you can:

- Identify historic activities which may have involved the burying of waste on the site.
- Locate potential areas where waste may be buried.
- Identify the content of any identified historic buried waste sites.
- Understand how historic buried waste may have decomposed resulting in release of contaminants into the environment.
- Understand the pathways of pollution to the environment from buried waste, considering nearby neighbours, drains, conduits and local waterways.
    - Define extent of the historic buried waste materials via methods including ground penetrating radar, test pitting and implementation of a comprehensive sampling program.
    - Investigate if the cap over the historic buried waste is appropriate to protect current and future site users and to minimise impacts to the environment.

- Identify the nature of material, odour levels, presence of methane, groundwater quality, groundwater levels and leachate quality to determine the correct management method (see Chapter 6: Contaminated land and groundwater).
- Identify whether the historic buried waste and any associated impacted material is to remain onsite or if it is to be excavated and removed. Engage a suitably qualified person to manage the process (see Work with an environmental consultant, EPA website).
- If the waste is required to be removed from the site, it must be taken to a place that is lawfully able to receive it.
- Ensure the area does not pose an immediate threat e.g. strong odours, sharp objects, or drums of unknown chemicals. Where an immediate threat is encountered, access to the area should be restricted and the threat removed by a suitably qualified person.
- Develop and implement an ongoing management plan to maintain and manage the site to ensure that risks to site users and the environment are minimised into the future.

Buried wastes create a risk of harm to human health and the environment by causing pollution ofair (gases), land, groundwater and surface waters, and present an explosion risk.

Contact EPA. If historic buried waste associated with a landfill is identified, contact EPA immediately – an in-depth assessment process may need to be followed.

Step three: implement controls

Implementing the following controls, in addition to those listed in Chapter 6:Contaminated land and groundwater, will assist you with managing buried waste discovered during your activities:

- Where historic buried waste has only been partly excavated, look to seal any uncovered waste - you may need approval from your local council to do this. Materials used to seal this waste may include geosynthetic liners and vegetative layers.
- If an existing cap over historic buried waste is found to be inadequate, undertake further capping works if the waste is to remain onsite.
- Control odours during excavation by minimising the working surface area and immediately covering with a clean fill (see Guidance sheet 5: Surplus excavated material). Use of a deodoriser may also be required to minimise emissions of malodorous gases to the atmosphere.
- Use sealed containers for the storage of small volumes of historic wastes and during transport to limit odour emissions.
- Limit leachate generation by minimising infiltration of ingress of water into the old landfill through installation of cut-off drains, banks or bunds around the excavation area.

Use an accredited consigner. This is a professional approved by the EPA with knowledge on how to properly manage specific types of waste and ensure they are sent to a place that is lawfully able to receive them.

Step four: check controls

Controls that are put in place to prevent or mitigate risks must be monitored to ensure they work as planned – and improved if they do not.

For the management of historic buried waste, this could include:

- monitoring upgradient and downgradient groundwater and surface water quality levels from any identified buried waste, including monitoring for leachate
- air quality monitoring for methane and sulphur gases of uncovered buried waste.

GUIDANCE SHEET 10: Sewage

Sewage is a type of wastewater typically composed of excrement, detergents and toilet paper. Improper management can lead to contamination of the surrounding environment, disease and illness, and odour issues.

Step one: identify hazards

Human exposure to sewage and its entry into the environment.

Step two: assess risk

Sewage can create nuisance odour and contamination of the surrounding environment. Due to its biological nature, it can cause viral, bacterial and parasitic diseases in humans and animals.

To help assess the risk of sewage entering the environment, you can:

- Identify the potential sources of sewage on your site, which includes identifying the location of underground sewage pipes.
- Understand the pathways for sewage flow from the site and into the environment.
- Consider nearby neighbours, drains, conduits and local waterways.

Step three: implement controls

Implementing the following controls may assist you with managing sewage discovered during your activities:

- Mark the location of underground sewage pipes onsite.
- Provide temporary toilets throughout the construction and demolition period, that are clearly signposted with appropriately sized waste and water tanks where there is no connection to sewer. Regularly service the facilities.
- Regularly inspect toilets and excavations for visual signs of sewage spills.
- Use an authorised contractor to collect the sewage waste.
- Where civil construction, building and demolition are expected to occur for a significant length of time, consider engaging an authorised contractor to connect the toilet facilities to the sewerage network.

- Assess the location of buried sewage pipes and mark out services on ground surface to prevent damaging them.

Use an accredited consigner. This is a professional approved by the EPA with knowledge on how to properly manage specific types of waste and ensure they are sent to a place that is lawfully able to receive them.

Step four: check controls

Controls that are put in place to prevent or mitigate risks must be monitored to ensure they work as planned – and improved if they do not.

For the management of sewage waste, this could include:

- monitoring upstream and downstream surface water and groundwater
- reviewing the sampling and analysis program and update depending on effectiveness.

GUIDANCE SHEET 11: Wastewater

Wastewater is water that has been ‘used’, is contaminated (including contaminated storm water), or is ‘surplus’ (i.e. unwanted orexcessive), water resulting from dewatering activities.

Civil construction, building and demolitionactivities generating wastewater include:

- site dewatering
- vehicle and equipment washdown
- brick tile works
- concrete pour works
- painting and plastering
- air conditioner installations
- sewage generation (see Guidance sheet 10: Sewage).

Step one: identify hazards

Site dewatering

Dewatering is the permanent or temporary removal of ponded stormwateror infiltrated groundwater, usually for the purpose of excavation and construction activities.

Vehicle and equipment wash-down

Vehicles, machinery, tools and other equipment may require frequent or occasional washing on a construction site, with the washdown water potentially containingchemicals and / or sediments.

Other activities resulting in wastewater

Common construction and demolition activities with the potential to generate wastewater, include brick tile works, concrete pour works, painting and plastering, and air conditioner installations.

To help assess the risk of wastewater entering the environment, you can:

Step two: assess risk

- identify the potential sources of wastewater on your site
- understand how wastewater on your site can move offsite and into the environment
- consider nearby neighbours, drains and local waterways.

Site dewatering

Pumping out groundwater from an excavation or dewatering bore could cause groundwater drawdown, affecting nearby ecosystems, and draw contaminated water from other properties onto the site.

Discharge of potentially contaminated dewatering water to stormwater and reinjection into a groundwater aquifer could pollute surface water and groundwater's, posing a risk of harm to the environment and human health.

Vehicle and equipment wash-down

Washdown water can pollute waterways via the stormwater system if not managed appropriately.

Other activities resulting in wastewater

Wastewater from brick tile works, concrete pour works, painting and plastering, and air conditioner installations have the potential to enter the surrounding environment and pollute waterways.

Step three: implement controls

Site dewatering

The controls below may assist you to manage water resulting from dewatering activities to prevent potential adverse impacts to the environment. Consider engaging a suitably qualified person to manage this process (see Work with an environmental consultant, EPA website).

- Test the water resulting from dewatering activities for contaminants (see Chapter 6: Contaminated land and groundwater).
- Identify if the water can be reused onsite for activities such as dust suppression, vehicle and machinery wash down, earthworks compaction and revegetation.
- Treat contaminated water onsite where appropriate e.g. via flocculation or coagulation. Oils and grease may be removed from the surface of water by use of floating booms, pads and socks.
- Ensure any reuse of water does not cause ponding or run-off of water.
- For discharge to sewer, contact your local water authority to investigate whether the water meets the requirements for discharge to sewer by identifying the trade waste acceptance criteria and apply for a trade waste agreement.
- If discharge to a sewer is not viable and onsite treatment not appropriate, dispose of the water to a site that is lawfully able to receive it.
- Monitor upstream and downstream water quality during any discharge of treated water to a waterway (directly or via a stormwater drain) to check if discharge is affecting water quality of the waterway.

Cleaning of vehicle, equipment and roads

The controls below may assist you to manage your cleaning activities to prevent potential adverse impacts to the environment:

- Carry out washing of vehicles and equipment in a designated area, designed to allow collection of the washdown water.
- Cover the designated washdown area, where appropriate.
- Locate the washdown area away from drainage lines, stormwater inlets, waterways, areas of significant flora and fauna and other sensitive areas identified onsite.
- Contain wash out barrels in the designated washdown area for washing of tools and smaller equipment.
- Install sediment control structures e.g. fences or basins to collect sediments, downslope to prevent entry of sediment into drains and waterways (see Chapter 5: Erosion, sediment and dust).
- Appropriately bund the washdown area to contain all washdown water (see Chapter 7: Chemicals).
- Discharge the washdown water to the sewer with approval from the relevant water authority.
- Return concrete mixing and delivery trucks to the batching plant for washout, where possible. However, should this not be possible, designate an area onsite for washing out of concrete trucks, which:
    - is located near the site exit to encourage drivers to use it
    - signed for easy identification
    - is lined with an impervious liner (plastic or geotextile), allowing the water to evaporate, for concrete residue to then be disposed of as solid waste (in a skip bin or collected and transported to a site that is lawfully able to receive it) or used as a road base.
- Clean equipment off before washing to minimise use of water. Brush dirt and mud off equipment before you wash it.
- Avoid using solvents for cleaning vehicles and use phosphate-free soaps and biodegradable soaps.
- For tools used for water-based paints, use one container to wash the brush and another to rinse. The container used to wash the brush can be left to stand overnight to allow solids to settle – the contents can then be poured out and solids put in a bin.
- For tools used for oil-based paints, do not put on the ground and clean using a solvent bath. Contact a waste contractor to ensure it is taken to a lawful place.
- Where hazardous chemicals (see Chapter 7: Chemicals) are suspected to occur in the washdown water, ensure collection (e.g. via a sump with no outlet) and arrange for an authorised contractor to collect the washdown water and dispose of at a site that is lawfully able to receive it.
- For road cleaning:
    - Minimise use of roads by vehicles to reduce:
        - fuel and other chemical leaks from vehicles onsite
        - dust and sedimentation
        - frequency of vehicle washing.
    - Restrict access on and offsite during wet conditions.
    - Pave entry and exit roads with gravel and top dress these paths periodically.
    - Sweep roads at least once a day.

- Install rumble grids (see Figure 2) and wheel washes at entry and exit points and remove sediment from the wheel wash as required. Consider placing rumble grids under water via excavation of a shallow pit, to facilitate removal of sediment.

Figure 2. Rumble grid.

(photo courtesy of McConnell Dowell)

- Designate a paved parking area.
- Where the site is not large enough to install rumble grids and wheel washes, sweep the road daily.
- Install road sediment controls such as litter traps lined with filter cloth in all side-entry pits.
- Cover all loads of waste, including soil, being taken offsite to a site lawfully able to accept that waste.

Other activities resulting in wastewater

- Brick tile works
  - Mix mortars in areas that will not drain into the stormwater system.
  - Prevent wastewater from brick-cutting activities from entering the stormwater system.
  - Recycle or discharge surplus wastewater from brick-cutting activities to a contained area for evaporation.
- Concrete pour works
  - Carry out concrete mixing in a contained area to prevent residues and wastes from entering the stormwater system.
  - Install temporary bunds down slope gutters where the use of concrete pumps from public roadways is required.
  - Seal concrete once cured to prevent run-off water from becoming alkaline.

See above under ‘Cleaning of vehicle, equipment and roads’ for washdown controls.

- Painting and plastering
    - Keep unused paint in a tin or other sealed container.
    - Dispose of unwanted paint to a site that is lawfully able to receive it.
    - See above under ‘Cleaning of vehicle, equipment and roads’ for cleaning controls to clean up painting equipment.
    - Filter solvent used to clean oil-based paints, for reuse, or have it taken to a site that is lawfully able to receive it.
    - Allow plastering residues to dry within a designated contained area on the site. Then put solid waste into a skip bin or dispose of at a site that is lawfully able to receive it.
    - Consider using solid plastering wastes such as calcium sulfate as a clay modifier for landscaping works.
- Air conditioner installations
    - Ensure that air conditioners are installed to manufacturers specifications.
    - Direct saline wastewater from the air conditioner dump valve systems and cooling towers to a sewer, rainwater tank (non-drinking), or garden.
    - Install cooling towers so that wastewater from the tower does not enter the stormwater system.

Step four: check controls

Controls that are put in place to prevent or mitigate risks must be monitored to ensure they work as planned – and improved if they do not.For the management of wastewater, this could include:

- monitoring upstream and downstream water quality, if discharging into waterways.
- inspecting bunds during daily site walks to ensure they are installed correctly.

PROJECT SPECIFIC REQUIREMENTS

The follow sections on the EMP has been added to specifically address project specific requirements in setout in the SSD Consent Conditions, Principals Project Requirements and Project Preliminaries.

Sub-Plans

The below listed sub-plans from part of this in this Environmental Management Plan to address specific requirements setout in the SSD Consent Conditions. These sub-plans are attached as Appendices to this plan.

Sub-Plan and Appendix Title	PREPARED TO COMPLY WITH
Construction Pedestrian and Traffic Management Plan (CPTMP)	SSD Consent Condition C10(a)(xii) and C11
Construction Noise and Vibration Management Plan (CNVMP)	SSD Consent Condition C10(b) and C12
Air Quality Management Plan (AQMP)	SSD Consent Condition C10(c) and C13,C14 & C15
Construction Waste Management Plan (CWMP)	SSD Consent Condition C10(d) and C16
Construction Soil and Water Management Plan (CSWMP)	SSD Consent Condition C10(e) and C17
Unexpected Finds Protocol (UPF)	SSD Consent Condition C10(f), (g) and B36 & C24
Tree Protection Plan	Principals Project Requirements 10.4

Hours of Work

In accordance with the SSD Conditions of Consent, working hours are between

- 7:00am to 6:00pm Monday to Friday
- 8.00am to 1.00pm Saturday will be undertaken.

Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours;

- 9:00am to 12:00pm Monday to Friday
- 2:00pm to 5:00pm Monday to Friday
- 9:00am to 12:00pm Saturday.

24 Hour Contact Details

The below contact details are publicly available.

Communication Method	Contact Details
Telephone (24 hour)	1300 606 773
Post	ATTN: The Project Manager PNRL Centre of Excellence Project Kane Constructions Pty Ltd 2 John Street Waterloo NSW 2017 Australia Post: PO Box 243 Alexandria 2015
Email	pcoe_enquiries@kane.com.au
Emergency Contacts	Nathan Parris – 0401 395 980 Michael Wright – 0403 045 215 Andrew Baker – 0400 743 356 Johnathan Paparoulas – 0421 549 358

Community Consultation and Complaint Handling Procedure

Refer to Kane Project plan **PCoE Community Liaison & Stakeholder Engagement Plan** for full details however summary of community consultation and compliant handling procedure is outlined below.

Community Consultation

All relevant authorities, residents, businesses, and others affected by project works will be informed of the project activity and timeframes. This will occur periodically through the project in the form of door knocks and/or letterbox drops as appropriate. Details of the project's complaints and enquiries procedure will be provided in these letterbox drops.

Any community notification notices will be provided to the Superintendent for review prior issue to the community.

Complaint Handling Procedure

Enquiries about the works from external parties are recorded on the Communications and Complaints Register.

Any complaints concerning any aspect of the project are registered, investigated, and recorded detailing the nature of the complaint, the complainant and actions taken as a result of the complaint.

The Project Manager ensures that any complaint received is investigated promptly and that appropriate action is taken.

Kane will promptly notify the Superintendent of any external enquiries and/or complaints received during the project.

Environmental Aspects

The following additional control will be implemented on site.

Stormwater

Refer the sub-plan Construction Soil and Water Management Plan for the details of these controls

Dust and Odour

The following controls will be implemented to manage dust and odour on site;

- Physical barriers must be erected at right angles to the prevailing wind direction or be placed around or over dust sources to prevent wind or activity from generating dust emissions;
- All materials must be stored or stockpiled at suitable locations and stockpiles must be maintained at manageable sizes which allow them to be covered, if necessary, to control emissions of dust and/or VOCs/odour;
- The surface should be dampened slightly to prevent dust from becoming airborne but should not be wet to the extent that run-off occurs;
- All vehicles carrying spoil or rubble to or from the site must at all times be covered to prevent the escape of dust or other material;
- All equipment wheels must be washed before exiting the site using manual or automated sprayers and drive through washing bays;
- Gates must be closed between vehicle movements and must be fitted with shade cloth; and
- Cleaning of footpaths and roadways must be carried out regularly.

Flora and Fauna Management

Further to section 5.7, as part of the SSD Consent Conditions (condition no. C10) we need to comply with all recommendations and mitigation measures detailed in the Biodiversity Assessment Report dated 29/7/22. To briefly summarise the requirements, Kane are required to need to;

- Manage weeds
- Delineate site clearing extent
- Install tree protection measures
- Carry out pre-clearance surveys during site clearing
- Install sediment control measures
- Carry out landscaping and replanting works
- Habitat salvage where possible

A project Ecologist will be engaged to provide assistance and advise of any issues relating to fauna and flora during the works.

Contamination Management

An expected finds protocol has been prepared for this project. This addresses contamination management. Refer Appendix F.

External Lighting Compliance

Kane will ensure that all external lighting will be designed and installed in accordance with all relevant Australian Standards. Certification of the electrical design will be provided by a qualified electrical engineer and certification of the works being installed in accordance with the design and applicable standards will be provided prior to occupation.

Waste Classification

Douglas Partners have carried out a Detailed Site Investigation (Contamination) Report. Following this report they have provided a Preliminary Waste Classification for excavated material to be removed on site.

Recommendations from Project Reports

The below sub-plans have been prepared and address the following;

a) Construction Pedestrian and Traffic Management Plan, prepared to included the relevant recommendations outlined in the Traffic Impact Assessment report, by WSP.

b) Construction Noise and Vibration Management Plan, prepared to include the relevant recommendations and mitigation measures detailed in the Noise and Vibration Assessment, by Resonate

c) Air Quality Management Plan that includes the relevant recommendations and mitigation measures detailed in the Air Quality and Odour Assessment, by SLR

d) Tree Protection Plan, prepared to included the include the relevant recommendations detailed in the Arboricultural Impact Assessment, by Earthscape Horticultural Services,

e) Unexpected Finds Protocol, prepared (in part) to address the requirements detailed in the Aboriginal Cultural Heritage Assessment Report and Statement of Heritage Impact, by Coast History & Heritage

f) Unexpected Finds Protocol, prepared (in part) to address the requirements detailed in the Detailed Site Investigation (Contamination) Report, by Douglas Partners

g) An environmental scientist will also inspect and test the ground following removal of the Daracon Compound (incl road base) and demountable buildings, to address the recommendation detailed in the Detailed Site Investigation (Contamination) Report, by Douglas Partners

Hammertech

The Kane Safety Management system is implemented on all projects using HammerTech. The implementation of the WHS Management System is reviewed regularly, including the Site-Specific Safety Plan.

Updates to the site-specific documents are completed when there are key changes or occurrences on the project including; scope changes, safety in design implementation, regulator updated and incidents.

Kane has have been using the HammerTech system since 2018.

APPENDIX A - CONSTRUCTION PEDESTRIAN & TRAFFIC MANAGEMENT PLAN

APPENDIX A

CONSTRUCTION PEDESTRIAN AND TRAFFIC MANAGEMENT PLAN

PARRAMATTA NRL CENTRE OF EXCELLENCE AND COMMUNITY FACILITY

DOCUMENT HISTORY

Content Author	Michael Wright

REV	Change Type	Amendment Summary	Author	Date
01	Rev 1	Project Start Up	MW	28/08/2023
02	Rev 02	Revised following TfNSW Comments	MW	14/9/2023
03	Rev 03	Cranage and site fencing updated	MW	15/2/2024
04				
05				

TABLE OF CONTENTS

1.0 INTRODUCTION

Kane have engaged a Traffic Management consultant (ETM Traffic) to develop a project specific Construction Pedestrian and Traffic Management Plan (CPTMP). The document outline Kane's proposed intensions and incorporates Kane's management strategy to be utilised throughout the course of construction.

2.0 STATUTORY AND CONTRACTUAL OBLIGATIONS

The following statutory obligations of the SSDA Development Consent are setout below.

C11. Construction Pedestrian and Traffic Management Plan
Prior to the commencement of any earthwork or construction, the Applicant must submit to the satisfaction of the Certifier a final Construction Pedestrian and Traffic Management Plan (CPTMP), prepared in consultation with the Sydney Coordination Office within TfNSW and Council. The CPTMP needs to specify matters including, but not limited to, the following:
(a) a description of the development;
(b) location of any proposed work zone(s);
(c) details of crane arrangements including location of any crane(s) and crane movement plan;
(d) haulage routes;
(e) proposed construction hours (in accordance with Condition D3 - D7);
(f) predicted number of construction vehicle movements, detail of vehicle types and demonstrate that proposed construction vehicle movements can work within the context of road changes in the surrounding area, noting that construction vehicle movements are to be minimised during peak periods;
(g) construction vehicle access arrangements;
(h) construction program and construction methodology, including any construction staging;
(i) a detailed plan of any proposed hoarding and/or scaffolding;
(j) measures to avoid construction worker vehicle movements within the precinct;
(k) consultation strategy for liaison with surrounding stakeholders, including other developments under construction;
(l) identify any potential impacts to general traffic, cyclists, pedestrians, bus services within the vicinity of the site from construction vehicles during the construction of the proposed works. Proposed mitigation measures must be clearly identified and included in the CPTMP;
(m) identify the cumulative construction activities of the development and other projects within or around the development site. Proposed measures to minimise the cumulative impacts on the surrounding road network must be clearly identified and included in the CPTMP; and
(n) be consistent with and incorporate all relevant recommendations and mitigation measures detailed in the Traffic Impact Assessment Report, prepared by WSP, dated July 2022.

The following contractual obligations are setout in Principal's project Requirements.

10.5 Traffic Management

Throughout construction the Contractor is responsible for the preparation of all traffic management plans and the management of roadways and traffic affected by the execution of the works. This must include obtaining all relevant authority approvals, permits and the like. Where required, all traffic management plans must be prepared in accordance with Australian Standards AS1742.2 part 2: Traffic Control devices for general use and Part 3: Traffic control devices for works on roads and the relevant SSD condition. Work under the Contract must be carried out in accordance with the traffic management plan.

The Contractor shall maintain a safe traffic management policy for site deliveries and public access around the site as well as any areas where contractors and residents share access in, to and from the site.

The Contractor shall provide and work in accordance with certified Traffic Management Diagrams as required, to accompany any works which impact the internal and external roadways and pedestrian areas of the precinct.

The Contractor shall make all necessary arrangements with the Project Manager and appropriate authorities for ingress to and egress from the Site of all labour and materials.
The Contractor must organise for a worker with the required certificates to be available to accept deliveries and guide traffic & pedestrians.

3.0 TRAFFIC MANAGEMENT

Kane will adopt a collaborative approach to traffic and pedestrian management during this project. The acknowledgement of our responsibility to provide both the procedural infrastructure and the staff to ensure it can be done is essential to this.

This approach plus the implementation of a rigorous delivery booking system managed by our Site Manager will ensure that staff, the public and construction traffic can co-exist.
Our Site Establishment plans have been developed with the following considerations:

- Pedestrian access around the site
- Minimisation of disruption to public traffic.
- Contractor vehicular access for construction works;
- Maximising efficiency of construction works;
- Safety of council staff and visitors; and
- Ease of demobilisation upon completion of works.

Construction inevitably will impact the surrounding community and/or residents, via increased traffic movements, type of vehicles moving around the area or increased pedestrian traffic (workforce personnel).

With respect to the management of vehicle movements, to and from the site, adequate allowance has been made for a traffic controller to be positioned at the site entry gate to manage vehicle movements through these gates as required during the course of the project.

To effectively manage this, Kane shall implement a site procedure, where the trucks need to book in their deliveries before arriving at site and can only enter the site under the control of the traffic controller.

ETM Traffic have prepared the Construction Pedestrian and Traffic Management Plan outlined in Appendix A. This is considered a live document and may get updated from time to time throughout different phases of construction.

APPENDIX A - CONSTRUCTION PEDESTRIAN AND TRAFFIC MANAGEMENT PLAN

APPENDIX A

CONSTRUCTION PEDESTRIANS TRAFFIC MANAGEMENT PLAN –
PARRAMATTA COE

ADDRESS : 8 MEMORIAL AVENUE, KELLYVILLE
CLIENT : KANE

ETM AUSTRALIA
Authored by: BRUNA PINAFFO

TABLE OF CONTENTS

1. PROJECT OVERVIEW

TMP Producer for	KANE
Job Number	CPTMP2208
Project Address	8 MEMORIAL AVENUE, KELLYVILLE
Date Prepared	22/06/2023
Prepared by	BRUNA PINAFFO
RMSPWZTMP	TCT0011476
Contact Details	0455 135 735
Scope of Works	KELLYVILLE PARK REDEVELOPMENT PROJECT
Work Duration	18 MONTHS
Contract Manager	NATHAN PARRIS – 0452 194 401
TMP Distribution list	LIMITED DISTRIBUTION

2. DOCUMENT APPROVAL:

Development	
DA/CDC Approval Reference:	SSD 24452965
Prepared by	Bruna Pinaffo
Position	Traffic Management Designer
Date	22/08/2023
Signature	Bruna Pinaffo
Reviewed By	
Name	Paul Pizzolato
Signature	Paul Pizzolato
Position	Assistant Traffic Management
Date	23/08/2023

3. DOCUMENT CONTROL:

Rev	Date	Section	Author	Reason
00	22/08/2023	Entire Document	Bruna Pinaffo	Design of Construction Traffic Management Plan
01	13/09/23	Swept path	Kyle Fieg	Updated following TfNSW Consultation
02				
03				

4. ABBREVIATIONS AND TERMINOLOGY

Acronym	Definition
AS	Australian Standard 1742.3
CVPPM	Construction Vehicle and Pedestrian Plan of Management
PWZTMP	Prepare Work Zone Traffic Management Plan
RMS	Road and Maritime Services
ROL	Road Occupancy Licence
TCP	Traffic Control Plan
TCWS	Traffic Control at Work Sites Manual
TMP	Traffic Management Plan
TRSB	Temporary Road Safety Barrier
VMP	Vehicle Management Plan
VMS	Vehicle Message Signs
FAS	Flashing Arrow Signs
PMP	Pedestrian Management Plan
TTM	Temporary Traffic Management
TFNSW	Transport for New South Wales

5. LEGISLATIVE REQUIREMENTS

The purpose of this Traffic Management Plan is to ensure that KANE are commitment to safety, traffic management, reporting and reviewing and items listed are met during the life of this project.

This will be accomplished with consideration given to; Traffic Plans, Traffic Demands, Traffic Routing, Traffic Control Devices, Other road users and stake holders, Special (emergency) vehicle requirements and access, Accredited Traffic Controllers

The legislative and reference documents used in conjunction with this plan include, but are not limited to:-

- WH&S Act and Regulations (NSW).
- Risk Management Code of Practice (2007)
- Traffic Management for Construction or Maintenance Work Code of Practice (2008)
- Traffic Control at Worksites Manual (TCAWS) Version 6.1 February 2022 (RMS)
- Australian Standard AS1742.3 Traffic Control Devices

This plan aims to identify the risks to persons undertaking work on, or adjacent to, a traffic corridor. It shall ensure that appropriate control measures for any identified hazard are assessed, controlled, implemented, monitored and reviewed by elimination, substitution, engineering, administration or by using personal protective equipment.

All contractors, subcontractors, employers, self-employed persons, workers and other persons will be bound by the requirements set out in this plan. This plan forms the basis of ongoing programs in continuous improvement of traffic management and the required ongoing training and commitment of all personnel involved in this project.

6. INTRODUCTION

ETM Traffic has been commissioned by KANE to prepare a Construction Vehicle and Pedestrian Plan of Management to be implemented during the building of Parramatta Eels Community Facility and Centre of Excellence, Kellyville Park, Kellyville. This TMP is required to be prepared in consultation with the Sydney Coordination Office within TfNSW and Council prior to the commencement of works. This Construction Vehicle and Pedestrian Plan of Management and associated Traffic Guidance Scheme's (TGS) includes the provision for the safe movement of vehicular and pedestrian traffic, the protection of workers from passing traffic, the provision for access to properties located within the limits of the project, the provision of traffic controllers and traffic control measures, the installation of temporary signs and safety devices as required at Kellyville Park, Kellyville NSW 2155.

This CPTMP is consistent with and incorporates all relevant recommendations and mitigation measures detailed in the Traffic Impact Assessment Report, prepared by WSP, dated July 2022.

7. DESCRIPTION AND DETAILED PLAN OF PROPOSED MEASURES

The purpose of this document is to set out the approach, processes, and standards for providing Traffic Management for constructions related activities relating to the construction works for the
See attached TCP to this document on page 25.

Community Facility: Construction of a Community Facility, including a grandstand with approximately 1,500 seats which will also incorporate:

- Change rooms, Gymnasium, Café/Kiosk, Warm shell tenancy, Multipurpose community function room.

Centre of Excellence: Construction of high-performance Centre of Excellence facility in the northeast of the site comprising:

- Elite level gymnasium, Rehab Facilities, Recovery and Rehab Pools, Lecture Theatre, Meeting Rooms, Administrative Offices, Café, End of Trip Facilities.

Associated Site Works:

- 40 on grade car parking spaces,
- Site wide Infrastructure.

- Hard and Soft Landscaping.

This document is intended to provide consistency in terms of structure and delivery of Traffic Management. Provides a structured approach to manage traffic and access during construction to provide a safe road environment, minimise impact on the surrounding road network and maintain access for all road users and local community. It includes the provision for the safe, efficient, and effective movement of vehicular, cyclist and pedestrian traffic to keep disruption to traffic on the road network to a minimum. It also provides for the protection of workers from passing and site traffic.

KANE will be responsible to build the Parramatta Eels, Community Facility, and Centre of, Excellence at Kellyville Park, Kellyville. Project duration is the total of 18 months.

The Scope of work associated with the Kellyville Park redevelopment project, comprises of the following:

Community Facility:
Construction of a Community Facility, including a grandstand with approximately 1,500 seats which will also incorporate:

- Unisex change rooms and amenities.
- Referee change room and amenities.
- First Aid/Medical room.
- Community gymnasium.
- Café/kiosk.
- Concourse terrace.
- Warm shell tenancy.
- Multipurpose community function room with kitchen and amenities.
- Refuse Area.
- Bicycle parking.

Centre of Excellence:
Construction of high-performance Centre of Excellence facility in the northeast of the site comprising:

- Elite level gymnasium.
- Medical and rehabilitation facilities.
- Aquatic recovery and rehabilitation pools.
- Lecture theatre and meeting rooms.
- Player education and study areas.
- Administration offices for the Parramatta Eels.
- Female facilities including a dedicated female change room, cubicle toilets and showers.
- Balcony and terrace area.
- Café and front of house.
- End of Trip Facilities and bicycle parking.
- Refuse Area.

Associated Site Works:
Associated site works comprising:

- Construction of an Additional 40 car parking spaces for the proposed facility to operate in conjunction with existing at grade car park. already constructed by Council.
- Site wide Infrastructure.
- Hard and Soft Landscaping.

The site inspection and review apply to the whole of project arrangements applicable to traffic and pedestrian control arrangements. The report and any recommendations are not intended to be exhaustive and are provided with the intention to strengthen or complement the current arrangements to complete the works safely.

8. WORKING HOURS

Work hours are as per the Conditions of Approval from the EIA Checklist:

Monday to Friday	0700hrs – 1800hrs
Saturday	0800hrs – 13000hrs
Sunday & Public Holidays	NO WORK

Rock breaking, rock hammering sheet piling, pile driving, and similar activities may only be cared out between the following:

Monday to Friday	0900hrs – 1200hrs
Monday to Friday	1400hrs – 1700hrs
Saturday	0900hrs – 12000hrs

9. IDENTIFICATION AND ASSESSMENT OF TRAFFIC IMPACT OF PROPOSED WORKS

Memorial Avenue is a Council Road/RMS road which operates as a north - south conduit through Kellyville. Two Way Road 60km/h.
Windsor Road is a RMS which operates as an east - west conduit through Kellyville. Is a two-way road and the section next to the work site is 60km/h.
Kennedy Ave is a small Council Road owned local road 50km/h.
Stone Manson Dr is a Council Road owned local road which operates as a north - south conduit Memorial Avenue and Fairway Dr. 50km/h road.

Traffic is to be maintained in its existing configuration. This Construction Traffic Management Plan will only have traffic controllers managing the entering and exiting of vehicles on site and managing the safety of pedestrians during those movements.

10. TRAFFIC DATA AND ANALYSIS

To keep the road user delays to a minimum, KANE will plan and stage all works to avoid lane closures / road occupancies during peak periods. To assist the planning process, KANE nominated traffic representative will analyse traffic volume date to establish the capacity of road, assess the potential impact on the traffic flow and identify the best time to apply the temporary traffic arrangements, to minimise the inconvenience to road users.

The traffic volume data of the various roads will be documented within our (TMPs), which will include a summary of the traffic volume data, (AADTs), and where possible hourly, daily, weekly, and yearly traffic flow demand profiles. In order to provide users with the changed traffic condition information to enable them to plan their journey ahead and avoid the roadwork or unexpected impact.

11. IDENTIFIED IMPACTS

KANE will conduct the required assessments of the road network directly affected by the construction activities, which will be documented in the (TMPs). This assessment will assist in determining the need for specific mitigation measures. The facilities to be assessed will include, but are not limited to:

- Existing on-street parking (including type and associated time limits)
- Existing traffic controls
- Existing junction configurations
- Restrictions on existing traffic movements (right turn bans etc)
- Existing road occupancies
- Public transport (buses, including bus stops, taxis)
- Traffic generating developments, (eg schools, shopping centres, churches, industrial areas, sporting complexes, clubs etc)
- Temporary access arrangements or restrictions for local residents, businesses, traffic generating developments, major and special events etc
- Emergency vehicle access points
- Heavy vehicle movement restrictions, including over dimension vehicle loads
- Pedestrians, including disabled persons
- Cyclists, (general road, cycle and share way facilities).

12. DETAIL TRAFFIC MANAGEMENT MEASURES TO AMELIORATE THE IMPACTS OF PROPOSED WORKS

The proposed traffic controls include stop control the vehicles getting in and out of the site. Manage pedestrian during deliveries movement. A minimum of one traffic controller will be required in each gate during the work.

The proposed traffic controls include managing of vehicles accessing the site. This will be required for the two buildings will be developed simultaneously. See indicative durations below.

Building B

- Demolition – 1 month
- Civil Works – 3 months
- Ground works / Substructure – 4 months
- Pool Structure – 5 Months
- Structure – 1.5 months
- Building Envelope – 6 months
- Services & Finishes – 7 months
- External Works – 2.5 months

Building A

- Ground works / Substructure – 1.5 Months
- Structure – 4 months
- Building Envelope – 4 months
- Services & Finishes – 5 months
- External works – 1.5 months

External Works

- Meeting Place / Pedestrian Concourse (Landscaping Works) – 1.5 months
- New Carpark – 2 months

A traffic controller will be required on site as per the plan attached to this document. KANE will ensure that the lane will only be closed on one side at a time to allow vehicles movements through at all time when necessary.

MINIMISING ROAD USER DELAY DURING IMPLEMENTATION OF ROAD OCCUPANCIES

The delay minimization strategies to be applied by KANE project team will not delay the free flow of traffic in any direction more than 200 meters in accordance to G10 through the following strategies: -

- Minimising the impacts of each work area;
- Maximising the operating performance of the individual routes;
- Eliminate the need to work adjacent to live traffic as far as possible through the construction techniques and traffic phasing;
- Undertaking an AM and PM drive through as part of the maintenance plan to ensure no debris , detritus or broken down vehicles are impeding traffic which may lead to traffic delays;
- Aiming to maintain access;
- Over Dimensional movements to be conducted at pre-dawn or pre dusk outside of peak times and under escort; and
- Coordinating works at each work area to ensure road users do not encounter several delays in quick succession.

KANE acknowledges there are various measures that can be applied to minimise road user delays, and these are generally divided into four categories:

- Design;
- Isolation of work areas (the hierarchy of controls);
- Work methods; and
- Planning road occupancies during times of low traffic volumes.

13. EFFECT ON PUBLIC TRANSPORT

Services will operate as normal and not be affected by these works.
Construction activities are not expected to result in any likely impact on existing public transport services. The number of on-site workers is minimal and is therefore not anticipated to generate significant demand on public transport services.

The measures taken for any of those traffic controlling measures outlined above is that all public transportation services within vicinity of the worksite will be notified and given priority in and around the project's work area.
All public transportation services will be notified by either one or more of the following procedures:-

- A notification letter will be designed and distributed outlining details of road impacts, traffic flow impacts, estimated delay times if there are any, detailed routes where applicable and the location and dates and times such impacts will affect transportation.
- VMS boards placed around the proposed affected work area outlining the location and dates and times transportation services could be affected.
- A notification across the local radio stations outlining the affected roads for a given date and time frame as well as possible alternative routes if applicable.

14. DETAILS OF PROVISIONS MADE FOR TRAFFIC

MAINTAINING ACCESS FOR HEAVY VEHICLES

The effective management of loads carried by the heavy vehicles vary considerably and over-dimension loads are transported regularly on Kellyville Park, Kellyville. These loads vary in width, height, length and mass. In order for KANE to safely and efficiently facilitate the movement of heavy vehicles, (TMPs) will:

- Give consideration to the movement of heavy vehicles and over-dimension loads when preparing temporary works drawings and TCPs (adopting designs which provide a minimum lane width of 3.5 m and can accommodate the turning movements of a 26 m long B-Double heavy vehicle).
- Avoid traffic control operations at night so as not to disrupt freight movement.

- Limit obstructions and restrictions on the carriageways, and when required, provide alternatives to maintain access for transport operators including over-dimension load movements.
- Liaise with the police, permit authority and operators, as well as provide up-to-date information of any obstructions (specify minimum dimensions) which may impact on the movement of over dimension vehicles.
- Keep a register of proposed over-dimension vehicle movements, determine the best opportunity to proceed through the work site and advise the transport operator accordingly.
- When traffic control operations are in place, traffic controllers will effectively co-ordinate the movement of over-dimension vehicles through the work site.
- Assist the Special Permits Unit and over-dimension operators by notifying the relevant authority of any obstructions which may impact on over-dimension vehicle movements.
- Where possible, arrange the removal and re-instatement of roadside furniture and traffic control devices which impede over-dimension vehicle movements.
- Regularly monitor heavy vehicle movements through the work site and when required, implement the appropriate controls to mitigate potential hazards and/or congestion.

All delivery vehicles are to report to Site Office for identification. Deliveries are classified into two categories with each having separate controls:

AUTHORISED DRIVERS:

- Authorised drivers are to report to Site Office for identification
- Delivery drivers to use designated UHF channel for communications;
- To minimise confusion and potential hazards, site plans with access points clearly identified will be distributed to all suppliers and updated as required;
- Authorised drivers must comply with minimum site PPE requirements.

UN-INDUCTED DRIVERS:

- Un-inducted drivers are to park their vehicle up where practical as not to obscure local traffic or access into work site;
- Un-inducted drivers are to report to Site Office for identification verification
- Un-inducted drivers are to be directed to required material laydown area be an authorised Contractor representative;
- Delivery drivers to use designated UHF channel for communications and must remain in radio contact with the authorised Contractor Representative;
- All delivery drivers must comply with minimum site PPE requirements; and
- To minimise confusion and potential hazards, site plans with access points clearly identified will be distributed to all suppliers and updated as required.

MANAGING PEDESTRIANS

No dedicated or paved footpaths are being affected during working hours in this location. Medium pedestrian activity can be expected in this location every day. The peak pedestrian movements are expected to occur between 7:00am and 6:00pm
During vehicles entering and exiting the site, Authorized traffic controllers will be in place around the work zone to guarantee that pedestrians are informed and hold during those movements.

There will be little to no impact on pedestrians during the implementation and commencement of works and where pedestrians are affected, a site-specific TCP and risk assessment shall be drawn and submitted to council for the appropriate approvals.

Where feasible, KANE aim will be to maintain all existing pedestrian crossing facilities. Where this cannot be achieved, alternative facilities which are a similar standard to the present facility will be provided. Types of temporary crossing facilities may include pedestrian refuges, marked foot crossings, pedestrian-actuated traffic signals, temporary grade separated pedestrian bridges and so on.

MANAGING BICYCLES

No dedicated cyclist paths have been identified in this location. Cyclists will be subject to the same Traffic Management Controls as registered road users and will always have the right of way over construction works and vehicles accessing the site.

KANE will ensure that all temporary cycle paths will be:

- Clearly defined.
- Signposted appropriately to indicate the direction of the cycle path.
- Free of loose materials and obstacles.
- Designed to accommodate the type of cyclists to be encountered along the route.
- Where required, provided with ramps, holding rails and street lighting.
- Kept well maintained while in operation.

Where feasible, KANE will aim to maintain all existing cycle crossing facilities. Where this cannot be achieved, alternative facilities which are a similar standard to the present facility will be provided.

Cyclists will be subjected to normal road rules and shall follow the same routes as vehicles, unless resident access is required.

MANAGING EMERGENCY VEHICLES

The proposed construction activities are not expected to create any impacts to emergency vehicle access. As such, no special provisions for emergency service vehicles will be required as part of the proposed construction works. A 3m wide aisle is to be maintained at all times during any road works to ensure emergency vehicles can pass if required.

MANAGING INCIDENTS

KANE shall ensure their Emergency Response Plan has been developed, implemented, and communicated to all Team Members.

In the event of an emergency the Project Supervisor shall implement the appropriate process listed in their Emergency Response Plan and Safety Work Method Statement.

An incident notification form shall be completed as soon as practicable after the incident/accident.

ROADS AND MARITIME SERVICES AND LOCAL COUNCIL RESPONSIBILITIES

In accordance with its statutory obligations, Roads and Maritime Services and the local councils are responsible for road safety and traffic management of the road network. In conjunction with emergency service agencies, this includes the management of incidents and emergencies.

KANE understands the detailed management of large-scale emergencies and incidents happening within the boundary of the site shall be in accordance with the State requirements as laid out in the State Disaster Plan.

KANE will provide support to emergency service agencies and/or the Roads and Maritime Services/local councils when emergencies/incidents occur within or adjacent to the construction site.

15. COMMUNICATION STRATEGY

Notifications will be provided to all impacted stakeholders. KANE a critical first step is to identify the audience and key stakeholders. The following stakeholders will be consulted when preparing long term (TCPs). As required;

Affected adjacent land owners;
NSW Police; and
Local Councils

Neighbouring properties, business, emergency services and Council shall be provided with seven days' notice in the form of a letterbox drop and newspaper advertisement.
Directly affected residents and emergency services shall be notified by way of personally delivered and explained memo outlining works.

All affected parties will be provided with ETM phone number where they will be able to call and settle any queries.

See appendix at page 25.

WORKSITE COMMUNICATIONS

There will be two-way communications throughout the worksite to assist with traffic management of vehicles travelling into, through and/or around the worksite.

EMERGENCY SERVICES NOTIFICATIONS

Emergency Services will be informed by KANE in a timely manner of relevant activities proposed within this TMP that affect the use of the roadway. Approval from the local area command will be required for all temporary full road closures including changes to road network configurations.

FREQUENCY

The frequency of reports provided by the Project team to (Council) will be in four categories:

Immediate: Reporting of major incidents and critical issues;
Within one working day: Formal reports of major incidents;
Weekly reports: On forecast road occupancies and performance results of recently implemented changed traffic conditions / operations; and
Monthly reports: summarising: Construction activities; proposed major traffic changes; upcoming media releases; incidents and issues; road network performance etc.

16. ROLES AND RESPONSIBILITIES

PRINCIPAL CONTRACTOR – KANE

The Principal Contractor has an obligation to ensure all work at the construction workplace is carried out in a manner that will:

- Prepare a written construction safety plan, in accordance with the regulations before construction work starts.
- Ensures compliance with the contract requirements
- Provide a safe passage for both pedestrians and vehicular traffic through the work site

- Minimize delays and inconvenience to the community

In order to fulfil the above obligations the requirements contained within the Traffic Management Plan are to be compiled with, by all those who engaged in work on this project.
The management of KANE is committed to the requirements of this Traffic Management Plan. This will be achieved by:

- Providing clear direction and support in maintaining the objectives and standards set out in this Traffic Management Plan (TMP).
- The use of only accredited traffic controllers approved regulatory and advisory signs.
- Providing suitable communication between KANE supervisory staff and the Senior Traffic Controllers, e.g. radio transceiver or mobile phone.
- Providing the means necessary to achieve a safe working environment
- Reviewing procedures and work best practices.
- Providing control measures to effectively minimize the generation of dust and other environmental hazards and irritants.
- Monitor the use of any work method statement to ensure that all persons, to whom the statement applies, comply with the statement,
- Do not allow a person to start construction work, unless the Principal Contractor has sighted the person's general induction evidence (Blue / White Card),
- Ensure a person has been given a site-specific induction for the workplace before allowing the person to start construction work.
- Ensure that all persons working have the opportunity to read and or understand the Traffic Management Plan prior to starting construction work.

PROJECT MANAGER

The following list of requirements is not exhaustive for the responsibilities of a Project Manager:

- Programming of the works
- Outlines the high-risk construction activity i.e. Working on, or adjacent to a road
- Monitoring, reviewing and amending the Traffic Management Plan as required
- Managing non-conformances / corrective action and minor incidents,
- Ensure that an applicable Safe Work Method Statement (which may be generic if the activity is performed in the same way and in the same or similar circumstance) is delivered through training to all persons affected on the construction site.

WORKERS SUPPERVISOR

The following list of requirements is not exhaustive for the responsibilities of a Supervisor:

- Ensure compliance with the approved TMP, Traffic Control at Worksite manual & Amendments, Main Roads specification and the contract requirements

- Periodic inspection of traffic control devices on a daily basis prior to commencement of work in conjunction with the Traffic Controller's Supervisor;
- Ensure that all Traffic Controllers are in fact licensed or accredited to perform the duties of a Traffic Controller
- Identify non-conformances and implementation of corrective actions.

TRAFFIC CONTROL SUBCONTRACTOR – ETM Australia

The nominated sub-contractor is responsible but not limited to the following:

- Implementation of the approved Traffic Management Plan in accordance with the Traffic Control at Worksites manual and all other relevant documents,
- Ensuring the conflicting regulatory speed signs are covered during works and at completion of works to reinstate the current regulatory speed for each individual street / road.
- The monitoring and recording of changes in traffic movements
- Advising KANE supervisory staff in the first instance of any non – conformances, accidents, near misses or complaints.
- Providing only duly accredited Traffic Controllers

17.SPECIFIC METHOD OF TRAFFIC CONTROL

SPEED RESTRICTIONS

Speed limit reductions shall be kept to a minimum. 40kph should only be used when personnel are working closer than 1.2 meters to the nearest edge of a traffic lane. These reductions should commence just prior to the work (area) and concluding immediately at the end of the work (area).

CONSTRUCTION UNDER TRAFFIC

Maximum expected movement will be up to 30 light contractor delivery vehicles. All light contractor delivery vehicles will off load or pick up of equipment and leave site, no construction vehicle to remain within on the road network without council approval.

Maximum of twenty heavy rigid vehicles per day without Traffic Controllers on site.
Where the possibility that vehicle movements shall exceed these, KANE shall notify RMS and The Hills Shire council with as much advance warning as possible.

Ingress and egress movements shall always occur in a forward direction with reversing of vehicles only to be undertaken with a minimum of two spotter/traffic controller will be requires at the gates area to maintain pedestrian safety and assist vehicles entering and exiting. One traffic controller on each gate.

Trucks are loaded within site hoardings; trucks are unloaded within site hoardings or under traffic controller's guidance only.

SITE ACCESS

Site Ingress and Egress points are clearly marked on the attached Traffic Control Plan which is active for the current work stage. During non-working hours, all access points to the site will be secured with locked fences.

Vehicles will move in and out of the site at a speed limit of 5km/h and will be maintained at all times whilst within the site. Advanced warning and directional signage will be placed upon the entrance & exit of the construction site. The signage will guide drivers to the construction site.
Site egress will be via the nominated site egress gates.

All vehicles exiting the site are to ensure the following:

- Excessive mud and dirt collected on the wheels and undercarriage way is removed by responsible driver or site labourer.
- Vehicles must not leave the site with flashing lights still in operation.

All active work areas are to be clearly sign posted with no entry, call up signs and access is for authorized personnel only subject to the following call up protocol's signs for all entry points so as to inform personnel the requirements to proceed past that point.

Vehicle movement will be carried out taking into consideration the surrounding building and roads. Mitigation measures will be put in place and a traffic control plan has been developed to ameliorate conditions. No alternate access are to be used without prior approval.

18.ASSESSMENT OF FUTURE IMPACT

ASSESSMENT OF EFFECT ON EXISTING AND FUTURE DEVELOPMENTS IMPLICATIONS

The works shall not cause any ongoing implications once completed and normal traffic flow restored.

ASSESSMENT OF EFFECT OF PROPOSED MEASURES ON TRAFFIC MOVEMENTS

The impact of works on the area shall be small on the local area. The effects of the construction site will be minor, just deliveries entering and exiting the site. Pedestrians are to be managed by traffic controller during the working hours as per the Traffic Management Plans attached.

19. SIGNAGE

All signage identified and implemented in this TMP will be compliant and in accordance with current TCAWS signage requirements. Only undamaged and/or non-defective signage shall be used. Where signage has been damaged, site staff must inform ETM and replacements arranged.

LONG TERM SIGNAGE

This TMP introduces advance warning signage designed to provide motorists the clearest notification of changed traffic conditions.

All temporary signs will be installed to meet the requirements of RMS project specification R143 with regard to clearance and orientation. All diamond warning signs will be 'B' size. All W5-22 (Truck Turning) diamond warning signs will be installed with hinged faces or easy to access for cover up to accommodate hiding the sign face when the compound is not in operation.

For advanced warning signs and due to width restrictions and the amenity of pedestrians T1-31 'Roadwork Ahead' signage will be used in lieu of T1-1 signage. In addition, T2-17 signage will be utilized instead of the traditionally used T2-16 signage.

The approach signage for the work zone shall be prominently placed in a suitable location prior to the work zone.

The following details shall be displayed to be erected on the site:

- The name of the principle Certifying Authority, address, and telephone number.
- The name of the person in charge of the work site, as well as telephone number.
- Stating that unauthorised access of the work site is prohibited.
- The designated waste storage area shall be covered when the site is unattended.
- All sediment and erosion control measures shall be fully maintained until completion.

Signage stating the above details are to be erected:

- At the commencement of the work site.
- Displayed in a prominent position on the work site.
- Displayed in a manner that can be easily read by pedestrian traffic.

SHORT TERM SIGNAGE

Speed limit reductions shall be kept to a minimum. 40kph should only be used when personnel are working closer than 1.2 meters to the nearest edge of a traffic lane. These reductions should commence just prior to the work (area) and concluding immediately at the end of the work (area).

A number of short-term TCP's have been and will be developed and implemented for the preparation and switch works, these TCP's will be reviewed by an ETM Australia representative before implementation.
All signage will be brought to site and implemented as per TCP, once shift has been completed all short-term signage will be removed from site.

Times of lane closures, shoulder closures will be subject to approval in accordance with The Hills Shire Council.

All short-term TCP's will continually be monitored and assessed for the safety of workers and the public.

20.PROJECT SPECIFIC REQUIREMENTS

IMPLEMENTATION OF CONTROLS

Traffic control devices and their use shall conform to the requirements of the TCAWS and such other additional Standards as may be issued by Transport and Main Roads. All traffic control devices shall be securely fixed in the correct position and maintained in an effective and clean condition suitable for day and night operations whilst employed on the work under the Contract. Devices which are damaged or worn, or which do not conform to the above requirements, shall not be used.

The Supervisor, Foreman and / or senior Traffic Controller on the construction site shall ensure that all applicable controls and safety devices are implemented prior to the commencement of works on a daily basis.

The Traffic Management Plan shall be monitored continually throughout the construction period and reviewed by the Project Manager and nominated traffic control sub-contractor. Amendments to the Traffic Management Plan shall be made within the timeframe specified under the contract.

Daily inspections of devices shall be carried out by the traffic control sub-contractor to ensure all traffic control devices are maintained and comply with the Traffic Control at Worksites Manual, Main Roads Specifications, relevant Australian Standards and contract requirements.

Details of traffic lane configurations, traffic delays, periods of no lane closures, detours, and the use of side tracks applicable to this contract are detailed in the Project Specific requirements of this Plan.

Work shall be programmed to minimize the effect on the road users. Specific requirements for individual premises will be planned on a day to day basis during a planning meeting at the end of the preceding day.

RESTRICTIONS TO TRAFFIC LANES

Single lane reversible flow – Where single lane reversible flow (to serve both directions) is allowed, the Contractor shall maintain traffic flow under the control of traffic controllers or portable traffic signals in such a way that no road user is unduly delayed. In all cases, the length of one-lane, two-way operation shall be limited to one kilometer.

Stopping traffic in both directions – The Contractor may stop traffic in both directions simultaneously only for purposes of construction of specific work and during the specific period (Reversing large vehicles onto Site). And for a period no longer than is deemed necessary

Specific periods where lane closures are not permitted – Work not under the Contract involving lane closures, stop/slow arrangements or construction traffic entering or leaving any through traffic lanes

shall not be carried out during any periods and unless otherwise stated, such restrictions shall apply 24 hours per day.

Days during which lanes shall not be closed and work involving stop / slow arrangements shall not be carried out as below unless specific approval is granted by the Superintendent prior to commencement of the works.

- All Public Holidays, plus the preceding and succeeding days to the public holidays
- Other Public events not mentioned could also be deemed a special case for stopping the closure of lanes
- All queue management strategies must be compliant as per current TCAWS guidelines.

ROAD CLOSURES & DETOURING TRAFFIC

No Detours unless written approval from the local authority has been sighted.

VISIBILITY & LIGHT

When working in poorly lit situations or when sign visibility is affected, this TMP will ensure that all controls and details are compliant with current TCAWS standards.

SIDE TRACKS

Not applicable to this project

ACCESS TO PRIVATE PROPERTY

Existing accesses to private properties affected by the work shall be maintained in useable condition during the construction, or alternative access arrangements acceptable to the property owners/tenants shall be made. The Contractor shall permit and provide for the free movement of traffic in and out of the properties at all times except as otherwise agreed to by the property owners/tenants. The Contractor shall, at no expense to the principal, make good any damage to accesses to private properties which results from the Contractor's operations during the construction of the work under the Contract.

PREVENTION OF COLLISION

Additional traffic controllers, or other end of queue risk control measures deemed to be adequate for the site circumstances, shall be used in high-speed situations or where sight-distance is restricted, to prevent rear end collisions where vehicles are stopped or slowed by the work under the Contract. Additional traffic controllers shall also be used in other situations where described in AS 1742.3. Additional guidance is provided in TCAWS regarding supplementary devices at roadworks to reduce speed.

DIRECTION AND STREET SIGNAGE

Where access to streets and side roads has been altered during the construction of the Works, the Contractor shall supply and erect all such temporary signs necessary to assist the travelling public to find their way to such streets and roads.

TEMPORARY ROAD SAFETY BARRIERS

Temporary Road Safety Barriers shall be used to contain and redirect errant vehicles to reduce the likelihood of them entering the work site. They may also be used to separate opposing traffic. Where Temporary Road Safety Barriers are shown on the Traffic Control Plan, the type and location of barriers shall be as shown on the Traffic Control Plan. Opposing flows of traffic may be separated with Temporary Road Safety Barriers with sufficient offset provided to reduce the likelihood that Temporary Road Safety Barriers deflect into opposing traffic flow in the event of impact.

When Temporary Road Safety Barriers are used to protect the works site, the requirements to maintain a clearance zone behind the Temporary Road Safety Barriers as specified in the TCAWS shall apply. The maximum dynamic deflection is specified by the manufacturer. Provision shall be made to treat the approach and/or departure ends of both permanent and Temporary Road Safety

Barriers that are exposed to on-coming traffic, including barriers that are flared to terminate outside the clear zone.

ANTI-GAWKING SCREENS

Anti-gawking screens are used to minimize visibility of the construction activities to the travelling public. When the requirement for anti-gawking screens is identified, they shall be installed where activities are being undertaken within 3.5 meters of the lane edge and such activities are likely to cause traffic delays or may be a visual distraction to drivers.

MATERIAL LEFT ON SITE

Where materials are stored on site overnight within nine (9) meters of the edge of any traffic lane, the said plant must be delineated with warning lights unless located behind a safety barrier.

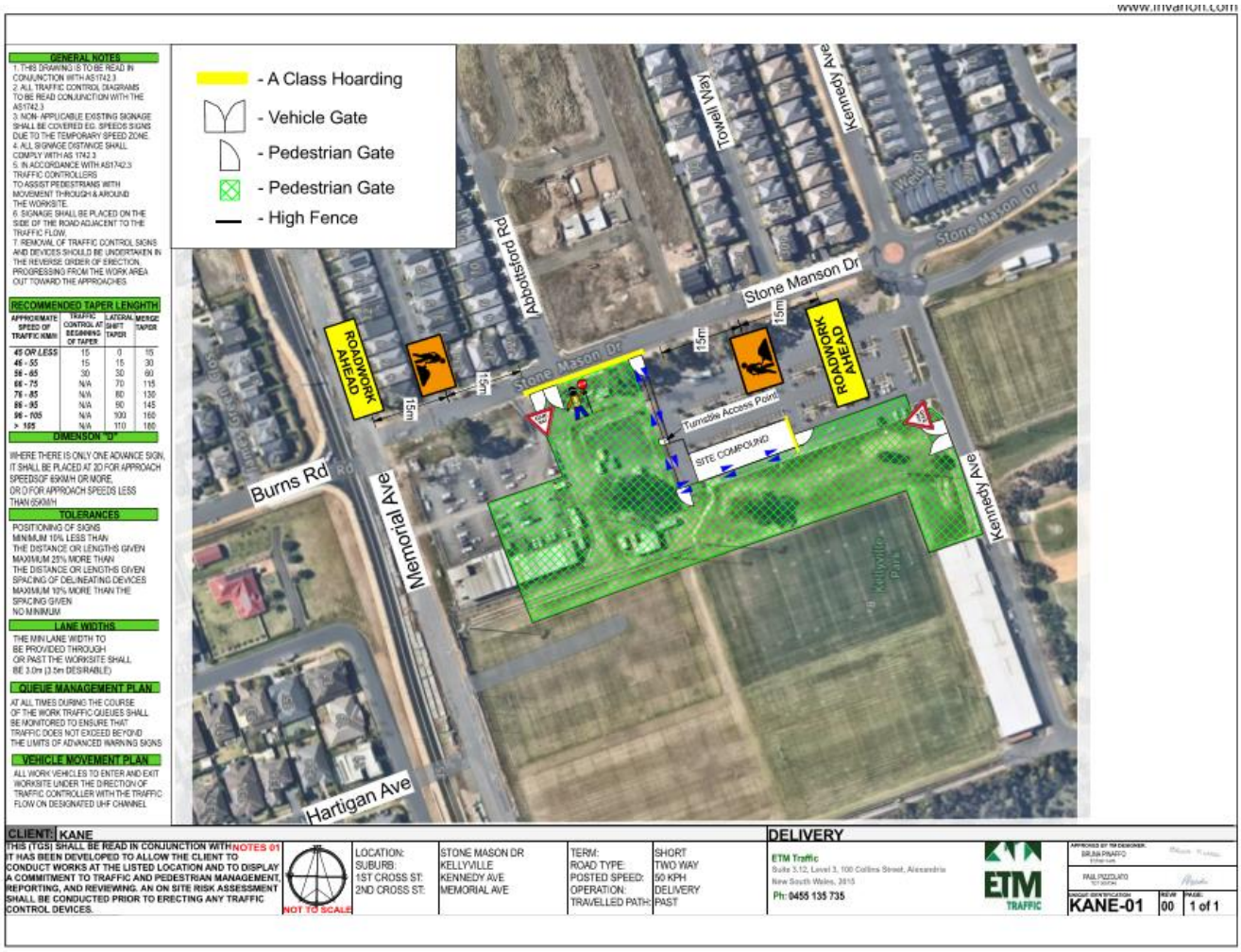
DUST AND SEDIMENT CONTROL

Prior to work commencing on site sediment and erosion control measures shall be installed along the contoured edges immediately down slope of any future disturbed areas. The controls shall be maintained in an operational condition until the development activities have been completed.

MISCELLANEOUS

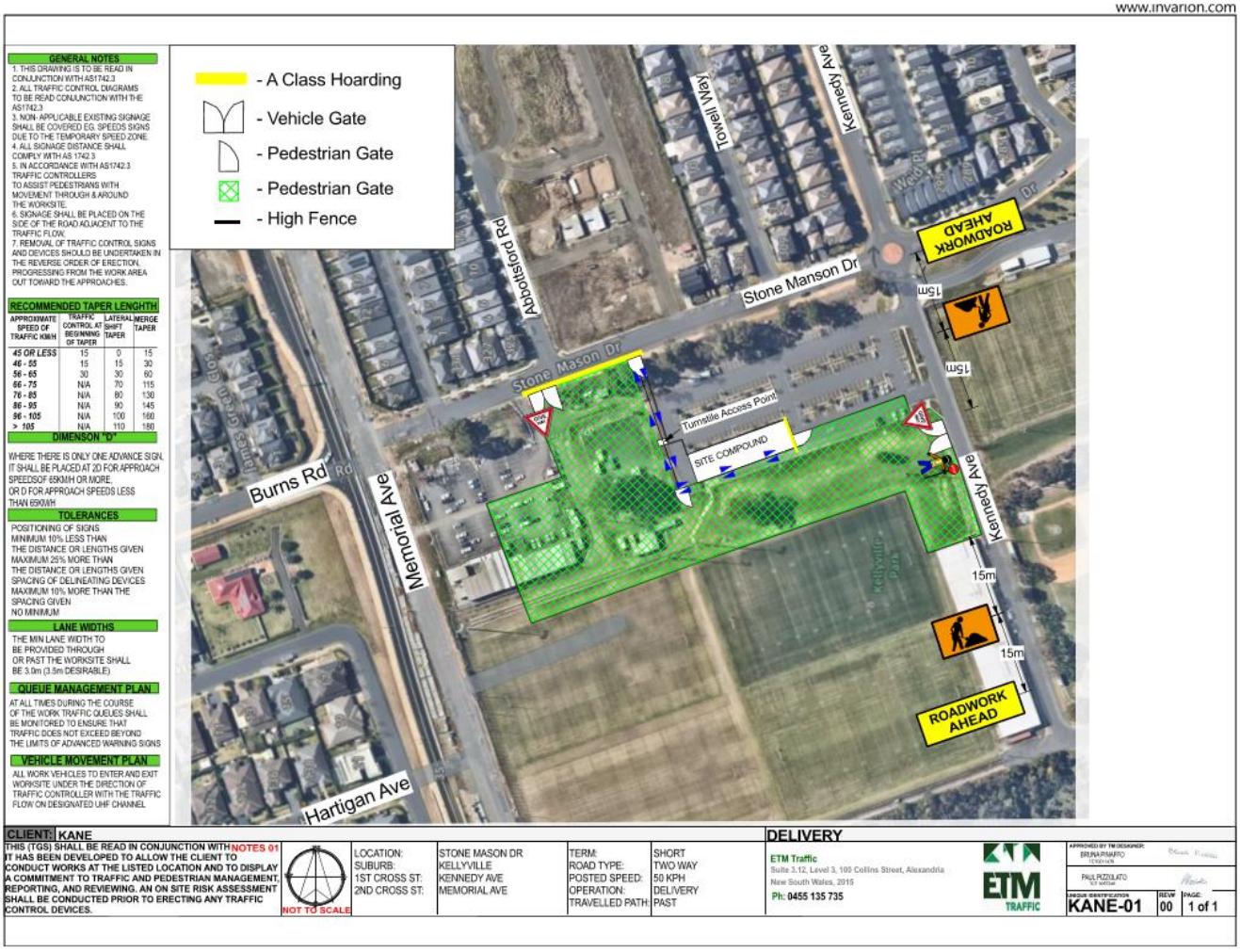
1. Removed or damaged parking signs shall be replaced immediately.
2. Damaged trees shall be repaired / replaced to the satisfaction of Council.
3. Traffic and pedestrian control shall be in accordance with the TfNSW Traffic Control at Work Sites Technical Manual and Australian Standard AS1742.3 – Manual of uniform traffic control devices - Part 3 Traffic control for works on roads.
4. Reserving of on-street parking shall not occur without prior Council approval. All on street parking spaces outside the site are to remain available for the use by the general public during the approved work hours unless Council signage is installed to the contrary.
5. Barricades, delineators (including bollards, cones, barrier boards etc.) shall not be placed in the kerbside parking lane outside or adjacent to the site to reserve on street parking spaces without the prior approval of Council.
6. A separate application to and approval from Council is required for occupation of any road related area (traffic and parking lanes, verge, footpath etc.) even if it is included in the approved CPTMP. Fees may apply.

21. APPENDIX – TRAFFIC GUIDANCE SCHEMES – DAILY SET UP -GATE CONTROL - STONE MANSON DRIVE

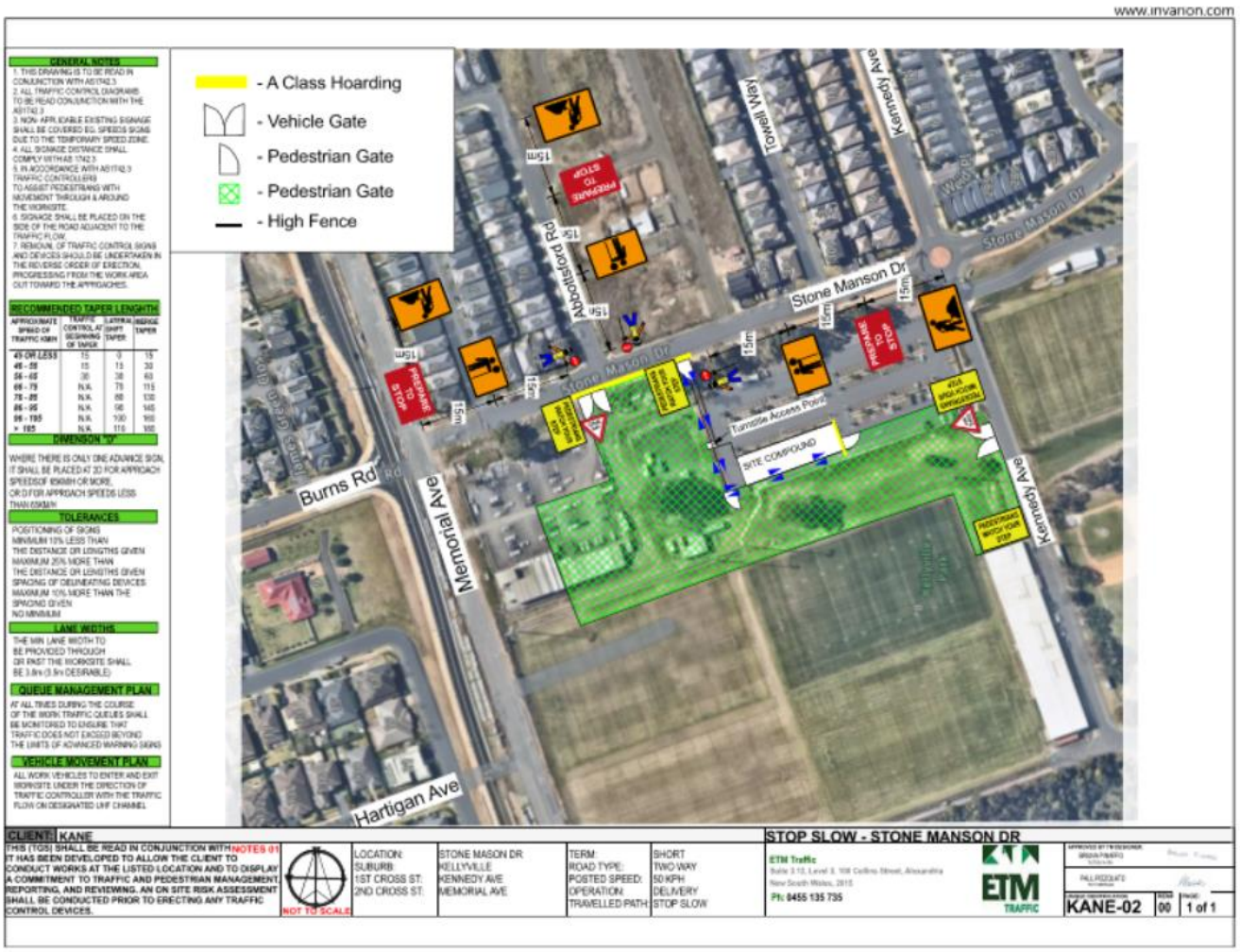


WHEN NEED SET UP -GATE CONTROL – KENNEDY AVE

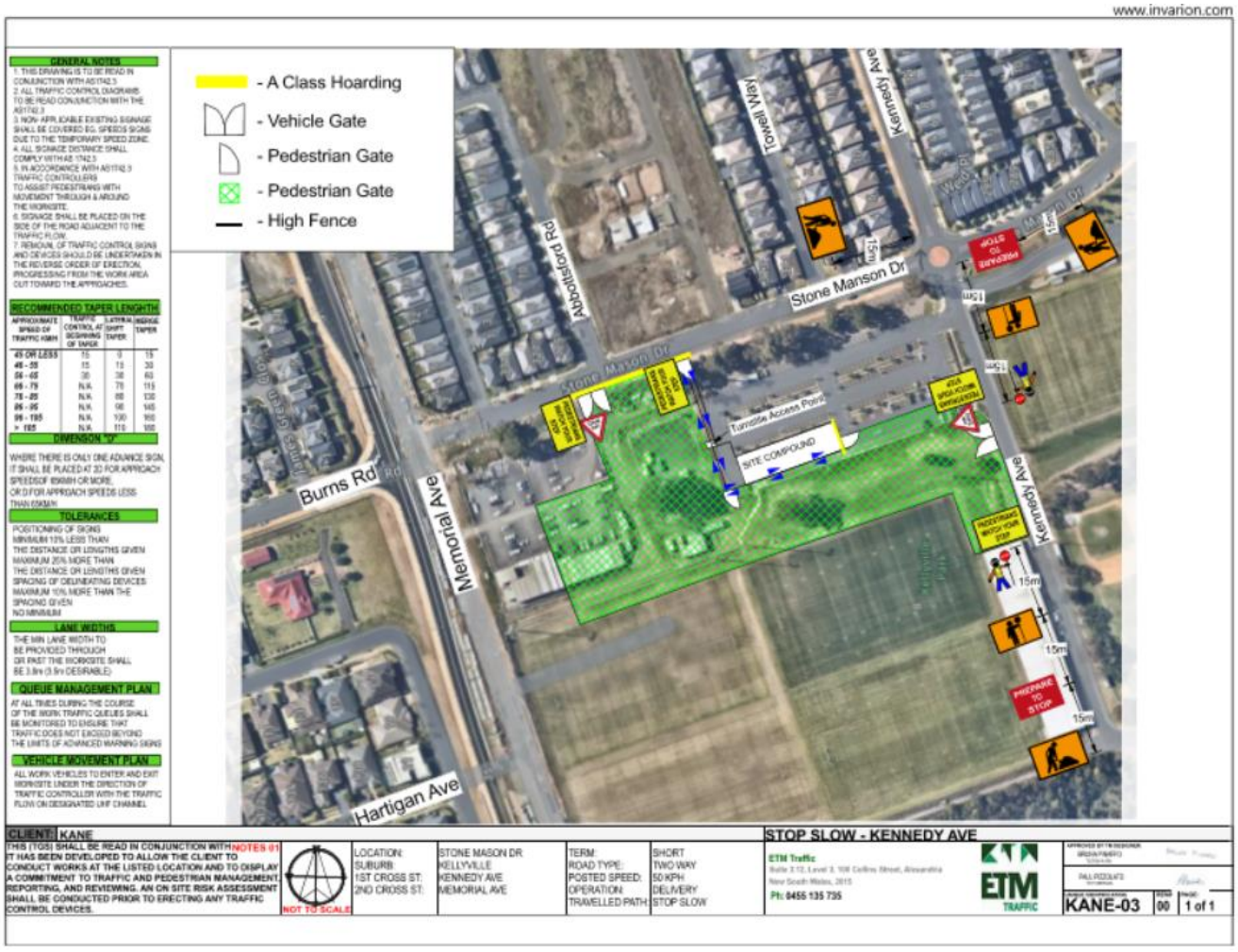
www.invarion.com



22.APPENDIX – TRAFFIC GUIDANCE SCHEMES – STOP SLOW – STONE MANSON DR



23.APPENDIX – TRAFFIC GUIDANCE SCHEMES – STOP SLOW – KENNEDY AVE



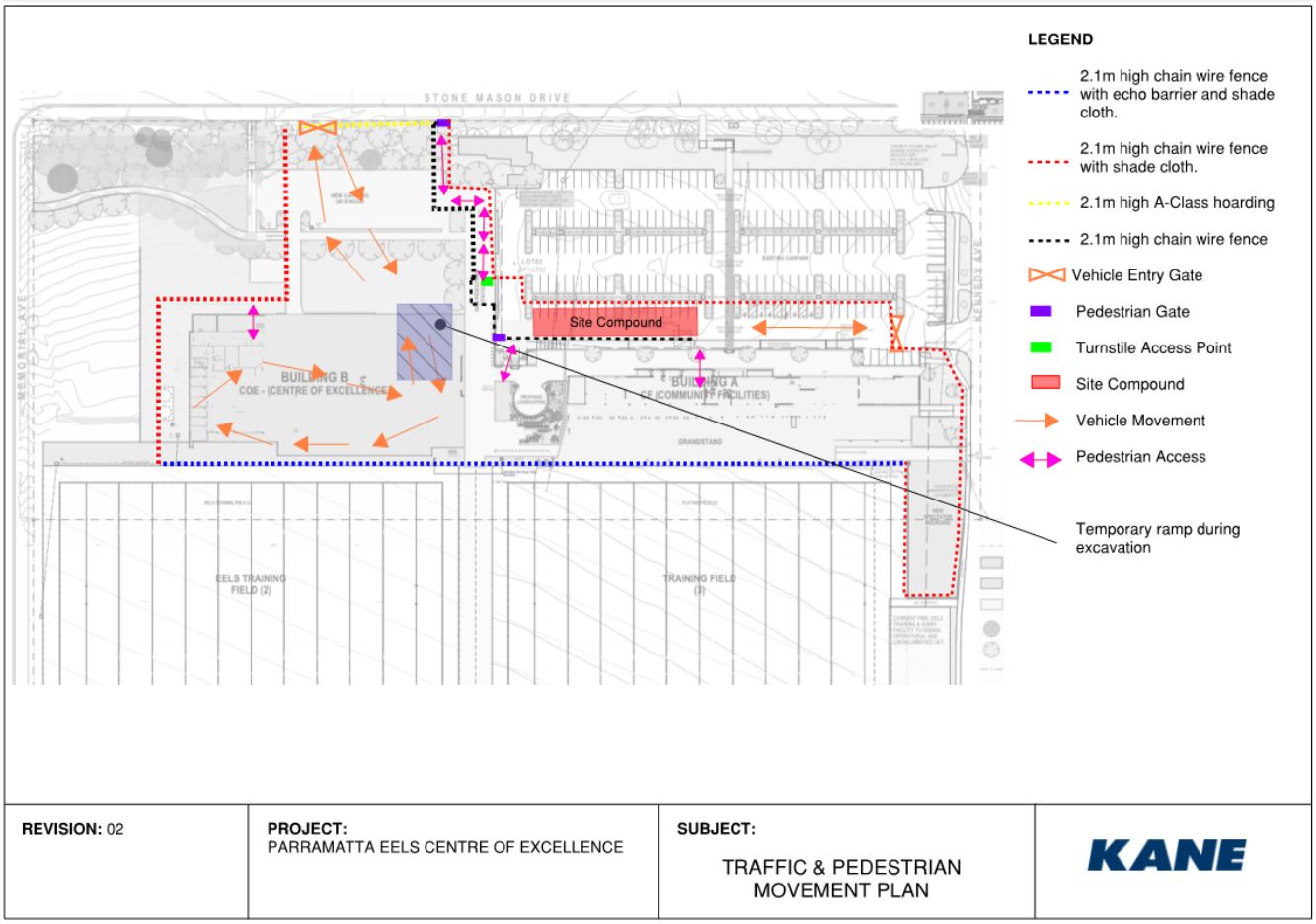
24.APPENDIX – SITE ESTABLISHMENT PLAN

LEGEND

- 2.1m high chain wire fence with echo barrier and shade cloth.
- 2.1m high chain wire fence with shade cloth.
- 2.1m high A-Class hoarding
- 2.1m high chain wire fence
- Vehicle Entry Gate
- Pedestrian Gate
- Turnstile Access Point
- Site Compound
- Contractor Parking
- Alternative Telco access
- Maintain footpath access
- Access to telecommunications compound and tower to be maintained at all times
- Maintain 5m wide 'run off' zone between playing fields and site boundary
- Coordinate location of fencing with TfNSW / Daracon project compound. Sheds to be relocated prior to site establishment

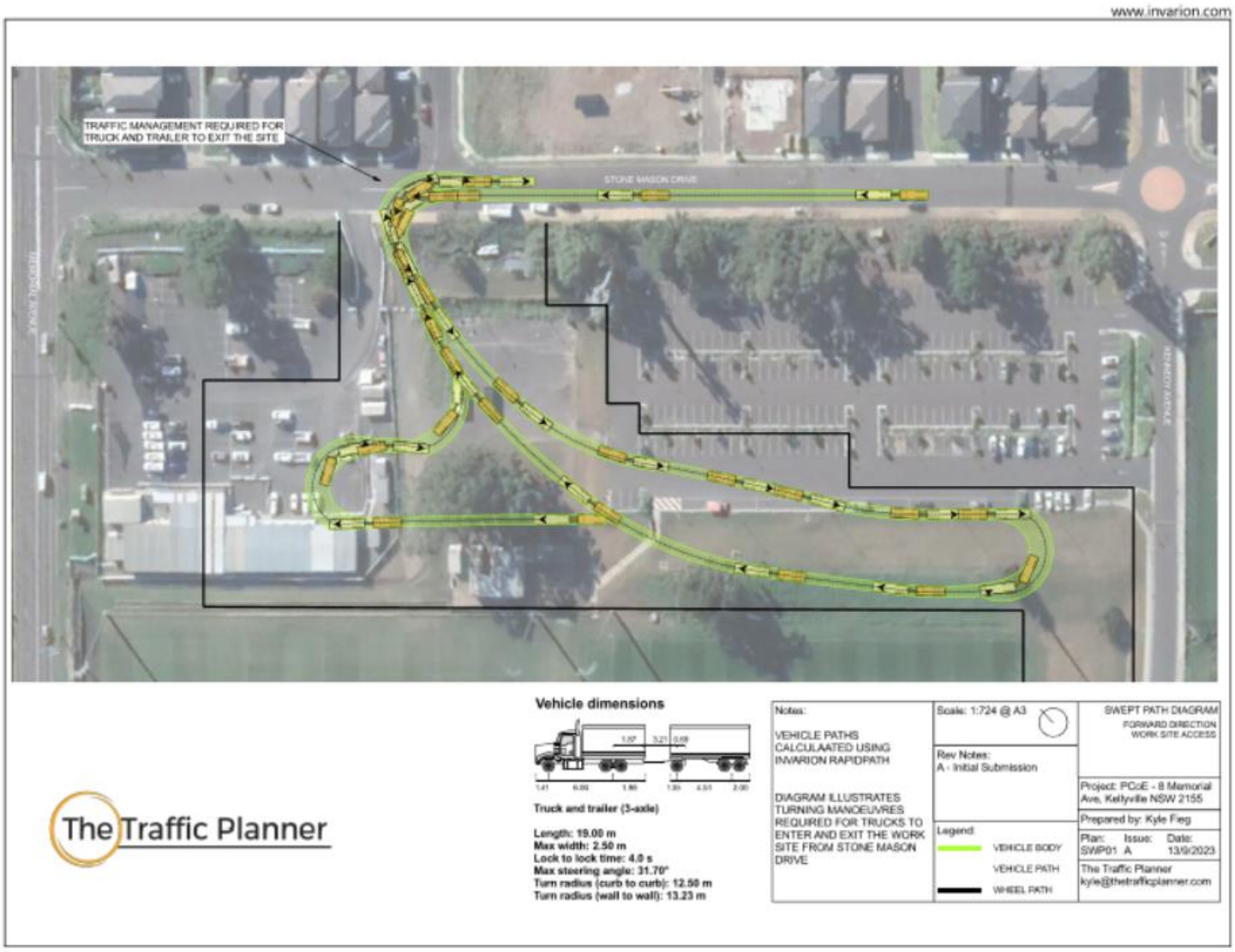
REVISION: 03	PROJECT: PARRAMATTA EELS CENTRE OF EXCELLENCE	SUBJECT: SITE ESTABLISHMENT PLAN	KANE

25.APPENDIX – EXISTING BUILDING AND SITE



26.APPENDIX – VEHICLE ROUTES

27.APPENDIX – SWEPT PATH



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ETM TRAFFIC PTY LTD
A: Suite 3.12, 100 Collins Street
Alexandria NSW 2015
P: 0455 135 735
W: www.etmtraffic.com.au
ABN: 51 604 518 390

APPENDIX B - TRAFFIC CONTROL PLAN – SITE COMPOUND DELIVERY

APPENDIX B

GENERAL NOTES

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6. SIGNAGE SHALL BE PLACED ON THE SIDE OF THE ROAD ADJACENT TO THE TRAFFIC FLOW,
7. REMOVAL OF TRAFFIC CONTROL SIGNS AND DEVICES SHOULD BE UNDERTAKEN IN THE REVERSE ORDER OF ERECTION, PROGRESSING FROM THE WORK AREA OUT TOWARD THE APPROACHES.

RECOMMENDED TAPER LENGHTH

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46 - 55	15	15	30
56 - 65	30	30	60
66 - 75	N/A	70	115
76 - 85	N/A	80	130
86 - 95	N/A	90	145
96 - 105	N/A	100	160
> 105	N/A	110	180

DIMENSON "D"

WHERE THERE IS ONLY ONE ADVANCE SIGN, IT SHALL BE PLACED AT 2D FOR APPROACH SPEEDSOF 65KM/H OR MORE, OR D FOR APPROACH SPEEDS LESS THAN 65KM/H

TOLERANCES

POSITIONING OF SIGNS
MINIMUM 10% LESS THAN
THE DISTANCE OR LENGTHS GIVEN
MAXIMUM 25% MORE THAN
THE DISTANCE OR LENGTHS GIVEN
SPACING OF DELINEATING DEVICES
MAXIMUM 10% MORE THAN THE SPACING GIVEN
NO MINIMUM

LANE WIDTHS

THE MIN LANE WIDTH TO BE PROVIDED THROUGH OR PAST THE WORKSITE SHALL BE 3.0m (3.5m DESIRABLE)

QUEUE MANAGEMENT PLAN

AT ALL TIMES DURING THE COURSE OF THE WORK TRAFFIC QUEUES SHALL BE MONITORED TO ENSURE THAT TRAFFIC DOES NOT EXCEED BEYOND THE LIMITS OF ADVANCED WARNING SIGNS

VEHICLE MOVEMENT PLAN

ALL WORK VEHICLES TO ENTER AND EXIT WORKSITE UNDER THE DIRECTION OF TRAFFIC CONTROLLER WITH THE TRAFFIC FLOW ON DESIGNATED UHF CHANNEL

CLIENT: KANE

THIS (TGS) SHALL BE READ IN CONJUNCTION WITH NOTES 01 IT HAS BEEN DEVELOPED TO ALLOW THE CLIENT TO CONDUCT WORKS AT THE LISTED LOCATION AND TO DISPLAY A COMMITMENT TO TRAFFIC AND PEDESTRIAN MANAGEMENT, REPORTING, AND REVIEWING. AN ON SITE RISK ASSESSMENT SHALL BE CONDUCTED PRIOR TO ERECTING ANY TRAFFIC CONTROL DEVICES.

NOT TO SCALE

LOCATION:	STONE MASON DR	TERM:	SHORT
SUBURB:	KELLYVILLE	ROAD TYPE:	TWO WAY
1ST CROSS ST:	KENNEDY AVE	POSTED SPEED:	50 KPH
2ND CROSS ST:	MEMORIAL AVE	OPERATION:	DELIVERY
		TRAVELLED PATH:	STOP SLOW

STOP SLOW - KENNEDY AVE

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BRUNA PINAFFO
TCT0011476

PAUL PIZZOLATO
TCT 0057346

UNIQUE IDENTIFICATION: KANE-03 | REV#: 00 | PAGE: 1 of 1

APPENDIX C - TRAFFIC CONTROL PLAN – GENERAL CONSTRUCTION TRAFFIC (STONE MASON DRIVE)

APPENDIX C

GENERAL NOTES

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46 - 55	15	15	30
56 - 65	30	30	60
66 - 75	N/A	70	115
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86 - 95	N/A	90	145
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NO MINIMUM

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VEHICLE MOVEMENT PLAN

ALL WORK VEHICLES TO ENTER AND EXIT WORKSITE UNDER THE DIRECTION OF TRAFFIC CONTROLLER WITH THE TRAFFIC FLOW ON DESIGNATED UHF CHANNEL

CLIENT: KANE

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NOT TO SCALE

LOCATION:	STONE MASON DR	TERM:	SHORT
SUBURB:	KELLYVILLE	ROAD TYPE:	TWO WAY
1ST CROSS ST:	KENNEDY AVE	POSTED SPEED:	50 KPH
2ND CROSS ST:	MEMORIAL AVE	OPERATION:	DELIVERY
		TRAVELLED PATH:	PAST

DELIVERY

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PAUL PIZZOLATO
TCT 0057346

UNIQUE IDENTIFICATION	REV#	PAGE:
KANE-01	02	1 of 1

APPENDIX D - TRAFFIC CONTROL PLAN – ALTERNATIVE ENTRANCE GENERAL CONSTRUCTION TRAFFIC (KENNEDY AVENUE)

APPENDIX D

GENERAL NOTES

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VEHICLE MOVEMENT PLAN

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NOT TO SCALE

LOCATION:	STONE MASON DR	TERM:	SHORT
SUBURB:	KELLYVILLE	ROAD TYPE:	TWO WAY
1ST CROSS ST:	KENNEDY AVE	POSTED SPEED:	50 KPH
2ND CROSS ST:	MEMORIAL AVE	OPERATION:	DELIVERY
		TRAVELLED PATH:	PAST

DELIVERY

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PAUL PIZZOLATO
TCT 0057346

UNIQUE IDENTIFICATION	REV#	PAGE:
KANE-01	00	1 of 1

APPENDIX E - TRAFFIC CONTROL PLAN – REVERSING IN/OUT OF SITE

APPENDIX E

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VEHICLE MOVEMENT PLAN

ALL WORK VEHICLES TO ENTER AND EXIT WORKSITE UNDER THE DIRECTION OF TRAFFIC CONTROLLER WITH THE TRAFFIC FLOW ON DESIGNATED UHF CHANNEL

- A Class Hoarding
- Vehicle Gate
- Pedestrian Gate
- Pedestrian Gate
- High Fence

CLIENT: KANE

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SUBURB:	KELLYVILLE	ROAD TYPE:	TWO WAY
1ST CROSS ST:	KENNEDY AVE	POSTED SPEED:	50 KPH
2ND CROSS ST:	MEMORIAL AVE	OPERATION:	DELIVERY
		TRAVELLED PATH:	STOP SLOW

STOP SLOW - KENNEDY AVE

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CLIENT: KANE

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		TRAVELLED PATH:	STOP SLOW

STOP SLOW - STONE MANSON DR

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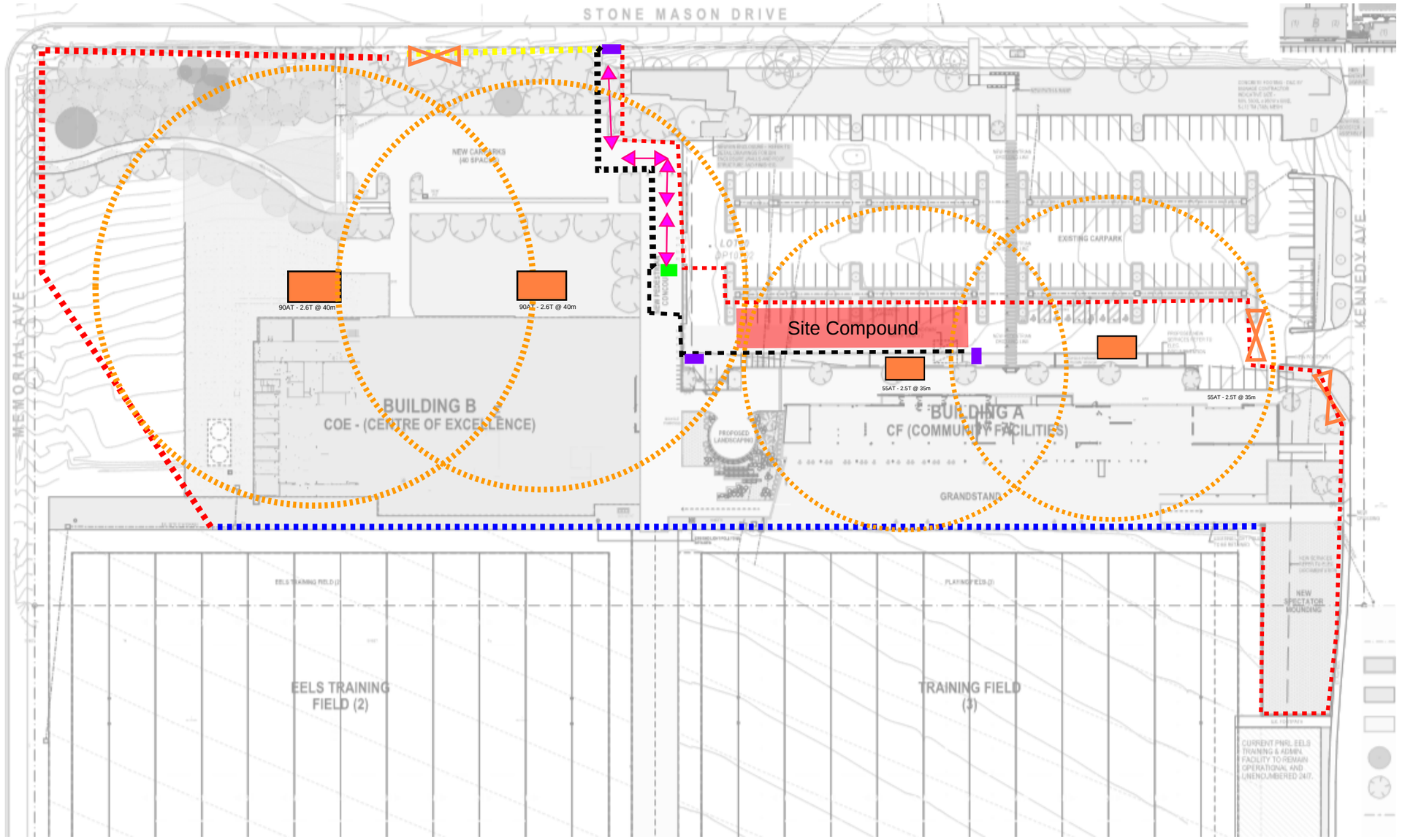
UNIQUE IDENTIFICATION	REV#	PAGE:
KANE-02	01	1 of 1

APPENDIX F - TRAFFIC CONTROL PLAN – CRANAGE/LIFT PLAN

APPENDIX F



LEGEND

- 2.1m high chain wire fence with echo barrier and shade cloth.
- 2.1m high chain wire fence with shade cloth.
- 2.1m high A-Class hoarding
- 2.1m high chain wire fence
- Vehicle Entry Gate
- Pedestrian Gate
- Turnstile Access Point
- Site Compound
- Mobile Crane Set up Locations

REVISION: 01	**PROJECT:** PARRAMATTA EELS CENTRE OF EXCELLENCE	**SUBJECT:** MOBILE CRANE SET UP LOCATION	KANE

APPENDIX B - CONSTRUCTION NOISE & VIBRATION MANAGEMENT PLAN

APPENDIX B

Resonate

Parramatta Eels National Rugby League Club: Centre of Excellence & Community Facilities CNVMP

Construction Noise and Vibration Management Plan

S230621RP1 Revision A

Monday, 11 September 2023

Resonate

Document Information

Project	Parramatta Eels National Rugby League Club: Centre of Excellence & Community Facilities
Client	Kane Constructions
Report title	Construction Noise and Vibration Management Plan
Project Number	S230621

Revision Table

Report revision	Date	Description	Author	Reviewer
0	08 September 2023	Draft for review	Andrew Parker	Cameron Heggie
A	11 September 2023	Final – first issue	Andrew Parker	Raymond Sim

Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Daytime	Between 7 am and 6 pm as defined in the NPI.
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of that sound level.
dB(A)	'A' Weighted sound level in dB.
Evening	Between 6 pm and 10 pm as defined in the NPI.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second. The human ear responds to sound in the frequency range of 20 to 20,000 Hz.
NPI	New South Wales *Noise Policy for Industry*, 2017.
Intrusive Noise	Noise emission that when assessed at a noise-sensitive receiver (principally a residential premises' boundary) is greater than 5 dB(A) above the background noise level.
L_{10}	Noise level exceeded for 10% of the measurement time. The L_{10} level is commonly referred to as the average maximum noise level.
L_{90}	Noise level exceeded for 90% of the measurement time. The L_{90} level is commonly referred to as the background noise level.
L_{eq}	Equivalent Noise Level—Energy averaged noise level over the measurement time.
L_{max}	Maximum measured sound pressure level in the time period.
mm/s	Millimetres per second—units of vibration velocity.
Night-time	Between 10 pm on one day and 7 am on the following day as defined in the NPI.
Rating Background Level (RBL)	Overall single-figure A-weighted background level representing an assessment period (Day/Evening/Night). For the short-term method, the RBL is simply the measured $L_{A90,15min}$ noise level. For the long-term method, it is the median value of all measured background levels during the relevant assessment period.

Resonate

Table of Contents

1 Introduction

Resonate Consultants has been commissioned by Kane Constructions to provide an acoustic assessment and Construction Noise and Vibration Management Plan (CNVMP) for the development of the Parramatta Eels Centre of Excellence, which includes the construction of a high-performance community facility, including a grandstand with approximately 1500 seats.

The construction consists of 7 stages:

- Site establishment and enabling works
- Demolition
- Retaining piles and excavation
- Substructure construction
- Frame construction
- Facade works
- Internal works and fitout.

1.1 Objectives

The CNVMP has been prepared to *ensure noise generating activities are appropriately managed and nearby sensitive receivers protected.* The Development Application (DA) conditions, reference DA173/18, issued by The Hills Shire Council for the Project, specifically Condition C12, are presented below in Table 1.

Table 1 Development Application conditions

Reference	Condition	Addressed in this report
C12	Prior to the commencement of any earthwork or construction, the Applicant must submit to the satisfaction of the Certifier a Construction Noise and Vibration Management Plan (CNVMP) for the development	Context
C12 (a)	identification of the specific activities that will be carried out and associated noise sources at the site.	Section 5.1.1
C12 (b)	identification of all potentially affected sensitive residential receiver locations	Section 2.2
C12 (c)	quantification of the rating background noise level (RBL) for sensitive receivers, as part of the Plan, or as undertaken in the EIS.	Section 4.1.3
C12 (d)	the construction noise, ground-borne noise and vibration objectives derived from an application of the EPA Interim Construction Noise Guideline (ICNG), as reflected in conditions of approval.	Section 5.1
C12 (e)	prediction and assessment of potential noise, ground-borne noise (as relevant) and vibration levels from the proposed construction methods expected at sensitive receiver premises against the objectives identified in the ICNG and conditions of approval.	Section 5.1.1
C12 (f)	where objectives are predicted to be exceeded, an analysis of feasible and reasonable noise mitigation measures that can be implemented to reduce construction noise and vibration impacts.	Section 6

Reference	Condition	Addressed in this report
C12 (g)	description of management methods and procedures, and specific noise mitigation treatments/measures that can be implemented to control noise and vibration during construction.	Section 6
C12 (h)	where objectives cannot be met, additional measures including, but not necessarily limited to, the following must be considered and implemented where practicable; reduce hours of construction, the provision of respite from noise/vibration intensive activities, acoustic barriers/enclosures, alternative excavation methods or other negotiated outcomes with the affected community.	Section 7.3
C12 (i)	where night-time noise management levels cannot be satisfied, a report must be submitted to the Planning Secretary outlining the mitigation measures applied, the noise levels achieved and justification that the outcome is consistent with best practice.	Section 7.1
C12 (j)	measures to identify non-conformances with the requirements of the Plan, and procedures to implement corrective and preventative action.	Section 7.3
C12 (k)	suitable contractual arrangements to ensure that all site personnel, including sub-contractors, are required to adhere to the noise management provisions in the Plan.	Section 7.3
C12 (l)	procedures for notifying residents of construction activities that are likely to affect their noise and vibration amenity.	Section 5.3.2
C12 (m)	measures to monitor noise performance and respond to complaints.	Section 6.2
C12 (n)	measures to reduce noise related impacts associated with offsite vehicle movements on nearby access and egress routes from the site.	Section 5.3.4
C12 (o)	procedures to allow for regular professional acoustic input to construction activities and planning.	Section 7.3
C12 (p)	effective site induction, and ongoing training and awareness measures for personnel (e.g., toolbox talks, meetings etc).	Section 7.3
C12 (q)	be consistent with and incorporate all relevant recommendations and mitigation measures detailed in the Noise and Vibration Assessment, prepared by Resonate, dated 19 March 2022.	Section 6
D3 (a)	Construction, including the delivery of materials or machinery to and from the site, may only be carried out between the following hours of 7am and 6pm, Mondays to Fridays.	Section 4.1.1
D3 (b)	Construction, including the delivery of materials or machinery to and from the site, may only be carried out between the following hours of 8 am and 1 pm, Saturdays.	Section 4.1.1
D4	No work may be carried out on Sundays or public holidays.	Section 4.1.1
D5 (a)	Activities may be undertaken outside of these hours if required by the Police or a public authority for the delivery of vehicles, plant or materials.	Section 5.3.3
D5 (b)	Activities may be undertaken outside of these hours if required in an emergency to avoid the loss of life, damage to property or to prevent environmental harm.	Section 5.3.3

Reference	Condition	Addressed in this report
D6	Notification of activities undertaken in the circumstances in Condition D5 must be given to affected residents before undertaking the activities or as soon as is practical afterwards.	Section 4.1.3
D7 (a)	Rock breaking, rock hammering, sheet piling, pile driving, and similar activities may only be carried out between the following hours of 9 am to 12 pm, Monday to Friday.	Section 5.3.3
D7 (b)	Rock breaking, rock hammering, sheet piling, pile driving, and similar activities may only be carried out between the following hours of 2 pm to 5 pm Monday to Friday.	Section 5.3.3
D7 (c)	Rock breaking, rock hammering, sheet piling, pile driving, and similar activities may only be carried out between the following hours of 9 am to 12 pm, Saturday.	Section 5.3.3
D15	The development must be constructed to achieve the construction noise management levels detailed in the Interim Construction Noise Guideline (DECC, 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 management and mitigation measures identified in the CNVMP (Condition C12).	Section 0
D16	The Applicant must ensure construction vehicles (including concrete agitator trucks) do not arrive at the subject site or surrounding residential precincts outside of the construction hours of work outlined under this consent.	Section 5.3.4
D17	The Applicant must implement, where practicable and without compromising the safety of construction staff or members of the public, audible movement alarms of a type that would minimise noise impacts on surrounding noise sensitive receivers.	Section 5.3.5
D18	The Applicant must ensure that any work generating high noise impact (i.e. work exceeding a NML of LAeq 75 dBA) as measured at any sensitive receiver is only 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 1 hour respite between ceasing and recommencing any of the work the subject of this condition.	Section 0
D19	Any noise generated during construction of the development must not be offensive noise within the meaning of the Protection of the Environment Operations Act 1997 or exceed approved noise limits for the site.	Section 4.1
D20	Vibration caused by construction at any residence or structure outside the site must be limited.	Section 4.2
D20 (a)	for structural damage, the latest version of DIN 4150-3 (1992-02) Structural vibration - Effects of vibration on structures (German Institute for Standardisation, 1999).	Section 4.2

Reference	Condition	Addressed in this report
D20 (b)	for human exposure to vibration, the evaluation criteria set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) (as may be updated or replaced from time to time).	Section 4.2.2
D21	Vibratory compactors must not be used within 30 metres of residential or heritage buildings unless vibration monitoring confirms compliance with the vibration criteria specified above. These limits apply unless otherwise outlined in the project specific CNVMP required by this consent.	Section 4.2.1

The key objective of the CNVMP is to ensure that project impacts on noise and vibration sensitive receivers are minimised and within the scope permitted by the planning approval. This includes a target to minimise complaints from the community and stakeholders relating to noise and vibration.

To achieve this objective, Kane Construction will undertake the following:

- Ensure appropriate controls and procedures are implemented during construction activities to avoid or minimise noise and vibration impacts and potential adverse impacts to neighbouring sensitive receivers.
- Ensure appropriate measures are implemented to address Condition C12 and other guidance for construction noise and vibration management relevant to building works in NSW.

2 Project and Site Description

2.1 Project Description

The proposed development will provide state of the art facilities which enable physical recreation opportunities in conjunction with improved facilities for staff, players and existing users of the site. The proposed development will be integrated with the existing recreational landscape of the site and complement the upgrades to the existing playing fields being undertaken by Council. The proposed development is defined as a Recreation facility (major), and includes the following components:

- Construction of high-performance Centre of Excellence in the north-east of the site adjacent to Training Field 2:
  - Elite level gymnasium.
  - Medical and rehabilitation facilities.
  - Aquatic recovery and rehabilitation pools.
  - Lecture theatre and meeting rooms.
  - Player education and study areas.
  - Administration offices for the Parramatta Eels.
  - New female facilities including a dedicated female change room, cubicle toilets and showers.
  - Balcony and terrace area.
  - End of Trip Facilities and bicycle parking.
  - Refuse Area.
- Construction of a Community Facility, including a grandstand with approximately 1,500 seats in the centre of the site adjacent to the Main Playing Field 3:
  - Unisex changerooms and amenities.
  - Referee changeroom and amenities.
  - First Aid/Medical room.
  - Community gymnasium.
  - Café/kiosk.
  - Concourse terrace.
  - Multipurpose community function room with kitchen and amenities.
  - Refuse Area.
  - Bicycle parking.
- Solar arrays will be included on the roof of both the Centre of Excellence and Community Facility.
- Additional 40 car parking spaces for the proposed facility to operate in conjunction with existing at grade car parking already constructed by Council.
- Additional landscaping throughout the development footprint.
- Removal of a small number of trees internal to the site, however noting perimeter trees will be retained where not affected by the proposed building footprints.
- Hours of operation for the Centre of Excellence and Community Facility are 5:00am to 12:00am, however the following key times are likely:
  - Centre of Excellence: 7.00am - 7.00pm
  - Community Facility: 7.00am - 10.00pm

The site is bounded by Memorial Avenue to the north and Stone Mason Drive to the east. Playing fields are located to the west of the buildings and council reserves are to the south. Figure 1 shows the proposed site location.

Several noise and vibration sensitive land uses are located in the immediate vicinity of the site as shown in Figure 1, including residential receivers located on Gormon Avenue, Stone Mason Drive and McKellar Court.

2.2 Location

The site is located at Kellyville Memorial Park, 8 Memorial Avenue, Kellyville. It is bound by Memorial Avenue to the North and Stone Mason Drive to the East. The site is primarily surrounded by residential receivers, with other receivers including medical, commercial buildings, and a childcare centre. The most affected Noise Sensitive Receivers (NSR) are summarised alongside a description of the land use, as shown in Figure 1.

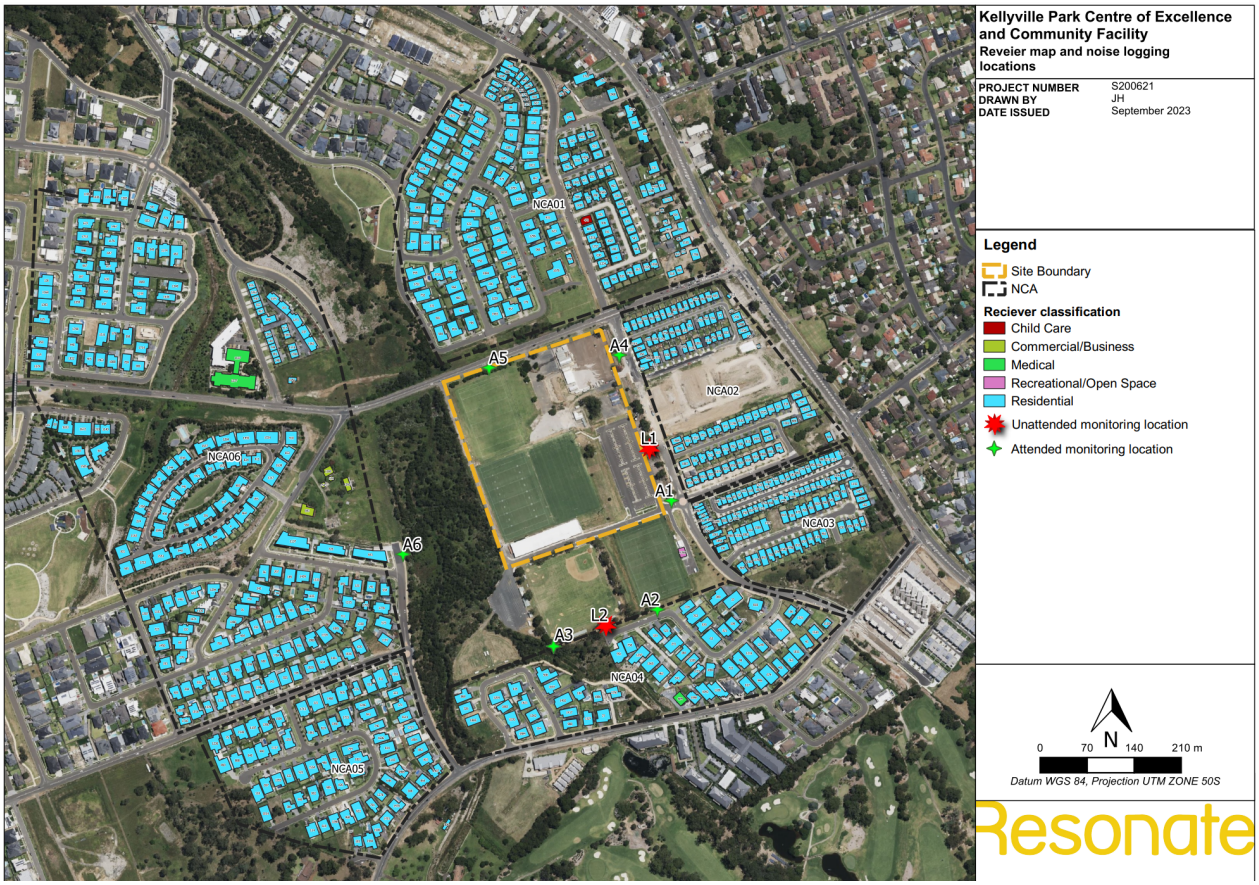


Figure 1 Site location in context

3 Existing Acoustic Environment

3.1 Noise monitoring

Unattended and attended noise measurements were undertaken to determine the existing background and ambient noise levels at representative sensitive receivers surrounding the project site, as shown in Figure 1 above.

3.1.1 Instrumentation

Noise logging was conducted using two Rion noise loggers bearing the serial numbers 00841630 and 772983. Field calibration was conducted at the commencement and conclusion of the logging period and no significant calibration drift was observed.

The noise loggers were configured to record all relevant noise indices, including background noise level (L_{A90}) and equivalent continuous noise levels (L_{Aeq}). Samples were accumulated at 15-minute intervals. The time response of the logger was set to 'fast'.

Attended measurements were conducted using a Rion NL-52 sound level meter bearing the serial number 820944. Field calibration was conducted before and after the measurements and no significant calibration drift was observed. Each measurement was for a period of 15 minutes with the meter response set to 'fast'.

The noise logger at Stone Mason Drive was vandalised on 16 September 2021 and so data from that that point forward has been excluded.

Noise measurements were taken in general accordance with AS1055.1.

3.1.2 Weather conditions

It is a requirement that noise data is captured during periods of favourable weather conditions avoiding adverse impacts of wind and rain on background noise levels. In order to assess weather conditions for the measurement period, half-hourly weather data was obtained from the Bureau of Meteorology (BOM) weather observation station ID 60800 at Richmond.

Noise data has been excluded from the analysis if:

- Rain was observed during a measurement period, and/or
- Wind speed exceeded 5 m/s (18 km/h) at the measurement height of 1.5 m above ground. Wind data obtained from the BOM is presented as the value at 10 m above ground.

The BOM wind speed data obtained for this report was measured at a height of 10 m above ground level. It is therefore necessary to apply a correction factor in order to estimate the wind speed at the height of the logger (1.5 m).

The methodology to formulate a correction factor has been derived[1]. The correction multiplier for the measured wind speed at 10 m is derived by the following formula:

$$W_{1.5}=W_{10}\times\left(\frac{M_{1.5,cat}}{M_{10,cat}}\right)$$

where:

$W_{1.5}$ = Wind speed at height of 1.5 m

[1] Gowen, T., Karantonis, P. & Rofail, T. (2004), *Converting Bureau of Meteorology wind speed data to local wind speeds at 1.5m above ground level*, Proceedings of ACOUSTICS 2004

W_{10} = Wind speed at height of 10 m
$M_{1.5,cat}$ = AS 1170 multiplier for receiver height of 1.5 m and terrain category
$W_{10,cat}$ = AS 1170 multiplier for receiver height of 10 m and terrain category

Noise logging data that has been excluded due to adverse weather conditions is identified in the overall summary and daily noise logging graphs presented in Appendix A.

3.2 Unattended noise monitoring

Unattended noise monitoring conducted in accordance with the NSW EPA's Noise Policy for Industry (NPI) has been used to establish existing conditions at the following locations around the site:

- L1 – Off Stonemason Drive on the Kellyville Park side near Towell Way
- L2 – At the end of McKellar Court at the southwest end of Kellyville Park

The unattended measured noise levels are presented in Table 2. Detailed charts presenting measured noise levels versus time overlaid with weather data for the monitoring period are presented in Appendix A.

Table 2 Unattended monitoring results

Location[1]	Rating Background Level, dB(A) L_{90}[2]			Ambient noise level, dB(A) L_{eq}		
	Day 7 am–6 pm	Evening 6 pm–10 pm	Night 10 pm–7 am	Day 7 am–6 pm	Evening 6 pm–10 pm	Night 10 pm–7 am
L1 – Stone Mason Drive	44	39	31	55	55	44
L2 – McKellar Court	42	39	31	53	51	47

(1) Refer to Figure 1 for the location of the monitoring.

(2) The Rating Background Level is a measure of the typical minimum steady background noise level for each time of day.

3.3 Attended noise monitoring

Attended monitoring was conducted at locations around the site on Wednesday, 6 October 2021. The monitoring was conducted between 3:00 pm and 6:00 pm.

The measured noise levels at each location are shown in Table 3, with the measurement locations shown on Figure 1.

Table 3 Attended noise level measurement results

Location	Measured noise level, dB(A)			
	L_{max}	L_{10}	L_{eq}	L_{90}
A1 – The corner of Stonemason Drive and Kennedy Avenue	71	53	51	43
A2 – McKellar Court across from number 26	71	50	47	40
A3 – At the southwestern corner of the baseball field	60	46	44	39

Location	Measured noise level, dB(A)			
	L_{max}	L_{10}	L_{eq}	L_{90}
A4 – On Stonemason drive midway between Memorial Avenue and Abbottsford Road	68	58	55	45
A5 – On Memorial Avenue near the midpoint of the two northern playing fields	89	76	73	58
A6 – At the northern extent of Severn Vale Drive	69	53	47	46

4 Construction noise and vibration criteria

4.1 Construction noise

Construction noise in New South Wales is assessed using the Department of Environment & Climate Change (now Environment Protection Authority) *Interim Construction Noise Guideline* (ICNG).

The ICNG aims to manage noise from construction works regulated by the EPA. It is also intended to provide guidance to other interested parties in the management of construction noise, and has therefore been adopted for this construction noise assessment. The ICNG prescribes $L_{eq,15min}$ Noise Management Levels (NML) for sensitive receivers as part of a quantitative construction noise assessment. Where the predicted or measured construction noise level exceeds these management levels, then all feasible and reasonable work practices should be implemented to reduce construction noise, and community consultation regarding construction noise is required to be undertaken.

Any noise generated during construction of the development must not be offensive noise within the meaning of the Protection of the Environment Operations Act 1997 or exceed approved noise limits for the site. Noise limits for the site are the NML set out in Section 4.1.4 below.

4.1.1 Standard Working Hours

The ICNG recommends standard working hours for construction as follows:

- Monday to Friday, 7 am to 6 pm
- Saturday, 8 am to 1 pm
- No work on Sundays or Public Holidays

To encourage work during the Standard Working Hours, and to reflect the lower impact of work at these times, the ICNG prescribes less stringent Standard Working Hours NMLs.

It should be noted that the Standard Working Hours are only applicable to residential (or similar) land uses. At educational or commercial land uses, where evening amenity and sleeping is not a concern, the impact of construction noise is assessed based on the times that the land use operates.

4.1.2 Residential land uses

The NMLs prescribed for residential land uses by the ICNG are presented in Table 4. The levels apply at the most exposed property boundary of the noise sensitive receiver at a height of 1.5 metres above ground level.

4.1.3 Other sensitive land uses

The ICNG also prescribes NMLs for other sensitive land uses, including educational buildings and offices. The NMLs for relevant land uses are summarised in Table 5 and apply only when those land uses are in use.

For those receivers where an internal NML applies, it is common to assume an outdoor-to-indoor noise reduction of 10 dB(A). This is based on a standard residential building facade with windows kept open.

Table 4 Noise management levels for residential land uses

Time of day	NML, $L_{Aeq,15min}$	Application notes
Recommended Standard Working Hours	Noise affected: RBL + 10 dB(A)	May be some community reaction to noise. • Where the predicted or measured construction noise level exceeds the noise affected level, all feasible and reasonable work practices should be applied to meet the noise affected level. • All residents potentially impacted by the works should be informed of the nature of the works, the expected noise levels and duration, and provided with site contact details.
	Highly noise affected: 75 dB(A)	May be strong community reaction to noise. • Where construction noise is predicted or measured to be above this level, the relevant authority may require respite periods that restrict the hours that the very noisy activities can occur. • Respite activities would be determined considering times identified by the community when they are less sensitive to noise, and if the community is prepared to accept a longer period of construction to accommodate respite periods.
Outside recommended Standard Working Hours	Noise affected: RBL + 5 dB(A)	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the affected noise level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the affected noise level, the proponent should negotiate with the affected community.

Table 5 ICNG noise management levels for other sensitive land uses

Land use	NML $L_{Aeq,15min}$ (applies when property in use)
Classrooms at schools and other educational institutions	Internal noise level of 45 dB
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation).	External noise level of 60 dB
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion).	External noise level of 65 dB
Offices, retail outlets	External noise level of 70 dB

4.1.4 Project specific noise management levels

Table 6 summarises the NMLs applicable to sensitive land uses around the site during the construction phase. The NMLs are based on the background noise levels from unattended monitoring.

Table 6 Noise Management Levels

Land use	NML for time period, dB(A)			
	Standard Working Hours	Out of Hours Day[1] (Saturday afternoon & Sundays)	Out of Hours Evening[2]	Out of Hours Night[3]
NCA 01, 02 and 03	54	49	44	36
NCA 04, 05 and 06	52	47	44	36
Commercial	70	70	70	70
Industrial	75	75	75	75
Classrooms at schools and other educational institutions	45[2]	45[2]	45[2]	45[2]
Hospital wards and operating theatres	45[2]	45[2]	45[2]	45[2]
Places of worship	45[2]	45[2]	45[2]	45[2]
Active recreation areas	65	65	65	65
Passive recreation Areas	60	60	60	60

(1) Any out of hours work occurring between 7 am and 6 pm.

(2) Any out of hours work occurring between 6 pm and 10 pm.

(3) Any out of hours work occurring between 10 pm and 7 am.

4.2 Construction vibration

Ground vibration generated by construction can have a range of effects on buildings and building occupants. The main effects are generally classified as:

- human disturbance – disturbance to building occupants: vibration which inconveniences or interferes with the activities of the occupants or users of the building.
- effects on building structures – vibration which may compromise the condition of the building structure itself.

In general, vibration criteria for human disturbance are more stringent than vibration criteria for effects on buildings. Building occupants will normally feel vibration readily at levels well below those which may cause a risk of cosmetic or structural damage to a structure. However, it may not always be practical to achieve the human comfort criteria. Furthermore, unnecessary restriction of construction activities can prolong construction works longer than necessary, potentially resulting in other undesirable effects for the local community.

Construction vibration criteria have been adopted from the following sources:

- Cosmetic and structural damage to buildings: German Standard DIN 4150-3[2]
- Human comfort: *Assessing Vibration – A Technical Guideline: DEC 2006* (the Vibration Guideline)

4.2.1 Cosmetic and structural damage

DIN 4150-3 summarises structural and cosmetic damage assessment criteria for different types of buildings, which are presented in Table 7, which are widely used for the assessment of construction vibration effects on buildings in Australia. The criteria are specified as Peak Particle Velocity (PPV) levels measured in any direction at or adjacent to the building foundation.

Table 7 DIN 4150-3 vibration cosmetic and structural damage criteria

Structure type	Peak Particle Velocity (PPV), mm/s			
	Foundation of structure			Vibration at horizontal plane of highest floor at all frequencies
	<10 Hz	10-50 Hz	50-100 Hz	
Buildings used for commercial, industrial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
Dwelling and buildings of similar design and/or use	5	5 to 15	15 to 20	15
Structures that, because of their particular sensitivity to vibration, do not correspond to those listed in rows 1 and 2, and are of great intrinsic value (e.g. heritage-listed buildings)	3	3 to 8	8 to 10	8

DIN 4150-3 states that exposing buildings to vibration levels higher than that recommended would not necessarily result in damage. Rather, it recommends these values as maximum levels of short-term construction vibration at which experience has shown damage reducing the serviceability of structures will not occur due to vibration effects.

[2] German Standard DIN 4150-3, 1999, *Structural Vibration – Part 3: Effects of vibration on structures*.

DIN 4150-3 is considered to be suitable for the assessment of both structural and cosmetic damage as it considers a reduction in serviceability of the structure is deemed to have occurred if cracks form in plastered surfaces of walls, existing cracks in the building are enlarged or partitions become detached from loadbearing walls or floors.

4.2.2 Human comfort

The ICNG recommends that vibration from construction works be assessed under *Assessing Vibration – a technical guideline* (the Vibration Guideline), consistent with the SEARs issued by DPIE. The vibration assessment criteria defined in the Vibration Guideline are for human comfort and represent goals that, where exceeded, require the application of all feasible and reasonable mitigation measures. Where the maximum value cannot be feasibly and reasonably achieved, the operator would need to negotiate directly with the affected community.

The Vibration Guideline defines vibration assessment criteria for continuous, impulsive and intermittent vibration. Vibration can be classified according to the following definitions:

- Continuous vibration: continues uninterrupted for a defined period. Applies to continuous construction activity such as tunnel boring machinery.
- Impulsive vibration: rapid build-up to a vibration peak followed by damped decay or the sudden application of several cycles of vibration at approximately the same magnitude providing that the duration is short. Applies to very occasional construction activities that create distinct events such as dropping of heavy equipment.
- Intermittent vibration: interrupted periods of continuous vibration (such as a drill) or repeated periods of impulsive vibration (such as a pile driver).

The majority of construction activities as part of the proposed works would be expected to be continuous or intermittent in nature.

Table 8 presents the management levels for continuous and impulsive vibration at different land uses. The management levels specified are as overall unweighted RMS vibration velocity levels. The Vibration Guideline specifies the management levels as suitable for vibration sources predominantly in the frequency range 8-80 Hz as would be expected for construction vibration.

Table 8 RMS velocity management levels for continuous and impulsive vibration

Land use	Continuous vibration – RMS vibration velocity, mm/s		Impulsive vibration – RMS vibration velocity, mm/s	
	Preferred	Maximum	Preferred	Maximum
Critical areas[1]	0.1	0.2	0.1	0.2
Residences and hospital wards – daytime[2]	0.2	0.4	6.0	12.0
Residences and hospital wards – night time[3]	0.14	0.28	2.0	4.0
Offices, schools	0.4	0.8	13.0	26.0
Workshops	0.8	1.6	13.0	26.0

(1) Critical operating areas include hospital operating theatres and precision laboratories where sensitive operations are occurring.

(2) Daytime is defined by the Vibration Guideline to be 7 am to 10 pm.

(3) Night time is defined by the Vibration Guideline to be 10 pm to 7 am.

For intermittent vibration, the Vibration Dose Value (VDV) is used as the metric for assessment as it accounts for the duration of the source, which will occur intermittently over the assessment period. The VDV management levels at different land uses for intermittent vibration sources are presented in Table 9.

Table 9 VDV management levels for intermittent vibration

Land use	VDV – intermittent vibration, m/s$^{1.75}$	
	Preferred	Maximum
Critical areas[1]	0.1	0.2
Residences and hospital wards – daytime[2]	0.2	0.4
Residences and hospital wards – night time[3]	0.13	0.26
Offices, schools	0.4	0.8
Workshops	0.8	1.6

(1) Critical operating areas include precision laboratories where sensitive operations are occurring.

(2) Daytime is defined by the Vibration Guideline to be 7 am to 10 pm.

(3) Night time is defined by the Vibration Guideline to be 10 pm to 7 am.

4.2.3 Minimum working distances

The *Construction Noise and Vibration Guideline (CNVG)* (NSW Government, 2006) provides guidelines for minimum working distances for vibration-intensive activities with respect to the stated standards and guidelines. The minimum working distances for building damage should be complied with at all times. The distances are noted as being indicative and are likely to vary depending on the particular item of plant and local geotechnical conditions. The minimum working distances apply to addressing the risk of cosmetic (minor – easily reparable) damage of typical buildings under typical geotechnical conditions.

Where vibration intensive works are required to be undertaken within the specified minimum working distances, vibration monitoring should be undertaken to ensure acceptable levels of vibration are satisfied.

In relation to human comfort, the minimum working distances relate to continuous vibration. For most construction activities, vibration emissions would be intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods may be allowed.

Table 10 presents the recommended minimum working distances for vibration intensive plant.

Table 10 Recommended safe working distances for vibration intensive plant

Plant Item	Rating/Description	Minimum Working Distance – Cosmetic Damage (BS7385)	Minimum Working Distance – Human Response (OH&E Guideline)
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	Five metres	15 metres to 20 metres
	< 100 kN (Typically 2-4 tonnes)	Six metres	20 metres
	< 200 kN (Typically 4-6 tonnes)	12 metres	40 metres
	< 300 kN (Typically 7-13 tonnes)	15 metres	100 metres
	> 300 kN (Typically 13-18 tonnes)	20 metres	100 metres
	> 300 kN (> 18 tonnes)	25 metres	100 metres

Plant Item	Rating/Description	Minimum Working Distance – Cosmetic Damage (BS7385)	Minimum Working Distance – Human Response (OH&E Guideline)
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	Two metres	Seven metres
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	Seven metres	23 metres
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 metres	73 metres
Vibratory Pile Driver	Sheet piles	2 metres to 20 metres	20 metres
Pile Boring	≤ 800 mm	2 metres (nominal)	Four metres
Jackhammer	Hand held	1 metres (nominal)	Two metres

4.3 Construction road noise criteria

The NSW Road Noise Policy (RNP) provides guidance, criteria and procedures for assessing noise impacts from existing, new and redeveloped roads and traffic generating developments. The assessment of road traffic noise impacts on public roads is assessed under the RNP.

Road traffic generated by the operation of the Project will not increase from the existing operational traffic volumes, and as such, there will be no increase to the existing road traffic. Hence, road traffic noise impact due to operational noise will not be assessed in this study.

The construction of the Project will generate additional traffic on surrounding public roads, such as construction worker car movements and delivery and construction vehicle movements. Once construction is complete, project traffic is expected to return to levels similar to the current situation.

The RNP details a number of noise assessment criteria for various road categories and land uses.

The Application Notes for the RNP state that;

> *'for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level as a result of the development should be limited to 2 dB above that of the noise level without the development. This limit applies wherever the noise level without the development is within 2 dB of, or exceeds, the relevant day or night noise assessment criterion.*'

If road traffic noise during the Project construction is within 2 dB(A) of current levels then the objectives of the RNP are met and no specific mitigation measures are required. Where the Project road traffic noise levels exceed 2 dB(A) of current levels than the consideration should be given to the actual noise levels associated with construction traffic and whether or not these levels comply with the RNP criteria as presented in Table 11.

Table 11 RNP Residential Road Traffic Noise Criteria

Road Category	Type of Project/Land Use	Assessment Criteria – dB(A)	
		Day 7am to 10pm	Night 10pm to 7am
Local roads	Existing residences affected by additional traffic on existing local roads by land use developments.	$L_{Aeq,15hr}$ 55(external)[1]	$L_{Aeq,9hr}$ 50 (external)[1]

(1) The assessment criteria for external noise levels apply at 1 metre from the facade of any affected residential receiver

An estimation of the anticipated noise level contribution of construction traffic on local roads has been conducted using the TfNSW Construction Noise Estimator Tool. The following indicative construction road traffic volumes have been assumed for Stone Mason Drive:

- 30 two-way light vehicle movements per hour.
- 2 two-way heavy vehicle movements per hour.

The following has been determined:

- A typical $L_{Aeq(1\ hour)}$ noise level contribution of 52 dB(A) has been predicted for construction scenarios.
- A total combined noise level of 57 dB(A) is predicted with a noise level increase of 2 dB or less, noting that the existing daytime L_{Aeq} noise level is approximately 55 dB(A) outside of peak times.

Therefore, per the NSW RNP, no further assessment of construction road traffic is required.

5 Construction Noise and Vibration Assessment

5.1 Construction noise

5.1.1 Construction noise sources

Table 12 summarises the assumed sound power levels (L_W) for the major construction noise sources which we expect would be on site during each phase. The sound power levels have been based on data obtained from previous measurements conducted by Resonate and those within the UK Department for Environment, Food and Rural Affairs (DEFRA) *Update of noise database for prediction of noise on construction and open sites*. An overall sound power level for each phase has also been assumed based on the loudest typical source(s) operating for each works phase.

Table 12 Construction noise source sound power levels

Stage	Typical plant items	Assumed sound power level, dB(A)
Site establishment and enabling works	Large excavator	111
	Vibratory roller[1]	107
	Concrete truck	109
	Concrete pump	107
	Large truck	108
	Chainsaw	114
	Typical overall sound power level	**112**
Demolition	Large excavator	111
	Rockbreaker[1]	121
	Crane	106
	Pneumatic jackhammer[1]	109
	Large truck	108
	Typical overall sound power level	**118**
Retaining piles and excavation	Bored piling rig	111
	Large excavator	111
	Crane	106
	Large truck	108
	Typical overall sound power level	**112**
Substructure	Crane	106
	Large excavator	111
	Pneumatic jackhammer[1]	109
	Concrete truck	109

Stage	Typical plant items	Assumed sound power level, dB(A)
	Concrete pump	107
	Large truck	108
	Typical overall sound power level	**114**
Frame	Concrete truck	109
	Concrete pump	107
	Crane	106
	General hand tools	98
	Large truck	108
	Typical overall sound power level	**111**
Facade works	Crane	106
	General hand tools	98
	Large truck	108
	Typical overall sound power level	**107**
Internal works and fitout	General hand tools	98
	Compressor	94
	Portable generator	95
	Typical overall sound power level	**84[2]**

(1) Results include a 5 dB penalty to account for 'annoying' characteristics.

(2) Includes a 15 dB(A) indoor-to-outdoor reduction in noise levels for internal works.

5.1.2 Typical construction noise levels during Standard Works Hours

Typical worst-case construction noise levels are to be predicted using a three-dimensional environmental noise model of the site and surrounds, developed in SoundPLAN version 8.2 environmental noise modelling software, including:

- topography
- building structures
- ground absorption (ground assumed to be 50% absorptive and 50% reflective)
- air absorption
- attenuation with distance.

Predictions have been carried out based on the environmental noise prediction algorithms documented in ISO 9613-2:1996 *Acoustics - Attenuation of sound during propagation outdoors -- Part 2: General method of calculation*. This provides predictions typical of conditions where the receiver is downwind of the source or where there is a moderate ground-based temperature inversion.

It is important to note that these predictions are typical worst-case predictions as they assume that:

- The construction works are occurring at the nearest point to each receiver and that the receiver is located at the most exposed position.
- The noisiest construction sources are operating continuously for the entire 15-minute period. This will not occur at all times as equipment will regularly be stood down or idled while other activities are undertaken.

Typical worst-case predicted noise levels are shown in Table 13 for each sensitive-receiver location and each phase of works. Noise levels are predicted to exceed the relevant Standard Work Hours NMLs for all activities with the exception of those occurring inside the new buildings (such as fitout works).

As seen in Table 13 properties are predicted to be in the highly noise affected category (predicted sound pressure level > 75 dB(A)) in NCA01 and NCA02 during demolition.

Table 13 Typical worst-case external construction noise levels for Standard Working Hours

NCA	Typical worst-case external construction noise level for phase during Standard Working Hours, dB(A) L_{eq}						
	Site establishment	Demolition	Retaining piles and excavation	Substructure	Frame	Facade works	Internal works and fitout
1	69	**76**	65	72	65	66	38
2	74	**80**	69	**76**	68	67	39
3	67	73	63	70	61	64	36
4	67	74	63	70	61	62	34
5	64	70	59	66	58	57	29
6	66	72	61	69	60	59	31

A description of predicted noise levels per NCA are discussed below with reference to subjective effects of changes to sound levels as shown in Table 14. Noise contours of predicted construction noise levels are also presented in Appendix B. Exceedances of standard working hours criteria are expected across all noise catchment areas, during site establishment, demolition, retaining piles and excavation, substructure, frame, and façade works as seen in Table 15.

Table 14 Subjective effect of changes to sound levels

Change in sound level, dB	Subjective change in apparent loudness
1	Not perceptible
2 – 3	Just perceptible
5	Clearly noticeable
10	Half or twice as loud
20	Much quieter or louder

Table 15 Predicted number of exceedances and average exceedance in dB(A) for Standard Working Hours

NCA	Site Establishment		Demolition		Retaining piles and excavation		Substructure		Frame		Façade works	
	No.	Average NML exceedance dB(A)	No.	Average NML exceedance dB(A)	No.	Average NML exceedance dB(A)	No.	Average NML exceedance dB(A)	No.	Average NML exceedance dB(A)	No.	Average NML exceedance dB(A)
1	156	5	241	9	56	4	201	6	50	4	61	4
2	160	7	183	12	96	5	177	9	92	5	106	5
3	90	6	98	12	44	4	93	8	35	3	54	4
4	58	8	64	13	42	5	63	9	40	4	24	5
5	56	4	71	9	17	3	66	6	13	2	11	2
6	131	4	205	8	30	3	175	5	21	3	20	3

Recommendations for construction noise management are provided in Section 0.

NCA01

NCA01 is expected to be the most impacted by Demolition works. Demolition noise levels are predicted to range from *Clearly Noticeable* to *Twice as Loud* as existing background noise levels. 2 Bugle Circuit and Receiver 1537 are predicted to be highly noise affected with a predicted sound pressure level of 80 dB(A). Predicted noise levels during site establishment, retaining piles and excavation, substructure works, frame works and façade works are expected to be *Clearly Noticeable* at most receivers in NCA01, with some receivers on the north western and north eastern flank of the NCA experiencing just perceptible noise levels.

NCA02

NCA02 is expected to be most impacted by noise from demolition and substructure works. The noise levels from demolition works are predicted to result in noise levels approximately *Twice as Loud* as the background noise levels across the entire noise catchment area.

The following ten receivers, located in closest proximity to the works along Bugle Circuit and Stone Mason Drive are predicted to be highly noise effected during demolition works;

- 1 Bugle Circuit
- 2 Bugle Circuit
- 3 Bugle Circuit
- 3/4 Bugle Circuit
- 6 Bugle Circuit
- Receivers located on Stone Mason Drive, QGIS ID's as shown in Appendix B:
  - 356, 936, 1016, 1537, 1890,

Noise levels during site establishment, retaining piles and excavation, frame works, and façade works are expected to exceed daytime NMLs and are likely to be *clearly noticeable* throughout the NCA. During substructure works 2 Bugle Circuit is expected to be highly affected.

NCA03

NCA03 is expected to be most impacted by noise from demolition and substructure works. The noise levels from demolition works are predicted to result in noise levels approximately *Twice as Loud* as the background noise levels across the NCA. Noise levels during site establishment, retaining piles and excavation, frame works and façade works are predicted to exceed the daytime NMLs and are likely to be *Clearly Noticeable* throughout the NCA.

NCA04

NCA04 is expected to have an average NML exceedance of approximately 15 dB (more than *Twice as Loud*) during demolition. No receivers are predicted to be highly noise affected. Substructure works are also predicted to result in noise levels in the *Clearly Noticeable* range. Noise levels from site establishment, retaining piles and excavation frame works and façade works would be considered as *Clearly Noticeable*.

NCA05

NCA05 is expected to be most impacted by noise from demolition and substructure works. The noise levels from demolition works are predicted to result in noise perceptibly *Twice as Loud* as the background noise level across the NCA. Noise levels during site establishment, retaining piles and excavation, frame works and façade works are expected to exceed daytime NMLs and will be clearly noticeable throughout the catchment area.

NCA06

NCA06 is expected to be most impacted by noise from demolition works, which is predicted to be perceptibly *Twice as Loud* as the background noise level across the NCA. Noise levels from site establishment and substructure works are expected to be *Clearly Noticeable*. Retaining piles and excavation and façade works noise levels are predicted to be *Barely Perceptible*.

5.2 Construction vibration

Table 16 summarises recommended safe working distances for key vibration-generating activities that would be expected during the construction phase, based on prior measurements conducted by Resonate. The closest receivers to the works are approximately 35 metres northeast of the site boundary of the construction site. Works to be undertaken within the typical safe working distance for occupant comfort and building damage should be subject to a vibration management plan.

Table 16 Recommended safe working distances for key vibration generating activities

Plant	Rating	Typical safe working distance for occupant comfort, m		Typical safe working distance for building damage, m	
		Preferred vibration target	Maximum vibration target	Heritage structure	Commercial building
Vibratory roller	< 7t	≥ 35	≥ 20	≥ 10	≥ 2
	7t – 12t	≥ 50	≥ 30	≥ 15	≥ 5
	≥ 13t	≥ 75	≥ 40	≥ 20	≥ 10
Small hydraulic hammer	300 kg – 5 to 12T excavator	≥ 12	≥ 7	≥ 5	≥ 2
Medium hydraulic hammer	900 kg – 12 to 18T excavator	≥ 35	≥ 23	≥ 15	≥ 7
Large hydraulic hammer	1600 kg – 18 to 34T excavator	≥ 65	≥ 45	≥ 35	≥ 22
Excavator	Large excavator digging	≥ 25	≥ 15	≥ 5	≥ 1

Plant	Rating	Typical safe working distance for occupant comfort, m		Typical safe working distance for building damage, m	
		Preferred vibration target	Maximum vibration target	Heritage structure	Commercial building
Bored piling	≤ 800mm	≥ 20	≥ 10	≥ 2	≥ 1
Jackhammer	Handheld	–(1)	–(1)	≥ 3	≥ 1

5.3 Construction noise and vibration management measures

To manage the potential impact of noise and vibration during construction, reasonable and feasible management measures and work practices should be implemented as detailed below.

5.3.1 Construction Noise and Vibration Management Plan

Prior to the commencement of major construction works, the contractor should develop a Construction Noise and Vibration Management Plan (CNVMP). The CNVMP should:

- identify relevant construction noise and vibration criteria as detailed in this report
- identify neighbouring sensitive land uses for noise and vibration
- summarise key noise- and vibration-generating construction activities and the associated predicted levels at neighbouring land uses
- identify reasonable and feasible work practices to be implemented during the works
- summarise stakeholder consultation and complaints handling procedures for noise and vibration.

5.3.2 Stakeholder consultation

Nearby stakeholders should be consulted prior to the works and kept regularly informed of potential noise and vibration impacts from the works. Specifically, this would involve:

- Residential receivers on Bugle Circuit
- Residential receivers on Stone Mason Drive

A noise and vibration complaints handling procedure and register should be developed and implemented during construction.

5.3.3 Work programming

Work should be programmed such that particularly noisy works occur during Standard Working Hours wherever feasible, namely:

- Monday to Friday 7 am to 6 pm
- Saturday 8 am to 1 pm
- No work on Sundays or public holidays.

If high noise works are to occur outside of the Standard Working Hours and later than 1 pm on a Saturday, then the CNVMP should define an approval process for undertaking out of hours works and for identifying reasonable and feasible mitigation measures to be implemented.

Consideration of a respite regime where particularly highly intensive activities are programmed to occur at times identified by the community when they are less sensitive to noise.

5.3.4 Truck movements and site access

Truck movements during long term construction projects have the potential to cause annoyance for sensitive receivers, even where trucks may be travelling on sealed roads. The design and selection of site access routes shall consider the potential disturbance to residents. In particular:

- site access and delivery points shall be located as far away from residences as possible
- truck movements shall use arterial roads and be diverted away from residential streets where feasible
- deliveries to/from site shall not occur during the night time period where possible.

5.3.5 Site management

Site management procedures should include the following:

- processes that generate lower noise levels should be selected where feasible.
- noisy plant should be located as far away from residences as is practical to allow efficient and safe completion of the task.
- the potential shielding provided by site topography and intervening buildings should be considered in locating equipment.
- site compounds should be located as far away as possible from residences.
- equipment that is used intermittently should be shut down or throttled down to a minimum during periods where it is not in use.
- works should be planned to minimise the reduce the noise from reversing signals.
- warning horns should not be used as signalling devices.
- two-way radios should be set to the minimum effective volume.
- noise associated with packing up plant and equipment at the end of works should be minimised.
- audible movement alarms of a type that would minimise noise impacts on surrounding noise sensitive receivers.

5.3.6 Equipment management

Equipment management should include the following:

- selection of low-noise plant and equipment where possible.
- equipment should be well maintained.
- equipment should have quality mufflers and silencers installed where relevant.
- equipment not in use on site should be shut down.
- tasks should be completed using the minimum feasible power and equipment.

6 Noise and Vibration Management Measures

This section outlines noise management measures that will be implemented as part of the construction works, including consultation and complaint handling procedures.

It may not be feasible to adopt all management measures at all times during construction, and identification of all reasonable and feasible mitigation methods will be conducted by the site supervisor and/or environmental representative on a regular basis during noisy works near sensitive land uses.

In relation to the implementation of mitigation measures, feasibility addresses engineering consideration regarding what is practical to build. Reasonableness relates to the application of judgment in arriving at a decision, taking into account the following factors:

- noise reduction achieved
- number of people or other uses benefited
- cost of the measure
- delay to schedule and whether the measure will prolong exposure to noise
- community views
- pre-construction noise levels at receivers.

While the management measures presented will not necessarily result in mitigating all noise impacts at all times, they are expected to reduce impacts to levels most stakeholders should find acceptable considering the anticipated benefits of the completed project as a whole.

6.1 Noise and vibration management measures

Noise and vibration management measures that will be implemented throughout works where reasonable and feasible are presented in Table 17:

Table 17 Noise and vibration management measures

Reference	Details of management measures	Implementation		Responsibility
Implemented throughout external works		**PC[1]**	**C[2]**	
NVMM01	Works to be undertaken during Standard Working Hours where possible.	✓	✓	Construction Manager
NVMM02	The induction of site staff will include a reference to potential noise impacts and the identification of noise-sensitive land uses.	✓		Construction Manager
NVMM03	'Toolbox talks' will include a reference to any noise management measures being implemented on site at the time.		✓	Site Supervisor
NVMM04	Where possible, schedule work breaks at same time as sensitive times for receivers. For example, break for lunch between 12 and 2 pm when catering usage is busy.		✓	Site Supervisor
NVMM05	Implement complaint response procedures as detailed in Section 6.2.	✓	✓	Community Relations Manager

Reference	Details of management measures	Implementation		Responsibility
Implemented throughout external works		**PC[1]**	**C[2]**	
NVMM06	Vehicle warning devices, such as horns, are not to be used as signalling devices.		✓	Site Supervisor Operators
NVMM07	No swearing or unnecessary shouting or loud stereos/radios on site.		✓	Site Supervisor
NVMM08	No unnecessary dropping of materials from height, throwing of metal items and slamming of doors.		✓	Site Supervisor
NVMM09	Site access and delivery points will be located as far away from the sensitive receivers as possible.	✓	✓	Construction Manager
NVMM10	Truck movements will use arterial roads and be diverted away from residential streets where feasible.	✓	✓	Construction Manager
NVMM11	Loading and unloading operations will be undertaken away from the northern boundary of the site to reduce impacts on the childcare centre.		✓	Site Supervisor Operators
NVMM12	Traffic flow, parking and loading/unloading areas will be planned to avoid the need for reversing near sensitive receivers.	✓	✓	Construction Manager Site Supervisor
NVMM13	Two-way radios will be used at the minimum effective volume.		✓	Site Supervisor Operators
NVMM14	Quieter construction methods will be used where feasible and reasonable.	✓	✓	Construction Manager
NVMM15	Noise levels of plant and equipment will be considered in rental decisions and all plant and equipment will be selected and operated to be compliant with the sound power levels by referral to Section 5.1 wherever possible.	✓	✓	Construction Manager
NVMM16	Simultaneous operation of noisy plant close together and near the sensitive receivers will be avoided.		✓	Site Supervisor
NVMM17	The offset distance between plant and sensitive uses will be maximised.		✓	Site Supervisor
NVMM18	Plant used intermittently will be shut down or throttled down to a minimum in between use.		✓	Site Supervisor
NVMM19	Plant emitting noise in a particular direction will be directed away from sensitive receivers.		✓	Site Supervisor
NVMM20	Delivery vehicles will be fitted with straps rather than chains for unloading near sensitive areas, wherever possible.		✓	Site Supervisor Operators
NVMM21	Ensure that truck tailgates are cleared and locked at the point of unloading.		✓	Site Supervisor Operators

Reference	Details of management measures	Implementation		Responsibility
Implemented throughout external works		**PC[1]**	**C[2]**	
NVMM22	Locate plant and equipment to take advantage of barriers provided by existing site features and structures.		✓	Site Supervisor Operators
NVMM23	Implement mufflers/silencers on plant and equipment. Undertake regular maintenance of plant and equipment, including silencers, to ensure that noise emissions do not increase over time. Servicing, refuelling and warm-up to be undertaken during standard construction hours.		✓	Site Supervisor Operators
NVMM24	Noise associated with packing up plant and equipment at the end of works will be minimised.		✓	Site Supervisor Operators

(1) Pre-construction – note that this may refer to prior to commencement of specific activities rather than prior to the commencement of all construction works.

(2) Construction

6.2 Complaint handling

The person receiving complaints will have the ability to implement reasonable and feasible measures to action the complaint. These measures may include modification of the work site or work practices, or a review of night activities. The following complaint management procedure will be implemented during all works:

1) Assess whether the issue can be resolved easily and take immediate action if possible.
2) If not, assess the construction site and activities and determine whether there is any reason to believe noise levels are higher than anticipated.
3) Undertake monitoring of noise (where this is an appropriate response).
4) Ensure all planned management measures have been appropriately implemented.
5) If steps 3 and 4 are correct, no further site actions are required (proceed to step 8).
6) If steps 3 and 4 are incorrect, implement all reasonable and practicable mitigation measures where possible and implement correct engagement procedures.
7) Ensure person receiving complaints is well briefed on the existing mitigation measures in place during the activity and the justification for the activity and understands the details of any night works approvals (if applicable).
8) Advise complainant of actions undertaken.

Records of any noise and vibration complaint received during the works, and the action taken in response to the complaint, will be maintained throughout the works. The Kane Construction's Health Safety and Environment Site Management Plan should be updated to adopt these recommendations.

7 Compliance management

7.1 Roles and responsibilities

Kane Construction's Project Team's organisational structure and overall roles and responsibilities are outlined in the Environmental Site Management Plan. Specific responsibilities for the implementation of noise and vibration management measures are detailed in Section 6.

7.2 Training

All employees, sub-contractors and utility staff working on site will undergo site induction training relating to noise and vibration management issues, including:

- Existence and requirements of this CNVMP.
- Standard Working Hours.
- Location of noise sensitive areas and receivers.
- General noise and vibration management measures, including monitoring procedures.
- Complaints reporting.

Kane Construction's Health Safety and Environment Site Induction documentation should be updated to adopt all noise and vibration related requirements.

7.3 Monitoring and inspections

Weekly inspections by the Site Manager or a suitably qualified representative will occur throughout construction.

Noise and vibration monitoring will also occur routinely during the works as detailed in Table 18.

Table 18 Noise and vibration monitoring plan

Situation	Monitoring requirements	Frequency, reporting and responsibility
Noise monitoring		
Attended monitoring to assess typical construction noise levels at noise sensitive receivers. Where complaint is received and monitoring is considered an appropriate response to determine if noise levels exceed predicted construction noise levels documented in this CNVMP.	If monitoring cannot be undertaken at the nearest relevant sensitive receiver, a suitable representative location will be selected. The testing method includes: • Sound level meter configured for "Fast" time weighting and "A" frequency weighting. • Test environment free from reflecting objects where possible. Where noise monitoring is conducted within 3.5 metres of large walls or a building facade, then a reflection correction of up to -2.5 dB(A) will be applied to remove of increased noise due to sound reflections. • Tests will not be carried out during rain or when wind speed exceeds 5m/s. • Conditions such as wind velocity and direction, temperature, relative humidity and cloud cover will be recorded from the nearest Bureau of Meteorology station or on-site weather station/observations. • The monitoring period should be sufficient such that measured noise levels are representative of noise over a 15-minute period. • At a minimum L_{Aeq}, $L_{AF,max}$, L_{A10} and L_{A90} levels will be measured and reported. The observations of the person undertaking the measurements will be reported including audibility of construction noise, other noise in the environment and any discernible construction activities contributing to the noise at the receiver.	<u>Frequency</u> On a minimum bi-monthly basis for attended monitoring or As required for complaints. <u>Reporting</u> Written reports of all noise monitoring will be maintained by Kane Construction staff and submitted to key stakeholders on request. <u>Responsibility</u> Monitoring to be undertaken by Kane Construction staff suitably experienced in carrying out noise monitoring. If deemed necessary, a suitably qualified acoustic consultant will undertake monitoring to resolve complaints.

Situation	Monitoring requirements	Frequency, reporting and responsibility
Spot checks of noisy plant to determine noise emission levels for: • assessing compliance against manufacturer specifications • assisting to assess accuracy of predictions • assessing quieter construction techniques where required.	Stationary test procedures according to AS 2012.1:1990 *Acoustics – Measurement of airborne noise emitted by earth-moving machinery and agricultural tractors – Stationary test condition*. The testing method includes: • Sound level meter configured for "Fast" time weighting and "A" frequency weighting. • The test environment will be free from reflecting objects. • Tests will not be carried out during rain or when wind speed exceeds 5 m/s. • In accordance with *AS 2012.1*, a minimum of three measurement points will be defined at locations on the hemispherical surface around the plant with the radius determined by the basic length of the machine. • The L_{A90} background noise level at the measurement locations will be at least 6 dB and preferably 10 dB below the level with plant operating. • L_{Aeq} and L_{A10} levels will be measured and reported.	Frequency On an as required basis during main works. Reporting Records of spot checks of noisy plant will be maintained by Kane Construction. Responsibility Monitoring to be undertaken by Kane Construction staff suitably experienced in carrying out noise monitoring.
Vibration monitoring		
If any works occur within safe working distances for damage to buildings, detailed in Section .4.2.	Continuous vibration monitoring conducted throughout works as follows: • Geophone installed at ground adjacent to building foundations or equivalent (or nearer) location if access not provided to the outside of the building. • Monitor to continuously record PPV vibration level in 15-minute (or shorter) intervals. • If PPV level exceeds 75% of the minimum DIN 4150-3 building damage limit, an alert will be sent to nominated site staff via email/SMS. This will include a Site Supervisor with suitable authority to stop work. • Upon receipt of an alert, work will STOP. • Necessary modifications will be made to work practices to reduce the vibration level and the works will continue as long as further alerts are not received. • Note that if the frequency of the vibration event is such that 75% of the DIN 4150-3 limit was not exceeded, then works will proceed with caution, and the alert level adjusted as appropriate.	Frequency If required if works change such that works may occur in safe working distances for buildings. Reporting Records of logged vibration levels will be maintained by Kane Construction. Responsibility Monitoring to be undertaken by a suitably qualified acoustic consultant.

Situation	Monitoring requirements	Frequency, reporting and responsibility
Vibration monitoring in response to a complaint, where this is considered an appropriate response.	Attended vibration monitoring will be conducted of the relevant activities as follows: • Geophone installed at ground adjacent to building foundations or equivalent (or nearer) location if access not provided to the outside of the building. • Monitor to continuously record PPV and/or VDV vibration levels generated by the activity. • Measured levels to be compared to human disturbance vibration goals and/or building damage limits as appropriate. If necessary following the vibration measurements: • Appropriate vibration management measures will be implemented. Continuous vibration monitoring will be considered if this is considered of benefit to address the complaint.	Frequency As required for complaints. Reporting Report detailing measurement results and any corrective actions to be provided to the complainant and relevant stakeholders. Responsibility A suitably qualified acoustic consultant will undertake monitoring to resolve complaints.

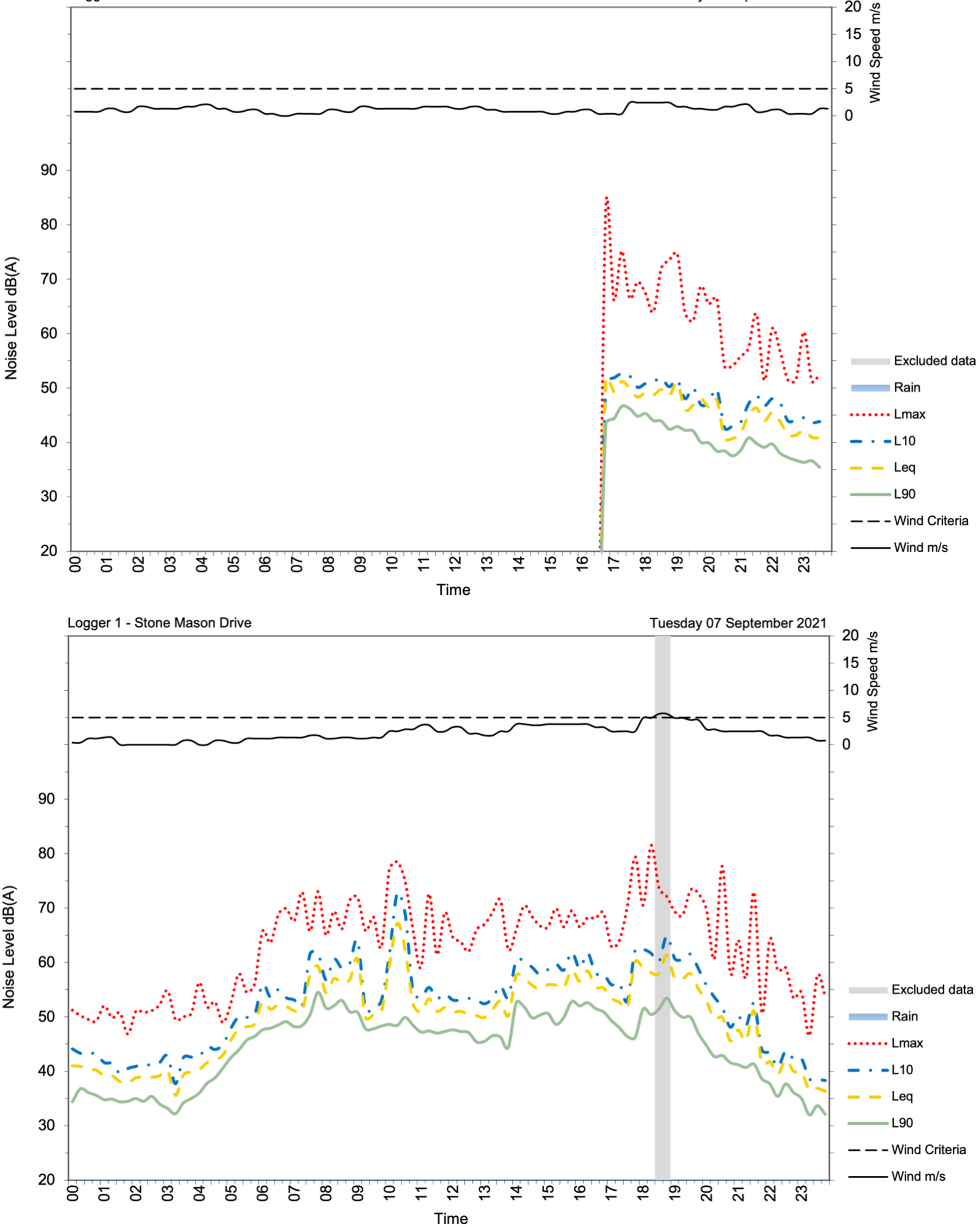
Appendix A — Unattended noise monitoring

An initial unattended environmental noise survey was conducted during the period 6 September to 19 September 2021. The noise logging was conducted at two locations, with positions shown on Figure 1. The noise logger at Stone Mason Drive was vandalised on 16 September 2021 and was rendered non-operational from that point onward.

For reference, a weekly chart showing the graphed noise logging results is shown in the tables below for each noise logging location.

Logger 1 - Stone Mason Drive

Monday 06 September 2021



Logger 1 - Stone Mason Drive

Tuesday 07 September 2021

Logger 1 - Stone Mason Drive

Wednesday 08 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

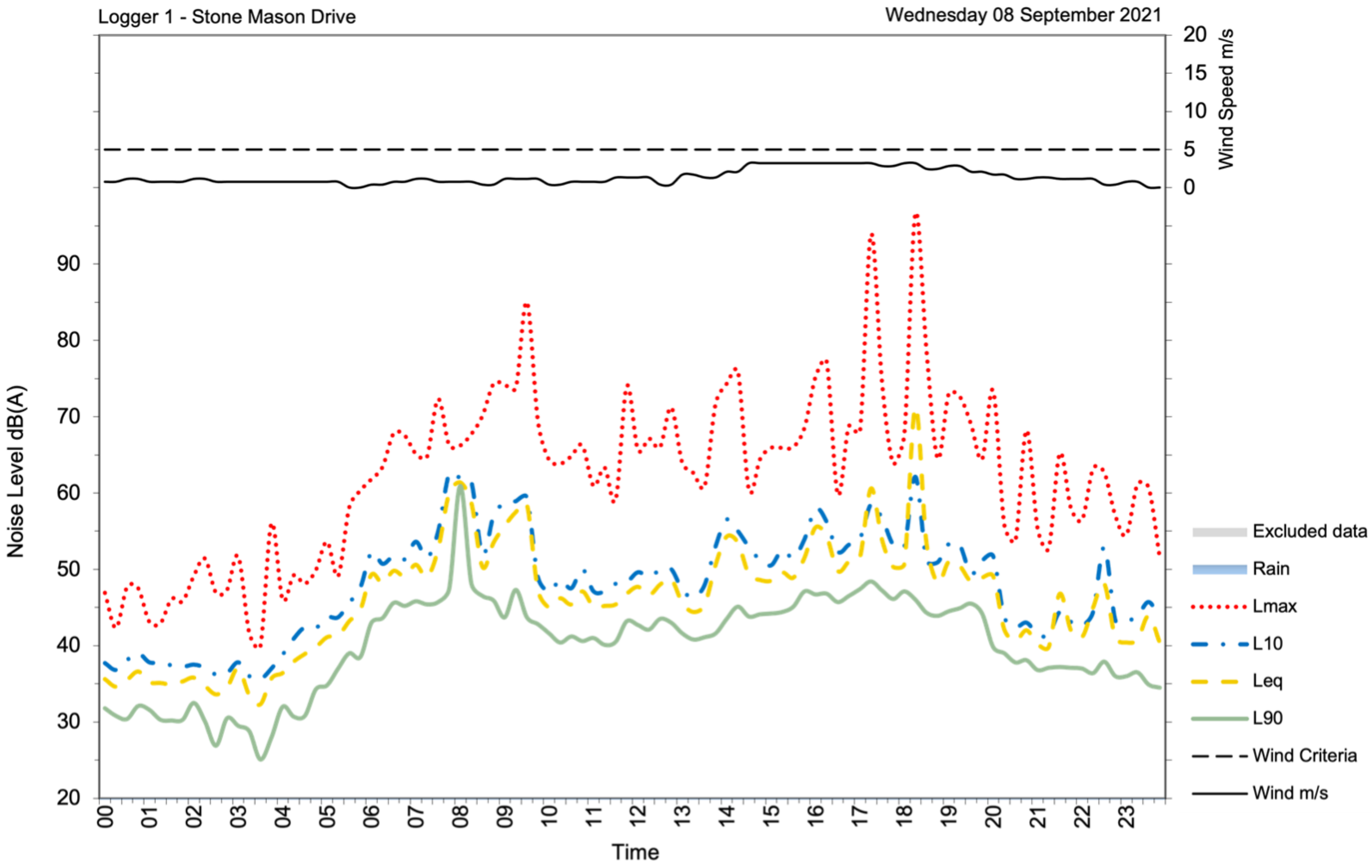
L10

Leq

L90

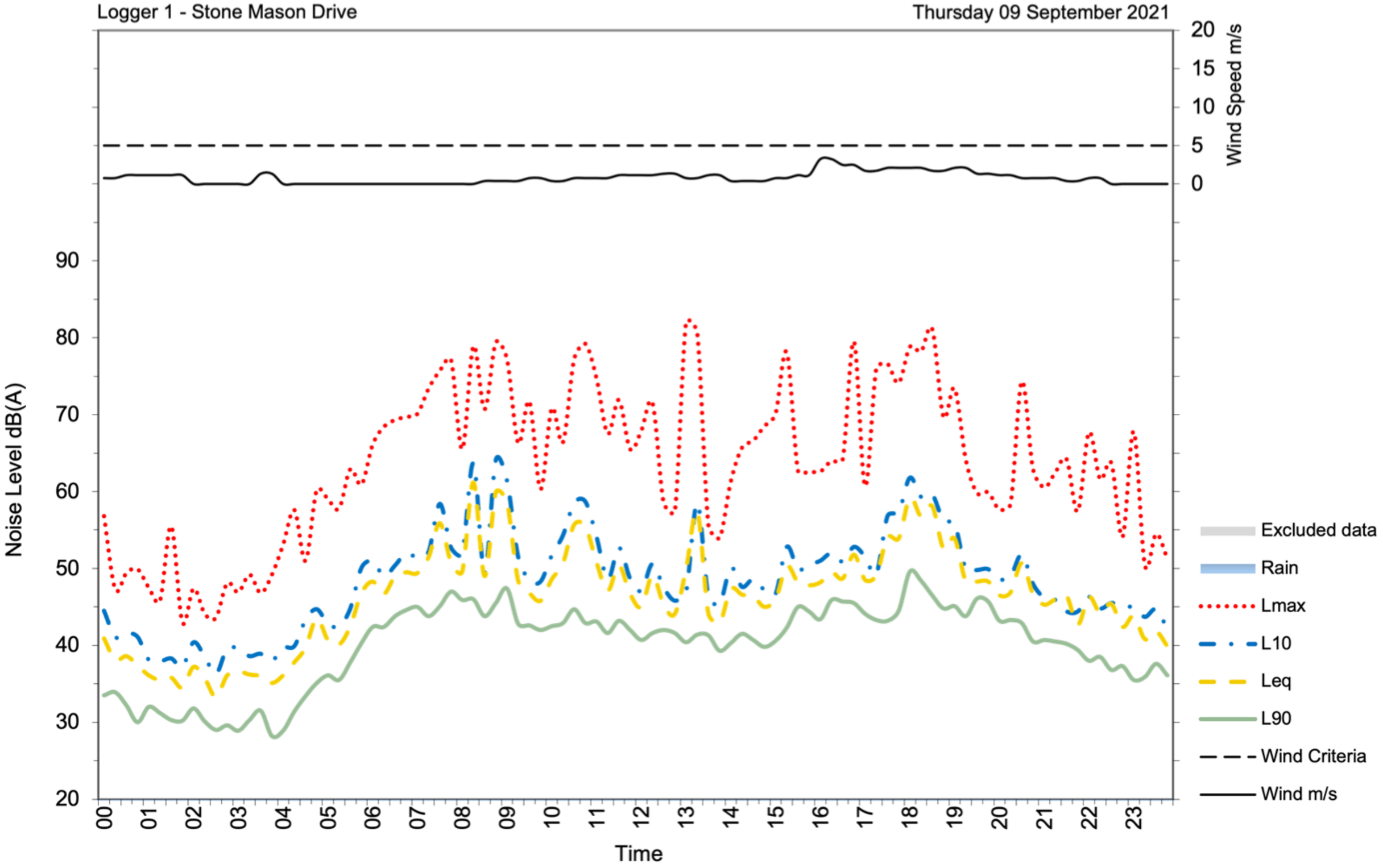
Wind Criteria

Wind m/s



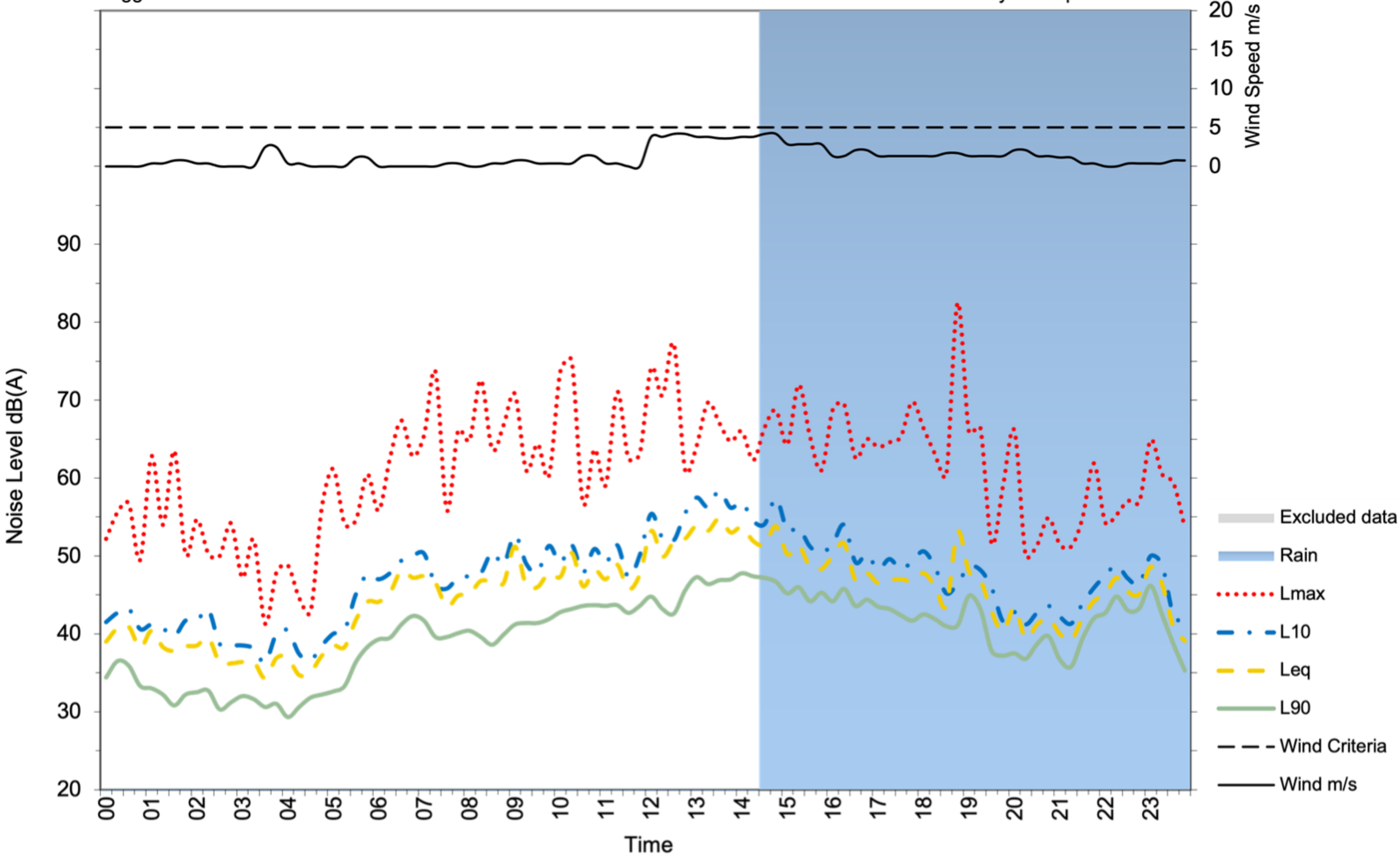
Logger 1 - Stone Mason Drive

Thursday 09 September 2021



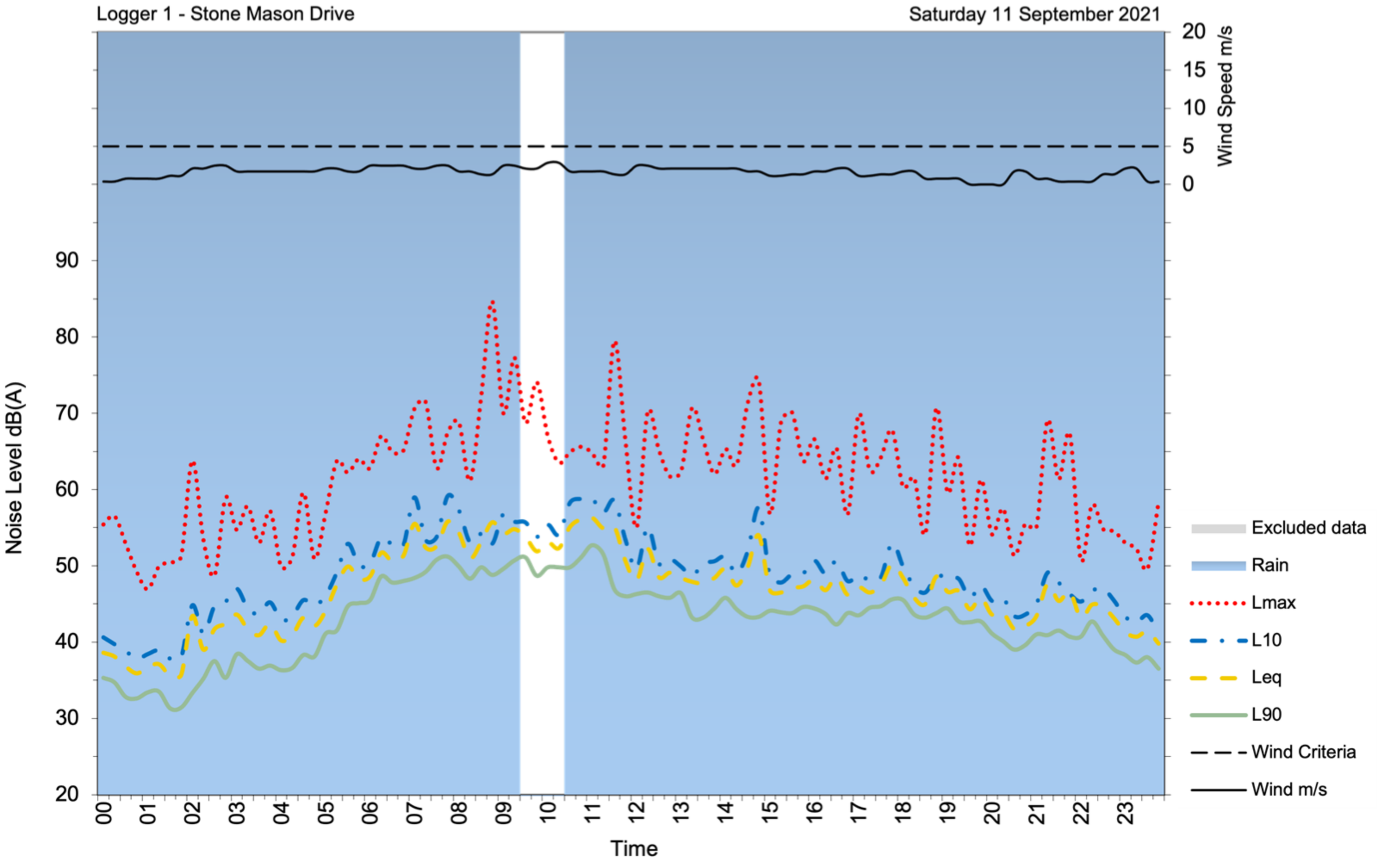
Logger 1 - Stone Mason Drive

Friday 10 September 2021



Logger 1 - Stone Mason Drive

Saturday 11 September 2021



Logger 1 - Stone Mason Drive

Sunday 12 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 1 - Stone Mason Drive

Monday 13 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 1 - Stone Mason Drive

Tuesday 14 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

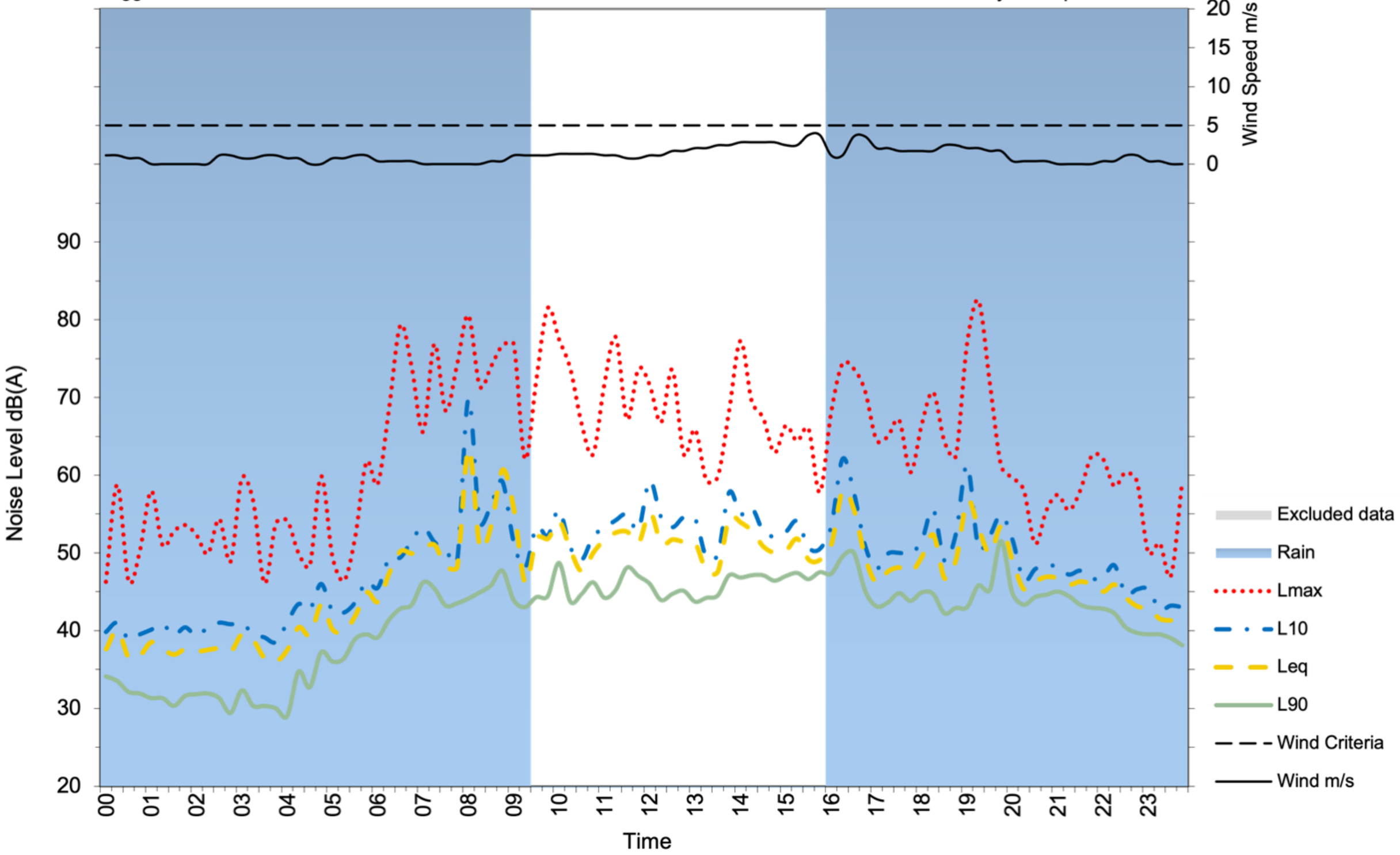
L10

Leq

L90

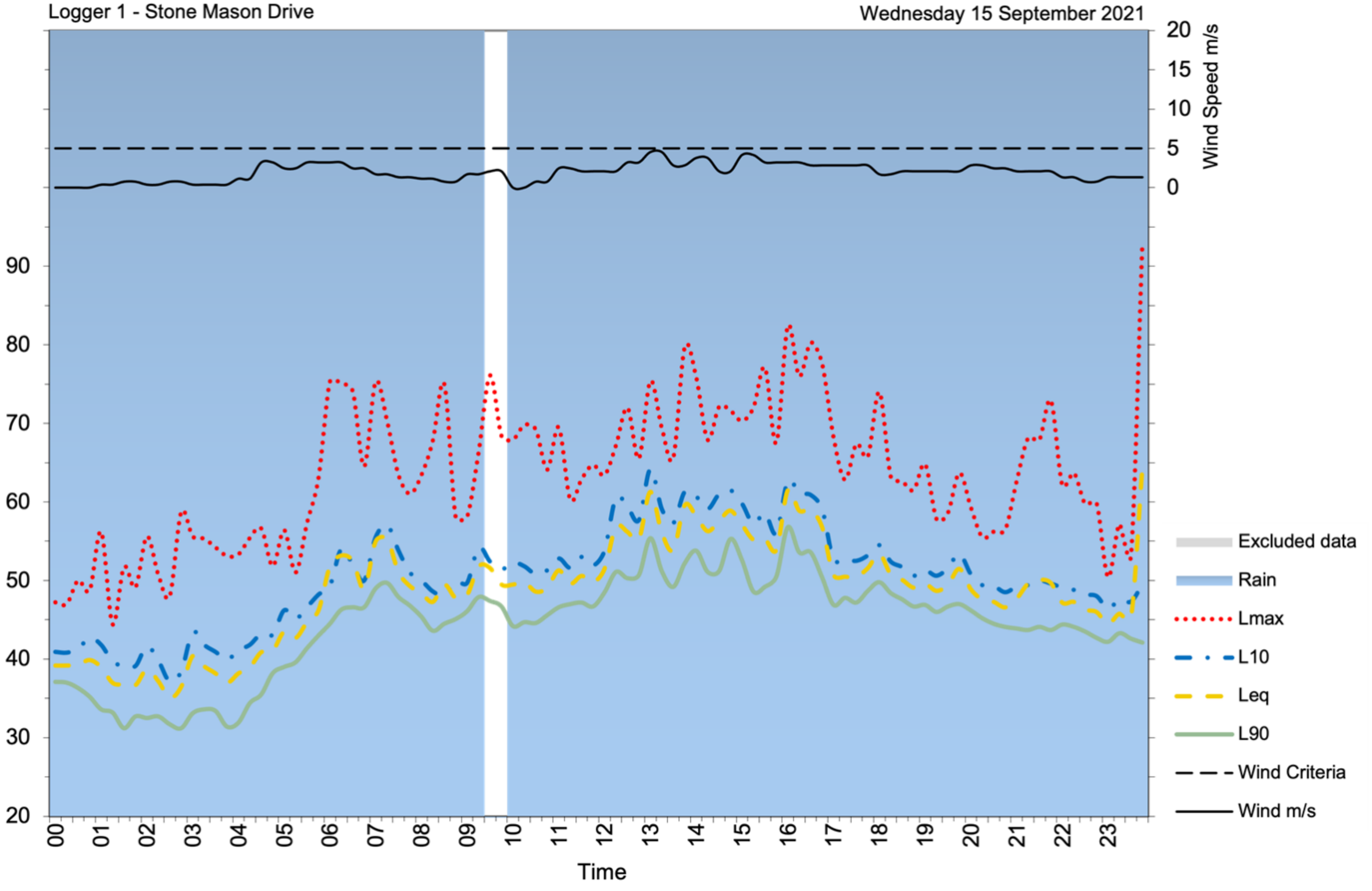
Wind Criteria

Wind m/s



Logger 1 - Stone Mason Drive

Wednesday 15 September 2021



Logger 1 - Stone Mason Drive

Thursday 16 September 2021

Noise Level dB(A)

Wind Speed m/s

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 1 - Stone Mason Drive

Friday 17 September 2021

Noise Level dB(A)

Wind Speed m/s

Excluded data

Rain

Lmax

L10

Leq

L90

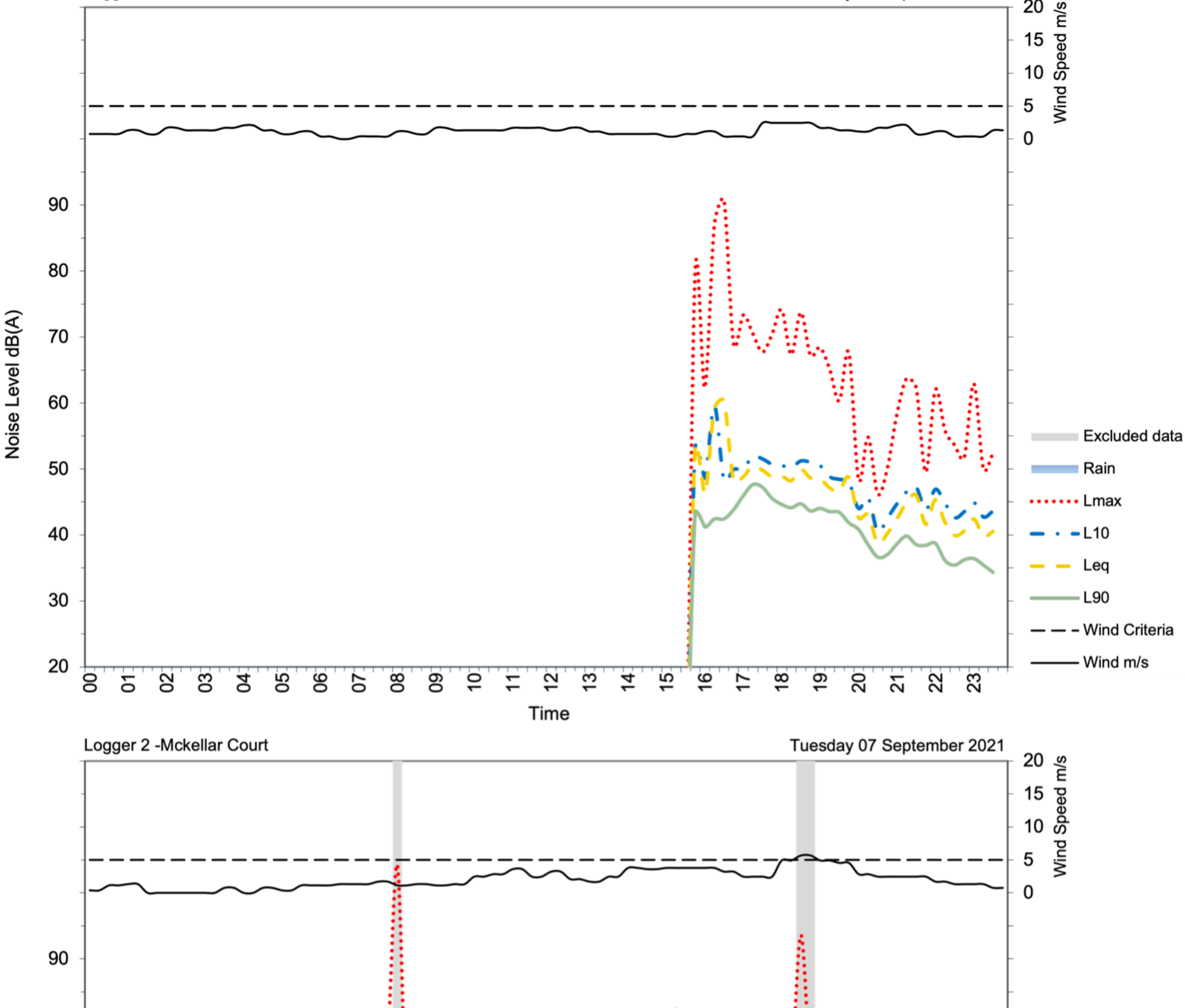
Wind Criteria

Wind m/s

Time

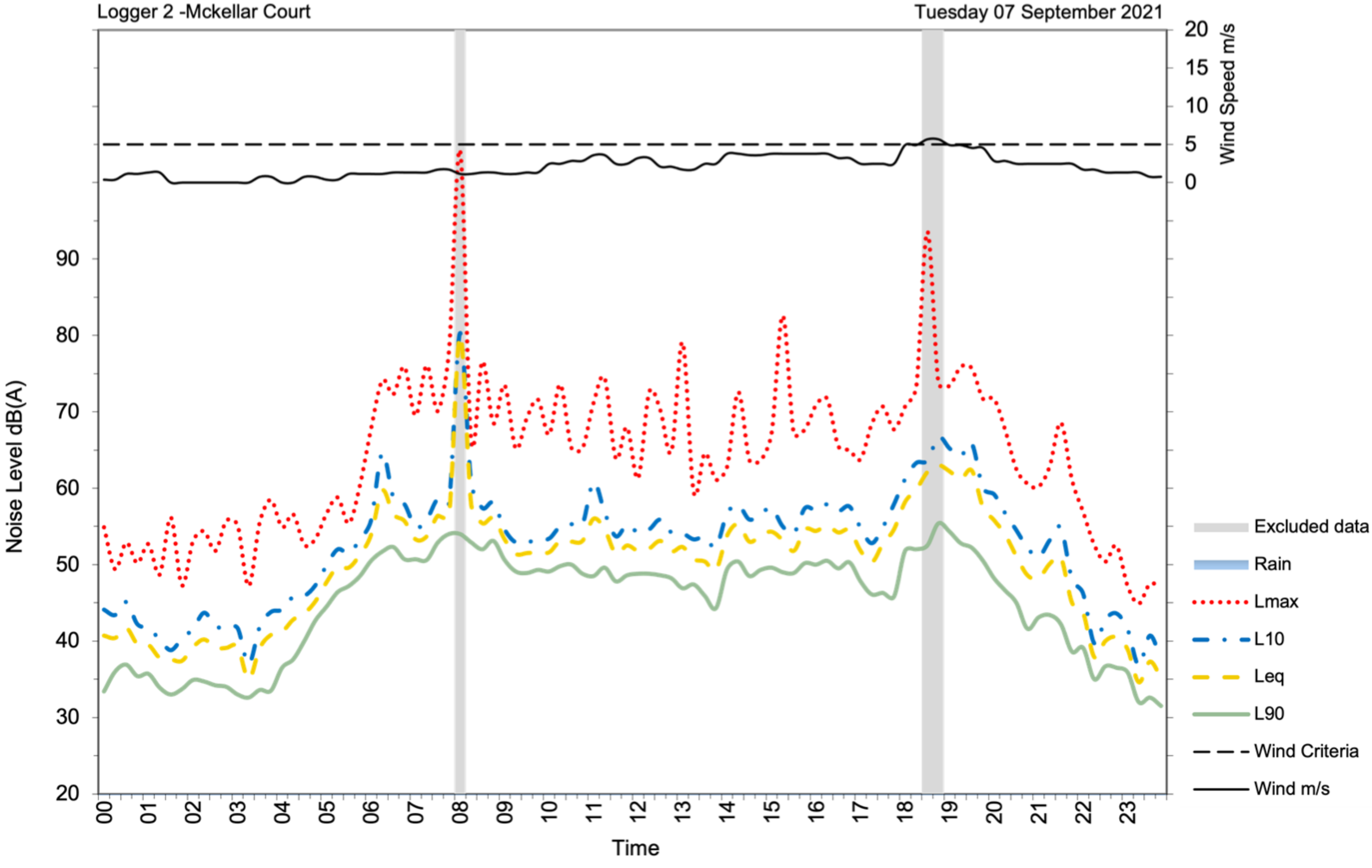
Logger 2 - McKellar Court

Monday 06 September 2021



Logger 2 -Mckellar Court

Tuesday 07 September 2021



Logger 2 -Mckellar Court

Wednesday 08 September 2021

Wind Speed m/s

Noise Level dB(A)

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 1 - Stone Mason Drive

Thursday 09 September 2021

Wind Speed m/s

Noise Level dB(A)

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 1 - Stone Mason Drive

Friday 10 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Saturday 11 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Sunday 12 September 2021

Wind Speed m/s

Noise Level dB(A)

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Monday 13 September 2021

Wind Speed m/s

Noise Level dB(A)

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Tuesday 14 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Wednesday 15 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Thursday 16 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Friday 17 September 2021

Noise Level dB(A)

Wind Speed m/s

Time

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Logger 2 - McKellar Court

Saturday 18 September 2021

Noise Level dB(A)

Wind Speed m/s

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Time

Logger 2 - McKellar Court

Sunday 19 September 2021

Noise Level dB(A)

Wind Speed m/s

Excluded data

Rain

Lmax

L10

Leq

L90

Wind Criteria

Wind m/s

Time

Appendix B — Noise contours

Kellyville Park Centre of Excellence and Community Facility

Noise contours
Site establishment

PROJECT NUMBER	S200621
DRAWN BY	JH
DATE ISSUED	September 2023
CLIENT	Kane Constructions
PREDICTION METHOD	Concawe
GROUND ABSORPTION	G=0.4
RECEIVER HEIGHT	1.5 m AGL
TEMP	24°C
RH	70%

NCA01
NCA02
NCA03
NCA04
NCA05
NCA06

Legend

Site Boundary
NCA

Reciever classifcations

- Child Care
- Commercial/Business
- Medical
- Recreational/Open Space
- Residential

Noise contours dB(A)

- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

N

0 70 140 210 m

Datum WGS 84, Projection UTM ZONE 50S

Resonate

Kellyville Park Centre of Excellence and Community Facility

Noise contours
Demolition works

PROJECT NUMBER	S200621
DRAWN BY	JH
DATE ISSUED	September 2023
CLIENT	Kane Constructions
PREDICTION METHOD	Concawe
GROUND ABSORPTION	G=0.4
RECEIVER HEIGHT	1.5 m AGL
TEMP	24°C
RH	70%

NCA01

NCA02

NCA03

NCA04

NCA05

NCA06

Legend

Site Boundary

NCA

Reciever classifcations

- Child Care
- Commercial/Business
- Medical
- Recreational/Open Space
- Residential

Noise contours dB(A)

- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

N

0 70 140 210 m

Datum WGS 84, Projection UTM ZONE 50S

Resonate

Kellyville Park Centre of Excellence and Community Facility

Noise contours
Retaining piles

PROJECT NUMBER	S200621
DRAWN BY	JH
DATE ISSUED	September 2023
CLIENT	Kane Constructions
PREDICTION METHOD	Concawe
GROUND ABSORPTION	G=0.4
RECEIVER HEIGHT	1.5 m AGL
TEMP	24°C
RH	70%

NCA01
NCA02
NCA03
NCA04
NCA05
NCA06

Legend

Site Boundary
NCA

Reciever classifcations

Child Care
Commercial/Business
Medical
Recreational/Open Space
Residential

Noise contours dB(A)

35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
> 75

N

0 70 140 210 m

Datum WGS 84, Projection UTM ZONE 50S

Resonate

Kellyville Park Centre of Excellence and Community Facility

Noise contours
Structure construction

PROJECT NUMBER	S200621
DRAWN BY	JH
DATE ISSUED	September 2023
CLIENT	Kane Constructions
PREDICTION METHOD	Concawe
GROUND ABSORPTION	G=0.4
RECEIVER HEIGHT	1.5 m AGL
TEMP	24°C
RH	70%

NCA01
NCA02
NCA03
NCA04
NCA05
NCA06

Legend

- Site Boundary
- NCA

Reciever classifcations

- Child Care
- Commercial/Business
- Medical
- Recreational/Open Space
- Residential

Noise contours dB(A)

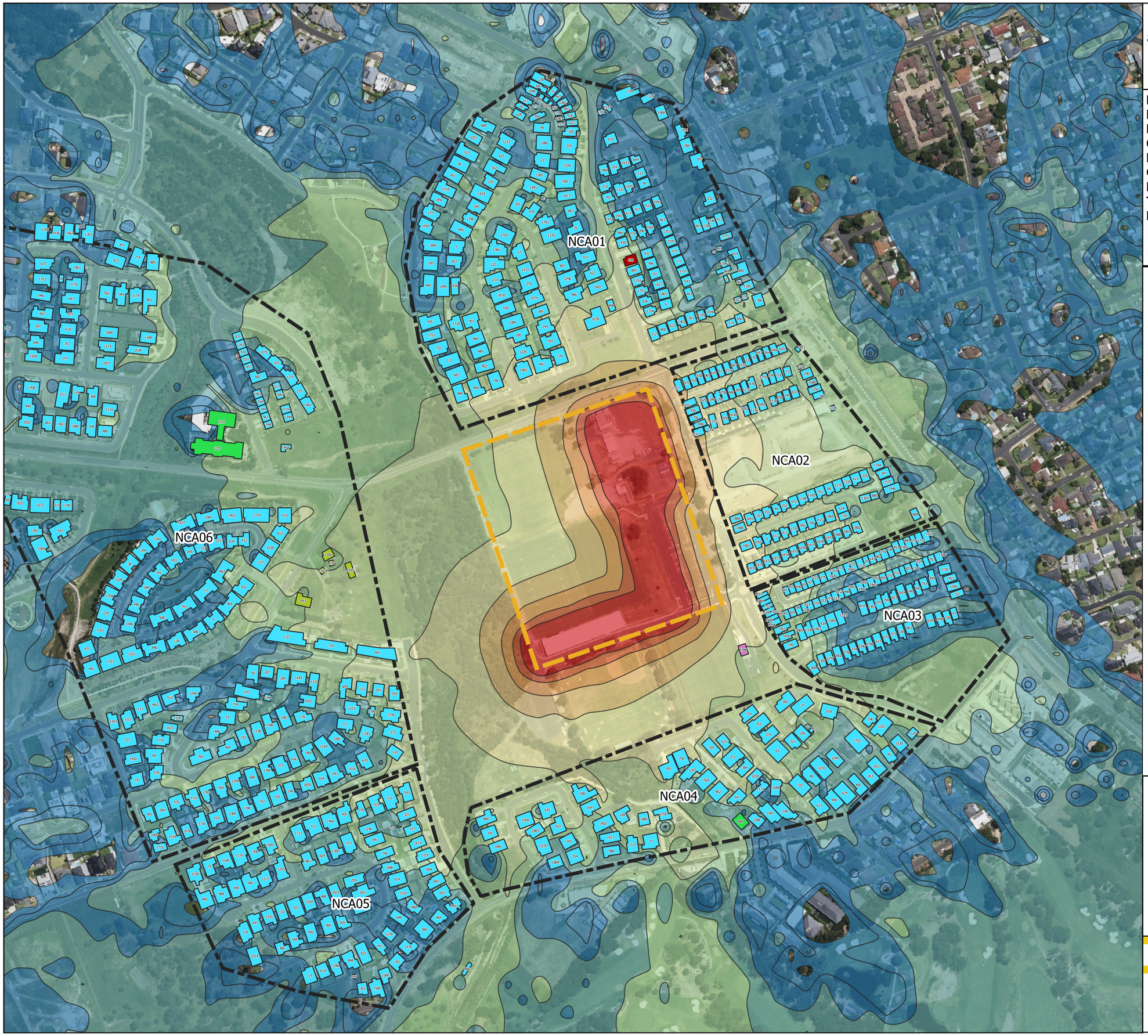
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

N

0 70 140 210 m

Datum WGS 84, Projection UTM ZONE 50S

Resonate



Kellyville Park Centre of Excellence and Community Facility

Noise contours
Frame

PROJECT NUMBER	S200621
DRAWN BY	JH
DATE ISSUED	September 2023
CLIENT	Kane Constructions
PREDICTION METHOD	Concawe
GROUND ABSORPTION	G=0.4
RECEIVER HEIGHT	1.5 m AGL
TEMP	24°C
RH	70%

Legend

Site Boundary

NCA

Reciever classifcations

- Child Care
- Commercial/Business
- Medical
- Recreational/Open Space
- Residential

Noise contours dB(A)

- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

N

0 70 140 210 m

Datum WGS 84, Projection UTM ZONE 50S

Resonate

Kellyville Park Centre of Excellence and Community Facility

Noise contours
Facade works

PROJECT NUMBER	S200621
DRAWN BY	JH
DATE ISSUED	September 2023
CLIENT	Kane Constructions
PREDICTION METHOD	Concawe
GROUND ABSORPTION	G=0.4
RECEIVER HEIGHT	1.5 m AGL
TEMP	24°C
RH	70%

NCA01
NCA02
NCA03
NCA04
NCA05
NCA06

Legend

Site Boundary
NCA

Reciever classifcations

- Child Care
- Commercial/Business
- Medical
- Recreational/Open Space
- Residential

Noise contours dB(A)

- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

N

0 70 140 210 m

Datum WGS 84, Projection UTM ZONE 50S

Resonate

Kellyville Park Centre of Excellence and Community Facility

Noise contours
Internal works

PROJECT NUMBER	S200621
DRAWN BY	JH
DATE ISSUED	September 2023
CLIENT	Kane Constructions
PREDICTION METHOD	Concawe
GROUND ABSORPTION	G=0.4
RECEIVER HEIGHT	1.5 m AGL
TEMP	24°C
RH	70%

NCA01

NCA02

NCA03

NCA04

NCA05

NCA06

Legend

Site Boundary

NCA

Reciever classifcations

- Child Care
- Commercial/Business
- Medical
- Recreational/Open Space
- Residential

Noise contours dB(A)

- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

N

0 70 140 210 m

Datum WGS 84, Projection UTM ZONE 50S

Resonate

APPENDIX C - AIR QUALITY MANAGEMENT PLAN

APPENDIX C

Parramatta Eels Centre of Excellence

Construction Air Quality Management Plan

Kane Constructions Pty Ltd

2 John Street
Waterloo NSW 2017

Prepared by:

SLR Consulting Australia

Tenancy 202 Submarine School, Sub Base
Platypus, 120 High Street, North Sydney NSW
2060, Australia

SLR Project No.: 610.031438.00001

8 September 2023

Revision: 1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	8 September 2023	Danny Echeverri	Ali Naghizadeh	Ali Naghizadeh

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Kane Constructions Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Table of Contents

Tables in Text

Figures in Text

1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Kane Construction Pty Ltd (Kane Constructions) to prepare a Construction Air Quality Management Plan (CAQMP) for the construction of the Parramatta Eels Centre of Excellence (the Project), as per Development Consent (SSD 24452965) conditions C13, C14 and C15.

The construction works to which this CAQMP relates, includes (but is not limited to) the construction of state-of-the-art facilities which enable physical recreation opportunities in conjunction with improved facilities for staff, players and existing users of the Project site. The proposed development will be integrated with the existing recreational landscape of the site and complement the upgrades to the existing playing fields being undertaken by Council. It is noted that the construction of the Centre of Excellence and Community Facility will be staged. It is anticipated that construction of the Community Facility will be completed over approximately 10 months. Construction works for the Centre of Excellence will begin after the completion of the Community Facility construction and is anticipated to take approximately 13 months.

Kane Constructions have been contracted by Parramatta National Rugby League Club Pty Ltd to undertake the construction works.

1.1 Objectives of the CAQMP

The objectives of this CAQMP are as follows:

- Maintain acceptable levels of amenity for surrounding residents.
- Maintain an effective response mechanism to deal with issues and complaints relating to emissions of dust and other air pollutants from the construction works.
- Outline roles and responsibilities in relation to the management of dust and other air pollutant emissions during construction; and
- Promote awareness of the Project's air quality impacts and responsibilities among employees and subcontractors.

2.0 Statutory Requirements

The requirements relating to air quality management stipulated by Development Consent (SSD 24452965) for the construction of the Project, and where they have been addressed in this CAQMP are shown in **Table 1**.

Further information on relevant ambient air quality standards and guidelines are detailed in **Section 5.0**.

Table 1: Air Quality Management Conditions

Conditions	Section Reference
Condition C13	
a) prepared by a suitably qualified and experienced expert in accordance with the EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (the Approved Methods);	Prepared by SLR's specialist air quality consultants
b) relevant environmental criteria to be used in the day-to-day management of dust and volatile organic compounds (VOC/odour),	**Section 8.0**
c) mission statement,	**Section 1.1**
d) dust and VOCs/odour management strategies consisting of: i) objectives and targets, ii) risk assessment, iii) suppression improvement plan, iv) monitoring requirements including assigning responsibility (for all employees and contractors), v) communication strategy, and vi) system and performance review for continuous improvements.	**This report**
e) be consistent with and incorporate all relevant recommendations and mitigation measures detailed in the Air Quality and Odour Assessment, prepared by SLR, dated March 2022	**Section 7.0**
Condition C14	
The AQMP must detail management practices to be implemented for all dust and VOC/odour sources at the site. The AQMP must also detail the dust, odour, VOC and semi-volatile organic compounds (SVOC) monitoring program (eg. frequency, duration and method of monitoring) to be undertaken for the Project.	**Section 8.0** and **Section 11.0**
Condition C15	
The Applicant must also develop and implement an appropriate comprehensive Reactive Air Quality and Odour Management Plan which will incorporate an Ambient Air Monitoring Program and Reactive Management Strategy to ensure that the assessment criteria are met during the works.	**Section 12.0**

3.0 Project Overview

3.1 Project Site Location and Context

The Project site is located at 8 Memorial Avenue, Kellyville NSW, approximately 36 km northwest of the Sydney Central Business District (CBD) and 13 km Northwest of Parramatta CBD. **Figure 1** illustrates the location of Project site.

The land to which the development consent relates comprises Lot 60 DP10702 and Lot 1 DP167535.

Figure 1: Project Site Location

3.2 Surrounding Land Uses and Receptors

The area surrounding the Project site includes lands zoned as local centre, commercial core, mixed use, general residential, public recreation and infrastructure, as seen in **Figure 2.** neighbouring sensitive receptors are shown in **Figure 3.**

Figure 2: Land Zoning

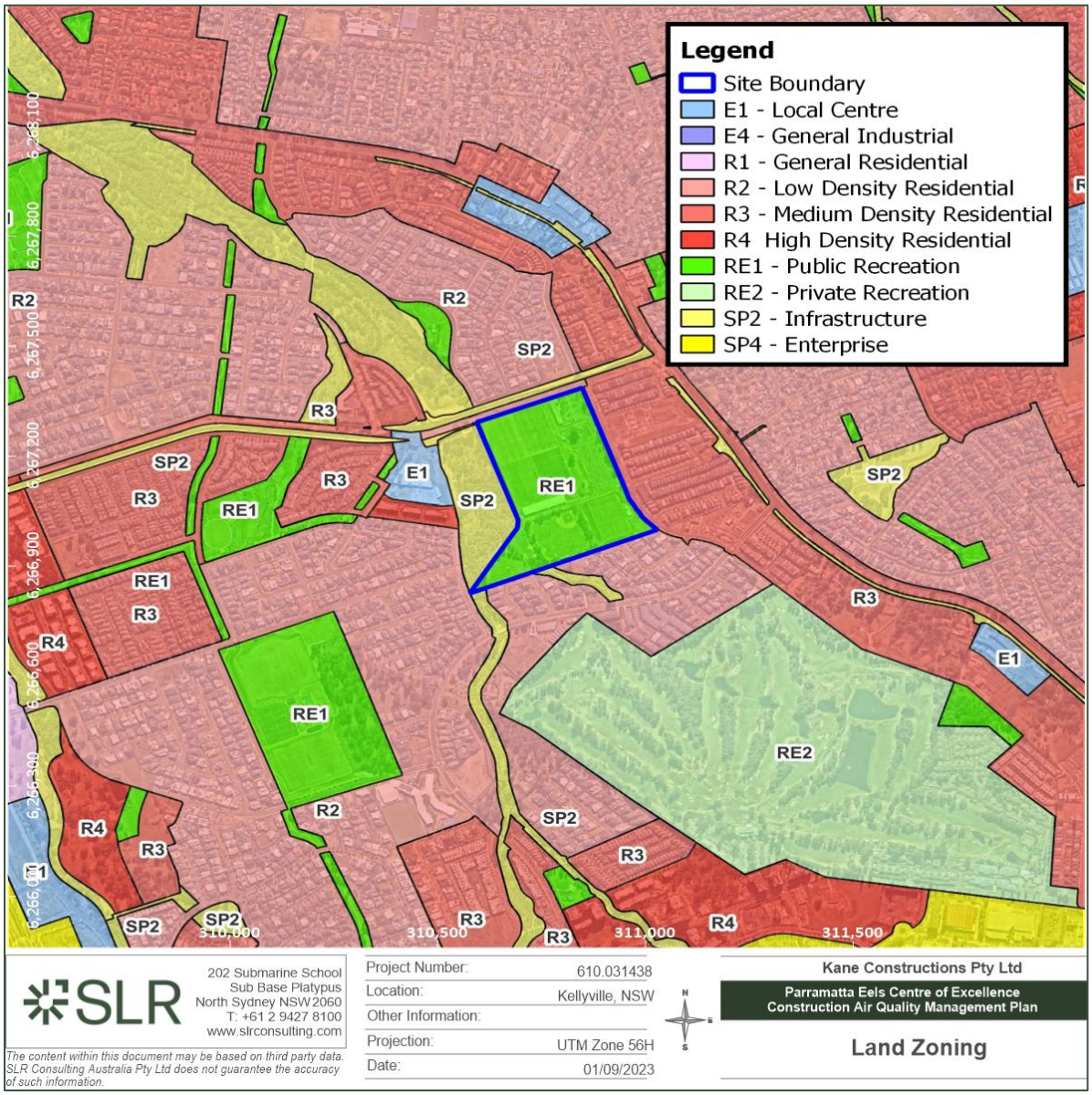
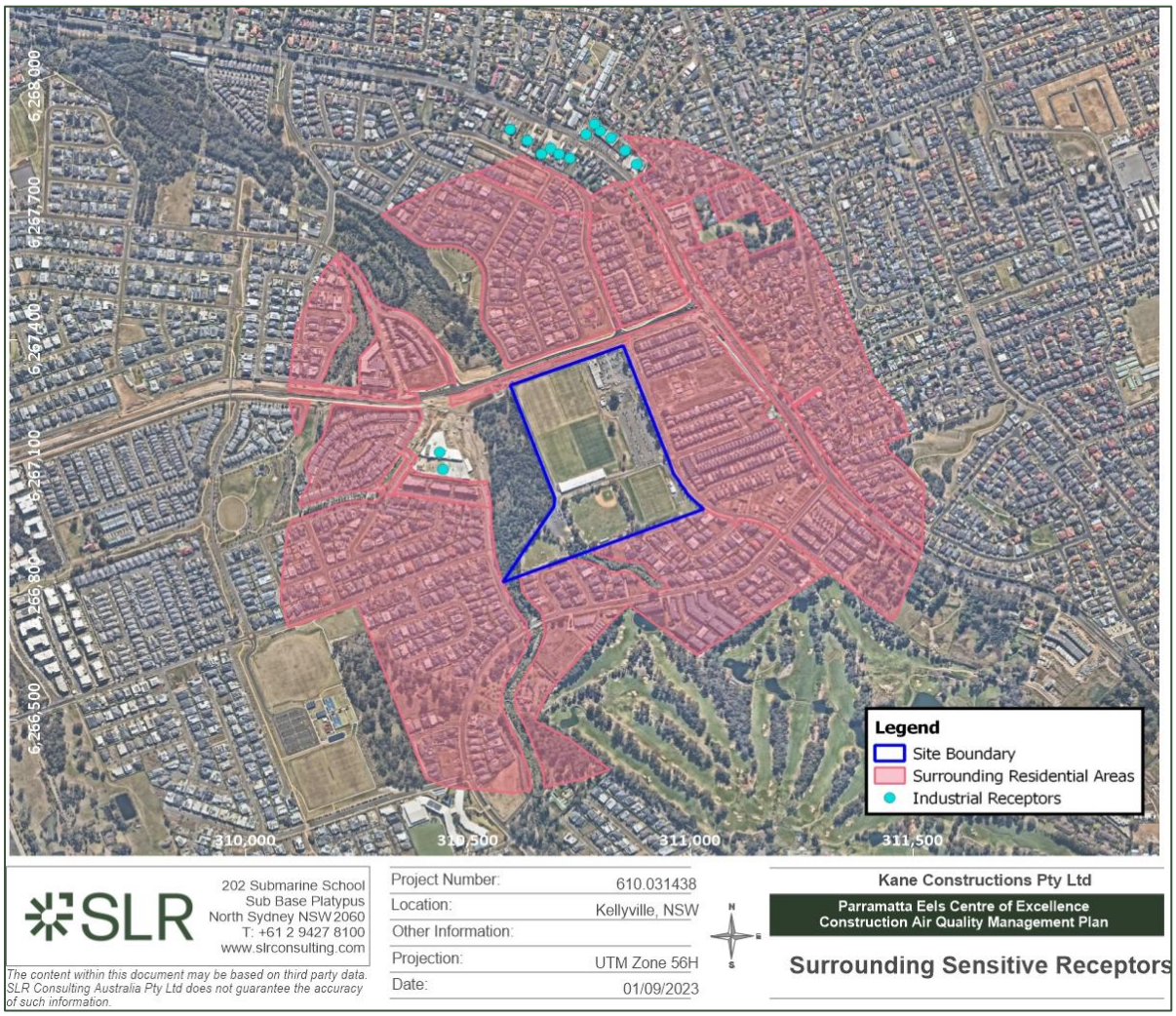


Figure 3: Sensitive Receptor Locations



3.3 Construction Activities

Construction works for the Project are summarised as follows:

- Construction of high-performance Centre of Excellence in the northeast of the Project site adjacent to Training Field 2. The Centre of Excellence is proposed to include:
    - Elite level gymnasium
    - Medical and rehabilitation facilities
    - Aquatic recovery and rehabilitation pools
    - Lecture theatre and meeting rooms
    - Player education and study areas
    - Administration offices for the Parramatta Eels
    - New female facilities including a dedicated female change room, cubicle toilets and showers
    - Balcony and terrace area

  - End of Trip Facilities and bicycle parking
  - Refuse Area
- Construction of a Community Facility, including a grandstand with approximately 1,500 seats in the centre of the Project site adjacent to the Main Playing Field 3. The Community Facility is proposed to include:
  - Unisex changerooms and amenities
  - Referee changeroom and amenities
  - First Aid/Medical room
  - Community gymnasium
  - Café/kiosk
  - Concourse terrace
  - Multipurpose community function room with kitchen and amenities
  - Refuse Area
  - Bicycle parking
- Solar arrays will be included on the roof of both the Centre of Excellence and Community Facility.
- Additional 40 car parking spaces for the s to operate in conjunction with existing at grade car parking already constructed by Council.
- Additional landscaping throughout the development footprint.
- Removal of a small number of trees internal to the site, however noting perimeter trees will be retained where not affected by the proposed building footprints.

3.4 Construction Hours

In accordance with the SSD approval, working hours between

- 7:00 am to 6:00 pm Monday to Friday
- 8:00 am to 1:00 pm Saturdays

Rock breaking, rock hammering, sheet piling, pile driving, and similar activities will only be carried out between the following hours;

- 9:00 am to 12:00 pm Monday to Friday
- 2:00 pm to 5:00 pm Monday to Friday
- 9:00 am to 12:00 pm Saturday.

3.5 Key Contact Details

Table 2 lists the key contacts during the construction.

Table 2: Construction Contract List

Role	Name	Company	Contact Details
Project Manager	Nathan Parris	Kane Constructions	0401 395 980
Project Manager	Michael Wright	Kane Constructions	0403 045 215
Site Manager	Andrew Baker	Kane Constructions	0400 743 356

4.0 Potential Sources of Air Emissions

Potential air emissions associated with the construction of the Project include:

- Fugitive dust emissions
- Products of combustion from construction plant, machinery; and
- Odours from contaminated soil material.

4.1 Fugitive Dust Emissions from Construction Activities

During the construction works, fugitive dust emissions are considered to have the greatest potential for off-site air quality impacts, which could give rise to nuisance and/or health impacts for the surrounding sensitive areas. Temporary elevation in the emissions of particulate matter and local dust is considered to be inevitable as part of the construction works, particularly where those activities are undertaken during periods of low rainfall and/or windy conditions.

The impact of elevated dust emissions is dependent upon the potential for particulates to become and remain airborne prior to being deposited as dust or experienced as an ambient particulate concentration. The key potential sources of dust associated with construction works at the Project site have been identified as:

- Dust emissions from earthworks activities (e.g. excavation and loading of soils to trucks and barges);
- Wind-generated dust from disturbed surfaces and stockpiles;
- Wheel-generated dust and particulate matter emissions in diesel exhaust emissions from on-site plant and equipment and construction traffic movements;
- Particulate matter associated with vehicle emissions from increased/congested traffic emissions due to road closures or diversions; and
- Dust generated from drilling, piling and hammering activities.

In addition to the construction activities being carried out at any point in time, a number of other environmental factors may also affect the generation and dispersion of dust emissions, including:

- Wind direction - determines whether dust generated at the Project site are transported in the direction of the sensitive receptors;

- Wind speed - governs the potential lift off and drift resistance of particles;
- Rainfall or dew - rainfall or heavy dew that wets the surface of the soil reduces the risk of dust generation.
- Surface type - more erodible surface material types have an increased soil or dust erosion potential;
- Surface material moisture - increased surface material moisture levels reduces soil or dust erosion potential.

4.2 Products of Combustion from Construction Plant and Machinery

Diesel and petrol fuelled trucks, excavators, dozers and other equipment associated with the construction of the Project site will emit products of fuel combustion. A review of the National Pollutant Inventory Emission Estimation Technique Manual (NPI EET) for Combustion Engines (DSEWPC 2008) identifies the primary pollutants from combustion engines as:

- Carbon monoxide (CO).
- Oxides of nitrogen (NO_x).
- Particulate matter less than 2.5 µm in aerodynamic diameter ($PM_{2.5}$).
- Particulate matter less than 10 µm in aerodynamic diameter (PM_{10}).
- Sulfur dioxide (SO_2).
- Total Volatile Organic Compounds (TVOCs).

Other substances are also emitted in trace amounts as products of incomplete combustion, such as metallic additives, which contribute to the particulate content of the exhaust (DSEWPC 2008).

4.3 Odours Emissions

According to the Air Quality Assessment prepared for the Project by SLR Consulting (SLR Consulting 2022) (hereafter, the Air Quality Assessment) at the SSDA stage found that that no significant sources of emissions of odour are expected during the construction phase of the Project. A preliminary site investigation (contamination) undertaken by Douglas Partners Pty Ltd (DP) for the Project found that there is a low potential for contamination associated with fill at the site (Douglas Partners Pty Ltd 2021). A subsequent detailed site investigation (contamination) undertaken by DP, that involved the collection and testing of 29 soil samples from test locations across the Project site found:

- Concentration of contaminants were below the relevant health investigation levels and health screening levels at all locations tested
- Concentrations of contaminants were below the relevant the ecological investigation levels and ecological screening levels at all but two locations. The two exceedances were deemed by DP as minor and not considered statistically significant.

Given the above, the risk of volatilisation of ground contaminants were considered by the Air Quality Assessment to be negligible. Nevertheless, to reduce the potential for any nuisance odours a number of mitigation measures have been adopted (refer **Section 8.0**).

5.0 Relevant Air Quality Criteria

The following sections outline the potential health and amenity issues associated with the particulate matter along with relevant ambient air quality criteria.

Note - in the event that additional monitoring of other pollutants is required, then the CAQMP is to be updated with relevant criteria.

5.1 Particulate Matter (Dust)

Airborne contaminants that can be inhaled directly into the lungs can be classified on the basis of their physical properties as gases, vapours or particulate matter. In common usage, the terms “dust” and “particulates” are often used interchangeably. The health effects of particulate matter are strongly influenced by the size of the airborne particles. Smaller particles can penetrate further into the respiratory tract, with the smallest particles having a greater impact on human health as they penetrate to the gas exchange areas of the lungs. Larger particles primarily cause nuisance associated with coarse particles settling on surfaces.

The term “total particulate matter” (TSP) refers to a category of airborne particles, typically less than 30 microns (µm) in diameter. Particulate matter with an aerodynamic diameter of 10 microns or less is referred to as PM_{10}. The PM_{10} size fraction is sufficiently small to penetrate the large airways of the lungs, while $PM_{2.5}$ (2.5 microns or less) particulates are generally small enough to be drawn in and deposited into the deepest portions of the lungs. Potential adverse health impacts associated with exposure to PM_{10} and $PM_{2.5}$ include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children. In an urban setting, the emission of $PM_{2.5}$ is primarily associated with vehicles exhausts resulting from the incomplete combustion of diesel.

State air quality guidelines specified by the NSW Environmental Protection Agency (EPA) are published in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA 2022) (hereafter ‘Approved Methods’). The ground level air quality impact assessment criteria listed in Section 7 of the Approved Methods have been established by NSW EPA to achieve appropriate environmental outcomes and to minimise associated risks to human health as published in the Approved Methods. They have been derived from a range of sources and are the defining ambient air quality criteria for NSW, and are considered to be appropriate for the Project.

In addition to health impacts of particulate matter, nuisance impacts need also to be managed, mainly in relation to deposited dust. Dust can cause nuisance by settling on surfaces and possessions, affecting visibility and contaminating tank water supplies. High rates of dust deposition can also adversely affect vegetation by blanketing leaf surfaces. The rate of dust deposition is measured by means of a collection gauge, which catches the dust settling over a fixed surface area and over a period of about 30 days. Given the long sample times and delays between sampling and reporting of deposition levels, monitoring of dust deposition cannot be used for reactive dust management. The air quality goals adopted for the Project are summarised in **Table 3.**

Table 3: Project Air Quality Goals

Activity	Description	Timing
PM_{10}	24 Hours	50 µg/m^3
	Annual	25 µg/m^3
Source: Approved Methods, **(NSW EPA 2022)**		

6.0 Receiving Environment

6.1 Local Meteorology

Local wind speed and direction influence the dispersion of air pollutants. Wind speed determines both the distance of downwind transport and the rate of dilution as a result of 'plume' stretching. Wind direction, and the variability in wind direction, determines the general path pollutants will follow and the extent of crosswind spreading. Surface roughness (characterised by features such as the topography of the land and the presence of buildings, structures and trees) will also influence dispersion.

Considering the distance and terrain features between the Project site and the nearest weather stations, the Air Quality Assessment, found that recordings from these stations are not a reasonable representation of the wind conditions in the area surrounding the Project site. Given this, the Air Quality Assessment used the Air Pollution Model (TAPM) meteorological model (Version 4.0.4) to compile a more site-representative dataset for the Project site.

A summary of the average annual and seasonal wind behaviour predicted by TAPM for the modelled years (2016-2020) at Project site is presented as wind roses in in **Figure 4.**

Wind roses show the frequency of occurrence of winds by direction and strength. The bars correspond to the 16 compass points (degrees from North). The bar at the top of each wind rose diagram represents winds blowing from the north (i.e., northerly winds), and so on. The length of the bar represents the frequency of occurrence of winds from that direction, and the widths of the bar sections correspond to wind speed categories, the narrowest representing the lightest winds. Thus, it is possible to visualise how often winds of a certain direction and strength occur over a long period, either for all hours of the day, or for periods during the day.

The annual wind rose for the years 2016-2020 (**Figure 4**) indicates that throughout the year, winds are mostly light to gentle (between 1.5 m/s and 5.5 m/s) and blow from the northeast quadrant. Calm wind conditions (wind speed less than 0.5 m/s) were predicted to occur approximately 2.4% of the time.

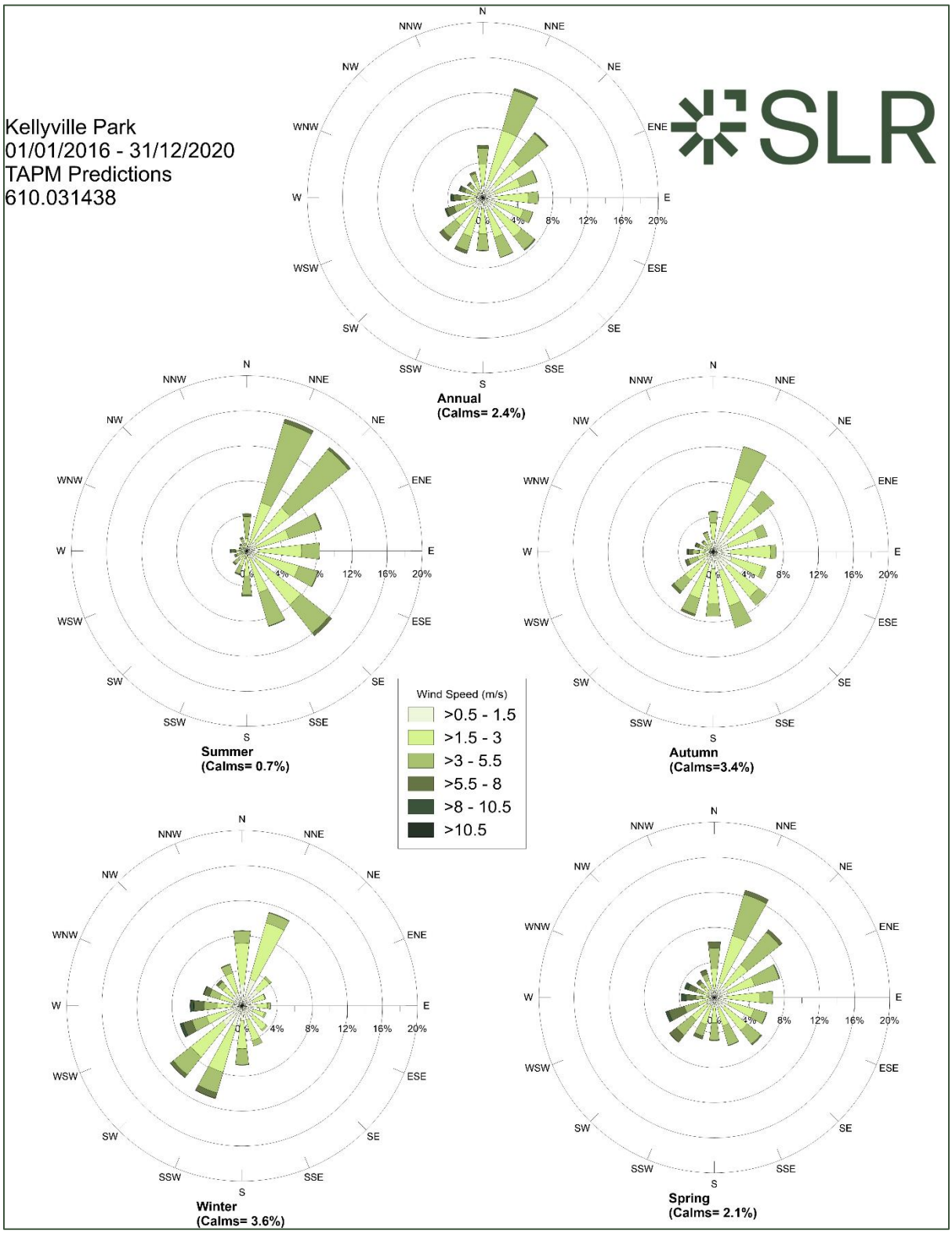
The seasonal wind roses for the years 2016-2020 (**Figure 4**) indicate that:

- In summer, winds are predominantly from northeast quadrant, with few winds from the south-southwest to north-northwest directions. Calms were predicted to occur approximately 0.7% of the time.
- In autumn, winds are predominantly from the northeast and southeast quadrants and there is a higher frequency of winds from the south-southwest quadrant compared to summer. Calms were predicted to occur approximately 3.4% of the time.
- In winter, winds are predominantly from southwest quadrant with very few winds from the northeast to south-southeast directions. Calms were predicted to occur approximately 3.6% of the time.

- In spring winds blow from all directions with the highest frequency of winds from the northeast quadrant and the lowest frequency from the northwest quadrant. Calms were predicted to occur approximately 2.1% of the time.

As identified in **Section 3.2**, the closest sensitive receptors are located to the north, east and south of the Project site. Winds blowing emissions from the site towards these sensitive receptors occur throughout the year.

Figure 4: Project Site Annual and Seasonal Wind Roses, 2016-2020



6.2 Background Air Quality

Air quality monitoring is performed by the NSW Department of Planning and Environment (DPE) at a number of monitoring stations across NSW. The nearest such station is located at Rouse Hill, approximately 6 km northwest of the Project site. The Rouse Hill AQMS was commissioned in June 2019 and is located on Cudgegong Rd at an elevation of 73 m. The following air pollutants are monitored at this station:

- NO, NO_2 and NO_x
- SO_2
- CO
- $PM_{2.5}$ and PM_{10}

A summary of the monitored pollutant concentrations for the last four years (2019-2022) is summarised in **Table 4** and the data are presented graphically in **Table 4**. To be consistent with the annual NSW compliance monitoring reports, the data for gaseous pollutants are presented in parts per hundred million (pphm) or parts per million (ppm), rather than $\mu g/m^3$ and mg/m^3.

Exceedances of the 24-hour average PM_{10} and $PM_{2.5}$ criteria were recorded by the Rouse Hill AQMS each year over the period analysed except for 2022. A review of the available compliance monitoring reports indicates that these exceedances were primarily due to exceptional events such as bushfires, dust storms or hazard reduction burns. Very elevated PM_{10} and $PM_{2.5}$ concentrations were recorded along the east coast of Australia in late 2019 and early 2020 during the 'Black Summer' bushfire event.

Exceedances of the annual average PM_{10} and $PM_{2.5}$ criteria were recorded for the year 2019 only; these exceedances were primarily due to the above-mentioned bush fires, which impacted much of the state in late 2019 and early 2020.

Ambient concentrations of the gaseous pollutants SO_2, NO_2, and CO were all well below the relevant criteria for all years investigated.

Table 4: Summary of Rouse Hill AQMS Data (2019 – 2022)

Pollutant	PM_{10}		$PM_{2.5}$		CO	NO_2		SO_2	
Averaging Period	Maximum 24-hour	Annual	Maximum 24-hour	Annual	Maximum 1-hour	Maximum 1-hour	Annual	Maximum 1-hour	Maximum 24-hour
Units	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	ppm	pphm	pphm	pphm	pphm
2019	216.2 (24)	27.3	183.5 (24)	12.7	6.2 (0)	5.0 (0)	0.6 (0)	1.1 (0)	0.50 (0)
2020	220.3 (10)	18.3	61.3 (10)	7.1	12.0 (0)	3.4 (0)	0.5 (0)	2.8 (0)	0.50 (0)
2021	51.6 (1)	15.0	40.5 (4)	5.9	1.5 (0)	3.4 (0)	0.5 (0)	2.2 (0)	0.30 (0)
2022	23.8 (0)	11.8	14.8 (0)	4.6	0.9 (0)	3.3 (0)	0.5 (0)	0.9 (0)	0.30 (0)
Criteria	**50**	**25**	**25**	**8**	**25**	**8**	**1.5**	**10**	**2**

Notes:
• red font indicates an exceedance of the relevant criterion
• numbers in brackets represent number of exceedances of relevant criteria recorded each year

7.0 Assessment of Air Quality Emissions During Construction

The Air Quality Assessment's findings in relation to the predicted risk of air quality impacts on sensitive receptors after the implementation of mitigation measures (presented in **Section 8.0**) are presented in **Table 5**.

Table 5: Risk of Air Quality Impacts from Preliminary Risk Assessment from Construction Activities (uncontrolled)

Impact	Sensitivity of Area	Residual Risk			
		Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low	Negligible Risk	Low Risk	Low Risk	Negligible Risk
Human Health	Low	Negligible Risk	Negligible Risk	Negligible Risk	Negligible Risk
*Note Demolition works were previously considered in Air Quality Assessment (SLR Consulting Pty Ltd, 2022).					

The mitigated dust deposition and human health impacts for earthworks and construction activities are anticipated to be *low* and *negligible,* respectively. For almost all construction activity, the IAQM Methods notes that the aim should be to prevent significant effects on receptors through the use of effective mitigation and experience shows that this is normally possible.

The Air Quality Assessment was based on the following assumptions:

- Demolition of total building volume of up to 20,000 m^3 would be performed.
- 5 to 10 heavy earth moving vehicles active at any one time
- Total material moved between 20,000 tonnes (t) and 100,000 t.
- Total building volume to be constructed would be between 25,000 m^3 and 100,000 m^3.
- 10 and 50 heavy vehicle movements per day.

SLR understand that there are not demolition plans as part of the construction Project, apart from removal of trees, footpaths, kerbs and vehicle pavements. Further, it is understood that and the abovementioned assumptions remail relevant to the Project. Therefore, the overall risk from the Project construction activities remains unchanged from what was reported in the Air Quality Assessment.

8.0 Mitigation Measures

The air emissions during construction at the Project site and the potential impact (as discussed in **Section 4**) on surrounding sensitive receptors will be controlled through a range of mitigation measures, including good site management, good housekeeping measures, appropriate vehicle maintenance and applying appropriate mitigation measures where required. The dust and odour mitigation measures to be implemented during construction are detailed in **Table 6**.

Table 6: Air Emission Mitigation Measures

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Communications			
Kane Construction's Community Communications Strategy will be implemented.	Kane Constructions Project Manager and Site Manager	Prior to commencing construction and ongoing	SSD 24452965 Condition C13(v)
The name and contact details of person(s) accountable for air quality and dust issues will be displayed on site signage.			Best practice
The head or regional office contact information will be displayed on site signage.			
Complaints and enquiry procedures will be implemented.			Best Practice
Site Management			
Where excessive dust events occur (i.e. continuous monitor trigger or prolonged visual dust in a particular area), additional watering of dust producing activities will be undertaken or activities temporarily halted until such times that the dust source is under control.	Kane Constructions Project Manager and Site Manager	During excessive dust events	Best Practice
Nearest Bureau of Meteorology station (Sydney Olympic Park AWS) weather forecast will be reviewed daily (i.e. wind, rain) to inform site dust management procedures for the day.		Daily	
Preparing and Maintaining the Site			
Adequate measures shall be taken to prevent dust from affecting the amenity of the neighbourhood during construction.	Kane Constructions Project Manager and Site Manager	Ongoing	SSD 24452965 Condition C13

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All materials shall be stored or stockpiled at suitable locations and stockpiles shall be maintained at manageable sizes which allow them to be covered, if necessary, to control emissions of dust and or VOCs/SVOC and odour			Best Practice
The surface should be dampened slightly to prevent dust from becoming airborne but should not be wet to the extent that run-off occurs			Best Practice
Gates shall be closed between vehicle movements and shall be fitted with shade cloth			Best Practice
Cleaning of footpaths and roadways shall be carried out regularly			Best Practice
Dust generating activities in areas close to receptors will be closely monitored and additional mitigation applied as required to best manage potential dust emissions			Best Practice
Stockpiles that will be in place for more than 20 days and are not actively used as well as any stockpiles that are susceptible to wind or water erosion will be suitably protected from erosion within 10 days of the establishment of each stockpile. Temporary stabilisation of disturbed surfaces will be undertaken within two weeks of the stockpile being established.			
Site fencing and barriers will be kept clean using wet methods.			
Prioritise the replacement of highly odorous excavated soil material onto ground where possible to limit odour emissions.			
Excavated soil material is to be kept covered where possible to limit odour emissions.			
Operating Vehicle/Machinery and Sustainable Travel			
All vehicles carrying spoil or rubble to or from the site shall at all times be covered to prevent the escape of dust or other material	Kane Constructions Project Manager and Site Manager	Ongoing	Best practice

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
All equipment wheels shall be washed before exiting the site using manual or automated sprayers and drive-through washing bays			Best practice
All on-road vehicles will comply with relevant vehicle emission standards (prescribed by the NSW RMS), where applicable, and will be maintained in good condition, in accordance with manufacturer's specifications and relevant regulations.			Best practice
Delivery trucks will switch off engines whilst undertaking a delivery on-site, if idling time is likely to exceed 5 minutes.			
Vehicle speed limit of 10km/h are implemented on site.			
Truck queuing and unnecessary trips will be minimised through logistical planning and by the identification and use of specific park up/hold areas away from the Project.			
General			
Only cutting, grinding or sawing equipment fitted with suitable dust suppression systems, such as filters or water sprays will be used.	Kane Constructions Project Manager and Site Manager	Ongoing	Best practice
Adequate water supply will be available on the site for effective dust/particulate matter suppression/ mitigation using a combination of potable and non-potable water sources.			
Water carts will be used on all denuded or exposed surfaces and unsealed roads to minimise dust emissions.			
Equipment, inclusive of, but not limited to Environmental spill kits will be readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.			
Works will be assessed during strong winds or in weather conditions where high levels of airborne particulates may potentially impact the sensitive receivers.		Continuously and during high winds	

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Continual monitoring of wind speed and direction will be undertaken to guide this decision and ensure that adequate mitigation measures are undertaken			
Waste Management			
All trucks entering or leaving the site will have their loads covered.	Kane Constructions Project Manager and Site Manager	Ongoing	Best practice
No waste materials, timbers or any other combustible materials will be burnt on site.			
Earthworks			
Scopes of work will be planned in such a way to assist in minimising the duration that surfaces are left denuded	Kane Constructions Project Manager and Site Manager	Ongoing	Best practice
Rehabilitation of disturbed surfaces will be undertaken within 20 days of final construction levels.		Within 20 days of final construction levels	
If unanticipated strong odours or significant visual dust emissions are noted or observed on site, an investigation will be undertaken by the Project Manager to identify the scope of work or source of the emission prior to undertaking and applying any additional mitigation measures.		Ongoing	
Stockpiles			
Sand and other aggregates will not be allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Kane Constructions Project Manager and Site Manager	Ongoing	Best practice
Trackout			
Water-assisted road sweeper(s) will be used on an as required basis should any material be tracked out of the site.	Kane Constructions Project Manager and Site Manager	Ongoing	Best practice
Record all regular inspections and maintenance undertaken of site haul routes and Project related access roads in a site log book.			
A wheel washing system and/or cattle grid system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site) will be implemented.			

Environmental Management Control	Person Responsible	Timing / Frequency	Reference / Notes
Demolition			
Ensure effective water suppression of dust is used during demolition operations.	Kane Constructions Project Manager and Site Manager	Ongoing	Best practice

9.0 Performance Objectives

Table 7 summarises the performance objectives identified to assess the effectiveness of the control measures shown in **Section 8.0**.

Table 7: Summary of the Parameters to Assess the Effectiveness of Control Measures

Parameter	Visible Dust	Odours and VOCs/SVOCs		PM_{10}	Products of Combustion	Complaints
Key performance indicator	No visible dust leaving the Project site boundary	No odours detected at the boundary of the Project site		<50 µg/m^3 as a 24-hour average	No clearly visible exhaust emissions on any mobile plant or vehicles for a sustained period of 5 seconds when engine is idling[1]	No complaints related to dust or other air quality issues
Monitoring method	Visual inspection / observations	Field observations		Continuous Low Cost Sensor technology monitor	Visual inspection / observations	-
Location, frequency and duration of monitoring	Daily onsite inspection	Daily onsite inspection		Section 11.0	Daily onsite inspection	-
Record keeping	Section 8.0	Section 8.0		Section 11.0	Section 8.0	Section 8.0
Response procedures	Section 12.0	Section 12.0		Section 12.0	Section 12.0	Section 12.0

1. Adopted from https://www.nzta.govt.nz/resources/rules/vehicle-exhaust-emissions-2007/ #4

10.0 Complaints Handling and Response Procedure

All complaints will be handled in accordance with the sections below.

10.1 Performance Objective

To ensure that all environmental complaints in relation to the air emissions from the construction activities are promptly and effectively received, handled and addressed.

10.2 Responsibility

The Project ManagerProject Manager is responsible for ensuring that the appropriate management response and handling procedures are instigated and carried through in the event of an environmental complaint. It should be ensured that all site employees are aware of and understand their obligations for complaints response.

All employees who take receipt of a complaint, either verbal or written, are to immediately notify the Contractor's Project Manager, who will then contact the Project Manager.

10.3 Complaints Handling Procedure

Upon becoming aware of a complaint, the protocol outlined below will be followed.

1. Record and Acknowledge

Any employee who takes receipt of a complaint, either verbal or written, is to immediately notify the Project Manager.

In the normal course of events, the first contact for complaints will usually be made in person or by telephone.

The complainant's name, address and contact details, along with the nature of the complaint, must be requested. If the complainant refuses to supply the requested information, a note will be made on the form and complainant advised of this.

2. Assess and Prioritise

The Project Manager will prioritise all complaints by considering the seriousness of the complaint including risk to health and safety and will attempt to provide an immediate response via phone or email.

3. Investigate

A field investigation will be initiated in an attempt to confirm details relevant to the complaint and the cause of the problem. Any air quality monitoring information and/or site records at and around the time of the complaint will be reviewed for any abnormality or incident that may have resulted in the complaint.

4. Action or Rectify

Once the cause of the complaint has been established, every possible effort will be made to undertake appropriate action to rectify the cause of the complaint and mitigate any further impact. The Project Manager will assess whether the complaint is founded or unfounded and delegate the remediation of the issue to the Contractor's Project Manager for action, as required.

As outlined in **Section 12.0**, if a complaint regarding air quality impacts is concluded to be substantiated, the need for any changes to the air quality mitigation measures identified for the Project in **Section 7.0** and/or the air quality monitoring programme outlined in **Section 11.0** is to be reviewed and, the CAQMP updated as appropriate.

5. Respond to Complainant

The Project Manager and the Contract Superintendent will oversee the rectification of the issue. The Project Manager will then respond to the complainant once the issue has been resolved.

6. Record

It is imperative that an investigation of the situation is carried out and proposed improvements documented in order to minimise the potential for similar complaints in the future. On this basis, every complaint received is to be recorded in the Communications and Complaints Register.

7. Preventative Action

Once the complaint has been suitably handled, proposed improvements will be investigated and implemented to minimise the potential of re-occurrence. The Complaint Enquiry Form will not be closed out until the preventative actions are completed and recorded on the form.

10.4 Complaints Register

A Communications and Complaints Register will be maintained during construction and will contain the following:

- A copy of the environmental complaint handling procedure;
- A separate reference sheet containing the contact details;
- Details of of all complaints received.

11.0 Air Quality Monitoring Program

A summary of the proposed on-site dust monitoring programme to be under taken at the Project site is shown in **Table 8**. The proposed locations of the air quality monitor is illustrated in **Figure 5.**

Table 8: Summary of On-Site Monitoring Programme

Pollutant	Equipment Used	Monitoring Sites	Criterion (Averaging Period)
Suspended Particulate Matter (PM_{10})	SiteHive Hexanode, multi-sensor monitor [a]	Location 1	50 µg/m^3 (24-hour average)
The SiteHive Hexanode system is non-compliant with the Approved Methods and is used as a management tool to proactively manage the onsite operations to reduce dust impacts.			

In addition, monitoring activities listed in **Table 9** will also be conducted in order to ensure appropriate management of mitigation measures.

Table 9: Additional Air Quality Monitoring

Environmental Management Control	Person Responsible	Timing/ frequency	Reference
Perform on-site and off-site inspections where receptors (including roads) are nearby, to observe visible dust and odours travelling off-site, as well as smoky vehicle exhausts and confirm compliance with the relevant performance criteria in Table **Table 8.** Record inspection results and make the log available to the local authority when asked.	Kane Constructions	Daily	Best Practice
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust/odour are being carried out and during prolonged dry or windy conditions.		Ongoing	

Figure 5: Proposed Monitoring Location

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Project Number:	610.031438
Location:	Kellyville, NSW
Other Information:	
Projection:	UTM Zone 56H
Date:	01/09/2023

Kane Constructions Pty Ltd
Parramatta Eels Centre of Excellence
Construction Air Quality Management Plan

Proposed Monitoring Location

12.0 Reactive Air Quality and Odour Management

The reactive air quality and odour management plan for construction at the Project site is shown in **Table 10**. Data from the monitoring program presented in **Section 11.0** in conjunction with site observations and complaints data will be utilised to inform the appropriate response.

Table 10: Air Quality Reactive Management Plan for the Construction of Parramatta Eels Centre of Excellence

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
Visible dust leaving the site	Trigger	Daily inspections show that there is no visible dust leaving the site.	Daily inspections show that there is visible dust leaving the site.	Daily inspections show that there is visible dust leaving the site multiple times during a day OR from multiple locations within the site.
	Response	Continue monitoring program as normal.	Review and investigate construction activities and respective control measures. Where appropriate, implement additional remedial measures, such as: • *Deployment of additional water sprays, water trucks etc*	Undertake an investigation of the dust generating activities, and if necessary, temporarily halt the dust generating activities
Real-time suspended particulate matter monitoring (PM_{10})	Trigger	Running 24-hour average PM_{10} concentrations < 50 µg/m^3	1-hour average PM_{10} concentration >50 µg/m^3 but <100 µg/m^3	1-hour average PM_{10} concentration >100 µg/m^3
	Response	Continue monitoring program as normal.	Project Manager to review and investigate construction activities and respective control measures. Where appropriate, implement additional remedial measures, such as: • Deployment of additional water sprays, water trucks etc • Relocation or modification of dust-generating sources • Record findings of investigations and actions taken to reduce dust levels	• Project Managers to review and investigate construction activities and respective control measures for the monitoring period, in an air pollution incident report.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
			• Continue to closely monitor dust levels to ensure they are decreasing If elevated dust levels are due to regional dust event (fire, dust storm etc) – still take action to minimise dust from the Project site to minimise cumulative impacts, but also record details of the cause of the elevated background levels.	• If it is concluded that construction activities at Project site were directly responsible for the elevated PM_{10} concentrations, Kane Constructions to engage specialist air quality consultants to audit site activities and operator to implement additional mitigation measures (and possibly Australian Standard monitoring) based on audit findings.
Complaints received regarding nuisance dust or odour	Trigger	There are no complaints received during the construction	An air-quality related complaint is received from a nearby resident	Further complaints are received from the same complainant after the additional mitigation measures have been implemented
	Response	Continue monitoring program as normal.	• Complaints are to be recorded in the site complaint register. To be provided to regulator upon request. • Review and investigate construction activities and increase dust suppression measures (additional watering, covering stockpiles etc), where appropriate OR • Implement additional odour remedial measures (cover odour generating stockpile, remove odour sources from site)	• Review real-time monitoring data at the existing continuous monitors to investigate the likelihood of onsite activities contributing to dust impacts. OR • Undertake an investigation of the odour generating activities, and if necessary, temporarily halt the odour generating activities.
Odours detected off-site	Trigger	Daily inspections show that there are no off-site odour observations.	Daily inspections show that there are off-site odour observations.	• Daily inspections show that there are off-site odour observations multiple times during a day OR from multiple locations within the site.
	Response	Continue monitoring program as normal.	Review and investigate construction activities and respective control measures. Where appropriate, implement additional remedial measures, such as:	• Undertake an investigation of the odour generating activities, and if necessary, temporarily halt the odour generating activities.

Key Element	Trigger / Response	Condition Green	Condition Amber	Condition Red
			Covering of odorous stockpiles, removal of odour sources from site, etc	

13.0 Roles and Responsibilities

The key responsibilities specifically for air quality management are as follows:

13.1 Project Manager

- Ensuring appropriate resources/plant/personnel are available for the implementation of this CAQMP;
- Assessing data from inspections and the monitoring program, and providing project-wide advice to ensure consistent approach and outcomes are achieved;
- Providing necessary training for Project personnel to cover air quality management;
- Reviewing and update of this CAQMP;
- Assessing and engaging (as required) additional mitigation controls to best manage the risks of elevated dust levels before commencing works each day and ensuring that the appropriate controls are implemented and effective;
- Ceasing particular scopes of works as required in the event of excessive dust generation due to extreme weather conditions or inadequately controlled construction activities (eg high winds, surface dirt accumulation, etc.); and
- In case of elevated odour emissions, implementing appropriate mitigation measures and/or ceasing particular scopes of works.
- In the event that an air quality complaint is received, the procedure in **Section 10.0** of this CAQMP will be implemented.
- Undertaking dust monitoring program;
- Review that control measures are working in accordance with the CAQMP;
- Alerting the Project Manager of any non-compliances with monitoring data;
- Reviewing weather forecasts daily and current observations of meteorological conditions (as recorded at Horsley Park AWS) and provide details of changing conditions to workforce;
- Throughout the day, visually assessing the dust levels and the effectiveness of any dust controls that have been implemented, which may include engaging additional resources to reduce or mitigate the risk of dust leaving the site;
- Performing on-site and off-site odour observations to ensure no odour impacts arising on neighbouring receptors.

13.2 All Workers on Site

- Observing any dust emission control instructions and procedures that apply to their work;
- Taking action to prevent or minimise dust emission incidents; and
- Identifying and reporting dust emission incidents.

14.0 Review and Improvement of the CAQMP

The review of the CAQMP will be undertaken annually and will include participation by Kane Constructions. The review will comprise, as a minimum, the following:

- Identification of areas of opportunity for ongoing improved environmental performance;
- Analysis of the causes of any recorded non-compliances, including those identified in environment inspections and audits;
- Verification of the effectiveness of corrective and preventative actions; and
- Highlighting any changes in procedures resulting from process improvement.

This CAQMP will also be reviewed and, if necessary, revised in the following circumstances:

- Where there is any change to the scope of the construction activities and/or disturbance footprint;
- Where it is identified that the environmental performance is not meeting the objectives of the CAQMP;
- In the event of a substantiated complaint being received regarding air quality impacts; and/or
- At the request of a relevant regulatory authority.

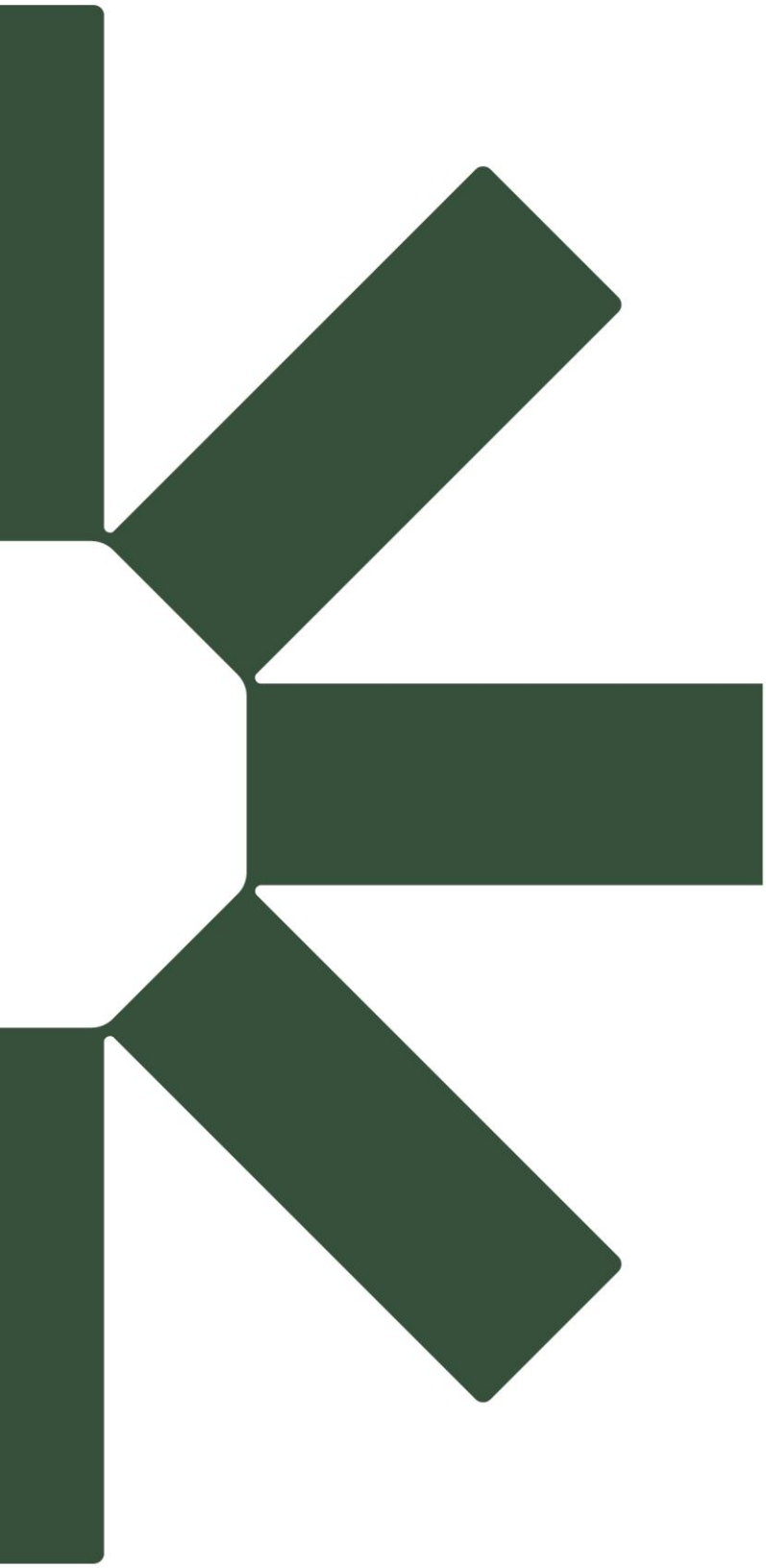
15.0 References

Douglas Partners Pty Ltd. 2021. *Report on Preliminary Site Investigation (Contamination) with Limited Sampling, PNRL Centre of Excellence and Community Facility.*

DSEWPC. 2008. “NPI Emission Estimation Technique Manual for Combustion Engines.” *Version 3.0.* Department of Sustainability, Environment, Water, Population and Communities, June.

NSW EPA. 2022. “Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.” August.

SLR Consulting. 2022. “Kellyville Park Centre of Excellence and Community Facility.” *Air Quality and Odour Assessment.*



Making Sustainability Happen

APPENDIX D - CONSTRUCTION WASTE MANAGEMENT PLAN

APPENDIX D

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WASTE MANAGEMENT PLAN

Kellyville Memorial Park, Corner Memorial Avenue and Stone Mason Drive, Kellyville NSW 2155

Proposed Sporting Complex

Prepared for:	Kane Constructions Pty Ltd
Date Prepared	September 2023
Revision:	1.0
State Significant Development #:	SSD-24452965

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Contents

List of Figures

Introduction

AusWide Consulting was commissioned by Kane Constructions Pty Ltd to prepare a Waste Management Plan (WMP) for approval of a proposed Parramatta Eels Centre of Excellence sporting complex at Kellyville Memorial Park, Kellyville NSW 2155.

The proposed development consists of:

Sporting Complex
Building A – Community Facilities including 1,500 seat stadium
Building B – Parramatta Eels Centre of Excellence

In the course of preparing this WMP, the subject site and its environs have been inspected, plans of the development examined, and all relevant council requirements and documentation collected and analysed.

This WMP has been prepared based on the following information:

- Architectural Plans provided by HB Arch Architecture & Planning
- The Hills Shire Council Waste Management Plan Template
- WESROC

Background and Existing Conditions

The subject site is located at Kellyville Memorial Park, Kellyville NSW 2155, an open sporting playing field bounded by Memorial Avenue to the north, Stone Mason Road to the east, Kennedy Avenue to the south, and an unnamed road to the east. The primary land use surrounding the area is residential.

The following **Figure 1** provides an overview of the area, and its surrounding land uses whilst **Figure 2** provides an aerial view of the immediate area surrounding the subject site.

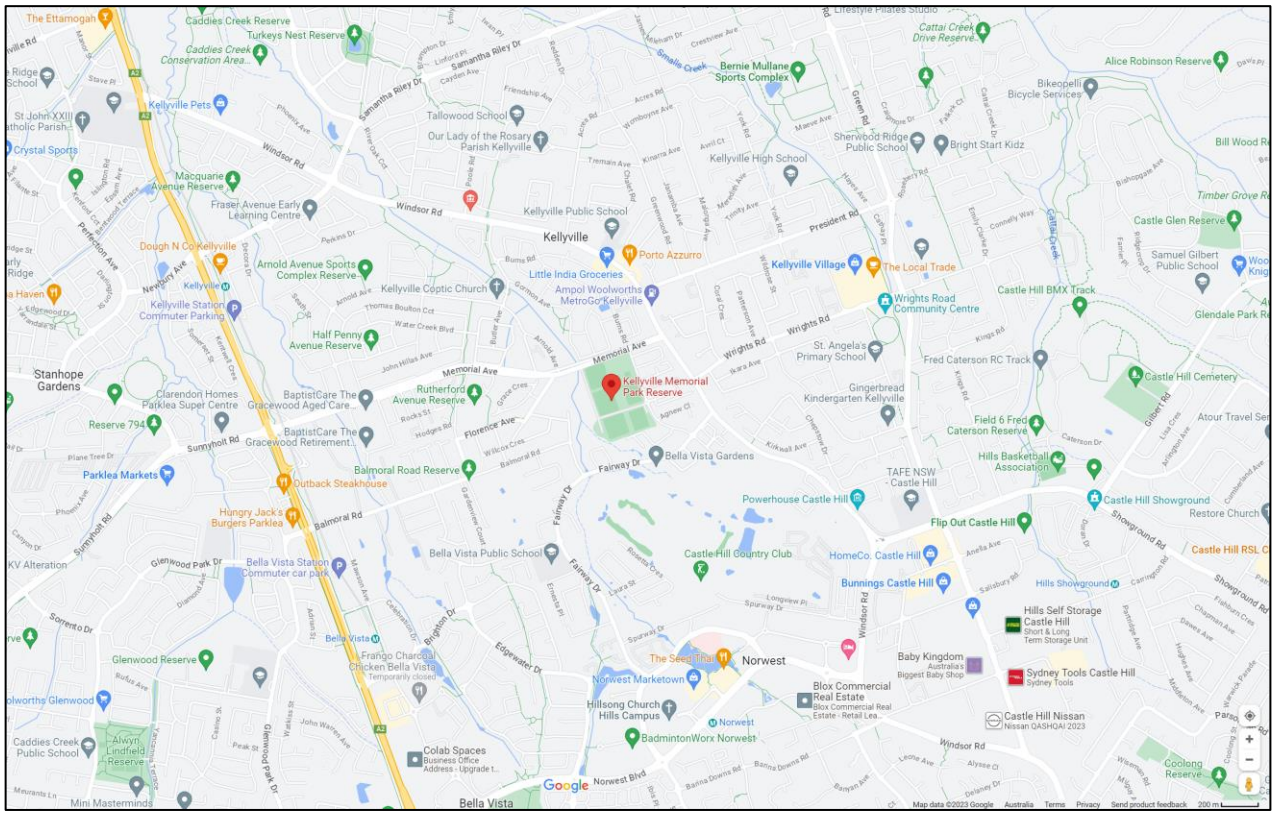


Figure 1 : Location of the Subject Site

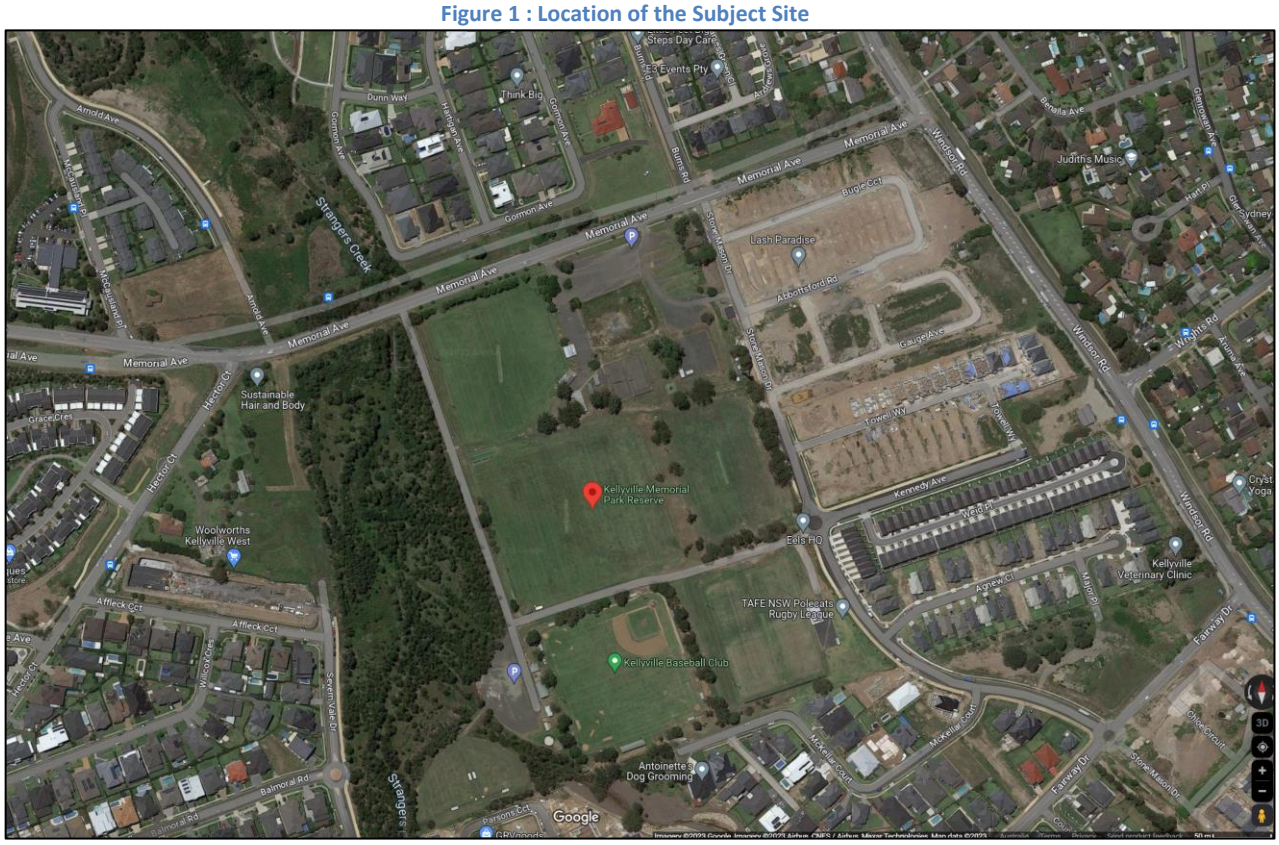


Figure 2 : *Aerial View of the Subject Site*

Proposed Development

The proposed development consists of a sporting centre of excellence and community hub. It will be accessed via the paved driveway off Stone Mason Drive. This waste management plan, consisting of this report and the attached The Hills Shire Council Waste Management Plan

Template, is for the partial demolition of the existing sporting and parking facilities and construction of the sporting centre of excellence and community hub.

Waste Classification

All waste generated to be removed from the site is to be assessed and classified in accordance with the NSW Environment Protection Authority's '*Waste Classification Guidelines Part 1: Classifying Waste*' and be transported and disposed of in accordance with the provisions of the *Protection of the Environment Operations Act 1997* and the *Protection of the Environment (Waste) Regulation 2014*.

Under the EPA waste classification guideline Part 1 "***Building and demolition waste*** *means unsegregated material (other than material containing asbestos waste or liquid waste) that results from:*

- *the demolition, erection, construction, refurbishment or alteration of buildings other than*
  - *chemical works*
  - *mineral processing works*
  - *container reconditioning works*
  - *waste treatment facilities*
- *the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports and includes materials such as:*
  - *bricks, concrete, paper, plastics, glass and metal*
  - *timber, including unsegregated timber, that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP)*
  - *but does not include excavated soil (for example, soil excavated to level off a site prior to construction or to enable foundations to be laid or infrastructure to be constructed)."*

It is expected that waste generated from the site during the demolition and construction phases will be classified as "building and demolition waste" and able to be accepted at the nominated skip bin service. Care should be taken to ensure that any asbestos at the site is identified and handled and disposed of by an appropriately qualified asbestos removal contractor.

Food and general waste from the site must not be disposed of into the building and demolition waste, but separate arrangements will be needed for collection and disposal of food and general waste generated from the site offices and amenities. This could be achieved by the use of a private contractor or by using Council kerbside collection if organised with Council.

Waste Volumes

The Council waste management plan template (Attachment B) requires estimation of the demolition waste generation types if over 10m^3. Based on the supplied plans, most waste

streams are estimated to be less than 10m^3, except for concrete (footings, kerbs and guttering, stands), asphalt (from the car park) and vegetation waste (from clearing of ~20 trees).
The demolition plan is in **Appendix A**.

The Council waste management plan template does not require waste generated from the construction to be quantified if handled by a nominated skip bin service provider. Despite the construction waste volumes not being required to be quantified, and the skip bin provider reprocessing the waste to recover recyclable materials at their facility, construction waste should be minimised whenever possible by adopting the following measures:

- Carefully estimating material volumes to avoid over-ordering
- Working with suppliers to minimise packaging and to take back surplus material when possible
- Prefabricating building elements off-site
- Separating building waste streams and utilising dedicated recycling services, such as Regyp for plasterboard recycling and various metal recyclers for metal recovery

Virgin Excavated Natural Material (VENM)

Virgin Excavated Natural Material (VENM) is not classified as waste so long as it is not contaminated with waste material. Care should be taken to ensure that VENM excavated, reused on site, or taken off site for reuse as fill is not contaminated. It is estimated that 7,863m^3 of VENM will be excavated and 5,261m^3 reused on site, leaving 2,601m^3 to be reused off site. Any stockpiled VENM must be handled in accordance with the site sediment and erosion control plan.

The following soil management measures are intended for the identification and control and disposal of any acid sulphate soils or soil contamination identified during site works:

- any excavated material to be removed from the site is to be assessed and classified in accordance with the NSW Environment Protection Authority's 'Waste Classification Guidelines Part 1: Classifying Waste' and be transported and disposed of in accordance with the provisions of the Protection of the Environment Operations Act 1997 and the Protection of the Environment (Waste) Regulation 2014;
- any fill material imported into the site is to be Virgin Excavated Natural Material (VENM) or material subject to a Resource Recovery Order that is permitted to be used as a fill material under the conditions of the associated Resource Recovery Exemption, in accordance with the provisions of the Protection of the Environment Operations Act 1997 and the Protection of the Environment (Waste) Regulation 2014.

Waste Handling and Storage

The building and demolition waste will be collected using suitable temporary bins (sound metal bins), and these bins moved using appropriate site material handling equipment such as light vehicles or mobile cranes and directly unloaded into the skip bins for reprocessing and disposal.

Double handling of materials should be avoided where possible, but this may not be possible at the final stages when the building is near completion and access is constrained.

The skip bins will be contained in defined holding areas behind hoardings within the secured building site. These areas should be on a level sealed or hardstand area to minimise the dust and traction problems and be contained in the site sediment controls so as to not drain off the site. The areas must be regularly inspected and cleaned of litter and debris.

Two skip bin holding areas have been identified near the site entrances for convenient skip bin collection outside the building footprint:

- A main area near the entrance off Stone Mason Avenue servicing the centre of excellence and the community facility; and
- A secondary area near the entrance off Kennedy Avenue, servicing the community facility.

Any vehicle used to transport waste or excavated material (VENM) must be covered before leaving the premises to minimise dust and litter generation off site.

The wheels of any vehicle, trailer or mobilised plant leaving the site, including the regular skip bin collection trucks, must be cleaned of debris prior to leaving the site.

Records must be collected and retained of all waste and excavated material transported from the site, including details of the amount (volume and/or mass) and type of material transported and the reprocessing, reuse or disposal site. These records must be made available to the Council and other authorities upon request.

The construction contractor has nominated Aussie Skips Bin Services Pty Ltd to collect demolition and construction waste in skip bins for reprocessing at their EPA licenced facility at 108 Madeline St Strathfield NSW 2136. Aussie Skips will collect details of the waste received from the site including the recovery rate achieved, alert the contractor of any identified problematic wastes, and provide this information to the contractor.

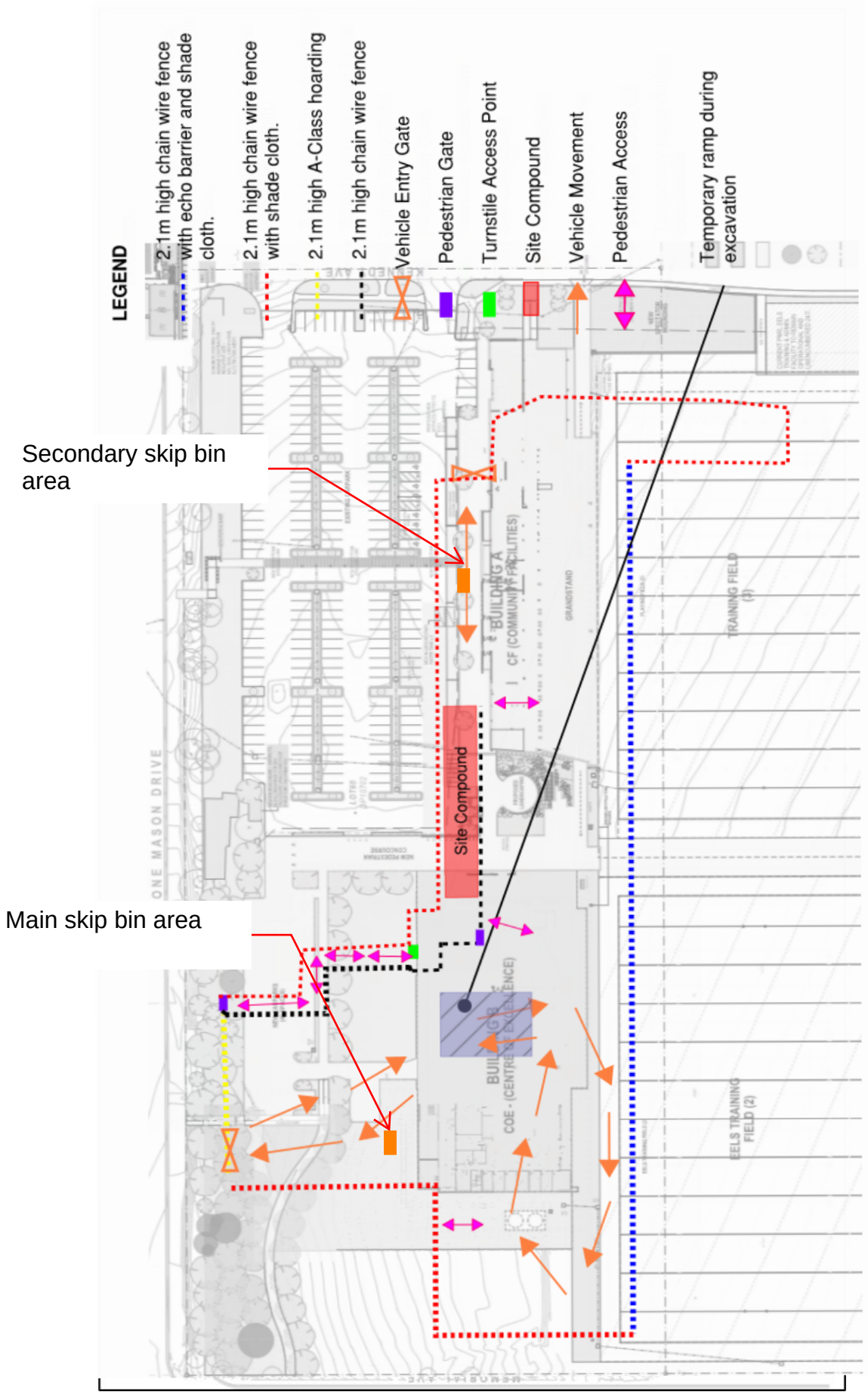
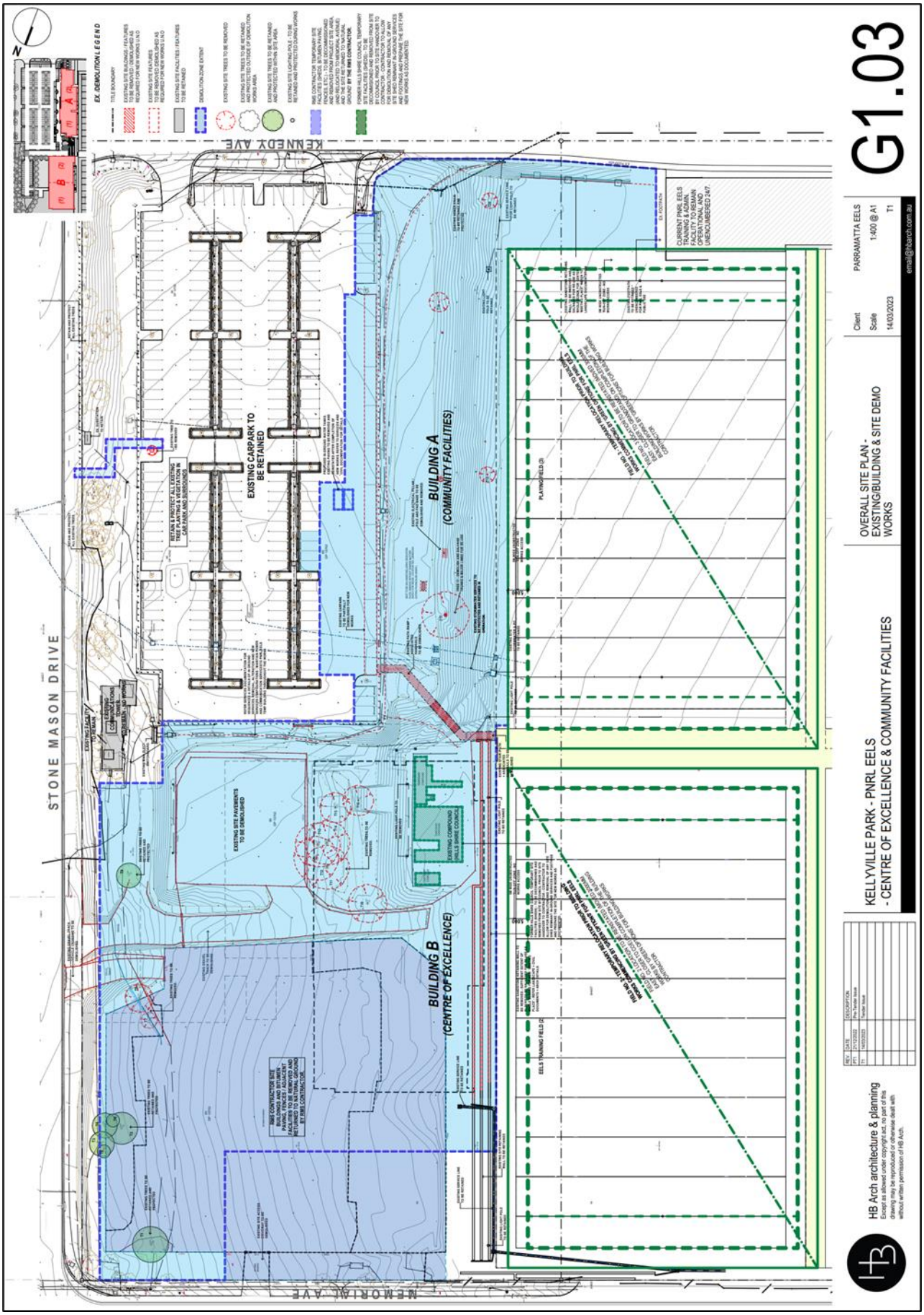
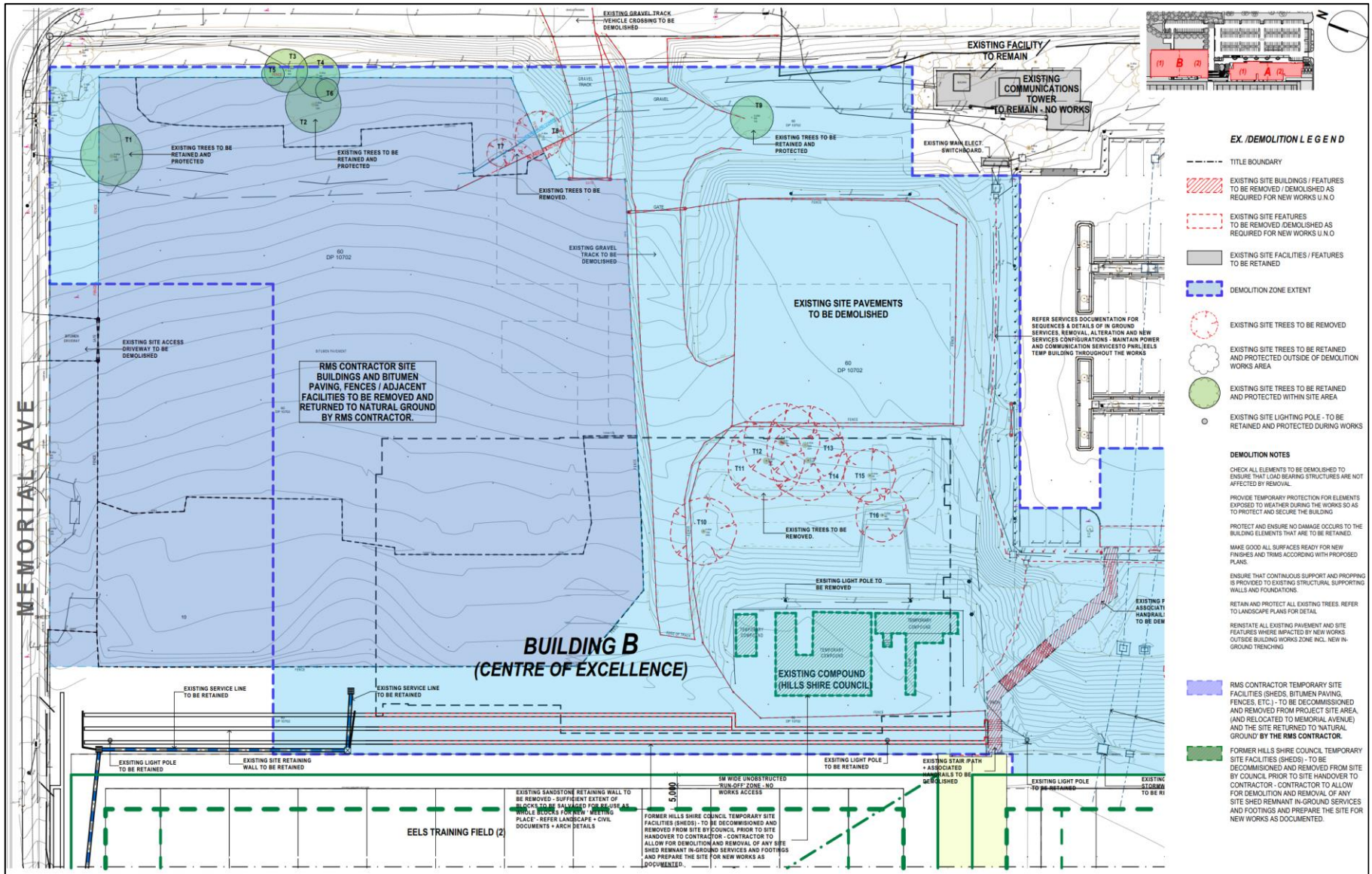


Figure 3 : *Waste Handling at the Site*

Appendix 1: Site Plans





REV.	DATE	DESCRIPTION
PT	21/12/2022	Pre-Tender Issue
T1	14/03/2023	Tender Issue

HB Arch architecture & planning

KELLYVILLE PARK - PNRL EELS
- CENTRE OF EXCELLENCE & COMMUNITY FACILITIES

EXISTING /DEMOLITION PLAN - BUILDING B

Client PARRAMATTA EELS
Scale 1:250 @ A1
15/03/2023 T1

email@hbarch.com.au

B2.01

APPENDIX E - CONSTRUCTION SOIL & WATER MANAGEMENT PLAN

APPENDIX E

Kane Construction

Kellyville Park PNRL Eels - Centre of Excellence and Community Sports Centre

Construction Soil and Water Management Plan

September 2023

Confidential

Kellyville Park PNRL Eels (Source: WSP Flood Report)

Question today
Imagine tomorrow
Create for the future

Construction Soil and Water Management Plan
Kellyville Park PNRL Eels - Centre of Excellence and Community Sports Centre

Kane Construction

WSP
Level 27, 680 George Street
Sydney NSW 2000
GPO Box 5394
Sydney NSW 2001

Tel: +61 2 9272 5100
Fax: +61 2 9272 5101
wsp.com

Rev	Date	Details
A	13/09/2023	Issue for Kane

	Name	Date	Signature
Prepared by:	Robby Woldu	2023/09/14	
Reviewed by:	Ehsan Bahram	2023/09/14	
Approved by:	Aleks Vasiloski	2023/09/14	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

Table of contents

1 Executive Summary

1.1 Introduction

WSP Australia Pty Ltd have been engaged by Kane Construction to produce a Construction Soil and Water Management Plan (CSWMP) for the Certifier and Council assessment and approval of the proposed development at Kellyville Park PNRL Eels - Centre of Excellence and Community Sports Centre, Sydney NSW.

1.2 Purpose of the report

The purpose of the report is to define and describe Erosion and Sediment controls which need to be implemented onsite to satisfy SSDA consent and Hills Shire Council Erosion and Sediment control measures and specifically address the following:

a) describe all erosion and sediment controls to be implemented during construction
b) provide a plan of how all construction works will be managed in a wet-weather event (i.e. storage of equipment, stabilisation of the Site)
c) detail all off-site flows from the Site
d) describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.

1.3 Related Report and documents

The following reports and documents are relevant to this proposed development:

- WSP Civil Drawings Issue for Approval CV-336 and CV-337 provided in Appendix A.
- Kellyville Park PNRL Eels - Centre of Excellence and Community Sports Centre Integrated Water Management Plan by WSP Rev E dated 28 July 2022

1.4 The Site

Kellyville Park is situated at 8 Memorial Avenue in Kellyville within The Hills Shire Council Local Government Area. The site borders Memorial Avenue to the north, Stone Mason Drive to the east, residential developments to the South and Strangers Creek to the West. Access to the site is via Memorial Avenue and Stone Mason Drive.

The current developed state of this site mostly consists of various sporting fields (some currently in construction) with surrounding access roads and carparks. A temporary construction compound currently occupies the north-eastern corner of the site.

The works to be completed as part of this proposed development are consigned to the north-eastern section of the site. as shown below in Figure 1.

Figure 1 - Locality and Extent of Works Plan

(Source: Nearmap, 06/10/2021 True North)

1.5 Proposed development

The proposed development will provide state of the art facilities which enable physical recreation opportunities in conjunction with improved facilities for staff, players, and existing users of the site. The proposed development will be integrated with the existing recreational landscape of the site and complement the upgrades to the existing playing fields being undertaken by Council. The proposed development is defined as a Recreation facility (major), and includes the following components:

- Construction of high-performance Centre of Excellence in the northeast of the site adjacent to Training Field 2:
  - Elite level gymnasium.
  - Medical and rehabilitation facilities.
  - Aquatic recovery and rehabilitation pools.
  - Lecture theatre and meeting rooms.
  - Player education and study areas.
  - Administrative offices for the Paramatta Eels.

    - New female facilities including a dedicated female change room, cubicle toilets and shower.
    - Balcony and terrace area.
    - End of Trip Facilities and bicycle parking.
    - Refuse Area.

- Construction of a Community Facility, including a grandstand with approximately 1,500 seats in the centre of the site adjacent to the Main Playing Field 3:
    - Unisex changerooms and amenities.
    - Referee changeroom and amenities.
    - First Aid/Medical room.
    - Community gymnasium.
    - Café/kiosk.
    - Concourse terrace.
    - Multipurpose community function room with kitchen and amenities.
    - Refuse Area.
    - Bicycle parking.
  - Solar arrays will be included on the roof of both the Centre of Excellence and Community Facility.
  - Additional 40 car parking spaces for the proposed facility to operate in conjunction with existing at grade car parking already constructed by Council.
  - Additional landscaping throughout the development footprints.
  - Removal of a small number of trees internal to the site, however noting perimeter trees will be retained where not affected by the proposed building footprints.
  - Hours of operation for the Centre of Excellence and Community Facility are 5:00am to 12:00am, however the following key times are likely:
    - Centre of Excellence: 7.00am – 7.00pm.
    - Community Facility: 7.00am – 10.00pm.

2 Erosion and Sediment Control

Soil and water management for the project will be implemented during construction in accordance with the Landcom "Blue Book". Refer to Appendix A for Sediment and Erosion Control Plan and typical details.

To prevent the infiltration of litter, sediments and other pollutants from entering the stormwater system or neighbouring properties, erosion and sediment control measures will be implemented during the construction phase. As drainage is constructed on site, any inlets into the system as well as any existing Council drainage infrastructure downstream of the site shall be protected. The following measures are compatible with a development of this nature and may be implemented onsite during construction works to protect downstream properties and stormwater infrastructure:

- Sediment Basins – Sediment basin is sized and proposed onsite to treat the disturbed catchment. Basin have been sized according to Landcom's Blue Book. Refer to sediment erosion drawing depicted in Appendix A for calculations.

- Silt Fences – are temporary, permeable barriers of geo-textile installed in a trench and supported by star pickets or wooden posts. This provides treatment from sediment as the velocity of the runoff is sufficiently slowed down whereby it no longer has the energy to hold particles in suspension. Filtration is also provided as runoff passes through the silt fence.

- Inlet filters / sediment traps – are permeable sacks (geo-textile, synthetic netting or wire) pre-filled or filled by the user with materials such as coarse sand or aggregate up to 50mm used most commonly to protect kerb inlets. Treatment from sediment is similar to that of silt fences.

- Rumble Grids (shaker pads) – remove sediment stuck to the tyres and chassis of vehicles through vibration. Many prefabricated rumble grids can open the tread on tyres to increase the amount of sediment removed from them. Rumble grids should be located at all vehicular access points to the site.

- Stockpile areas with sediment fence around it during construction. The stockpile must be located out of water flow paths (and be protected by earth banks/drains as required).

Prior to the commencement of works, the contractor is to submit a construction management plan to the Private Certification Authority (PCA) for approval. The contractor is responsible for maintaining temporary treatment infrastructure throughout the construction period in accordance with Landcom Blue Book. The drawings including sediment erosion plans are endorsed by Hills Shire Council and the stamp will be removed in the construction set drawings

3 Wet Weather Management

When a wet weather event is immanent Kane will carry out the following;

- Check the condition of silt fencing and make good as required
- Check the condition of sediment controls at storm water pits and inlets and make good as required.
- Ensure stockpiles and batters are in good condition and localised sediment controls are in place
- Create temporary swales where possible to direct water away from work areas

During a wet weather event;

- Vehicle movements are minimised and vehicles parked on flat/level ground
- Sediment and silt controls are monitored
- Workers relocated to undercover areas (if possible)

Following a wet weather event

- Check the condition of silt fencing and make good as required
- Check the condition of sediment controls at storm water pits and inlets and make good as required.
- Ensure stockpiles and batters are in good condition and make good as required
- Work areas are de-watered. Water is tested and treated, if required, before discharge into storm water system
- Worker access routes checked and made good
- Vehicle access routes checked and made good

Equipment not to be placed in the overland flow path as per the WSP Flood Impact Assessment dated July 2022 Overland flow path must remain unobstructed at all times during construction. Refer to Figure 2 extracted from the

flooding report:Figure 2 - Localised overland flow depth in 5% AEP event

(Source: WSP Flood Impact Assessment July 2022)

4 SSDA Condition

The following condition mentioned in the SSD 24452965 needs to be satisfied prior to commencment of any work onsite:

CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN

C17. Prior to the commencement of any earthwork or construction, the Applicant must submit to the satisfaction of the Certifier a Construction Soil and Water Management Plan (CSWMP) which must be prepared by a suitably qualified expert, in consultation with Council and address, but not be limited to the following:

(a) describe all erosion and sediment controls to be implemented during construction

WSP response: Refer to Section 2 of this report and the Erosion and Sediment Control plans prepared by WSP Attached as shown in Appendix A.

(b) provide a plan of how all construction works will be managed in a wet-weather event (i.e. storage of equipment, stabilisation of the Site).

WSP response: Refer to Section 3 of this report which is to be managed by the Contractor/s.

(c) detail all off-site flows from the Site

WSP response: All flows from the disturbed catchment need to be discharged (pumped out) after allowing adequate time for settling of the basin particle time.

(d) describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI and 1 in 100-year ARI.

WSP response: All runoff from the site during storm events up to and including 10% AEP (10Yeear ARI) will by captured by the sediment basin and will be detained onsite. For the major storm event, an emergency overflow spillway is designed to pass the peak flows during the storm event. Refer to CV-337 TYPE D & F Sedimentation Basin Detail as depicted in Appendix A.

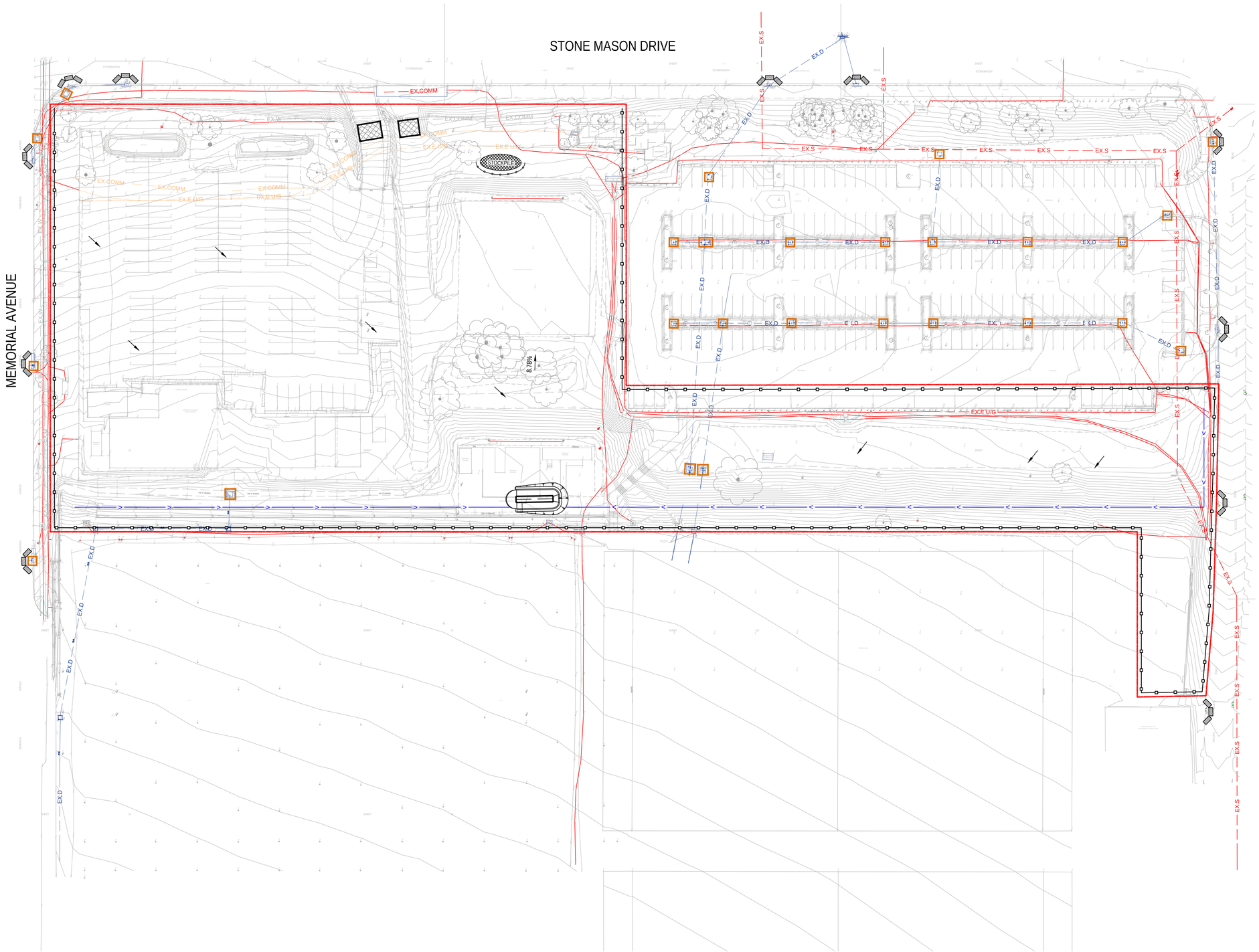
5 Conclusion

The Erosion and Sediment Control measures outlined in this report for the proposed development ensure that the requirements of the SSD (24452965) Condition 17 are achieved.

Throughout construction site conditions and construction methodologies can change. Therefore, it is recommended that soil and water management measures are reviewed and amended if necessary, to ensure that the development has minimal to no impact on the local environment.

Appendix A

Erosion and Sediment Control Plans



10 5 0 10 20 30m
1:500 @A1

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL DRAWINGS AS REFERENCED ON GN-CIV-2001. FOR GENERAL NOTES REFER TO DRAWING GN-CIV-2002.

LEGEND

- SEDIMENT FENCE
- PROPERTY BOUNDARY
- SWALE
- EXTEND OF WORK
- FLOW DIRECTION
- GATE
- SANDBAG SEDIMENT INLET TRAP
- GEOTEXTILE PIT FILTER
- STABILISED SITE ACCESS WITH SHAKER RAMP
- SEDIMENT BASIN B-1
- STOCKPILE — PROPOSED STOCKPILE LOCATION. ACTUAL LOCATION TO BE DETERMINED ON SITE TO SUIT CONSTRUCTION STAGING (SD 4-1)

NOTE:
"SD 6-8" REFERS TO THE STANDARD DETAIL DRAWING IN THE NSW DEPARTMENT OF HOUSING MANUAL" MANAGING URBAN STROMWATER, SOILS AND CONSTRUCTION", 4TH EDITION, MARCH 2004.

In the detailed calculation on Soil Loss Classes 1 to 4 lands, the sediment storage zone can be taken as 50 percent of the settling zone capacity. Alternately designers can design the zone to store the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(ii)). However, on Soil Loss Classes 5, 6 and 7 lands, the zone must contain the 2-month soil loss as calculated by the RUSLE (Section 6.3.4(i)(iii).

Place an "X" in the box below to show the sediment storage zone design parameters used here:

X 50% of settling zone capacity,

2 months soil loss calculated by RUSLE

Total Basin Volume

Site	Cv	Rx-day, y-%ile	"Total catchment area (ha)"	"Settling zone volume (m3)"	"Sediment storage volume (m3)"	"Total basin volume (m3)"
1	0.50	28.7	1.631	234.0485	117	351.07

BASIN SIZE

BASIN	A1 LENGTH (m)	B1 (WIDTH)	DEPTH (M)	VOLUME
B-1	19	9	1.5	400.5

CIVIL PLANS SUBJECT TO THE HILLS SHIRE COUNCIL REVIEW AND APPROVAL. NO CIVIL WORKS SHALL COMMENCE PRIOR TO ENDORSEMENT FROM COUNCIL.

DIAL BEFORE YOU DIG www.1100.com.au

WARNING
BEWARE OF UNDERGROUND SERVICES.
THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE BY CIVIL CONTRACTOR PRIOR TO CONSTRUCTION OF ANY CIVIL WORKS. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

REV	DATE	BY	DESCRIPTION	CHK	APP
T3	21/04/2023	S.D	ISSUE FOR TENDER	E.B	A.V
T2	13/03/2023	S.D	ISSUE FOR TENDER	E.B	A.V
T1	03/03/2023	S.D	AUTHORITY APPROVAL ISSUE	E.B	A.V

DRAWING STATUS: **TENDER ISSUE** ISSUE FOR APPROVAL

http://www.wsp.com

CLIENT: PARRAMATTA EELS

ARCHITECT: HB ARCHITECTS PTY LTD

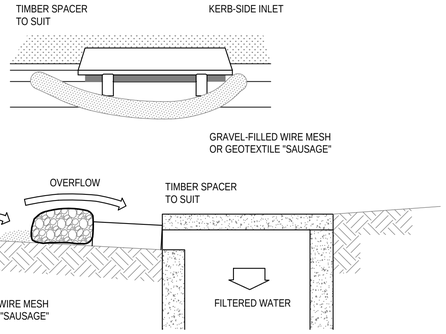
PROJECT: KELLYVILLE PARK PNRL EELS COMMUNITY FACILITIES BUILDING AND CENTRE OF EXCELLENCE

TITLE: SEDIMENT AND EROSION CONTROL PLAN

SCALE @ A1:	CHECKED:	APPROVED:
1:500	E.B	A.V
PROJECT NUMBER:	DRAWN:	DATE:
PS123790	K.U	13/02/2023
DRAWING No:		REV:
CV-336		T3

CAD FILE: PS123790-CV-336.DWG

DATE PLOTTED: 21/04/2023 12:29:48 PM BY : BALBASTRO, RAUL

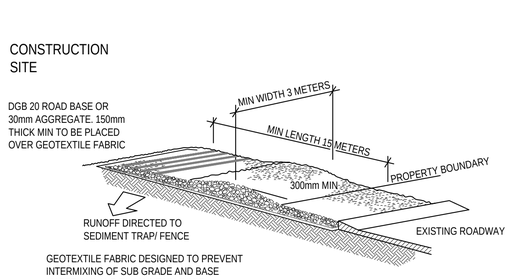


MESH & GRAVEL INLET FILTER CONSTRUCTION NOTES:

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
3. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
4. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
5. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY CAN FIRMLY ABUT EACH OTHER AND SEDIMENT / LADEN WATERS CANNOT PASS BETWEEN.

MESH & GRAVEL INLET FILTER

SCALE N.T.S.

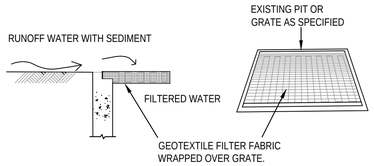


STABILISED SITE ACCESS WITH SHAKER RAMP

N.T.S.

NOTES:

1. THIS DEVICE IS TO BE LOCATED AT ALL EXITS FROM CONSTRUCTION SITE.
2. THIS DEVICE IS TO BE REGULARLY CLEANED OF DEPOSITED MATERIAL SO AS TO MAINTAIN A 50mm DEEP SPACE BETWEEN PLANKS.
3. ANY UNSEALED ROAD BETWEEN THIS DEVICE AND NEAREST ROADWAY IS TO BE TOPPED WITH 100mm THICK 40-70mm SIZE AGGREGATE.
4. ALTERNATIVELY, THREE(3) PRECAST CONCRETE CATTLE GRIDS (AS MANUFACTURED BY "HUMES CONCRETE MAY BE USED. 1, 2 & 3 ABOVE ALSO APPLY.



GEOTEXTILE PIT FILTER

N.T.S

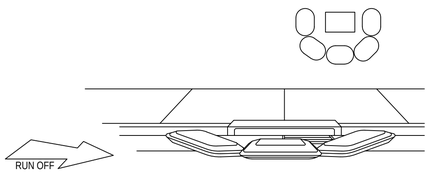
GENERAL INSTRUCTIONS

1. THIS SEDIMENT AND EROSION CONTROL WORKS FOR THE SITE SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION, 4TH EDITION (2004)" BY LANDCOM.
2. AS REQUIRED BY CITY OF PARRAMATTA COUNCIL SEDIMENT CONTROL MEASURES WILL BE REQUIRED DURING THE CONSTRUCTION OF ALL DEVELOPMENTS/BUILDING WORKS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY THAT THE WORKS ARE CARRIED OUT IN ACCORDANCE WITH THE SEDIMENT AND EROSION CONTROL PLAN AND COUNCIL'S REQUIREMENTS.
3. THE CONTRACTOR SHALL ENSURE THAT ALL SUBCONTRACTORS ARE INFORMED OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE AREAS.
4. THE NON-DISTURBED PORTION OF THE CATCHMENT OUTSIDE OF OPERATING AREA IS TO BYPASS THE BASINS BY MEANS OF LINED CATCH DRAINS.
5. WHERE PRACTICABLE, THE SOIL EROSION HAZARD SHALL BE KEPT AS LOW AS POSSIBLE. LIMITATIONS TO ACCESS ARE TO BE VIA CHAMBERS COURT UNLESS OTHERWISE APPROVED BY COUNCIL.
6. ENSURE THAT ALL DRAINS ARE OPERATING EFFECTIVELY AND SHALL MAKE ANY NECESSARY REPAIRS. REMOVE TRAPPED SEDIMENT WHERE THE CAPACITY OF THE TRAPPING DEVICE FALLS BELOW 60%.
7. CONSTRUCT ADDITIONAL EROSION OR SEDIMENT CONTROL WORKS AS MAY BE APPROPRIATE TO ENSURE THE PROTECTION OF DOWNSLOPE LANDS AND WATERWAYS.
8. MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES IN A FULLY FUNCTIONING CONDITION AT ALL TIMES UNTIL THE SITE IS REHABILITATED.
9. REMOVE TEMPORARY SOIL CONSERVATION STRUCTURES AS THE LAST ACTIVITY IN THE REHABILITATION PROGRAM.

CONSTRUCTION SEQUENCE

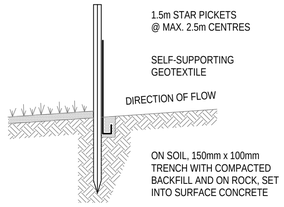
WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:

1. INSTALL SEDIMENT FENCING AND CUT DRAINS TO MEET THE REQUIREMENTS OF THE SEDIMENT AND EROSION CONTROL PLAN. WASTE COLLECTION BINS SHALL BE INSTALLED ADJACENT TO SITE OFFICE.
2. CONSTRUCT STABILISED SITE ACCESS IN ACCORDANCE WITH COUNCIL'S REQUIREMENTS.
3. REDIRECT CLEAN WATER AROUND THE CONSTRUCTION SITE.
4. INSTALL SEDIMENT CONTROL PROTECTION MEASURES AT ALL NATURAL AND MAN-MADE DRAINAGE STRUCTURES. MAINTAIN UNTIL ALL THE DISTURBED AREAS ARE STABILISED.
5. CLEAR AND STRIP THE WORK AREAS. MINIMISE THE DAMAGE TO THE GRASS AND LOW GROUND COVER OF NON-DISTURBED AREAS.
6. ANY DISTURBED AREAS, OTHER THAN BUILDING PAD AREAS, SHALL IMMEDIATELY BE COVERED WITH SITE TOPSOIL WITHIN 7 DAYS OF CLEARING. BUILDING PAD AREAS SHALL BE COVERED WITH BITUMEN EMULSION AS SPECIFIED.
7. APPLY PERMANENT STABILISATION TO SITE (LANDSCAPING).

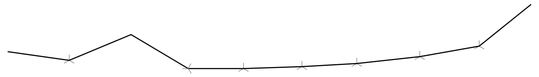


SANDBAG SEDIMENT INLET TRAP

N.T.S



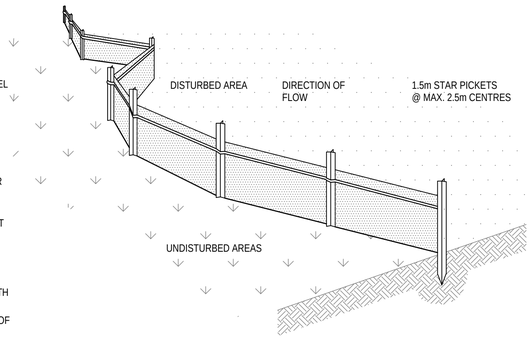
SECTION DETAIL



PLAN

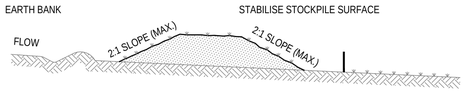
SEDIMENT FENCE CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND @ 2.5m INTERVALS (MAX.) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP. 6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



SEDIMENT FENCE

SCALE N.T.S.

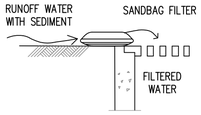


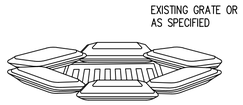
STOCKPILE CONSTRUCTION NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE PLACED FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED E.S.C.P. OR S.W.M.P. TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

STOCKPILES

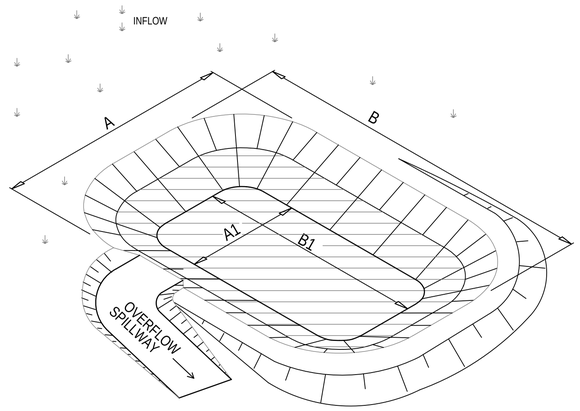
SCALE N.T.S.



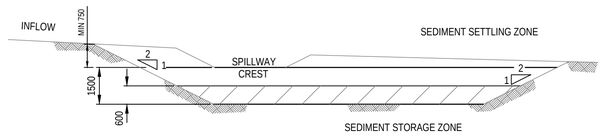


SANDBAG SEDIMENT TRAP

N.T.S



PERSPECTIVE VIEW



TYPICAL SECTION

TYPE 'D' & 'F' SEDIMENTATION BASIN

N.T.S.

NOTES:

1. FOR GENERAL NOTES REFER TO DRAWING GN-CIV-2002.
2. THE SITE FEATURE AND LEVEL SURVEY WAS PROVIDED BY PROJECT SURVEYORS AND REFLECTS THE EXISTING CONDITIONS CURRENT TO OCTOBER 2019. CAD DRAWING NO. B04616-DETAIL, LEVELS SHOWN ARE TO A.H.D SSM90891 WITH A STATED VALUE OF RL101.912. FOR FURTHER INFORMATION RELATING TO SURVEY CONTACT PROJECT SURVEYORS ON (02) 9056 1900.
3. WARNING: THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THE EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.
4. ALL EXISTING DRAINAGE CHANNELS ARE LIVE. THE CONTRACTOR MUST MAKE ADEQUATE PROVISIONS TO MAINTAIN THESE DURING THE WORKS INCLUDING TEMPORARY RE ROUTING ETC.
5. BULK EARTHWORK VOLUMES ARE CALCULATED FROM THE UNDERSIDE OF THE PAVEMENT LAYER (BEL) TO THE STRIPPING LEVEL. REFER TO PAVEMENT LAYOUR WORKS DETAILS. EARTHWORKS VOLUMES INCLUDE EXCAVATION FOR OSD TANK.
6. EXISTING STORMWATER AND SEWER CONNECTION POINTS ARE TO BE VERIFIED ON SITE AS NO SURVEY IS PROVIDED. CONSEQUENTLY, ADDITIONAL PIPEWORK MAY BE REQUIRED.
7. REFER TO THE TRAFFIC ENGINEERING REPORT AND DRAWINGS FOR ANY SPECIFICATION AND REQUIREMENTS.

DIAL BEFORE YOU DIG www.1100.com.au

WARNING

BEWARE OF UNDERGROUND SERVICES.
THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE BY CIVIL CONTRACTOR PRIOR TO CONSTRUCTION OF ANY CIVIL WORKS. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

REV	DATE	BY	DESCRIPTION	CHK	APP
T3	21/04/2023	S.D	ISSUE FOR TENDER	E.B	A.V
T2	13/03/2023	S.D	ISSUE FOR TENDER	E.B	A.V
T1	03/03/2023	S.D	AUTHORITY APPROVAL ISSUE	E.B	A.V

DRAWING STATUS: **TENDER ISSUE** ISSUE FOR APPROVAL

wsp http://www.wsp.com

CLIENT: PARRAMATTA EELS

ARCHITECT: HB ARCHITECTS PTY LTD

PROJECT: KELLYVILLE PARK PNRL EELS COMMUNITY FACILITIES BUILDING AND CENTRE OF EXCELLENCE

TITLE: SEDIMENT AND EROSION CONTROL DETAILS

SCALE @ A1:	CHECKED:	APPROVED:
N.T.S	E.B	A.V
PROJECT NUMBER:	DRAWN:	DATE:
PS123790	K.U	13/02/2023

DRAWING No: CV-337 REV: T3

CAD FILE: PS123790-CV-337.DWG
CAD FILE: PS123790-CV-337.DWG

DATE PLOTTED: 21/04/2023 12:30:13 PM BY : BALBASTRO, RAUL
DATE PLOTTED: 21/04/2023 12:30:13 PM BY : BALBASTRO, RAUL

APPENDIX F - UNEXPECTED FINDS PROTOCOL

APPENDIX F

UNEXPECTED FINDS PROTOCOL

PARRAMATTA NRL CENTRE OF EXCELLENCE & COMMUNITY FACILITY

DOCUMENT HISTORY

Content Author	Michael Wright

REV	Change Type	Amendment Summary	Author	Date
01		Project Start Up	MW	1/9/23
02	DP review	Update to include DP review comments	MW	7/9/23
03				
04				
05				

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this procedure is to provide information and guidance on how to safely conduct works when there is an unexpected contamination or heritage find on the Parramatta Eels Centre of Excellence Project.

2.0 STATUTORY REQUIREMENTS

The following statutory obligations of the SSDA Development Consent are setout below.

CONTAMINATION
B36. An Unexpected Contaminated Land and Asbestos Finds Procedure must be prepared before the commencement of any demolition / construction works and must be followed should unexpected contaminated land or asbestos be excavated or otherwise discovered during construction. The Unexpected Contaminated Land and Asbestos Finds Procedure must outline the steps to be undertaken to identify, report and manage any signs of potential environmental concern encountered during earthworks/redevelopment works.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN
C10. Prior to the commencement of any earthwork or construction, a Construction Environmental Management Plan (CEMP) must be submitted to the Certifier. The CEMP must address, but not be limited to, the following matters where relevant:
… (g) an unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure

C24. Remediation – Unexpected Finds Protocol
Prior to the commencement of any earthwork or remediation works, the Applicant must submit to the satisfaction of the Certifier an Unexpected Finds Protocol which has been reviewed and endorsed by a suitably qualified Environmental Consultant familiar with the requirements Unexpected Finds Protocol. The protocol must outline contingency measures and the procedures to be followed in the event unexpected finds of contaminated material are encountered during works.

3.0 KNOWN POTENTIAL FINDS (IDENTIFIED)

3.1 Contamination

Douglas Partners carried out a Detailed Site Investigation Report to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regards to the proposed development.

Kane has reviewed the report and understand that preliminary results indicate that there is a low potential for contamination associated with fill at the site and the demolition of previous buildings.

3.2 Heritage

Coast History and Heritage carried out an Aboriginal Cultural Heritage Assessment Report and also a Statement of Heritage Impact to assess the potential for cultural heritage and heritage at the site based on past land uses.

Kane has reviewed the respective reports and understand that;

- There are no previously recorded Aboriginal archaeological sites within the site, and none were identified during the initial Aboriginal Cultual Heritage Assessment Report and;

- It is unlikely we will encounter heritage items as the site area itself is not a listed heritage item or within a heritage conservation area and had low heritage significance as setout in the Statement of Heritage Impact Report.

4.0 DEFINITIONS

An unexpected find is defined as potential contaminated land or asbestos that was not previously identified in the project plans (and sub-plans) or during pre-construction investigations. For the purposes of this plan, contaminated land comprises land within the project area that meets the definition of contamination in Contaminated Land Management Act 1997, including asbestos.

An 'unexpected heritage find' can be defined as any unanticipated archaeological discovery that has not been identified during a previous assessment or is not covered by an existing permit under relevant legislation such as the NPW Act or Heritage Act. The find may have potential cultural heritage value, which may require some type of statutory cultural heritage permit or notification if any interference of the heritage item is proposed or anticipated

.

5.0 POTENTIAL UNEXPECTED FINDS

The below items are common type of unexpected finds and their characteristics.

5.1 Petroleum Hydrocarbons

May be identifiable by either odour and/or visual indications of contamination. Characteristic petrol, diesel or 'oily' odours (e.g. hydraulic oil) which may vary in strength from weak (just detectable) to very strong (easily detectable at a distance from the source).

In soils, the odour may or may not be accompanied by specific areas of dark staining (black-grey) or larger scale discolouration of strata from a previously identified 'natural colour' (e.g. staining of orange and brown clay to dark grey and green.) May also be visible as a distinct coloured sheen on water within an excavation.

5.2 Buried Dry Waste Materials

Characteristics include a variety of construction and demolition waste materials including wood, plastic, metal fragments, building rubble such as concrete, brick, asphalt, asbestos containing materials etc

5.3 Buried or Surface Bonded ACM, Asbestos Fines/Friable Asbestos

Cement-bound asbestos containing material (ACM) (e.g. compressed cement sheeting) may be present in building waste or pipes. Friable forms of asbestos including lagging and insulation, textured coatings and vinyl floor tiles may also contain asbestos. Fines and fibres are not typically visible to the unaided eye. Laboratory analysis is required to identify asbestos in soil.

5.4 Structures or Conduits Containing Possible Hazardous Materials

Could be identified a buried storage tank or former pipelines (typically metal, concrete or plastic), deeper sand fill sometimes with visual/olfactory indications of contamination, or presence of small concrete footings surrounding by odorous of visually impacted soils and/or groundwater.

5.5 Slag or Ash Deposits

Ash materials are typically light weight, grey and white sand and gravel sized particles (1mm to 10mm). Slag materials can be varied in consistency and colour and may comprise pale grey to blue/green/grey and be loose or cemented. Slag gravels can be very angular and appear to have a 'honeycomb' texture.

5.6 Landfill Type Materials

Could include a combination of the other categories along with domestic (e.g. clothing), clinical (e.g. human tissue or hair, laboratory specimens etc.), and/or putrescible waste (e.g. food scraps, nappies, etc.).

5.7 Buried Drums

Metal or plastic drums containing potentially unknown hazardous substances. Management of drum contents may require specialist hazmat contractors. Drums should not be opened to inspect contents until a qualified hazmat contractor has been engaged to assessed potential risks.

5.8 Other Unusual Odours

Other unusual odours that a different from surrounding soils, such as a sweet odour could indicate the presence of chlorinated hydrocarbon contamination.

5.9 Heritage

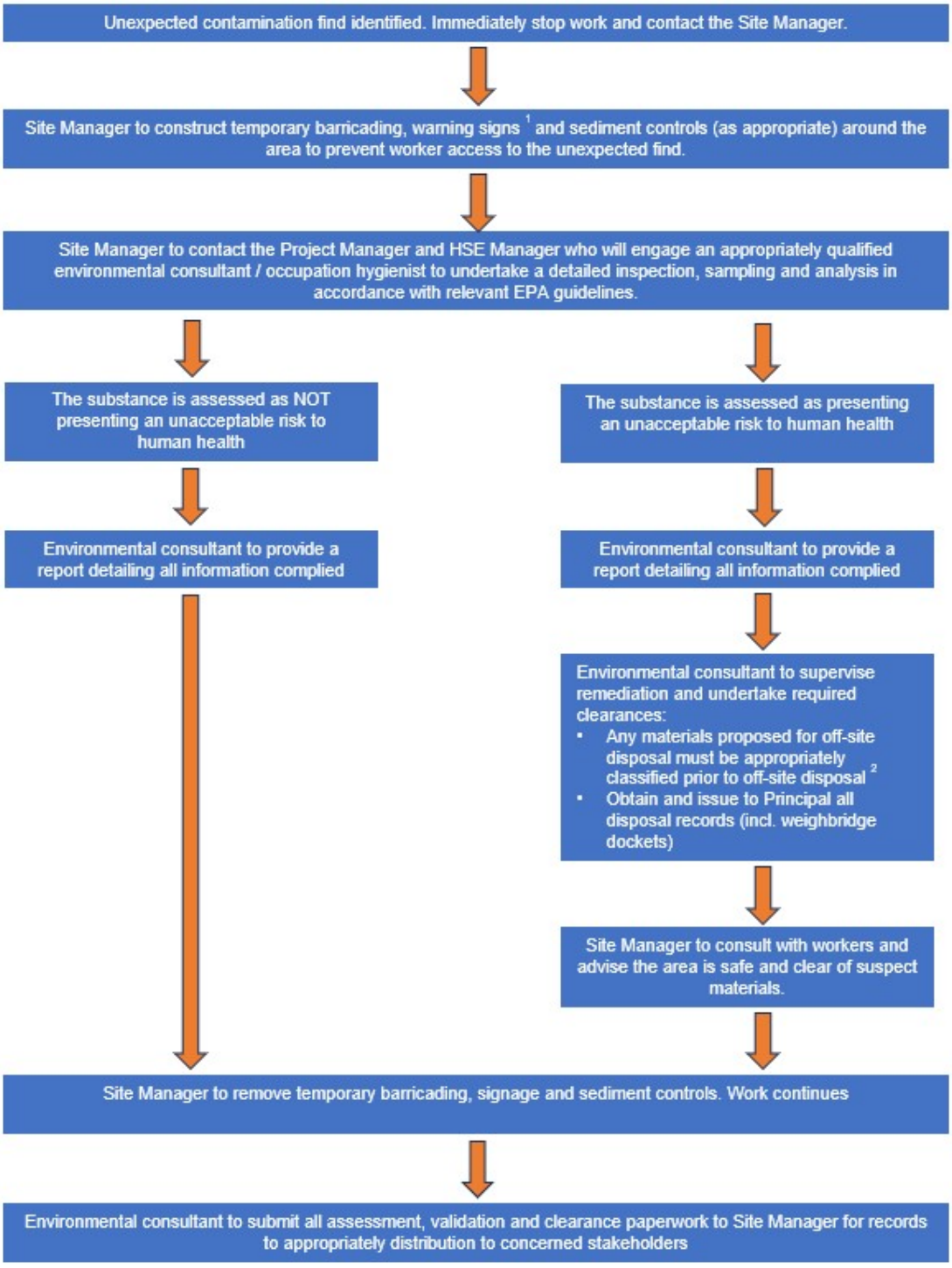
The range of potential archaeological discoveries can include but are not limited to:

- Aboriginal stone artefacts, shell middens, burial sites, engraved rock art, scarred trees
- Remains of rail infrastructure including buildings, footings, stations, signal boxes, rail lines, bridges and culverts
- Remains of other infrastructure including sandstone or brick buildings, wells, cisterns, drainage services, conduits, old kerbing and pavement, former road surfaces, timber and stone culverts, bridge footings and retaining walls
- Artefact scatters including clustering of broken and complete bottles, glass, ceramics, animal bones and clay pipes
- Archaeological human skeletal remains.

6.0 EMERGENCIES

In the event of emergencies, refer to procedures set out in the project WHS and Environmental Management Plan which has details of emergency services, government authorities that would need to notified in the event of an incident involving contamination spills, exposure etc.

7.0 UNEXPECTED FINDS PROTOCOL (CONTAMINATION)



Notes:

1. Warning signs shall be specific to the findings and potential hazards and shall comply with the Australian Standard 1319-1994 – Safety Signs for the Occupational Environment.
2. Any materials proposed for off-site disposal must be appropriately classified prior to off-site disposal as required by the Protection of the Environment Operations (POEO) Act 1997 in accordance with relevant EPA waste classification guidelines.
3. All works must comply with the provisions of the relevant legislation and guidelines.

8.0 ASBESTOS

Where asbestos contaminated is encountered the following additional protocols are recommended.

- A licensed asbestos assessor is to assess the find in consult with the environmental consultant to determine the most appropriate course of action.

- The impacted soil will be stockpiled for waste classification purposes (including sampling and chemical analysis) and will be disposed of, as a minimum, as Special Waste (asbestos) in accordance with the NSW EPA (2014) waste classification guidelines, at an appropriately licensed solid waste landfill site.

- In dry and windy conditions the stockpile will be lightly wetted and covered with plastic sheet whilst awaiting disposal

- All work associated with asbestos in soil will be undertaken by a contractor holding a Class A Licence if friable asbestos is identified, or Class B licence for non friable asbestos, and all workers working in the asbestos impacted zone must meet the minimum PPE requirement advised by the licenced asbestos assessor

- Monitoring for airborne asbestos fibres is to be carried out during the soil excavation is friable asbestos has been identified, and/or as required by the licensed asbestos assessor.

- Asbestos air monitoring, where required, will be undertaken in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC: 3003 (2005)] and sampling density and locations will be determined by the Occupational Hygienist. All filters will be submitted to a NATA accredited laboratory for analysis. Air samples will be collected from the breathing zone of a person, over a minimum of four hours duration.

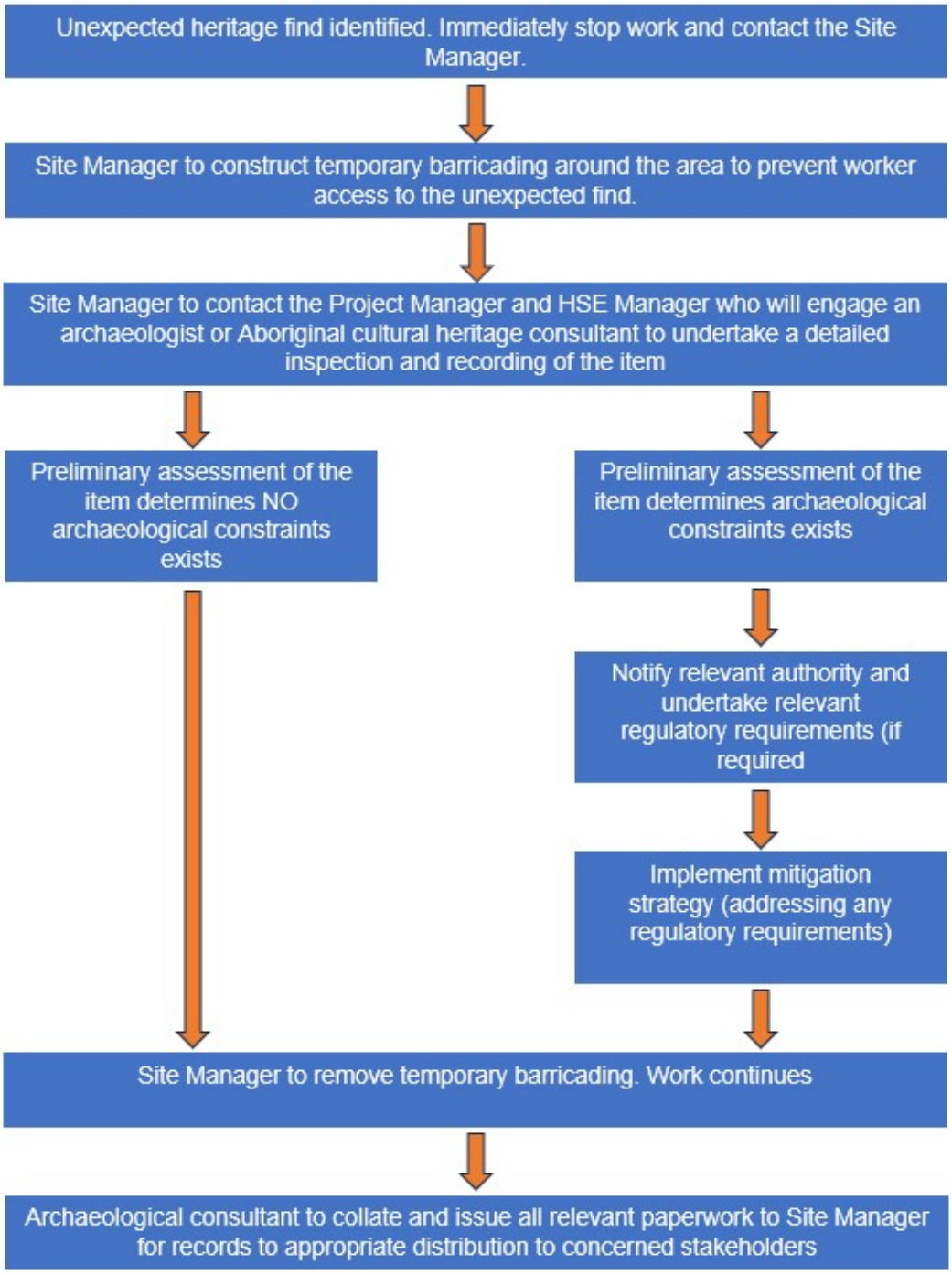
- Documentary evidence (weighbridge dockets) of correct disposal is to be provided to the Project Manager

- At the completion of the excavation, a clearance inspection is to be carried out and written certification is to be provided by the Occupational Hygienist that the area is safe to be accessed and worked. Clearance will include soil samples and asbestos analysis. If required, the filling material remaining in the inspected area can be covered/sealed by an appropriate physical barrier layer of non-asbestos containing material prior to sign–off. Such options will be advised by the environmental consultant

- Details of the incident are to be recorded in Hammertech

- The area may be reopened for further excavation or construction work, once formally advised by the environmental consultant.

9.0 UNEXPECTED FINDS PROTOCOL (HERITAGE)



APPENDIX G - TREE PROTECTION PLAN

APPENDIX G

TREE PROTECTION MANAGEMENT PLAN

PARRAMATTA NRL CENTRE OF EXCELLENCE AND COMMUNITY FACILITY

DOCUMENT HISTORY

Content Author	Michael Wright

REV	Change Type	Amendment Summary	Author	Date
01	Rev 1	Project Start Up	MW	14/08/2023
02				
03				
04				
05				

TABLE OF CONTENTS

1.0 INTRODUCTION

This Tree Protective Management Plan will outline the methodology and protocols to be applied to existing trees and removal of trees at the Hills shire Council of The Parramatta Centre of Excellence facility.

1.1 Overview and Purpose

The purpose of this procedure is to outline Kane's work practices towards Managing tree protection. Kane will maintain all required tree protection measures are in good condition in accordance with the construction site management plan. Kane will also maintain adequate soil grades and will ensure all machinery, builders refuse, spoil and materials will remain outside their protection zone.

2.0 STATUTORY AND CONTRACTUAL OBLIGATIONS

The following statutory obligations of the SSDA Development Consent are setout below.

C4. Protection of Public Infrastructure and Street Trees
Prior to the commencement of works, the Applicant must:
… (c) ensure all street trees directly outside the site not approved for removal are retained and protected in accordance with the applicable Australian Standards.

D.24 Tree Protection
While on site or building work is being carried out, the applicant must maintain all required tree protection measures are in good condition in accordance with the construction site management plan. The relevant requirements of the applicable Australian Standards and the Arboricultural Impact Assessment, prepared by Earthscape Horticultural Services, Dated February 2022.

The following contractual obligations are setout in Principal's project Requirements.

10.31 Tree Protection
The Contractor must take special care to protect existing structures and trees throughout all stages of the Works.

The Contractor is required to provide formal advice from the arborist to the Principal confirming that all tree protection has been installed in accordance with the requirements, prior to works commencing.

All tree protection must be installed in accordance with the relevant standards and be fixed to prevent unauthorised removal during the works. Appropriate signage must be maintained.

The Contractor is responsible for ensuring the Project Arborist is present on Site at the relevant stages of works, and must keep a log of the dates of attendance and the works performed, which is to be presented as a Final Compliance Report, for the approval of the PCA, prior to the issue of any Occupation Certificate.

3.0 TREE PROTECTION ZONES

Tree Protection Zones and Structural Root Zones are radial distance measured from the centre of the truck of the tree, calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).

The intention of the TPZ is to ensure protection of the root system and canopy from the potential

damage from construction works and ensure the long-term health and stability of each tree to be retained. In some instances incursions into the TPZ is allowable in line with the parameters setout in the Arborist Report.

The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. Incursions into the SRZ are not recommended and may compromise the stability of the tree.

4.0 TREE PROTECTION MEASURES

The tree protection measures should be read in conjunction with the Arboricultural Impact Assessment Report by Earthscape Horticultural Services dated February 2022 (**Arborist Report**).

4.1 Prohibited Activities in Tree Protection Zones

- Excavation and trenching (with exceptions stated in Arborist Report)
- Soil Disturbance, surface grading, compaction, ripping of soil.
- Mechanical removal of vegetation
- Soil level changes including the placement of fill material.
- Movement and storage of plant, equipment, vehicles and site sheds
- Affixing of signage, barricades or hoarding to trees
- Storage of any building materials, waste materials and chemicals
- Stockpiling of any spoil, fill or waste materials
- Any activity likely to cause physical damage to the trunk, root systems and to the tree.

4.2 Fencing & Signage

A temporary chainwire fencing will be installed as a protective barrier around all tree nominated in the Arborist Report.

Signs will be placed on the above tree protection fencing prohibiting unauthorized movement of machinery or equipment and to prevent entry into the protected tree zones.

4.3 Ground Protection

Vehicle movements within TPZs are generally prohibited. Where vehicles, plant or equipment need to traverse the soft landscape area of the TPZ prior approval of the Site Manager is required. 20mm marine ply sheets or truck mats will be placed over the ground surface prior to any vehicle access and works will be fully supervised by the Site Manager.

4.4 Tree Removal

All trees removal will be supervised by a qualified Arborist at the Australian Qualifications Framework Level 5 and follow all NSW Workcover Code of Practice for the Amenity Tree Industry (1998).

Only the trees identified for removal in the Arborist Report will be removed.

5.0 WORKS WITHIN TREE PROTECTION ZONES

Where access or works within the tree protection zones are unavoidable, care will be taken and control outlined the Arborists Report will be implemented.

5.1 Accidental Damage

Care will taken while operating plant and equipment and undertaking construction works in proximity to trees to prevent harm to the tree canopies.

If, for any reason, a tree sustains damage during the construction period, works relating to the damage must immediate cease and the Site Manager notified. A level 5 qualified Arborist will be contacted to inspected inspect the tree and offer advice for mitigating any negative effects.

These recommended actions will implement by the Site Manager to the satisfaction of the arborist. Any advise or instruction from the Arborist should be recorded and confirmed in wring.

5.2 Demolition Works

No mechanical soil cultivation is permitted within TPZs. Where existing turfgrass is proposed to be removed (demolished) the turfgrass shall be first treated with a non-selective herbicide with the active constituent Glyphosate (Round-up ® or equivalent). Once the turfgrass in the affected area is completely dead, any high grass may be slashed/mown close to ground level.

Any residual vegetation (dead grass etc) may then be carefully scraped-off the surface using a small rubber tracked excavator with a broad sand bucket.

Demolition of paved areas (including any temporary road base surface treatment) within the TPZs of trees shall be undertaken under the supervision of a level 5 qualified Arborist.

5.3 Excavation and Trenching Works

Prior to any mechanical excavations for building foundations or pavement sub-grade within the TPZs exploratory excavation using non-destructive techniques shall be taken along the perimeter of the structure or pavement within the TPZ to locate and expose any woody roots prior to any mechanical excavation.

Care will be taken to preserve any root structures identified with the non-destructive excavation and any cutting of tree roots shall follow the recommendations in the Arborists Report.

6.0 ONGOING MONITORING AND REVIEW

Compliance with tree protection measures will be reviewed on a regular basis during safety and environmental walks. Any non-compliance will be recorded on Hammertech and actions closed out promptly.

An arborist will also attend site on a regular basis and confirm compliance with controls identified on the arborist report.

APPENDIX A

ARBORICULTURE IMPACT ASSESSMENT REPORT

APPENDIX A

EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

ARBORICULTURAL IMPACT ASSESSMENT REPORT

PROPOSED CENTRE OF EXCELLENCE AND COMMUNITY FACILITIES

KELLYVILLE PARK
6-8 MEMORIAL AVENUE, KELLYVILLE

February 2022

Prepared for: Mr Gray Barton
HB Arch
134 Surrey Road,
BLACKBURN NORTH VIC 3130

Ph:- 02 0419 163 044

Prepared by: Andrew Morton
Dip. (Arboriculture) [AQF Level 5]
B. App. Sci. (Horticulture)
A. Dip. App. Sci. (Landscape)

EARTHSCAPE HORTICULTURAL SERVICES
Ph: - 0402 947 296

Member of Arboriculture Australia
Member International Society of Arboriculture - Australian Chapter (ISAAC)
Member Local Government Tree Resources Association (LGTRA)

PO Box 364, BEROWRA NSW 2081
Ph: (02) 9456 4787 Mobile: 0402 947 296 Fax: (02) 9456 5757
Email: earthscape@iinet.net.au

EXECUTIVE SUMMARY

This report has been prepared to provide an arboricultural assessment of the trees located in the vicinity of the Parramatta Eels Training Facility located in Kellyville Park, Kellyville for a proposed State Significant Development Application (SSDA) for redevelopment of the site to accommodate a new 'Centre of Excellence' (COE) and associated community facilities.

The proposed development will provide state of the art facilities which enable physical recreation opportunities in conjunction with improved facilities for staff, players and existing users of the site. The proposed development will be integrated with the existing recreational landscape of the site and complement the upgrades to the existing playing fields being undertaken by Council. The proposed development is defined as a Recreation facility (major), and includes the following components:

- Construction of high-performance Centre of Excellence in the north east of the site adjacent to Training Field 2:
  - Elite level gymnasium.
  - Medical and rehabilitation facilities.
  - Aquatic recovery and rehabilitation pools.
  - Lecture theatre and meeting rooms.
  - Player education and study areas.
  - Administration offices for the Parramatta Eels.
  - New female facilities including a dedicated female change room, cubicle toilets and showers.
  - Balcony and terrace area.
  - End of Trip Facilities and bicycle parking.
  - Refuse Area.
- Construction of a Community Facility, including a grandstand with approximately 1,500 seats in the centre of the site adjacent to the Main Playing Field 3:
  - Unisex changerooms and amenities.
  - Referee changeroom and amenities.
  - First Aid/Medical room.
  - Community gymnasium.
  - Café/kiosk.
  - Concourse terrace.
  - Multipurpose community function room with kitchen and amenities.
  - Refuse Area.
  - Bicycle parking.
- Solar arrays will be included on the roof of both the Centre of Excellence and Community Facility.
- Additional 40 car parking spaces for the proposed facility to operate in conjunction with existing at grade car parking already constructed by Council.
- Additional landscaping throughout the development footprint.
- Removal of a small number of trees internal to the site, however noting perimeter trees will be retained where not affected by the proposed building footprints.
- Hours of operation for the Centre of Excellence and Community Facility are 5:00am to 12:00am, however the following key times are likely:
  - Centre of Excellence: 7.00am - 7.00pm
  - Community Facility: 7.00am - 10.00pm

A total of twenty (20) trees stand within the subject site. These include a variety of introduced, non-local native and locally indigenous species. All except one of these are protected under The Hills Shire Council's Tree Management Controls. Of the thirteen (13) trees to be removed to accommodate the proposed development, five (5) are classified as low or very low Retention Value, three (3) are classified as moderate Retention Value and five (5) are classified as high Retention Value. The remaining seven (7) trees are proposed to be retained and protected during construction in accordance with the recommended Tree Protection Measures (Section 10) and Tree Protection Plan (Appendix 6) forming part of this report. These trees will not be adversely impacted by the proposed development.

Seven (7) of the subject trees to be removed are considered to be constituents of Shale Plains Woodland, which is listed as a Critically Endangered Ecological Community. However, these trees are within an isolated stand located centrally within the site and are not contiguous with any larger area of indigenous vegetation. There are no feasible options that can be recommended in this instance that would permit these trees to be retained given the desired location of the main COE building and the position of the trees within the site.

The Landscape Concept Plan indicates an area of approximately 2000 square metres set aside for new compensatory (offset) plantings, including forty-eight (48) new locally-indigenous trees, together with a further forty (40) other trees (being a variety of locally-indigenous and non-local native species) to be planted in and around the new facilities, giving a total of eighty-eight (88) new trees. This level of replacement planting will compensate for the loss of amenity incurred from the removal of trees to accommodate the proposed development within the next 10-15 years and result in a net increase in overall canopy coverage. As such, the proposed development will have limited environmental impact.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Overview

1.1.1 This report was commissioned by HB Arch on behalf of the Parramatta Eels National Rugby League (NRL) Club to assess the health and condition of twenty (20) trees located within or immediately adjacent to the Parramatta Eels Training Facility located within Kellyville Park, Memorial Avenue, Kellyville. The report has been prepared to aid in the assessment of State Significant Development Application (SSD-24452965) for the construction of a new Eels 'Centre of Excellence' and associated community facilities ('Community Sports Hub') within the Park in association with The Hills Shire Council.

1.1.2 The proposed development will provide state of the art facilities which enable physical recreation opportunities in conjunction with improved facilities for staff, players and existing users of the site. The proposed development will be integrated with the existing recreational landscape of the site and complement the upgrades to the existing playing fields being undertaken by Council. The proposed development is defined as a Recreation facility (major), and includes the following components:

▪ Construction of high-performance Centre of Excellence in the north east of the site adjacent to Training Field 2:
– Elite level gymnasium.
– Medical and rehabilitation facilities.
– Aquatic recovery and rehabilitation pools.
– Lecture theatre and meeting rooms.
– Player education and study areas.
– Administration offices for the Parramatta Eels.
– New female facilities including a dedicated female change room, cubicle toilets and showers.
– Balcony and terrace area.
– End of Trip Facilities and bicycle parking.
– Refuse Area.

▪ Construction of a Community Facility, including a grandstand with approximately 1,500 seats in the centre of the site adjacent to the Main Playing Field 3:
– Unisex changerooms and amenities.
– Referee changeroom and amenities.
– First Aid/Medical room.
– Community gymnasium.
– Café/kiosk.
– Concourse terrace.
– Multipurpose community function room with kitchen and amenities.
– Refuse Area.
– Bicycle parking.

▪ Solar arrays will be included on the roof of both the Centre of Excellence and Community Facility.

▪ Additional 40 car parking spaces for the proposed facility to operate in conjunction with existing at grade car parking already constructed by Council.

▪ Additional landscaping throughout the development footprint.

▪ Removal of a small number of trees internal to the site, however noting perimeter trees will be retained where not affected by the proposed building footprints.

▪ Hours of operation for the Centre of Excellence and Community Facility are 5:00am to 12:00am, however the following key times are likely:

– Centre of Excellence: 7.00am - 7.00pm
– Community Facility: 7.00am - 10.00pm

1.2 Purpose of this Report

1.2.1 The purpose of this report is to assess the potential impact of the proposed development on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

1.3 Response to SEARs

1.3.1 This Arboricultural Impact Assessment Report forms part of the Environmental Impact Statement (EIS) addressing part of Section 6 (Landscaping and Trees) of the Planning Secretary's Environmental Assessment Requirements (SEARS). This table identifies the SEARs and relevant reference within this report:-

Table 1 – SEARs and Relevant Reference

SEARs Item	Report Reference
6. Landscaping and Trees	
Details the proposed landscaping and planting, including proposal for native vegetation communities and plant species	**Section 11.** refer also iScape Landscape Architecture Report
Demonstrates how the development proposes to protect and increase the urban tree canopy	**Section 9, 10, 11, Appendix 6** (Tree Protection Plan) refer also iScape Landscape Architecture Report
Includes justification for any tree and vegetation removal	**Section 9**
Demonstrates how the proposed development maximises opportunities for green infrastructure, consistent with Greener Places	refer to iScape Landscape Architecture Report

1.4 Reporting Standards

1.4.1 This report has been prepared in accordance with The Hills Shire Council's guidelines for preparation of Arborists Reports as outlined in Appendix 2 of Council's *Tree Management Guidelines for Trees on Private Land* (November 2014), Part C, Section 3.2 of *The Hills Shire Development Control Plan 2012* and Sections 2.3.2-2.3.5 of the Australian Standard for *Protection of Trees on Development Sites* (AS 4970:2009).

2 THE SITE

2.1.1 The subject property is known as Lot 60 in DP 10702 and Lot 1 in DP 167535, being 8 Memorial Avenue, Kellyville. For the purposes of this report, the subject allotments will be referred to as 'the site'. The present Parramatta Eels Training Facility is located predominantly within Lot 1 in DP 167535. The subject trees are located within or immediately adjacent Lot 60 in DP 10702 to the east of the Training Facility. The site forms part of a large sporting complex known as Kellyville Park. The Park contains a variety of playing fields and sporting fields for baseball, tee ball and Rugby League. The Park is zoned Public Recreation [RE1] under *The Hills Local Environmental Plan 2019* (THLEP).

2.1.2 The northern portion of the site is presently occupied by Roads and Maritime Services (RMS) road construction contractor, Daracon. The central portion of the site contains several former hard courts (tennis & basketball), presently used as temporary construction site compounds by Western Earth Moving (WEM). The southern portion of the site contains a grass playing field. The site has a moderate westerly gradient with dilapidated grassed areas and scattered trees, with a fairly typical parkland character. The site contains a number of mature and semi-mature trees. These include a variety of locally-indigenous, non-local native and exotic (introduced) species.

2.1.3 The soils of this area are typical of the Blacktown Soil Landscape Group (as classified in the *Soil Landscapes of the Penrith 1:100,000 Sheet*), consisting of shallow to moderately deep (< 1000 mm) hardsetting mottled contrast soils, *Red & Brown Podzolic Soils* on crests, upper slopes and well drained areas, grading to *Yellow Podzolic Soils* on lower slopes and areas of poor drainage or along drainage lines. Soil materials are derived Wianamatta Group Shales.[1] The landscape generally consists of undulating rises with broad rounded crests and ridges with gently inclined slopes with gradients of usually less than 5%.

2.1.4 The original vegetation of this area consisted of woodland typical of the Cumberland Plain (Shale Plains Woodland),[2] most of which has now been cleared for urban development. The dominant locally-indigenous tree species formerly occurring in this area included *Eucalyptus moluccana*, (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus fibrosa ssp. fibrosa* (Broad-leaved Ironbark) & *Eucalyptus crebra* (Narrow-leaved Ironbark). Other species found in this vegetation community may include Eucalyptus *Eucalyptus globoidea (*White Stringybark) *Eucalyptus eugenioides (*Narrow-leaved Stringybark), *Eucalyptus longifolia* (Woollybutt), *Corymbia maculata* (Spotted Gum) and *Eucalyptus amplifolia* (Cabbage Gum). *Melaleuca decora* (Paperbark) and *Casuarina glauca* (Swamp Oak) may also be found in low lying areas or along drainage lines.

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 5th May 2021. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (**Appendix 5**), based on the survey prepared by Cardno, Dwg. Ref No. 11930501001 [01] dated 16/03/2021. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No.s T5 & T6 were not shown on the original survey

and have been plotted on the drawing in their approximate positions by taking offsets from existing features.

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure.[3] All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.

4.1.2 The following information was collected for each tree:-

- **Tree Species** (Botanical & Common Name);
- **Approximate height**;
- **Canopy spread** (measured using laser distance measurer in four directions and an average taken);
- **Trunk diameter** (measured with a diameter tape at 1.4 metres from ground level);
- **Live Crown Size** (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres);
- **Maturity Class -** the Maturity Class for each tree has been divided into the following categories:-
  - **OM** Over-mature – greater than 80% of the life expectancy for the species;
  - **M** Mature – 50-80% of the life expectancy for the species;
  - **SM** Semi-mature – 20-50% of the life expectancy for the species;
  - **I** Immature – less than 20% of the life expectancy for the species.
- **Health & vigour** (using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators),
- **Condition** (using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators); and
- **Suitability** of the tree to the site and its existing location (in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues).

4.1.3 This information is presented in a tabulated form in **Appendix 3**.

4.2 Safe Useful Life Expectancy (SULE)

4.2.1 The remaining Safe Useful Life Expectancy[4] of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area, less its estimated current age. The life expectancy of the tree has been further modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 3.**

4.2.2 The following ranges have been allocated to each tree:-

- Greater than 40 years (Long)
- Between 15 and 40 years (Medium)
- Between 5 and 15 years (Short)
- Less than 5 years (Transient)
- Dead or immediately hazardous (defective or unstable)

4.2.1 SULE ratings are intended to provide a general overview of the long-term sustainability of the trees within the site in consideration of these factors. The allocated ranges are not intended to be absolute. This information is useful in guiding future planning by highlighting the probable

lifespan of individual trees, for which a clear pattern may emerge. This information may be helpful in forecasting likely tree senescence and planning for replacement planting to ensure continuity in tree canopy across the site. It should be noted that SULEs *may* be extended or reduced depending on the way trees are managed. Intervention and remedial works may extend the SULE of some trees.

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

5.1.1 The significance of a tree in the landscape is a combination of its environmental, heritage and amenity values. Whilst these values may be fairly subjective and difficult to assess consistently, some measure is necessary to assist in determining the retention value of each tree. To ensure a consistent approach, the assessment criteria shown in **Appendix 1** have been used in this assessment.

5.1.2 A rating has been applied to each tree to give an understanding of the relative significance of each tree in the landscape and to assist in determining priorities for retention, in accordance with the following categories:-

1. **Significant**
2. **Very High**
3. **High**
4. **Moderate**
5. **Low**
6. **Very Low**
7. **Insignificant**

5.2 Environmental Significance

5.2.1 Tree Management Controls

A Tree Management Provision (TMP) applies to all land within The Hills Shire Local Government Area (LGA) made pursuant to Clause 9 of the *State Environmental Planning Policy (Vegetation in Non-rural Areas) 2017* (Vegetation SEPP) as detailed in Part C, Section 3, Clause 2.4 of *The Hills Development Control Plan* (THDCP). The TMP generally protects all trees with a height of six (6) metres or greater or crown spread of three (3) metres or greater or with a trunk diameter of 300mm or greater (measured at the base). The following trees are exempt (not protected) under The Hills Council's Tree Management Provision:-

Tree No.	Species	Exemption
T9	*Liquidambar styraciflua* (Liquidambar)	Undesirable Species

The remainder of the trees are protected under the THDCP.

5.2.2 Wildlife Habitat

Eucalyptus tereticornis (Forest Red Gum) [T2 & T16], *Eucalyptus moluccana* (Grey Box) [T15], *Corymbia maculata* (Spotted Gum) [T10] and *Eucalyptus amplifolia* (Cabbage Gum) [T11, T12, T13 & T14] are all locally-indigenous species, representative of the original vegetation of the area and would be of benefit to native wildlife. However, none of the trees contain cavities that would be suitable as nesting hollows for arboreal mammals or birds. There were no other visible signs of wildlife habitation.

5.2.3 Noxious Plants & Environmental Weeds

Cinnamomum camphora (Camphor Laurel) [T3 & T4] is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within all of NSW under the provisions of the *Biosecurity Act 2015.* The growth of this plant species must be managed in a manner that continuously inhibits the ability of the plant to spread (so far as is reasonably practicable) and the plant must not be sold, propagated or knowingly distributed. This species is protected under Council's Tree Management Controls where greater than 10 metres in height. Both of these trees are greater than 10 metres in height and are therefore protected under THDCP.

5.2.4 Threatened Species & Ecological Communities

Eucalyptus scoparia (Willow Gum) [T17, T18, T19 & T20] is listed as an Endangered Species under the *Biodiversity Conservation Act 2016* (NSW) and listed as a Vulnerable Species under the *Environmental Protection and Biodiversity Conservation Act* 1999. Whilst this species is listed as endangered & vulnerable, it is a commonly planted ornamental tree in parks, gardens and streetscapes. The species is *not* endemic to this area and therefore does *not* have any ecological significance in this context of this site.

The National Parks and Wildlife Service (NPWS) 1:25000 Mapping Series (Native Vegetation of the Cumberland Plain)[5] indicates that there may be remnants of Shale Plains Woodland (SPW) within the site. SPW is a sub-group of Cumberland Plain Woodland. Cumberland Plain Woodland in the Sydney Basin Bioregion is listed as a Critically Endangered Ecological Community (EEC) under the *Biodiversity Conservation Act 2016* (NSW) and a Critically Endangered Ecological Community under the *Environment Protection and Biodiversity Conservation Act 1999*.

Eucalyptus tereticornis (Forest Red Gum) [T2 & T16] and *Eucalyptus moluccana* (Grey Box) [T15] are both Positive Diagnostic Species of Shale Plains Woodland (SPW).[6] *Corymbia maculata* (Spotted Gum) [T10] and *Eucalyptus amplifolia* (Cabbage Gum) [T11, T12, T13 & T14] are associated canopy species, occurring less frequently in this vegetation community. Trees T11, T12, T13 & T14 appear to be remnant (refer to **Section 5.3.4**) and are therefore considered to be constituents of this EEC. The remainder of these trees appear to have been planted c. 1980 and are therefore *not* considered to be constituents of this EEC.

It should be noted that The Hills Shire Council Vegetation Communities Map (2008) classifies the vegetation within the site as 'Gardens/Modified Vegetation Communities'.

None of the other trees are listed as Threatened or Vulnerable Species or form part of Endangered Ecological Communities (EECs) under the provisions of the *Biodiversity Conservation Act 2016* (NSW) or the *Environment Protection and Biodiversity Conservation Act* 1999.

5.2.5 Biodiversity, Bushfire & Riparian Lands

The site does *not* contain any areas of 'Biodiversity' as indicated on Council's Natural Resources Biodiversity Map forming part of the THLEP.

The site does *not* contain any Bushfire Prone areas as indicated on Council's Brushfire Prone Land Map 2018 or 2012.

5.3 Heritage Significance

5.3.1 Heritage Items

The subject property is *not* listed as an item of Environmental Heritage under Schedule 5, Part 1 of THLEP 2012.

5.3.2 Heritage Conservation Areas

The site is *not* located within a Heritage Conservation Area under Schedule 5, Part 2 of THLEP 2012.

5.3.3 Significant Tree Register

The Hills Shire Council does *not* currently maintain a Register of Significant Trees.

5.3.4 General

The 1943 Aerial Photograph of Sydney indicates that the site was substantially cleared of native vegetation at this time for pastoral use (grazing land) with an orchard visible in the north-eastern corner of the site (corner of Memorial Avenue and Stone Mason Drive). Some scattered copses of trees were still extant in the paddocks. Trees T11, T12, T13 & T14 appear to be extant as mature specimens at this time and are therefore likely to be remnant of the original woodland of this area.

5.4 Amenity Value

5.4.1 Criteria for the assessment of amenity values are incorporated into **Appendix 1**. The amenity value of a tree is a measure of its live crown size, visual appearance (form, habit, crown density), visibility and position in the landscape and contribution to the visual character of an area. Generally the larger and more prominently located the tree, and the better its form and habit, the higher its amenity value.

6 TREE RETENTION VALUES

6.1.1 The Retention Values shown in **Appendix 3** and **Appendix 5** have been determined on the basis of the estimated longevity of the trees and their landscape significance rating, in accordance with **Table 1**. Together with guidelines contained in **Section 7** (Tree Protection Zones) this information should be used to determine the most appropriate position of building footprints and other infrastructure within the site, with due consideration to other site constraints, to minimise the impact on trees considered worthy of preservation.

TABLE 1 – TREE RETENTION VALUES – ASSESSMENT METHODOLOGY

	Landscape Significance Rating						
Estimated Life Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Long - Greater than 40 Years	High Retention Value						
Medium- 15 to 40 Years			Moderate Retention Value				
Short - 5 to 15 years				Low Ret. Value			
Transient - Less than 5 Years				Very Low Retention Value			
Dead or Potentially Hazardous							

6.1.2 The following table describes the implications of the retention values on site layout and design.

TABLE 2 – TREE RETENTION PRIORITES.

RETENTION VALUE	RECOMMENDED ACTION
"High"	These trees considered worthy of preservation; as such careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the recommended setbacks as discussed in the following section (refer also **Appendix 2**) to avoid any adverse impact on these trees. In addition to Tree Protection Zones, the extent of the canopy (canopy drip-line) should also be considered, particularly in relation to high rise developments. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
"Moderate"	The retention of these trees is desirable, but not essential. These trees should be retained as part of any proposed development if possible. However, these trees are considered less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replenishment Policy to compensate for loss of amenity (refer also **Section 9**).
"Low"	These trees are not considered to worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. These trees should not be considered as a constraint to the future development of the site.
"Very Low"	These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.

7 TREE PROTECTION ZONES

7.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 4**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).[7]

7.1.2 The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

7.2 Structural Root Zone (SRZ)

7.2.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. This is also a radial distance measured from the centre of the trunk as specified in **Appendix 4**. The SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).

7.2.2 Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may compromise the stability of the tree or lead to its decline and demise.

7.3 Acceptable Encroachments to the Tree Protection Zone.

7.3.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 2**. Greater incursions to the TPZ may result in an adverse impact on the tree.

7.3.2 Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable

7.4 Acceptable Encroachments to the Canopy

7.4.1 The removal of a small portion of the crown (foliage and branches) is generally tolerable provided that the extent of pruning required is less than 10% of the total foliage volume of the tree and the removal of branches does not create large wounds or disfigure the natural form and habit of the tree. All pruning cuts must be undertaken in accordance with AS 4373:2007. This generally involves reduction of the affected branches back to the nearest branch collar at the junction with the parent branch, rather than at an intermediate point. The latter is referred to as "lopping" and is no longer an acceptable arboricultural practice. Generally speaking, the minimum pruning as required to accommodate any proposed works is desirable. Extensive pruning can result in a detrimental impact on tree health and may lead to exposure of remaining branches to wind forces that they were previously sheltered from, leading to a greater risk of branch failure.

7.4.2 Clearance to between the building line and canopy should take into account any projecting structures, such as balconies, awnings and the roofline and any requirement for temporary scaffolding to be erected during construction (typically 1-1.5 metres wide). High structures should preferably be located outside the canopy dripline (as shown indicatively on the attached plans) in order to avoid or minimise canopy pruning.

7.5 Legal Protection

7.5.1 Notwithstanding the above recommendations, Council may require a greater setback from certain types of structures to ensure the on-going legal protection of the tree (i.e. its legal status under Council's Tree Management Controls). In the Hills Shire, a tree located within five (5) metres of the wall of a dwelling or ancillary structure (garage, carport etc) is not protected under THDCP. The measurement is taken from the face of the trunk of the tree to the external wall or roofline of the dwelling/building. As such, if a tree is considered worthy of preservation, Council is unlikely to approve the construction of a dwelling or ancillary structure within five (5) metres of the tree (regardless of whether this can be undertaken without having an adverse impact on its health or longevity). Note that an 'ancillary structure' includes a garage, carport, studio, shed, workshop, swimming pool, spa or retaining wall with a height of greater than 600mm.

8 PROPOSED DEVELOPMENT

8.1.1 The proposed development includes the construction of a new Centre of Excellence and associated community facilities within the property. This includes a new on-grade car parking area, Centre of Excellence building, community 'Sports Hub' and grandstand together with associated landscape works.

8.1.2 The proposed development will provide state of the art facilities which enable physical recreation opportunities in conjunction with improved facilities for staff, players and existing users of the site. The proposed development will be integrated with the existing recreational landscape of the site and complement the upgrades to the existing playing fields being undertaken by Council. The

proposed development is defined as a Recreation facility (major), and includes the following components:

▪ Construction of high-performance Centre of Excellence in the north east of the site adjacent to Training Field 2:
– Elite level gymnasium.
– Medical and rehabilitation facilities.
– Aquatic recovery and rehabilitation pools.
– Lecture theatre and meeting rooms.
– Player education and study areas.
– Administration offices for the Parramatta Eels.
– New female facilities including a dedicated female change room, cubicle toilets and showers.
– Balcony and terrace area.
– End of Trip Facilities and bicycle parking.
– Refuse Area.

▪ Construction of a Community Facility, including a grandstand with approximately 1,500 seats in the centre of the site adjacent to the Main Playing Field 3:
– Unisex changerooms and amenities.
– Referee changeroom and amenities.
– First Aid/Medical room.
– Community gymnasium.
– Café/kiosk.
– Concourse terrace.
– Multipurpose community function room with kitchen and amenities.
– Refuse Area.
– Bicycle parking.

▪ Solar arrays will be included on the roof of both the Centre of Excellence and Community Facility.

▪ Additional 40 car parking spaces for the proposed facility to operate in conjunction with existing at grade car parking already constructed by Council.

▪ Additional landscaping throughout the development footprint.

▪ Removal of a small number of trees internal to the site, however noting perimeter trees will be retained where not affected by the proposed building footprints.

▪ Hours of operation for the Centre of Excellence and Community Facility are 5:00am to 12:00am, however the following key times are likely:

– Centre of Excellence: 7.00am - 7.00pm
– Community Facility: 7.00am - 10.00pm

9 IMPACT ASSESSMENT

9.1.1 The intention of this assessment is to determine the incursions to the root zones and canopies created by the proposed development and evaluate the likely impact of the proposed works on the subject trees. Details shown on the following plans were used in this assessment:-

Title	Author	Dwg No.	Date
Site Analysis – Existing / Demolition	HB Arch	A014 [A]	1/12/2021
Site Plan – New Works	HB Arch	A016 [A]	1/12/2021
GA COE Lower Plan	HB Arch	A019 [A]	1/12/2021
GA COE Upper Plan	HB Arch	A020 [A]	1/12/2021
GA COE Roof Plan	HB Arch	A021 [A]	1/12/2021
GA Community Facility Lower Plan	HB Arch	A023 [A]	1/12/2021
GA Community Facility Upper Plan	HB Arch	A024 [A]	1/12/2021
GA Community Facility Roof Plan	HB Arch	A023 [A]	1/12/2021
Elevations West	HB Arch	A027 [A]	1/12/2021
Elevations East	HB Arch	A028 [A]	1/12/2021
Landscape Architecture Report	iScape		01/2022

9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 4**. The following criteria have been examined as part of this assessment:-

- Existing Relative Levels (R.L.);
- Tree Protection Zone (TPZ);
- Structural Root Zone (SRZ);
- Footprint and envelope of the proposed development and temporary structures (scaffolding, hoardings etc);
- Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;
- Incursions to the tree canopy from the building envelope and temporary structures; and
- Assessment of the likely impact of the works on existing trees.

9.1.3 The proposed development will necessitate the removal of five (5) trees of low and very low retention value. These include Tree No.s T7 (Sasanqua Camellia), T15 (Grey Box) and T18, T19 & T20 (Willow Gum). None of these trees are considered significant or worthy of special measures to ensure their preservation. The removal of these trees to accommodate the proposed development is therefore considered warranted in this instance.

9.1.4 The proposed development will also necessitate the removal of three (3) trees of moderate retention value. These include Tree No.s T8 (Crepe Myrtle), T16 (Forest Red Gum) and T17 (Willow Gum). These trees are not considered significant, but are in good health and condition and make a fair contribution to the amenity of the site and surrounding properties. In order to compensate for loss of amenity resulting from the removal of these trees to accommodate the proposed development, consideration should be given to replacement planting within the site in accordance with **Section 11**.

9.1.5 The proposed development will also necessitate the removal of five (5) trees of high retention value. These include Tree No.s T10 (Spotted Gum) and T11, T12, T13 & T14 (Cabbage Gum). Of these, T10 is in good health and condition and makes a positive contribution to the amenity of the site, but has no special ecological or heritage significance. Trees T11, T12, T13 & T14 are in fair health and condition and are remnant of the original vegetation community of this area (Cumberland Plain Woodland) which is classified as an EEC. Whilst having some ecological significance, the trees are in an isolated group located centrally within the site and are not contiguous with any larger stand of vegetation. There are no feasible options that can be recommended in this instance that would permit these trees to be retained given the desired location of the main COE building and the position of the trees within the site without substantial amendments to the site layout and design. It is understood that the level of amendment required (which would essentially require relocation of the main building outside the TPZs of the trees) is not considered acceptable and would overly compromise the site layout. In order to compensate for loss of amenity resulting from the removal of these trees to accommodate the proposed development, consideration should be given to replacement planting within the site in accordance with **Section 11**.

9.1.6 A proposed new pathway providing a pedestrian link to Memorial Avenue is located within the TPZ of T1 (Blackbutt). The extent of the encroachment to the root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS 4970:2009. As such, the proposed works will not result in any adverse impact on this tree. In order to avoid any adverse impact on T1, the existing road base surface (temporary carpark) within the TPZ should be demolished in accordance with **Section 10.8** and all excavations for the pavement sub-grade within the TPZ should be undertaken in accordance with **Section 10.9.** Existing ground levels within the remainder of the TPZ should be retained intact (no cut/fill or surface grading).

9.1.7 No other trees will be adversely affected by the proposed development, provided that existing ground levels within the TPZs are maintained (i.e. no excavation, filling or surface re-grading is undertaken within the TPZs). In order to avoid any adverse impact on Trees T1, T2 & T9, temporary Tree Protection Fencing should be erected in accordance with **Section 10.5**. Where demolition of the existing temporary construction compound and roadbase surface is required within the TPZs of these trees, such demolition works should be carried out in accordance with **Section 10.8**.

10 RECOMMENDED TREE PROTECTION MEASURES

10.1 Tree Protection Plan

10.1.1 The following Tree Protection Measures should be read in accordance with the Tree Protection Plan (**Appendix 6**). The Tree Protection Plan (TPP) indicates the position of tree protection devices and other recommended measures to ensure the protection of trees within the site to be retained as part of the proposed development.

10.2 Prohibited Activities

10.2.1 The following activities should be avoided within specified Tree Protection Zones (refer **Appendix 4 & 6** for extent of the TPZ for each tree):-

- Excavations and trenching (with exception of the approved remediation works, underground services, building foundations or pavement sub-grade);
- Soil disturbance, surface grading, compaction, tyning, ripping or cultivation of soil;
- Mechanical removal of vegetation, including extraction of tree stumps;
- Soil level changes including the placement of fill material (excluding imported validated fill for remediation works or placement of fill for approved works)

- Movement and storage of plant, equipment & vehicles (except within defined temporary haul roads, where ground protection has been installed, or within the footprint of existing floor slabs or paved areas);
- Erection of site sheds (except where approved by the site arborist);
- Affixing of signage, barricades or hoardings to trees;
- Storage of building materials, waste and waste receptacles;
- Stockpiling of spoil or fill;
- Stockpiling of bulk materials, such as soil, sand, gravel, roadbase or the like;
- Stockpiling of demolition waste;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

10.3 Tree Damage

10.3.1 Care shall be taken when operating cranes, drilling rigs and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Site Arborist must be sought.

10.3.2 In the event of any tree becoming damaged for any reason during the construction period a consulting arborist [Australian Qualification Framework Level 5] shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

10.4 Tree Removal

10.4.1 The removal of Trees [**T7, T8, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19 & T20**] shall be carried out by an experienced tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). Care shall be taken to avoid damage to other trees during the felling operation.

10.4.2 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder (or by hand where less than 150mm in diameter) without damage to the root system of other trees. Where trees to be removed are within the SRZ of any trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Stumps within the Tree Protection Zone of other trees to be retained shall **not** be pulled out using excavation equipment or similar.

10.5 Tree Protection Fencing

10.5.1 Trees [**T1, T2 & T9**] shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence in the positions as indicated on the Tree Protection Plan (**Appendix 6**). As a minimum, the fence shall consist of temporary chain wire panels of 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement using corner braces where required. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate. Existing site boundary fences may form part of the enclosure.

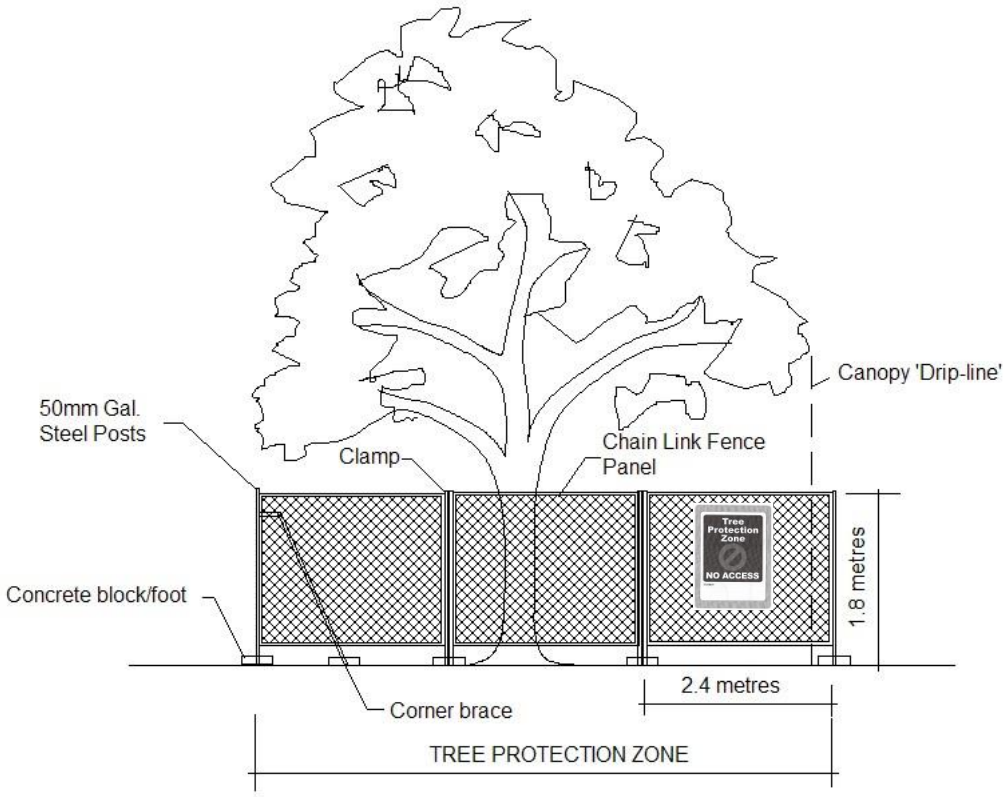


Figure 1 – Detail of Tree Protection Fence

10.6 Tree Protection Signs

10.6.1 Signs shall be installed on the Tree Protection Fence to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone. The signs shall be securely attached to the fence using cable ties or equivalent. Signs shall be placed at minimum 10 metre intervals. The wording and layout of the sign shall comply with AS 4970-2009 as shown in **Figure 2**.

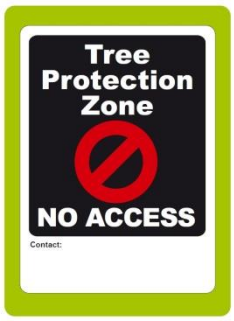


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Figure 2 – Detail of Tree Protection Sign

10.7 Ground Protection

10.7.1 Construction haul routes shall be confined to existing paved areas wherever possible. Where this is not feasible and construction haul routes or access for plant and equipment must traverse soft landscape areas within TPZs of [**any tree nominated for retention**], 20mm thick marine ply sheets or truck mats (such as Envirex Versadeck® access mats) (refer **Figure 4** shall be placed over the top of the ground surface to minimise compaction and disturbance of the underlying soil profile and root zone.

Figure 4 – Showing typical detail for truck mats.

10.7.2 Ground protection shall be installed prior to any site works and maintained in good condition for the duration of the construction period. On completion of the works, ground protection shall be removed without damage or disturbance to the underlying soil profile.

10.8 Demolition Works within Tree Protection Zones

10.8.1 Existing Turfgrass

No mechanical soil cultivation (using ripping tynes, rotary hoes or the like) is permitted within Tree Protection Zones (TPZs). Where existing turfgrass is proposed to be removed (demolished) within the TPZs of Trees [**T1, T2 & T9**], the turfgrass shall be first treated with a non-selective herbicide with the active constituent Glyphosate (Round-up ® or equivalent) at the manufacturers recommended rate and allowed to dehisce. Once the turfgrass in the effected area is completely dead, any high grass may be slashed/mown close to ground level.

Any residual vegetation (dead grass etc) may then be carefully scraped-off the surface using a small rubber tracked excavator with a broad sand bucket (i.e. without tynes/teeth), taking care to remove the minimum topsoil necessary (no more than 20mm deep) (refer to **Figure 1**). An observer shall be used to ensure that no woody surface roots of any trees are damaged during this process.

Figure 1 – Showing method for removal of residual surface vegetation from Tree Protection Zones following herbicide treatment and slashing.

10.8.2 Paved Areas

Demolition of paved areas (including any temporary road base surface treatment) within the Tree Protection Zones (TPZs) of trees [**T1 & T2**] shall be undertaken under the supervision of a qualified Arborist [Australian Qualification Framework (AQF) Level 5].

Concrete pavements shall be demolished by breaking the slab into manageable sections (using a rock hammer or similar) and asphalt pavements shall be removed by breaking the topcoat into manageable pieces. The broken sections shall be carefully lifted and folded over the remaining paved surface to minimise disturbance and compaction of the underlying soil profile (refer to **Figure 2**). Special care shall be taken where underlying woody roots have lifted or displaced the pavement. Any plant or equipment used in demolition work shall operate within the footprint of existing paved areas and avoid traversing soft landscape areas. Where this is unavoidable, suitable ground protection shall first be installed in accordance with **Section 10.7**.

Figure 2 – Showing method for removal of concrete pavement, by carefully lifting sections and folding over the remaining paved surface.

The pavement sub-base within the TPZ shall be gradually removed (where required) in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid excessive disturbance and compaction of the underlying soil profile and damage to underlying roots and minimise. The machine shall work within the footprint of the existing path footprint to avoid compaction of the underlying soil. The final layer of sub-base material shall be removed using hand tools were required to avoid compaction of the underlying soil profile and avoid damage to any underlying woody roots.

Following removal of the pavement surface and sub-base, clean, friable topsoil shall be used to fill in the excavated area and bring flush with surrounding levels within new landscape areas. Soil shall only be imported and spread when the underlying soil conditions are dry to avoid compaction of the soil profile. Where there is insufficient recovered site topsoil for this purpose, any imported material shall be free of rocks, vegetation, heavy clay or other extraneous matter complying with AS 4419:2003 (*Soils for Landscaping and Garden Use*). Any imported soil material should be similar in texture to the existing site topsoil.

10.9 Excavations within Tree Protection Zones

10.9.1 Prior to any mechanical excavations for building foundations or pavement sub-grade within the TPZs of Trees [**T1, T2 & T9**] exploratory excavation using non-destructive techniques shall be taken along the perimeter of the structure or pavement within the TPZ. Non-destructive excavation techniques may include the use of hand-held implements, air pressure (using an Air-spade® device) or water pressure (hydro-excavation in combination with a vacuum extraction unit). The exploratory excavation shall be undertaken along the perimeter of the foundation or pavement (within the TPZ) to the depth of the foundation or to a maximum of 800mm from surface levels, to locate and expose any woody roots prior to any mechanical excavation.

10.9.2 All care shall be undertaken to preserve woody roots intact and undamaged during exploratory excavation. Any roots encountered of less than 40mm in diameter may be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise moisture stress on the tree. Where large woody roots (greater than 40mm diameter) are

encountered during exploratory excavations, further advice from a qualified arborist shall be sought prior to severance.

10.10 Alternative Construction Methods

10.10.1 Where necessary, (to avoid severing large woody roots) consideration should be given to the installation of an elevated structure (e.g. pier and beam footing, suspended slab or floor supported on piers, cantilevered slab, up-turned edge beam etc) in preference to structures requiring a deep edge beam or continuous perimeter strip footing. The beam section of any pier and beam footing should be placed **above** grade to avoid excavation within the SRZ. Pier footings intersecting large woody roots should be slightly offset where necessary to avoid root severance.

10.10.2 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars. For paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation where large woody roots are found within the sub-base.

10.11 Underground Services

10.11.1 All proposed stormwater lines and other underground services should be located outside TPZs of trees proposed to be retained wherever possible or installed by alternative measures. Alternative measures include suspending pipelines beneath the floor of a building or structure (to avoid excavation with the TPZ), non-destructive excavation methods or Horizontal Directional Drilling (HDD). Where the installation of service lines within TPZs is unavoidable, the pipelines or conduits should be installed as follows.

10.11.2 Trenching for underground services and stormwater pipes within the TPZs of Trees [**any tree nominated for retention**], shall be undertaken using non-destructive excavation in accordance with **Section 10.6**. Where large woody roots are encountered during excavation or trenching (root diameter greater than 40mm), these shall be retained intact wherever possible (e.g. by tunnelling beneath roots and inserting the pipeline or conduit beneath or re-routing the service etc). Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by a qualified arborist [AQF 5] to evaluate the potential impact on the health and stability of the subject tree.

10.11.3 Installation of underground services and stormwater pipes within the SRZs of Trees [**any tree nominated for retention**], shall only be undertaken by Horizontal Directional Drilling (HDD) (also referred to as sub-surface boring or Micro-tunnelling for large diameter pipes). The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified. At this site a minimum depth of 1 metre to the invert level of the pipe is specified.

10.12 Root Pruning

10.12.1 Where root pruning of [**any tree nominated for retention**] is required to facilitate construction, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.

10.12.2 Any required root pruning shall be carried out in accordance with Australian Standard 4373-2007 – *Pruning of Amenity Trees* by a qualified and experienced arborist or tree surgeon [Australian Qualification Framework Level 3] in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). No roots of greater than 40mm in diameter should be removed

or pruned without further advice from a Consulting Arborist [Australian Qualification Framework Level 5].

11 REPLACEMENT PLANTING

11.1.1 The overall landscape concept plan prepared by iScape indicates a landscape area of approximately 2,000 m² located to the north and east of the proposed new car park dedicated for compensatory (offset) planting with a range of locally-indigenous tree species. This area is adequate to support the proposed 48 new trees capable of similar mature dimensions to those being removed (providing at least 40 m³ soil volume per tree) in addition to sub-canopy trees and shrub and groundcover plantings. In addition, 40 new trees (a variety of locally indigenous and non-local native species) are proposed to be planted in other areas of the site surrounding the proposed facilities as part of the overall development (a total of 88 new trees).

11.1.2 iScape estimates that the proposed development will result in loss of approximately 800m² of canopy coverage (which includes a variety of introduced, non-local native and locally indigenous tree species), with the proposed total replacement plantings achieving an estimated canopy coverage of 4,210 m² at maturity. As such, the proposed level of replacement planting will compensate for loss of amenity in the short term (next 10-15 years) and is therefore considered acceptable and compliant with the recommendations of this report.

Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
1st March 2022

REFERENCES

[1] Bannerman S.M. & Hazelton P.A. (1990)
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[2] Benson, Doug & Howell, Jocelyn (1990)
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[3] Mattheck, Dr. Claus & Breloer, Helge (1994) – Sixth Edition (2001)
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[5] National Parks and Wildlife Service of NSW (October 2002)
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[6] Tozer, Mark (2003)
The Native Vegetation of the Cumberland Plain, Western Sydney: Systematic Classification and Field Identification of Communities
Cunninghamia 8 (1) 2003, (Journal of Plant Ecology for Eastern Australia)
National Herbarium of NSW, Botanic Gardens Trust, Sydney

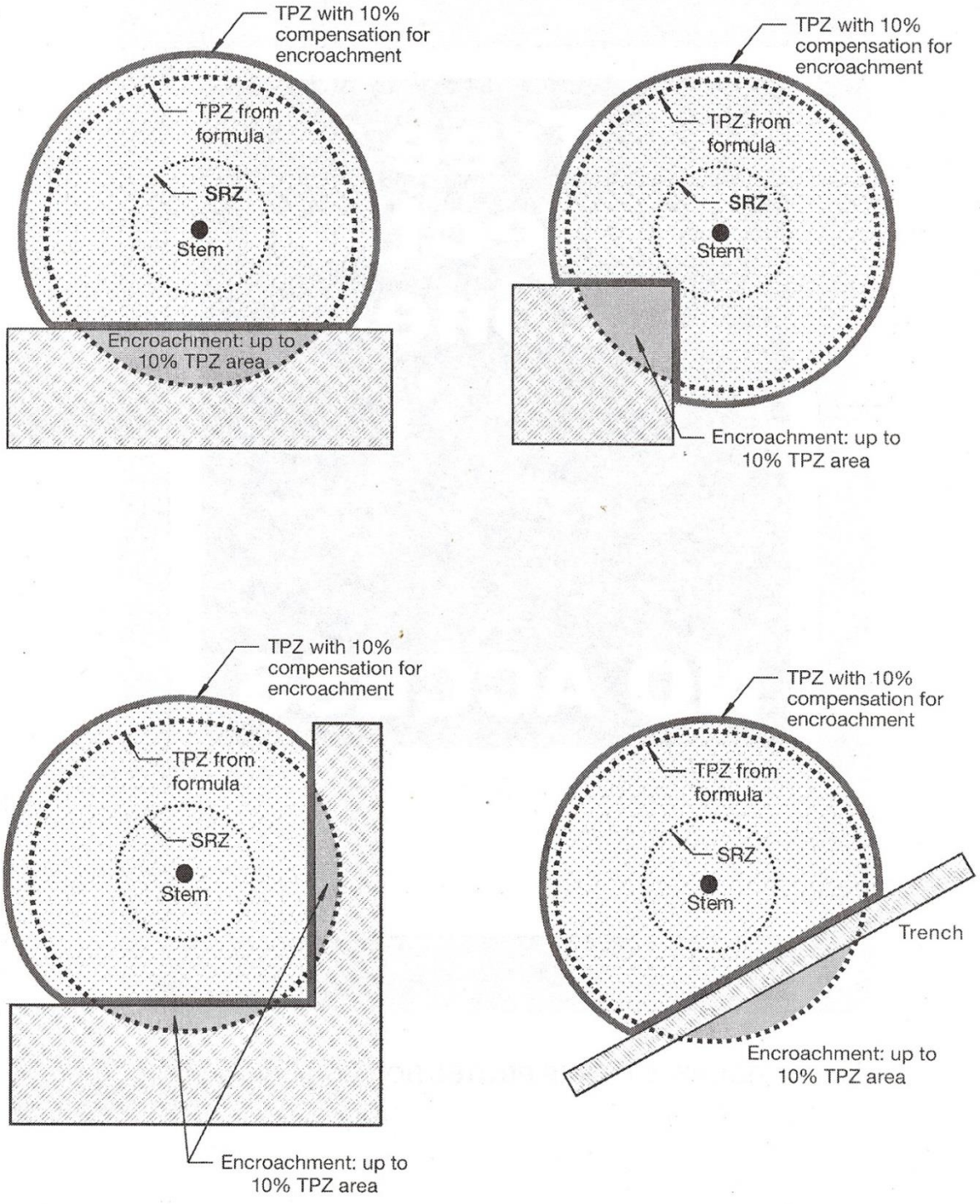
[7] Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened or Vulnerable Species as defined under the provisions of the *Biodiversity Conservation Act 2016* (NSW) or the *Environment Protection and Biodiversity Conservation Act 1999*.	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of the local or state planning controls (Development Control Plan etc).	The subject tree has a medium live crown size exceeding 40m²; the tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of the local or state planning controls (DCP etc) due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no known heritage value (or any habitat value)	The tree is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW or within the relevant Local Government Area under the provisions of the *Biosecurity Act 2015*	The tree is completely dead and represents a potential hazard.

Ref:- Morton, A (2006) **Determining the Retention Value of Trees on Development Sites**
TreeNet - Proceedings of the 7th National Street Tree Symposium 2006 Government of South Australia Department for Transport, Energy and Infrastructure

APPENDIX 2 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

REF:- Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
1	***Eucalyptus pilularis*** (Blackbutt)	15	13	650	117	M	Appears stable with sound branching structure. Exhibits a large dead PL (170mmØ) at 3 metres.	No evidence	Very Good	No Evidence	Long - more than 40 years	3	**High**	On-site
2	***Eucalyptus tereticornis*** (Forest Red Gum)	18	14	600	224	M	Appears stable with sound branching structure. Exhobits a prominent lean to the north-east (self-corrected).	No evidence	Good	No Evidence	Long - more than 40 years	3	**High**	On-site
3	***Cinnamomum camphora*** (Camphor Laurel)	10	10	275x2	80	SM	Appears stable with poor branching structure. Exhibits a high bark inclusion at junction of co-dominant PLs at 0.5 metres. Multiple wounds/broken branch stubs due previous branch loss and wounds to trunk due to mechanical injury.	No evidence	.Fair	No Evidence	Medium 15-40 Years	7	**Very Low**	On-site
4	***Cinnamomum camphora*** (Camphor Laurel)	11	12	490	108	SM	Appears stable with fair branching structure. Exhibits a high bark inclusion at junction of PL at 0.5 metres	No evidence	Good	No Evidence	Long - more than 40 years	7	**Very Low**	On-site
5	***Callistemon viminalis*** (Weeping Bottlebrush)	7	5	180+ 170 + 150	20	M	Appears stable with fair branching structure. Exhibits multiple moderate wounds and broken branch stubs to lower trunk and at 2 metres due previous mechanical injury. Crown suppress on the south-west side due to overshadowing. Multiple high bark inclusions at junctions of PLs at 0.5 and 0.8 metres.	No evidence	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	5	**Low**	On-site
6	***Callistemon viminalis*** (Weeping Bottlebrush)	5	4	125 + 145 + 120	12	SM	Appears stable with sound branching structure. Exhibits multiple high bark inclusions at junctions of co-dominant PLs at GL. Crown suppressed north east side due to overshadowing.	No evidence	Fair with thinning crown	No Evidence	Short 5-15 Years	5	**Low**	On-site
7	***Camellia sasanqua*** (Sasanqua Camellia)	4	5	150 + 80x4	15	SM	Appears stable with fair branching structure. Exhibits multiple moderate bark inclusions at junctions of PLs at GL.	Crown lifted to 2 metres	Good	No Evidence	Medium 15-40 Years	5	**Low**	On-site
8	***Lagerstroemia indica*** (Crepe Myrtle)	6	9	150x5	36	M	Appears stable with sound branching structure. Wisteria vine throughout crown.	No evidence	.Fair	Severe vine infestation (Wisteria)	Medium 15-40 Years	4	**Moderate**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
9	***Liquidambar styraciflua*** (Liquidambar)	5.5	5	213	27.5	I	Appears stable with fair branching structure.	No evidence	Good	No Evidence	Medium 15-40 Years	6	Low	On-site
10	***Corymbia maculata*** (Spotted Gum)	20	11	561	165	M	Appears stable with sound branching structure. Temporary construction haul road to west (within TPZ). Exhibits multiple axial striations and small wounds on lower trunk with exudate (kino) emanating from wounds.	No evidence	Very Good	No Evidence	Long - more than 40 years	3	High	On-site
11	***Eucalyptus amplifolia*** (Cabbage Gum)	23	15	400 + 625 + 650	315	M	Appears stable with fair branching structure. Exhibits multiple axial wounds with decay at 2 to 4 metres on northern most trunk. Some dieback in upper crown north side. Moderate occluded wound at 0.5-1.5 metres.	No evidence	Fair with thinning crown	Bracket Fungus (Phellinus sp.) infection at 2.5 metres (northern trunk)	Short 5-15 Years	1	High	On-site
12	***Eucalyptus amplifolia*** (Cabbage Gum)	21	12	580x2 + 450x2	228	M	Appears stable with fair branching structure. Exhibits a large axial wound a 1 to 3.5 metres with decay evident + PL at 7 to 10 metres (suspected previous lightning damage). Crown suppressed west side due to crowding. Moderate wound (broken stub) due branch loss at 6 metres (PL, 250mmØ). 15% epicormic growth. Located close to existing asphalt paved area.	No evidence	Good	Low borer infestation	Medium 15-40 Years	1	High	On-site
13	***Eucalyptus amplifolia*** (Cabbage Gum)	23	8	717	144	M	Appears stable with sound branching structure. Prominent lean to the east (self-corrected).	No evidence	Good	Low borer infestation	Medium 15-40 Years	1	High	On-site
14	***Eucalyptus amplifolia*** (Cabbage Gum)	18	16	460 + 685	208	M	Appears stable with fair branching structure. Exhibits a large dead PL (250mmØ). Large axial wound on tree at 2 to 4 metres due previous borer damage. Multiple moderate wounds at 1 to 2 metres + 4 to 5 metres. Hi bark inclusion at junction aof PL at 3.5 metres.	No evidence	Fair with slightly thinning crown	Moderate borer infestation	Short 5-15 Years	1	High	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
15	***Eucalyptus moluccana*** (Grey Box)	17	10	525	130	SM	Appears stable with fair branching structure. Exhibits a moderate axial wound at 5 to 6 metres with decay evident. Large basal wound due to extensive borer damage.	No evidence	Fair with slightly thinning crown	Severe borer infestation (Longicorn Beetle). Bracket Fungus (Phellinus sp.) infection at 5-6 metres	Transient (less than 5 years)	3	**Low**	On-site
16	***Eucalyptus tereticornis*** (Forest Red Gum)	13	8	395	72	SM	Appears stable with sound branching structure. Crown suppressed on the east side due to crowding.	No evidence	Very Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
17	***Eucalyptus scoparia*** (Willow Gum)	15	16	1064	192	M	Appears stable with fair branching structure. Exhibits a moderate wound and cavity in trunk at 1.5 metres with some decay evident. Moderate wound and cavity in PL at 7 metres. Multiple moderate wounds (broken branch stubs - SLs - to 200mmØ) due to previous storm damage. 30% epicormic growth.	No evidence	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	3	**Moderate**	On-site
18	***Eucalyptus scoparia*** (Willow Gum)	5	4	100x6	20	M	Appears stable with poor branching structure. Comprised of multiple elite epicormics arising from old stump due previous pruning.	Previously cut to stump (<1metre)	Good	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
19	***Eucalyptus scoparia*** (Willow Gum)	5	4	100x6	20	M	Appears stable with poor branching structure. Comprised of multiple elite epicormics arising from old stump due previous pruning.	Previously cut to stump (<1metre)	Good	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site
20	***Eucalyptus scoparia*** (Willow Gum)	4	4	100x6	16	M	Appears stable with poor branching structure. Comprised of multiple elite epicormics arising from old stump due previous pruning.	Previously cut to stump (<1metre)	Good	No Evidence	Transient (less than 5 years)	5	**Very Low**	On-site

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
1	***Eucalyptus pilularis*** (Blackbutt)	P	7.8	2.9	5.3	191.0	Proposed pedestrian pathway offset 5.6 metres south-west at RL? (assumed close to existing grade). Excavations for pathway sub-grade within TPZ. Encroachment to TPZ = 9%.	Extent of encroachment to the root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS 4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Maintain existing ground levels within TPZ. Demolish existing road base (temporary carpark/compound surface) within TPZ (where required) in accordance with Section 10.8. Undertake all excavations for the new pavement sub-grade within the TPZ in accordance with Section 10.9.
2	***Eucalyptus tereticornis*** (Forest Red Gum)	P	7.2	2.8	4.9	162.8	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Maintain existing ground levels within TPZ. Demolish existing road base (temporary car park/compound surface) within TPZ (where required) in accordance with Section 10.8.
3	***Cinnamomum camphora*** (Camphor Laurel)	M	4.8	2.3	3.3	72.3	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
4	***Cinnamomum camphora*** (Camphor Laurel)	M	5.9	2.7	4.0	108.8	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
5	***Callistemon viminalis*** (Weeping Bottlebrush)	M	3.6	2.1	2.4	40.7	No proposed works within TPZ.	No adverse impact.	Consider removal - poor specimen.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
6	***Callistemon viminalis*** (Weeping Bottlebrush)	M	3.6	2.1	2.4	40.7	No proposed works within TPZ.	No adverse impact.	Consider removal - poor specimen.
7	***Camellia sasanqua*** (Sasanqua Camellia)	M	2.4	1.8	1.6	18.1	Located within footprint of proposed footpath.	Proposed works will necessitate removal.	Remove tree.
8	***Lagerstroemia indica*** (Crepe Myrtle)	M	5.4	2.5	3.7	91.6	Located within footprint of proposed new car park.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
9	***Liquidambar styraciflua*** (Liquidambar)	M	2.6	1.9	1.7	20.6	No proposed works within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Maintain existing ground levels within TPZ. Install temporary Tree Protection Fence in accordance with Section 10.5.
10	***Corymbia maculata*** (Spotted Gum)	P	6.7	2.7	4.6	142.1	Located within footprint of proposed new building (Centre of Excellence).	Proposed works will necessitate removal (High Retention Value). There are no feasible options that can be recommended in this instance that would permit this tree to be retained given the desired location of the main building.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
11	***Eucalyptus amplifolia*** (Cabbage Gum)	P	13.2	3.7	9.0	547.1	Located within footprint of proposed new building (Centre of Excellence).	Proposed works will necessitate removal (High Retention Value). There are no feasible options that can be recommended in this instance that would permit this tree to be retained given the desired location of the main building.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

PL = Primary Limb; SL = Secondary Limb; TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
12	***Eucalyptus amplifolia*** (Cabbage Gum)	P	13.2	3.7	9.0	547.1	Located within footprint of proposed new building (Centre of Excellence).	Proposed works will necessitate removal (High Retention Value). There are no feasible options that can be recommended in this instance that would permit this tree to be retained given the desired location of the main building.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
13	***Eucalyptus amplifolia*** (Cabbage Gum)	P	8.6	2.9	5.8	232.2	Located within footprint of proposed new building (Centre of Excellence).	Proposed works will necessitate removal (High Retention Value). There are no feasible options that can be recommended in this instance that would permit this tree to be retained given the desired location of the main building.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
14	***Eucalyptus amplifolia*** (Cabbage Gum)	P	10.8	3.3	7.3	366.2	Located within footprint of proposed new building (Centre of Excellence).	Proposed works will necessitate removal (High Retention Value). There are no feasible options that can be recommended in this instance that would permit this tree to be retained given the desired location of the main building.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
15	***Eucalyptus moluccana*** (Grey Box)	P	6.3	2.7	4.3	124.9	Located within footprint of proposed new building (Centre of Excellence).	Proposed works will necessitate removal.	Remove tree.
16	***Eucalyptus tereticornis*** (Forest Red Gum)	P	4.7	2.4	3.2	70.5	Located within footprint of proposed new building.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

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APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
17	***Eucalyptus scoparia*** (Willow Gum)	P	12.8	3.4	8.7	511.6	Located within footprint of proposed new grandstand	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
18	***Eucalyptus scoparia*** (Willow Gum)	P	4.8	3.6	3.3	72.3	Located within footprint of proposed new grandstand	Proposed works will necessitate removal.	Remove tree.
19	***Eucalyptus scoparia*** (Willow Gum)	P	4.8	3.6	3.3	72.3	Located within footprint of proposed new paved area.	Proposed works will necessitate removal.	Remove tree.
20	***Eucalyptus scoparia*** (Willow Gum)	P	4.8	3.6	3.3	72.3	Located within footprint of proposed new pedestrian ramp associated with the new grandstand	Proposed works will necessitate removal.	Remove tree.

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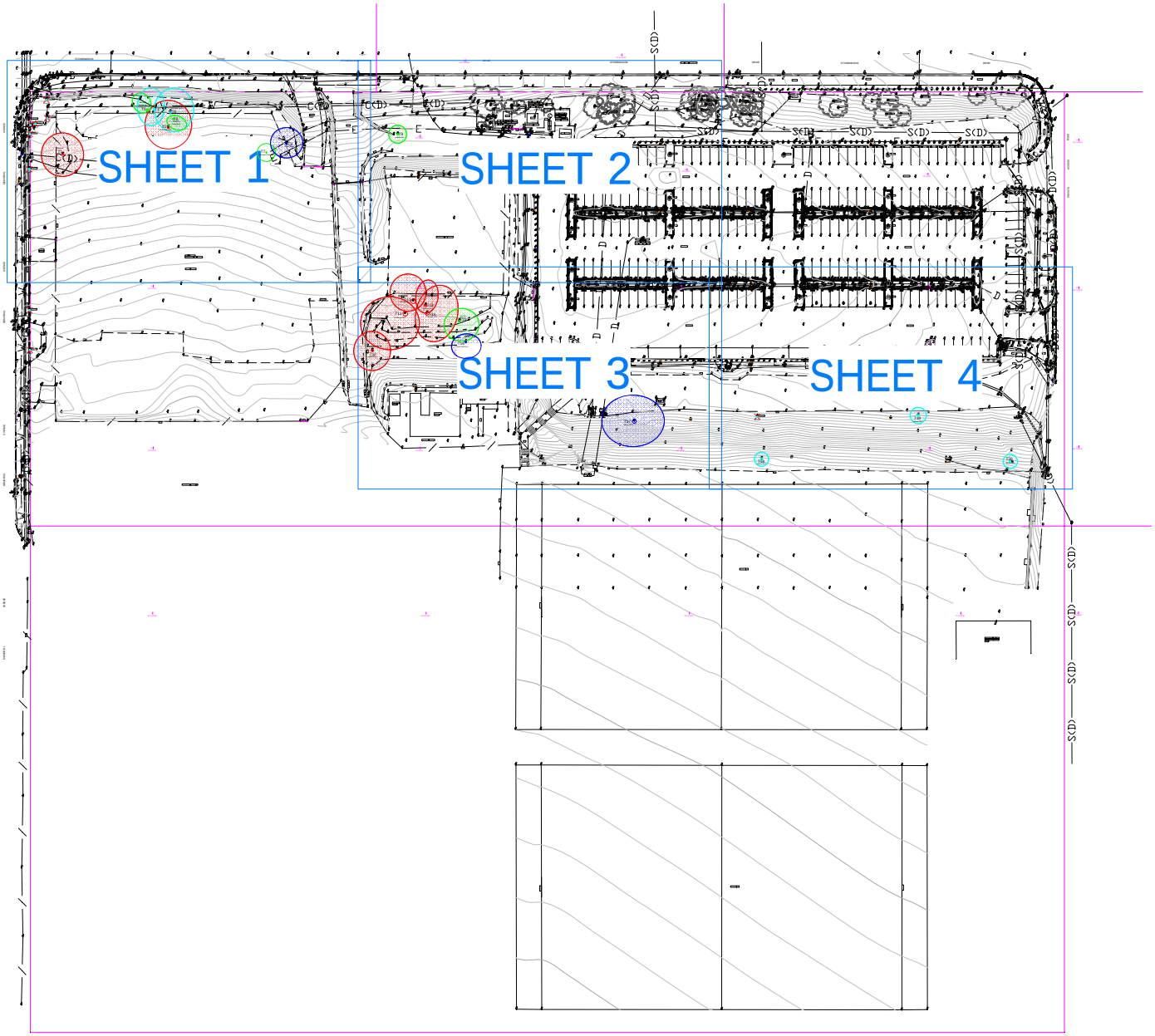


APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES

Parramatta Eels Training Facility
Memorial Avenue, KELLYVILLE, NSW

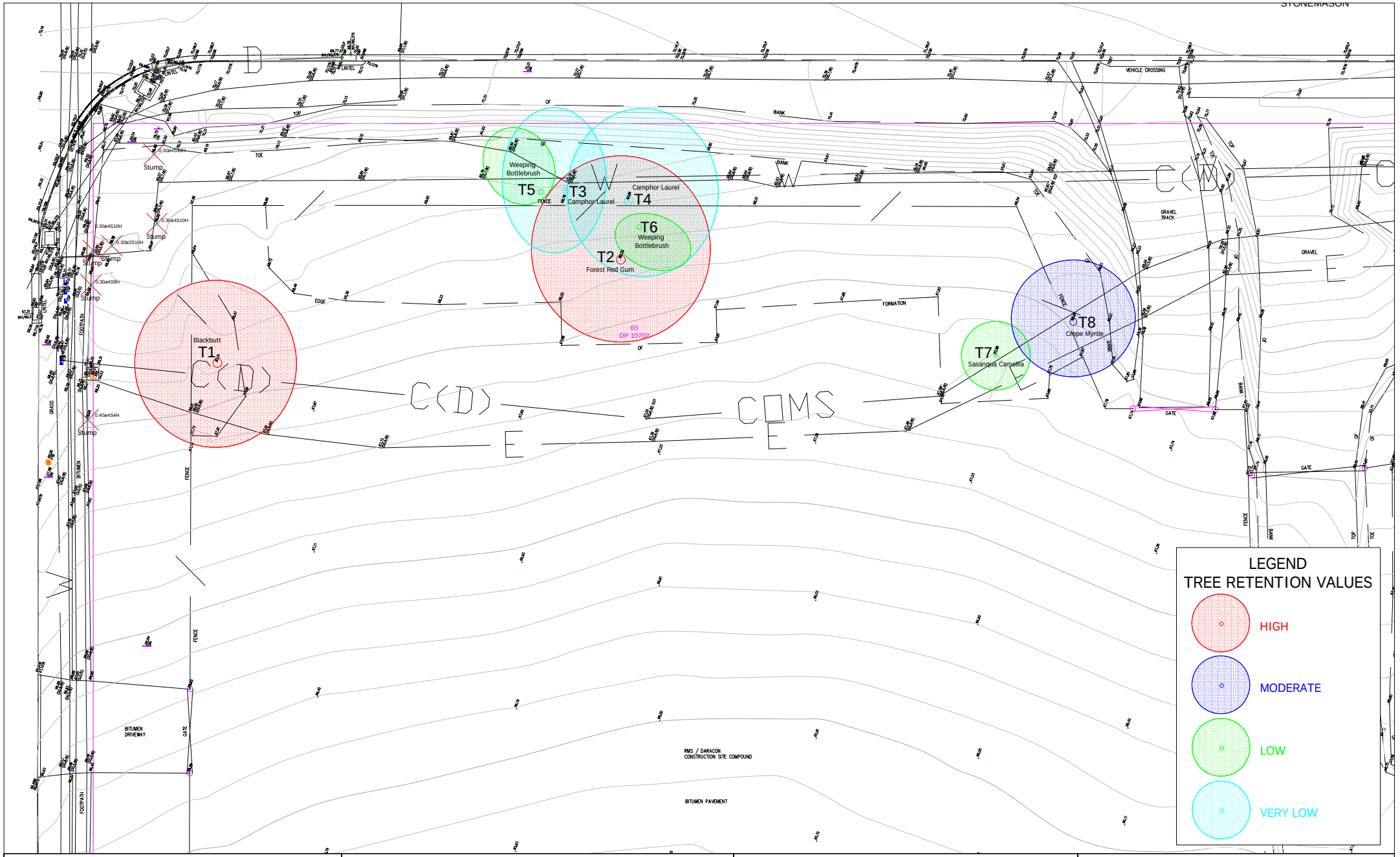
Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Cardno
Dwg Ref No. 11930501001 [01]
Dated 16/03/2021

DWG No. T21-0507/01 [A]

KEY PLAN

DATE: 07/05/2021



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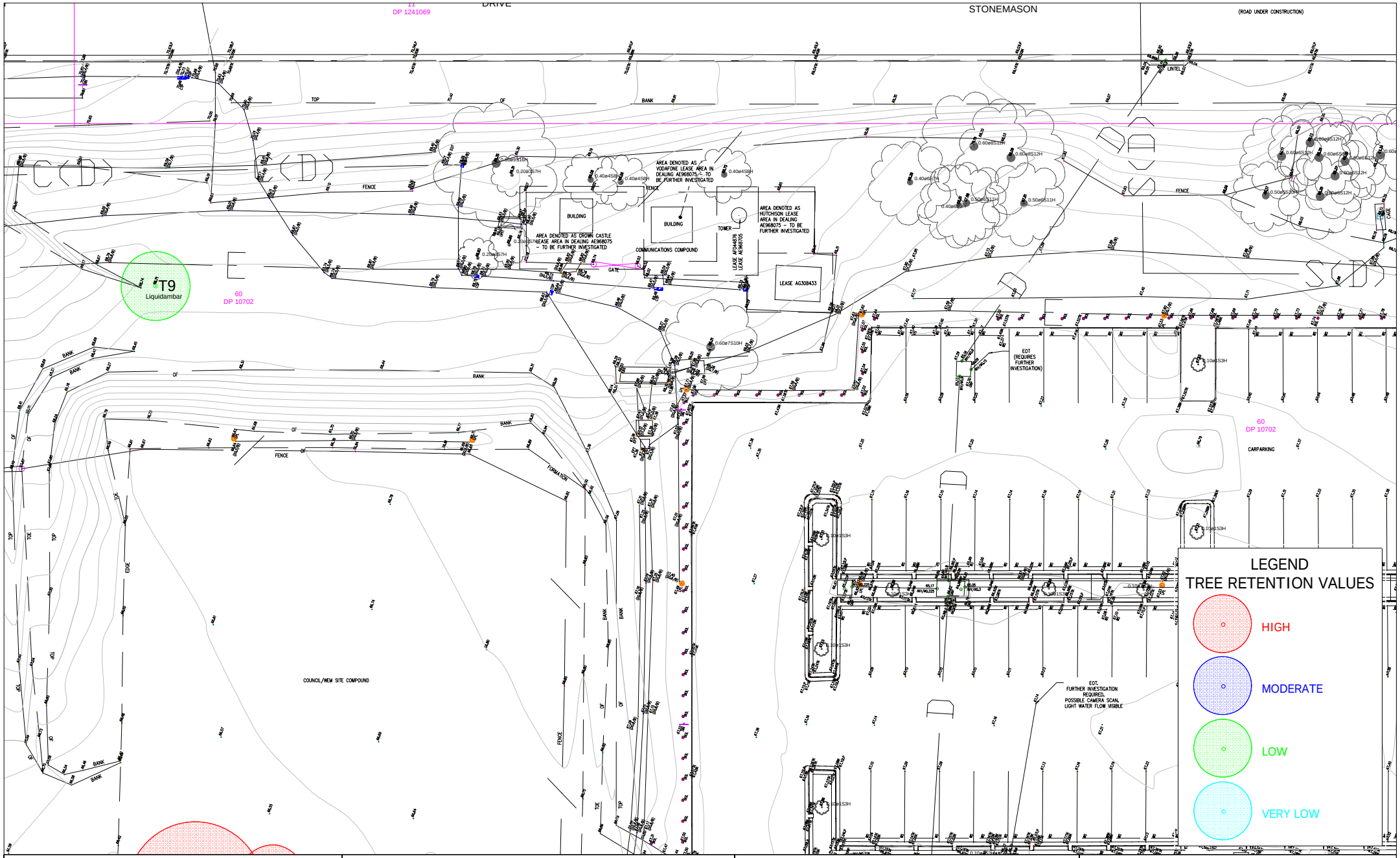

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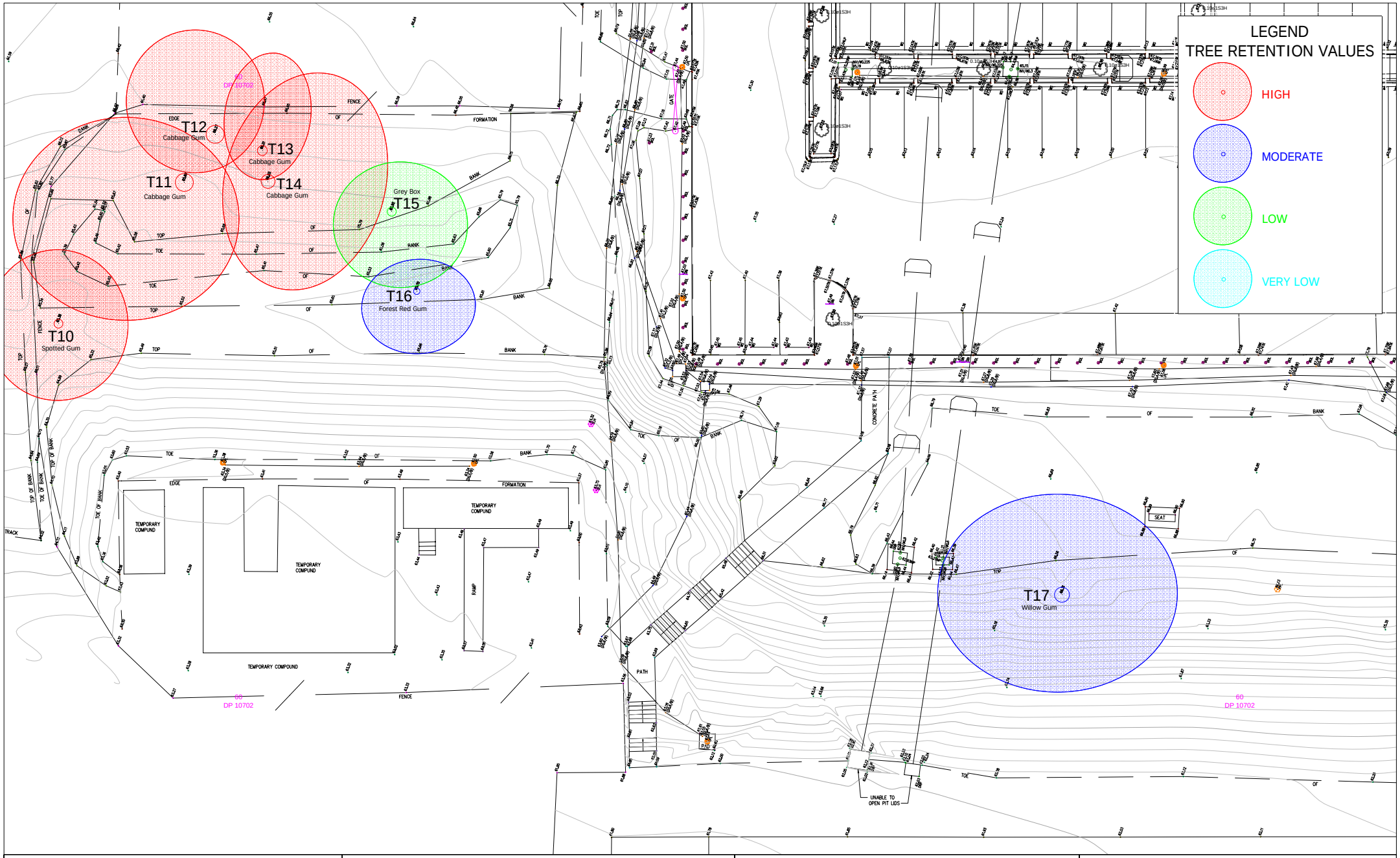

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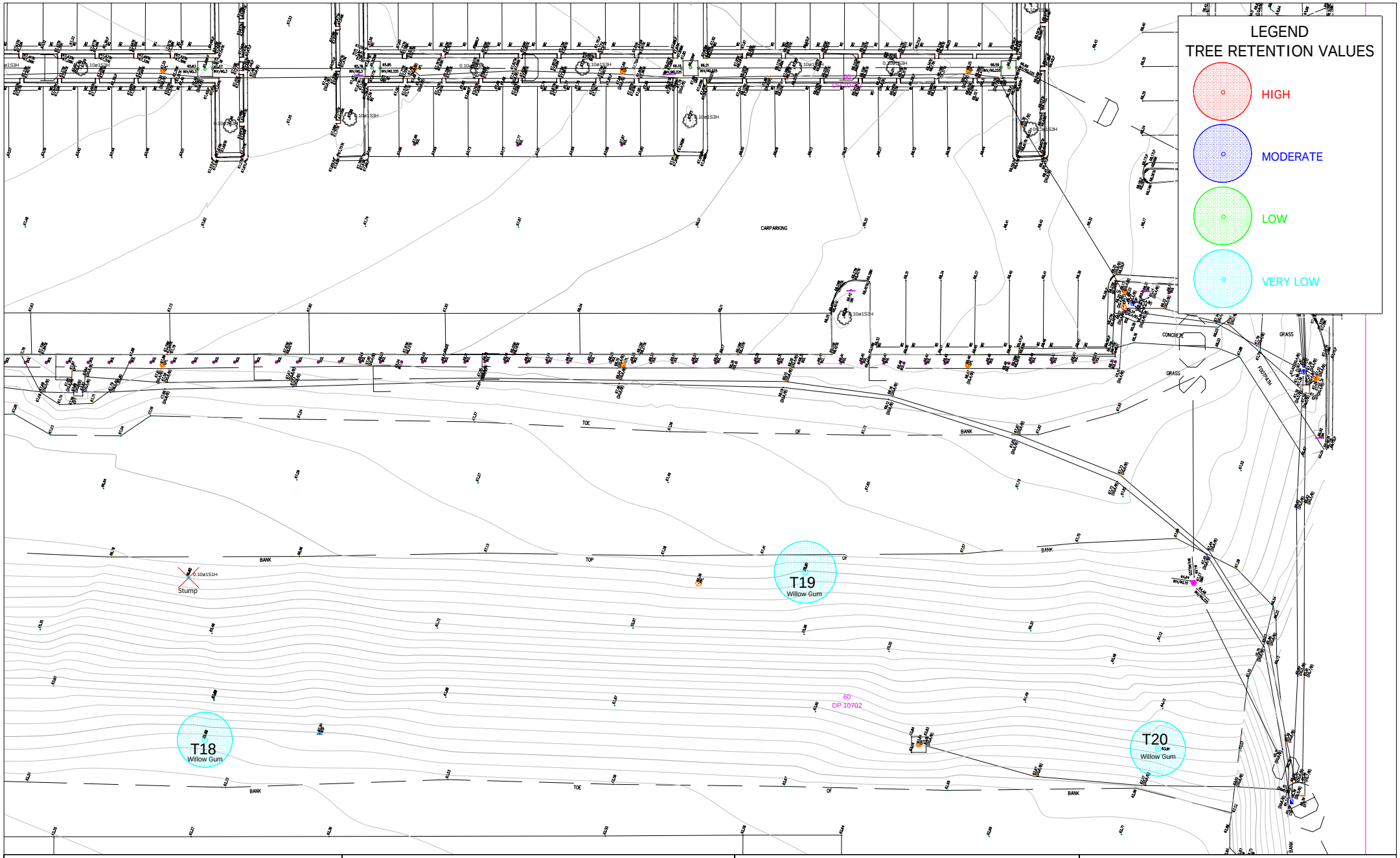

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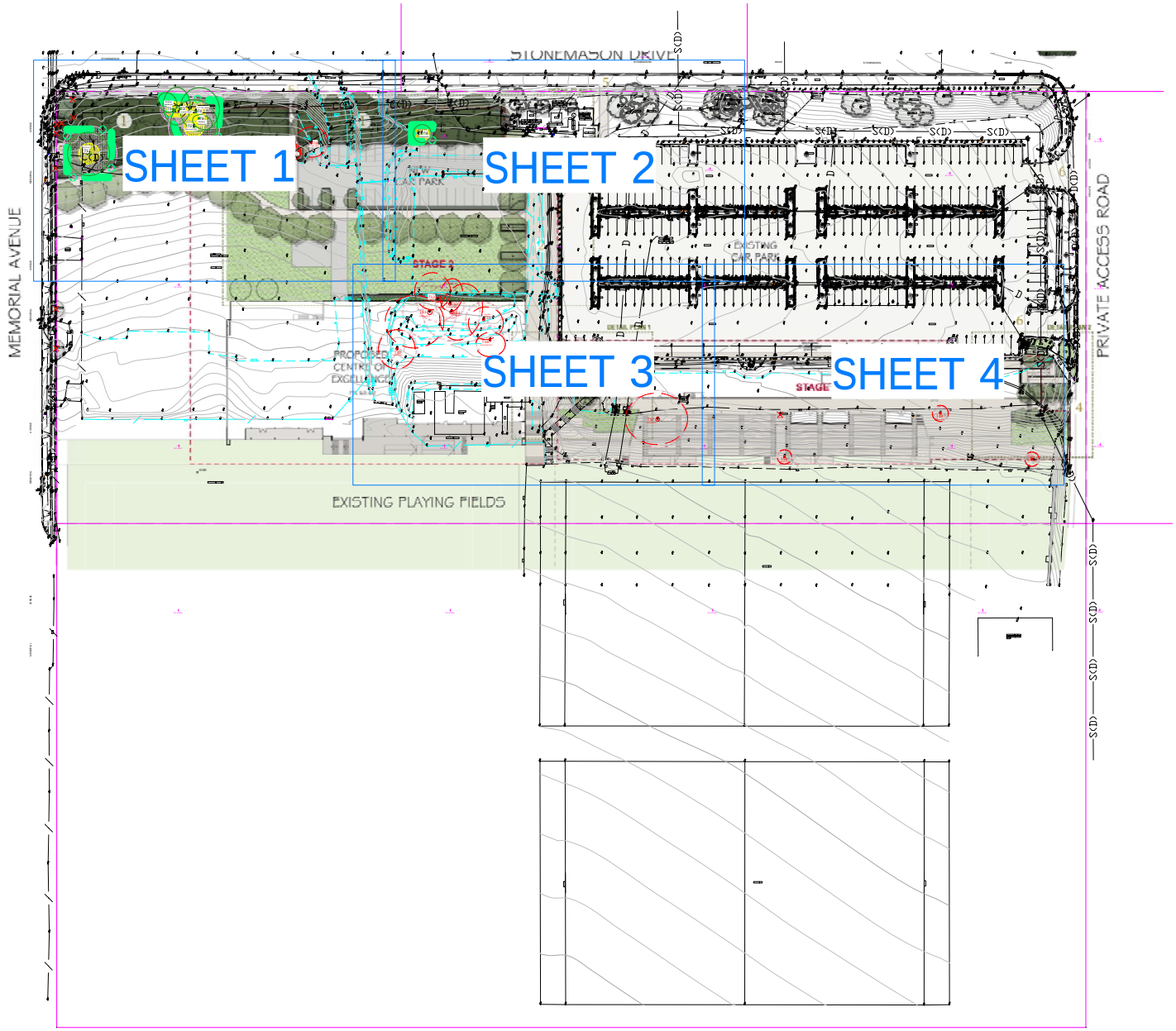

APPENDIX 6

TREE PROTECTION PLAN

KELLYVILLE PARK
6-8 Memorial Avenue, KELLYVILLE, NSW

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KEY PLAN

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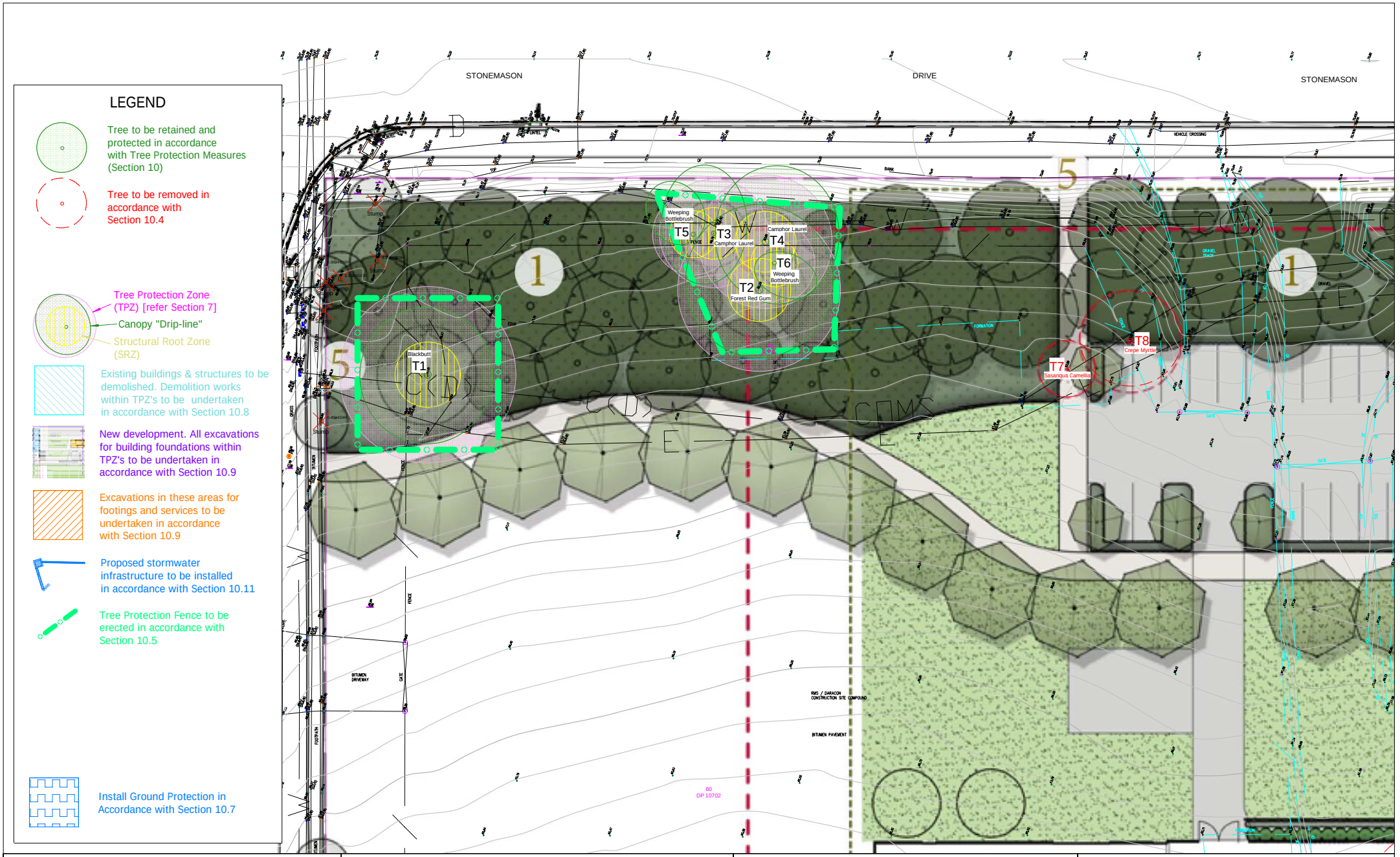

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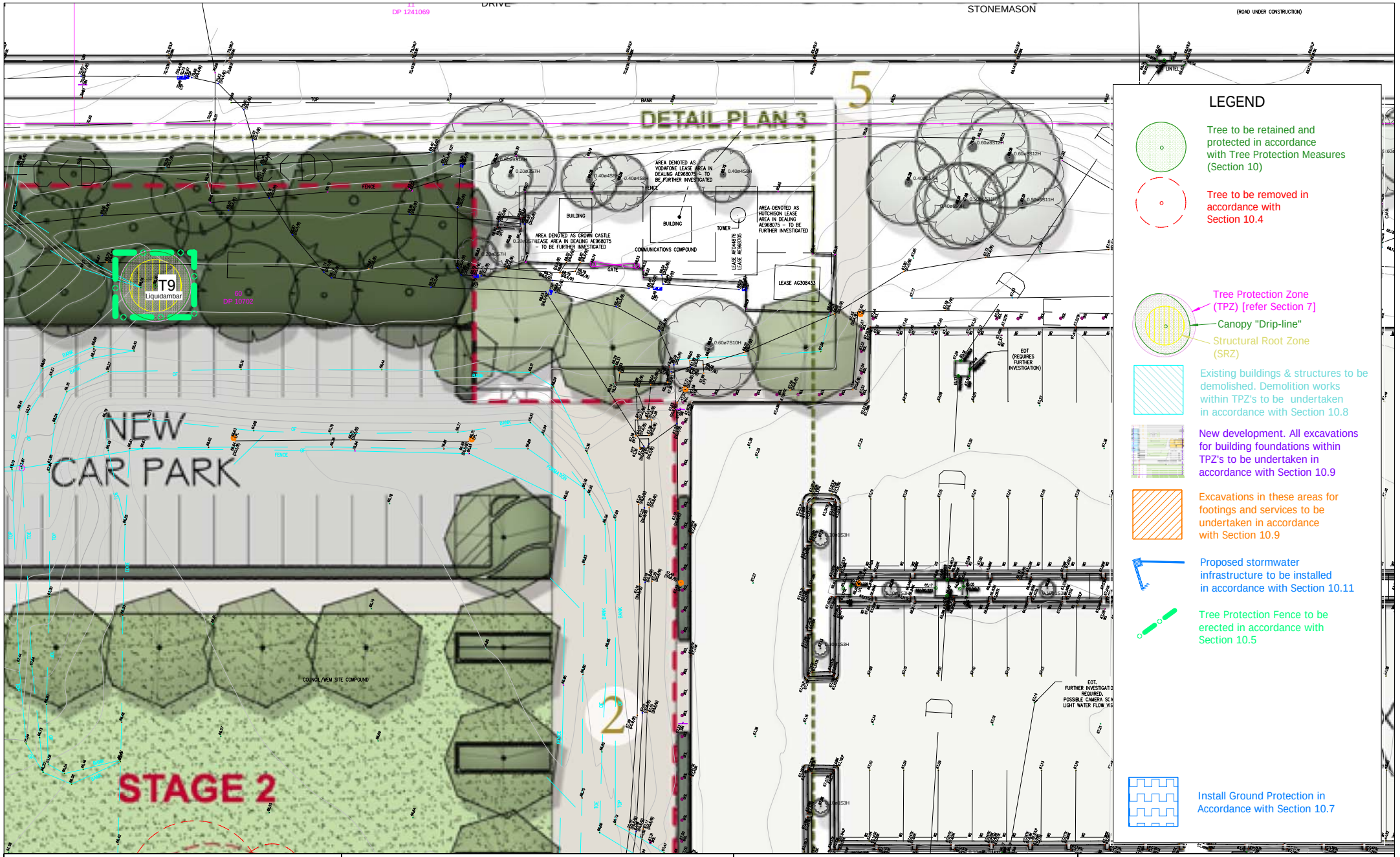

LEGEND

- Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)
- Tree to be removed in accordance with Section 10.4
- Tree Protection Zone (TPZ) [refer Section 7]
- Canopy "Drip-line"
- Structural Root Zone (SRZ)
- Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.8
- New development. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.9
- Excavations in these areas for footings and services to be undertaken in accordance with Section 10.9
- Proposed stormwater infrastructure to be installed in accordance with Section 10.11
- Tree Protection Fence to be erected in accordance with Section 10.5
- Install Ground Protection in Accordance with Section 10.7

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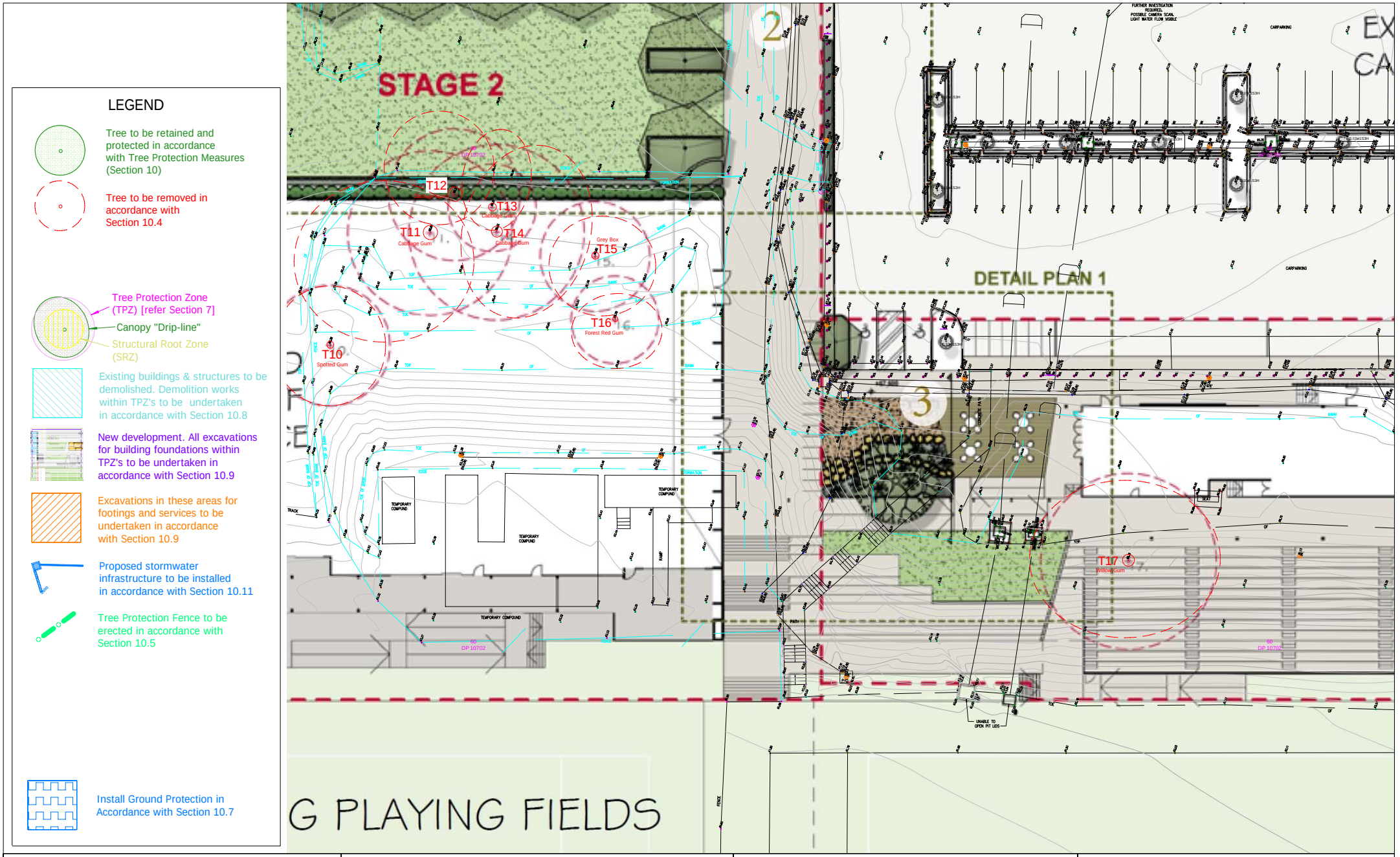

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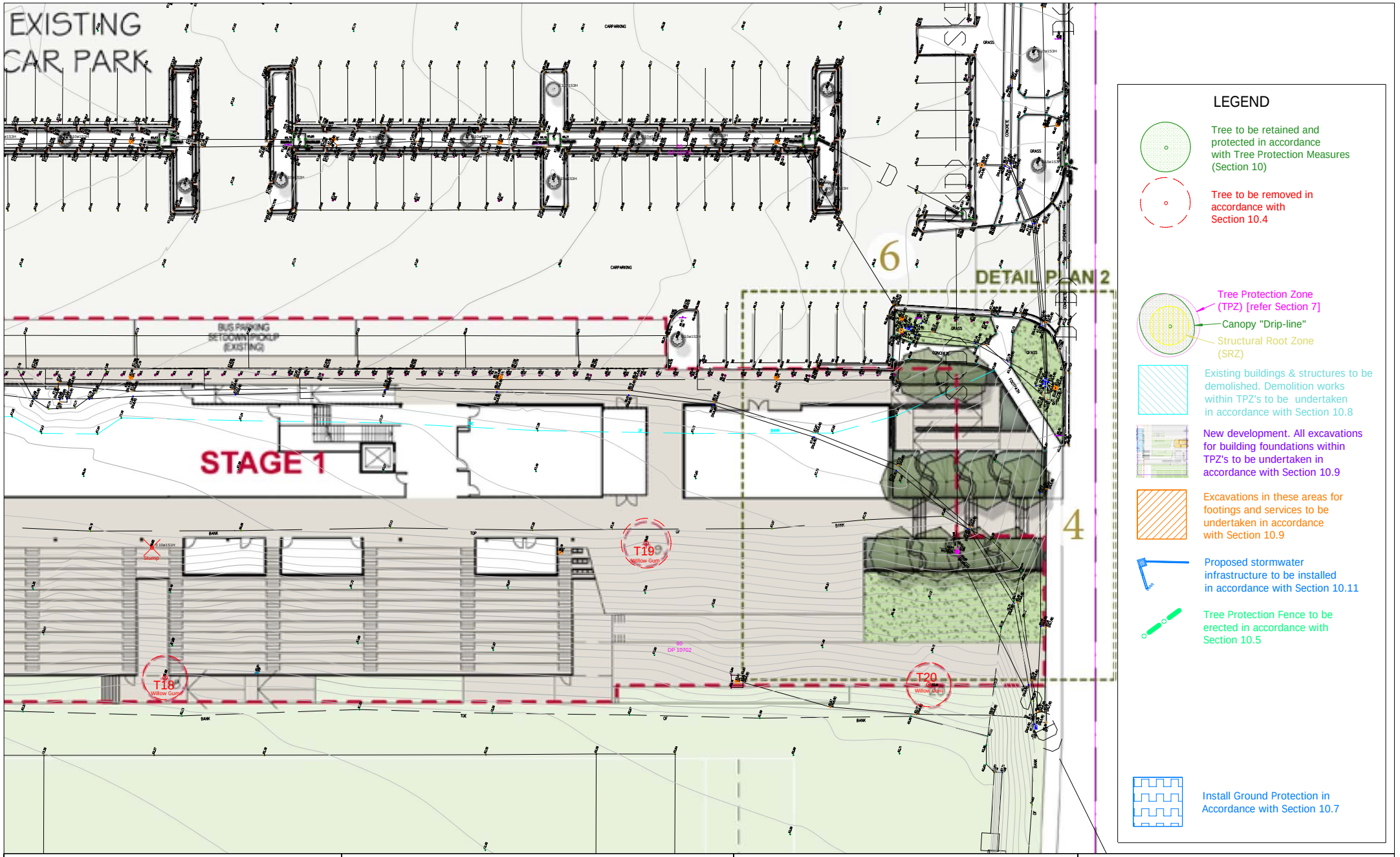

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