GALUNGARA PUBLIC SCHOOL STAGE 2
SSD 9368 – CONDITION B14

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

11 March 2022

CONTENTS

GLOSSARY

Term	Definition
Approved disturbance area	The area identified as such on the development layout
CEMP	Construction Environmental Management Plan
Conditions of consent	Conditions contained in Schedule 2 of the Development Consent for SSD 9368
Department	NSW Department of Planning, Industry and Environment.
EIA	Environmental impact assessment. This includes the approved documents prepared to support an application for consent or approval of a project, and any subsequent modifications to the application or proposed project, including (as relevant) further environmental impact assessments and responses to submissions.
EIS	Environmental impact statement prepared by the proponent for a state significant project application.
Environmental aspect	As defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment. They can be direct or indirect.
Environmental control map or plan	A plan or map that identifies the location of physical protection measures, work method controls and monitoring requirements to minimise the impact of project activities on the environment and community in and adjoining a specific work area.
Incident	An occurrence or set of circumstances that causes, or threatens to cause, material harm and which may or may not be or cause a non-compliance.
Material harm	Harm that: • Involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial • Results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).
Minister	NSW Minister for Planning and Public Spaces (or delegate or nominee, including the Secretary of the Department of Planning, Industry and Environment)
Mitigation	Actions or measures to reduce the impacts of a project.
Non-conformance	Failure to comply with an environmental requirement, standard, or procedure.
Non-compliance	An occurrence and/or set of circumstances that breach the conditions of consent and/or any other legal requirement.
Phase	A distinct period in the project (for example construction, operation, decommissioning).
Project (or 'The Project)	The construction process required to complete the works described in the SSD 9368 Conditions of Consent.
Proponent	The person or entity that is referred to as the proponent in an approval or the applicant in a consent or any other person carrying out any part of the development to which the approval or consent applies.
Planning Secretary	Planning Secretary under the Environmental Planning and Assessment Act 1979, or nominee. (Note references to the Planning Secretary in legislation now refer to the 'Secretary of the Department of Planning, Industry and Environment)

PMP	Project Management Plan – RCC internal project management document
RCC	Richard Crookes Constructions Pty Ltd
Stage	A discrete sequence of activities undertaken to complete one or many activities within the project scope. A project can have several stages which can extend throughout multiple phases.
SSD	State Significant Development

REVISION REGISTER

REVISION DATE	REVISION DESCRIPTION	PREPARED BY	APPROVED BY
25/02/22	Revision 1 – For SI Comment	George Denny-Smith (RCC – Site Engineer)	Tom Hemmett (RCC – Project Manager)
11/03/22	Issued for CC	George Denny-Smith (RCC – Site Engineer)	Tom Hemmett (RCC – Project Manager)

Project Stage – This CEMP relates specifically to the Construction of the SSD 9368 – Galungara Public School development. This CEMP relates to Stage 2 of the development as approved in Mod 3 of the SSD.

Project Phase – This EMP relates specifically to Construction Stage 2 of the SSD 9368 - Galungara Public School development.

CEMP CONDITION COMPLIANCE TABLE

Each Sub-Plan has an included Condition Compliance Table, with specific section and page number references. The below table is high level, and directs to each appendix/sub-plan.

Condition	Condition Requirements	Document/Sub-Plan Reference
B14	Prior to the commencement of construction, the Applicant must submit a Construction Environmental Management Plan (CEMP) to the Certifier and provide a copy to the Planning Secretary for information. The CEMP must include, but not be limited to, the following:	
	(a) Details of:	Section 2.4
	(i) hours of work;	
	(ii) 24-hour contact details of site manager;	
	(iii) management of dust and odour to protect the amenity of the neighbourhood;	Appendix 6.11
	(iv) stormwater control and discharge;	Appendix 6.11
	(v) measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site;	Appendix 6.11
	(vi) groundwater management plan including measures to prevent groundwater contamination;	Appendix 6.11
	(vii) community consultation and complaints handling;	Section 3 & Appendix 6.13
	(b) Construction Traffic and Pedestrian Management Sub-Plan (also see condition B16);	Appendix 6.8
	(c) Construction Noise and Vibration Management Sub-Plan (also see condition B17);	Appendix 6.9
	(d) Construction Waste Management Sub-Plan (see condition B18);	Appendix 6.10
	(e) Construction Soil and Water Management Sub-Plan (see condition B19);	Appendix 6.11
	(f) an unexpected finds protocol for contamination and associated communications procedure;	Appendix 6.6
	(g) an unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure; (h) waste classification (for materials to be removed) and validation (for materials to remain) be undertaken to confirm the contamination status in these areas of the site; (i) procedures to ensure that the proposed works do not result in a change of contamination risk for the site; and	Appendix 6.7

	(j) recommendations set out in Section 7 of the Aboriginal Cultural Heritage Assessment Report prepared by Biosis dated 13 March 2019.	

Condition	Condition Requirements	Document/Sub-Plan Reference
B16	The Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) must address, but not be limited to, the following:	Appendix 6.8
	(a) be prepared by a suitably qualified and experienced person(s);	
	(b) be prepared in consultation with Council and TfNSW;	
	(c) detail the measures that are to be implemented to ensure road safety and network efficiency during construction in consideration of potential impacts on general traffic, cyclists and pedestrians and bus services; and	
	(d) detail heavy vehicle routes, access and parking arrangements.	
	(e) include a Driver Code of Conduct to:	
	(i) minimise the impacts of earthworks and construction on the local and regional road network;	
	(ii) minimise conflicts with other road users;	
	(iii) minimise road traffic noise; and	
	(iv) ensure truck drivers use specified routes;	
	(f) include a program to monitor the effectiveness of these measures; and	
	(g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.	
Condition	**Condition Requirements**	**Document/Sub-Plan Reference**
B17	The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following:	Appendix 6.9
	(a) be prepared by a suitably qualified and experienced noise expert;	
	(b) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);	
	(c) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	
	(d) include strategies that have been developed with the community for managing high noise generating works;	
	(e) describe the community consultation undertaken to develop the strategies in condition B17(d);	

Condition	Condition Requirements	Document/Sub-Plan Reference
B19	The Applicant must prepare a Construction Soil and Water Management Sub-Plan (CSWMSP) and the plan must address, but not be limited to the following:	Appendix 6.11
	(a) be prepared by a suitably qualified expert, in consultation with Council;	
	(b) describe all erosion and sediment controls to be implemented during construction;	
	(c) provide a plan of how all construction works will be managed in a wet-weather events (i.e. storage of equipment, stabilisation of the Site);	
	(d) detail all off-Site flows from the Site; and	
	(e) 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, and 1 in 5- year ARI.	
	(f) include a complaints management system that would be implemented for the duration of the construction; and	
	(g) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the implemented management measures in accordance with the requirements of condition B11.	
B18	The Construction Waste Management Sub-Plan (CWMSP) must address, but not be limited to, the following:	Appendix 6.10
	(a) detail the quantities of each waste type generated during construction and the proposed reuse, recycling and disposal locations; and	
	(b) removal of hazardous materials, particularly the method of containment and control of emission of fibres to the air, and disposal at an approved waste disposal facility in accordance with the requirements of the relevant legislation, codes, standards and guidelines, prior to the commencement of any building works.	

1 INTRODUCTION

1.1 PURPOSE AND SCOPE

This Construction Environmental Management Plan (CEMP) has been prepared by Richard Crookes Constructions Pty Ltd for the Galungara Public School (EPPS) development, Stage 2.

This CEMP and its sub-plans have been developed in accordance with the SSD 9368 Conditions of Consent, Richard Crookes Constructions' environmental management systems, the relevant project approval documentation and the Environmental Management Plan Guideline: Guideline for Infrastructure Projects DPIE April 2020).

The purpose of this Construction Environmental Management Plan is to:

- Identify the environmental issues (aspects and impacts) for this project;
- Maintain Compliance with the SSDA;
- Establish, communicate & implement environmental operational controls to reduce any adverse impacts on the environment from RCC's activities, products and services.
- Implement and Monitor compliance by RCC and its suppliers & subcontractors with the requirements of all relevant environmental legislation, conditions of any applicable licence, approval and permit, regulatory requirements and this EMP.
- Action any outcomes from incidents or accidents, project audits or other identified non-conformances to continually improve the RCC environmental management system.

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1.2 OBJECTIVES

The principal objectives of the CEMP are:

- Ensure that the construction works are carried out in accordance with the appropriate environmental statutory requirements
- Ensure that the works are carried out in such a way as to minimise potential environmental degradation by the implementation of environmental best practice
- Ensure that personnel engaged in the work comply with the CEMP
- Respond to changes in environmental conditions during the proposed works through review, monitoring and control programs
- Ensure corrective actions are implemented in a timely manner

This CEMP is the overarching document for environmental management of the Project, with a number of supporting management documents. It is applicable to all personnel associated with the completion of the Project works, including Project Managers, Contractors and Sub-Contractors.

1.3 ENVIRONMENTAL POLICY

Richard Crookes Constructions Pty Ltd implements an Environmental Management System that is certified by Global mark as meeting the requirements of AS/NSW ISO 14001:2016 Environmental Management Systems.

RCC's Environmental Policy can be found in Appendix 6.4 of this CEMP. It is provided as an Appendix so that it may be updated in isolation as required.

This CEMP refers to Stage 2 of the Galungara Public School development.

2 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

The Project consists of a new primary school (Galungara Public School) in Schofields of which RCC is the principal contractor. The project is located at 95 Farmland Drive and the corner of the proposed future Pelican Road. Access to site is off Farmland Drive.

The works are the design and construction of the Galungara Primary School Stage 2. Stage 2 of the project, covered by this CEMP, includes:

- Extensive school grounds and additional landscaping suitable for 1200 (Core 35) students at Galungala Primary School.
- New Teaching Facilities including new learning spaces
- Additional Support Space for learning
- Additional Administration floor space
- More Aesthetically pleasing & functional landscapes, gardens & playground equipment
- Special programmes space
- OSHS support facilities

The works are planned for a 16-week design period and 39 week construction period. All being 55 weeks in total. This CEMP is to be used for Stage 2 of the works only under the SSD consent (SSD-9368-Mod-3). Installation of inground services and construction of an OSD tank have been dealt with under a REF planning approval pathway.

Contract type GC21 Milestones No. 3

- Milestone 1: Home base and Admin blocks complete for operational readiness
- Milestone 2: Landscaping areas at B3, B4 and OSD tank complete
- Milestone 3: Completion of sports courts and remaining landscaping

2.2 SITE LOCATION PLAN

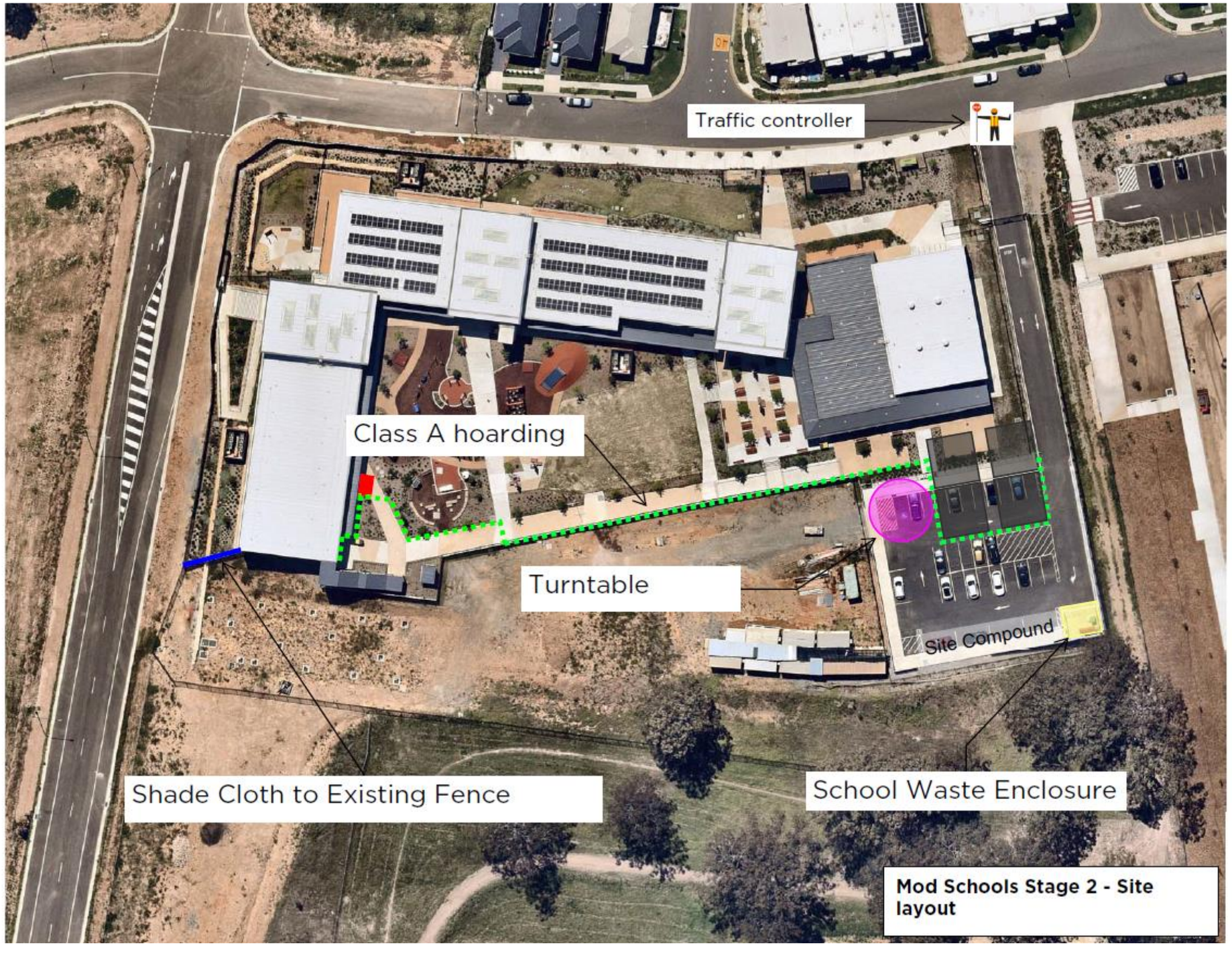
Please find overleaf:

- **Site Context – Site Location and Plan**

- **Site Context – Construction setup**

Site Context – Location and Plan

Site Context – Construction Setup



2.3 SCOPE OF WORKS

Scope of Works

This CEMP will apply to all construction activities relating to the project, including:

- Site establishment and installation of fencing and gates;
- Installation of scaffolding and hoarding
- Earthworks and site remediation
- Construct new school buildings and learning spaces
- Construct sports court areas
- Install services and internal finishes
- Finalise external and internal works and landscape

indicative plant and equipment

- Excavators
- Rollers
- Mobile Cranes
- Piling machines
- Trucks (deliveries, haulage etc.)
- Concrete trucks
- Concrete pumps
- Generators

The above list is indicative only. All plant and equipment required to complete the Project works will be used.

2.4 TIMING OF ACTIVITIES

Hours of Work

Construction activities will be carried out in accordance with the following approved work hours in accordance with SSDA consent conditions C3 to C6:

C3. Construction, including the delivery of materials to and from the site, may only be carried out between the following hours:

(a) between 7am and 6pm, Mondays to Fridays inclusive; and

(b) between 8am and 1pm, Saturdays.

No work may be carried out on Sundays or public holidays.

C4. Construction activities may be undertaken outside of the hours in condition C4 and C5 if required:

(a) by the Police or a public authority for the delivery of vehicles, plant or materials; or

(b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or

(c) where the works are inaudible at the nearest sensitive receivers; or

(d) where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.

C5. Notification of such construction activities as referenced in condition C4 must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

C6. Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

(a) 9am to 12pm, Monday to Friday;

(b) 2pm to 5pm Monday to Friday; and

(c) 9am to 12pm, Saturday.

24 Hour Contact Details

Name	Title	Phone Number
TBC		

3 COMMUNITY AND STAKEHOLDER ENGAGEMENT

A Community Communication Strategy has been prepared by SINSW as required by, and in accordance with SSD Condition B10.

This will be submitted to the Planning Secretary and will be made available on the School Infrastructure NSW website as required.

All information pertaining to community and stakeholder engagement for the SSD 9368 works can be found in this strategy. Refer to Appendix 6.13.

4 ENVIRONMENTAL MANAGEMENT FRAMEWORK

4.1 RELATIONSHIP TO AN EXISTING ENVIRONMENTAL MANAGEMENT SYSTEM

This CEMP is a supplementary document to RCC's Environmental Management System that is certified by Global mark as meeting the requirements of AS/NSW ISO 14001:2016 Environmental Management Systems.

RCC's Environmental Management Plan itself is included within RCC's Project Management Plan (PMP).

Some information has been copied into this CEMP for clarity, any reference in this CEMP to the PMP, QAP's or various forms is a reference to RCC's internal management system.

4.2 ENVIRONMENTAL MANAGEMENT STRUCTURE AND RESPONSIBILITIES

	Site Responsibility/Management														RCC Business Systems Management									
Project Environmental Roles & Responsibilities *Insert More Roles/Responsibilities as the Project develops*	Project Manager	Site Manager	Engineer	Contract Manager/Administrator	Design Manager	Cadet	Foreman	QA Officer /Finishes Foreman	WHS & Env Coordinator	Leading Hand	Construction worker	Subcontractors			Construction Director//Manager	Business Systems QA.ENV Manager	Human Resources Manager	WHS Manager	Rehabilitation Coordinator	Commercial Manager	External Auditors			
ENVIRONMENTAL MANAGEMENT																								
Identification of project environmental risks (aspects & impacts) and development of the EMP to document controls		•							•															
Planning & conducting training incl. inductions																•	•	•						
Inspections, monitoring & testing		•							•							•		•						
Compliance with the EMP, corrective & preventative action		•							•							•					•			
Verification of compliance (audits) and review of system effectiveness (i.e. is it working as planned?)	•	•							•							•					•			
Incident management & emergency response		•							•							•		•						
Environmental Policy, objectives & targets		•							•						•	•								
Allocation of resources for Environmental management		•							•						•									
Compliance with legal & other requirements		•							•						•	•								
Keeping abreast of changes in legal & other requirements	•	•							•							•								
Acquire & disseminate environmental management information		•							•							•								
Develop & implement procedures		•							•							•								
Assessing suppliers/subcontractors' abilities to comply with the EMS		•							•							•								
Ensuring compliance with RCC procedures and site rules		•							•			•				•								
Monitoring or technological changes & management practices		•							•							•	•							
Liaise with regulatory authorities (Local Council, Heritage Office, DECCW etc.)	•	•							•							•								
Management of community complaints	•	•							•							•								

4.3 LEGAL AND COMPLIANCE REQUIREMENTS

Legislation	Objectives & Application	Relevance
Federal		
Environment Protection and Biodiversity Conservation Act 1999	The Environment Protection and Biodiversity Conservation Act (EPBC) 1999 aims to: • Provide for the protection of the environment, especially matters of national environmental significance • Conserve Australia's biodiversity • Protect biodiversity internationally by controlling the international movement of wildlife • Provide a streamlined environmental assessment and approvals process where matters of national environmental significance are involved • Protect our world and national heritage • Promote ecologically sustainable development.	This Act is applicable to the Project in the event of an Unexpected Find of an Aboriginal object or Heritage item.
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	The purposes of this Act are the preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition.	This Act is applicable to the Project in the event of an Unexpected Find of an Aboriginal object.
National Environmental Protection Council Act 1994	The object of this Act is to ensure that, by means of the establishment and operation of the National Environment Protection Council: • People enjoy the benefit of equivalent protection from air, water, or soil pollution and from noise, wherever they live in Australia; and • Decisions of the business community are not distorted, and markets are not fragmented, by variations between participating jurisdictions in relation to the adoption or implementation of major environment protection measures.	The Council may make national environment protection measures that will influence the completion of the Project. See Act for further detail.

Legislation	Objectives & Application	Relevance
Federal		
National environmental Protection measures (Implementation) Act 1998	The objects of this Act are: • to make provision for the implementation of national environment protection measures in respect of certain activities carried on by or on behalf of the Commonwealth and Commonwealth authorities; and • to protect, restore and enhance the quality of the environment in Australia, having regard to the need to maintain ecologically sustainable development; and • to ensure that the community has access to relevant and meaningful information about pollution.	Under this Act, the Environment Minister may (subject to considerations of national interest or administrative efficiency): • Apply State laws to the activities of the Commonwealth or Commonwealth authorities in Commonwealth places • Apply State or Territory laws to the activities of the Commonwealth or Commonwealth authorities in other places.
NTC Brochure: Load Restraint Guide 2004	The Load Restraint Guide 2018 provides truck drivers, operators, and everyone in the transport chain of responsibility with basic safety principles for the safe carriage of loads.	All drivers (where relevant) must follow this guide when transporting goods to and from the Project.

Legislation	Objectives & Application	Relevance
State		
Waste Avoidance and Resource Recovery Act 2001	The objects of this Act are as follows: • To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of • ecologically sustainable development, • To ensure that resource management options are considered against a hierarchy of the following order: (i) Avoidance of unnecessary resource consumption, (ii) Resource recovery (including reuse, reprocessing, recycling and energy recovery), (iii) Disposal, • To provide for the continual reduction in waste generation, • To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste, • To ensure that industry shares with the community the responsibility for reducing and dealing with waste, • To ensure the efficient funding of waste and resource management planning, programs and service delivery, • To achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis, • To assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997.	Waste Avoidance and Resource Recovery Act 2001 Establishes the waste hierarchy. Promotes waste avoidance and resource recovery by developing waste avoidance and resource recovery strategies. Provides requirements for waste avoidance and resource recovery

Legislation	Objectives & Application	Relevance
State		
State Environmental Planning Policy No 55 - Remediation of Land	The object of this Policy is; • To provide for a State-wide planning approach to the remediation of contaminated land. In particular, this Policy aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment: • By specifying when consent is required, and when it is not required, for a remediation work, and • By specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular, and • By requiring that a remediation work meet certain standards and notification requirements.	The site is to be remediated in accordance with State Environmental Planning Policy 55 – Remediation of Land (SEPP 55).

Legislation	Objectives & Application	Relevance
State		
Protection of the Environmental Operations Act 1997	An Act to protect, restore and enhance the environment in NSW and to promote public access to information and involvement in environment protection. The Act: - Designates the EPA (Environment Protection Authority) as the regulatory authority. See epa.nsw.gov.au for further information. Objectives of the Act are: • To protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development, • To provide increased opportunities for public involvement and participation in environment protection, • To ensure that the community has access to relevant and meaningful information about pollution, • To reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote the following: • Pollution prevention and cleaner production, • The reduction to harmless levels of the discharge of substances likely to cause harm to the environment, • The elimination of harmful wastes, • The reduction in the use of materials and the re-use, recovery or recycling of materials, • The making of progressive environmental improvements, including the reduction of pollution at source, • The monitoring and reporting of environmental quality on a regular basis, • To rationalise, simplify and strengthen the regulatory framework for environment protection, • To improve the efficiency of administration of the environment protection legislation, • To assist in the achievement of the objectives of the Waste Avoidance and Resource Recovery Act 2001.	There is a duty to report pollution incidents under section 148 of the Protection of the Environment Operations Act 1997 (POEO Act). Schedule 1 of the POEO defines activities that require an Environmental Protection Licence. The POEO Act Classifies Environmental Offences and Penalties.

Legislation	Objectives & Application	Relevance
State		
Protection of the Environment Operations (Noise Control) Regulation 2017	The object of this Regulation is to repeal and remake, with minor amendments, the provisions of the Protection of the Environment Operations (Noise Control) Regulation 2000. This Regulation creates offences (maximum penalty $11,000 for corporations and $5,500 for individuals) for selling or driving a vehicle with a temporary noise reduction device or with temporary noise reduction packing or for modifying or repairing a vehicle so as to include any such device or packing. A person is not guilty of any such offence if the conduct alleged to give rise to the offence occurs within 6 months after the commencement of this Regulation. This Regulation also makes provision with respect to the following: a) the selling or using of certain classes of motor vehicles and motor vehicle accessories that are capable of emitting noise levels above a prescribed level, b) the use of motor vehicle horns and motor vehicle intruder alarms, c) the times during which it is not permissible to use certain motor vehicles if they emit noise that can be heard in other residential premises, d) the sounding of sirens and similar devices and the use of sound systems on vessels, e) the emission of noise from the engines or exhausts of motor vehicles and vessels, f) the maintenance of noise control equipment on motor vehicles and vessels, g) the issue of defective vehicle notices and defective vessel notices, h) the prohibition on selling certain articles that are capable of emitting noise levels above a prescribed level, i) the obligation to label certain articles, j) the times during which it is not permissible to use certain articles (including musical instruments) if they emit noise that can be heard in any residential premises, k) the inspection and testing procedures for the purpose of determining noise emission levels of certain motor vehicles, motor vehicle accessories, vessels, articles or equipment. See epa.nsw.gov.au for further information.	Equipment used during the Project construction works must be in compliance with this regulation.

Legislation	Objectives & Application	Relevance
State		
Protection of the Environment Operations (Waste) Regulation 2014	The Waste Regulation improves the EPA's ability to protect human health and the environment, and paves the way for a modern and fair waste industry in NSW. See epa.nsw.gov.au for further information.	Construction waste must be managed in accordance with this regulation.
Protection of the Environment Operations (Clean air) Regulations 2010	This Regulation: • Provides for the certification of domestic solid fuel heaters; • Controls burning generally by imposing an obligation to prevent or minimise emissions, by prohibiting the burning of certain articles and requiring approval for certain fires/incinerators; • Requires the fitting of anti-pollution devices to certain motor vehicles and prescribes an offence of emitting excessive air impurities; • Imposes certain requirements and standards on the supply of petrol; • Prescribes standards for certain groups of plant and premises to regulate industry's air impurity emissions; and • Imposes requirements on the control, storage and transport of volatile organic liquids. See epa.nsw.gov.au for further information.	The construction works associated with the project must be conducted in such a way that does not contravene this regulation. Regulates atmospheric pollutants including dust and odour onsite

Legislation	Objectives & Application	Relevance
State		
Crown Lands Act 2016	For the purposes of this Act, the principles of Crown land management are— (a) that environmental protection principles be observed in relation to the management and administration of Crown land; (b) that the natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible; (c) that public use and enjoyment of appropriate Crown land be encouraged; (d) that, where appropriate, multiple use of Crown land be encouraged; (e) that, where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity; and (f) that Crown land be occupied, used, sold, leased, licensed or otherwise dealt with in the best interests of the State consistent with the above principles.	The Project site is Crown Land, which influences the management of works, certification, and applicability of legislation.
Fire Brigades Act 1989	This Act applies to; • Land-based hazardous material incidents (and to any fires that may result from them) that occur anywhere in the State except on State waters, as defined in the Marine Pollution Act 2012. • A hazardous material incident that occurs in or on a building, bridge or other structure or on any body of water (not being part of State waters) is taken to be land-based.	Applies to emergency incidents and accidents involving hazardous materials
Local Government Act 1993	The purposes of this Act are as follows: • To provide the legal framework for an effective, efficient, environmentally responsible and open system of local government in New South Wales, • To regulate the relationships between the people and bodies comprising the system of local government in New South Wales, • To encourage and assist the effective participation of local communities in the affairs of local government,	Referenced and assessed during Approval Process

Legislation	Objectives & Application	Relevance
State		
Contaminated Land Management Act 1997	Objects of this Act: • The general object of this Act is to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3. • Particular objects of this Act are: • To set out accountabilities for managing contamination if the EPA considers the contamination is significant enough to require regulation under Division 2 of Part 3, and • To set out the role of the EPA in the assessment of contamination and the supervision of the investigation and management of contaminated sites, and • To provide for the accreditation of site auditors of contaminated land to ensure appropriate standards of auditing in the management of contaminated land, and • To ensure that contaminated land is managed with regard to the principles of ecologically sustainable development	Contamination on site must be assessed and managed in accordance with this act

Legislation	Objectives & Application	Relevance
State		
Environmental Planning and Assessment Act 1979	The objectives of this Act are to encourage: • The proper management, development, and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment, • The promotion and co-ordination of the orderly and economic use and development of land, • The protection, provision and co-ordination of communication and utility services, • The provision of land for public purposes, • The provision and co-ordination of community services and facilities, and • The protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and • Ecologically sustainable development, and • The provision and maintenance of affordable housing, and to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and • To provide increased opportunity for public involvement and participation in environmental planning and assessment.	Planning approval for the project is regulated by the DPE under the Environmental Planning and Assessment Act 1979.

4.4 TRAINING AND AWARENESS

Project specific environmental training and awareness will be conducted/enforced throughout the duration of construction. The key avenues for the implementation of this training and awareness are **Site Inductions**, **Toolbox Talks**, **Pre-Start Meetings** and **General Awareness** measures.

Additional training may be conducted on an as-required basis as the works progress.

Site Inductions

All workers will complete a Project specific induction prior to accessing site/commencing works. In addition to the compulsory WHS information, this induction will provide all construction personnel with site specific environmental training. The training will include environmental concerns, management measures and other protocols in place to satisfy the Conditions of Consent and other environmental obligations.

Toolbox Talks

Tool box talks will be conducted regularly by RCC and sub-contractors, to address specific WHS and environmental concerns. These toolbox talks will address specific activities, the hazards associated with them, and the management measures required to be put in place to maintain compliance and minimise/eliminate environmental harm.

Examples of specific environmental issues that will be addressed in tool box talks include:

- Erosion and sediment control
- Hours of work
- Emergency and spill response
- Noise
- Housekeeping and waste
- Dust control
- Construction traffic management

Tool box talk attendance is mandatory and all those in attendance will be required to sign in to the discussion and outcomes on an attendance form. RCC will maintain records of all Toolbox talks.

Pre-Start Meetings

Pre-start meetings are a daily training and awareness protocol that will be implemented to inform the daily activities of the construction workforce.

The upcoming construction activities will be reviewed daily, and prior to the day commencing, the pre-start meeting will review and inform the required WHS practices, environmental management measures, work area hazards and other task specific concerns.

The pre-start meeting will be conducted by an RCC representative responsible for the work area that is being discussed. Sub-contractors will be encouraged to share and discuss WHS and environmental concerns in relation tot heir specific works for that day.

Attendance is mandatory and all in attendance will be required to sign in to the discussion and outcomes on an attendance form. RCC will maintain records of all pre-start topics, dates and attendees.

General Awareness Training

General awareness of environmental obligations, risks and management measures will be enforced through site notice boards, posters, environmental bulletins and sub-contractor engagement (i.e. contractual) information packages.

4.5 ENVIRONMENTAL RISK MATRIX/ASSESSMENT

A copy of the Environmental Risk Matrix/Assessment has been included as an appendix to this CEMP. This is a live document that will be continuously revised as the Project progresses.

It will be supplementary to a monthly High Risk Project Assessment, that will be completed and provided to all construction workers.

4.6 HOLD POINTS

Other than the specific requirements of the SSD 9368 Conditions of Consent, there are no additional hold points applicable to the construction works of the Project.

The key hold points from the consent are:

- Unexpected Finds Procedure for contamination.
- Unexpected Finds procedure for Aboriginal Heritage.
- Unexpected Finds procedure for Non-Aboriginal Heritage.

Specific unexpected finds protocols for these hold points have been completed and are supplied with this CEMP as required by the Conditions of Consent.

4.7 ENVIRONMENTAL MANAGEMENT MEASURES, INSPECTIONS AND MONITORING

The following table outlines the environmental management measures, inspection and monitoring process that will be followed as part of RCC's existing Environmental Management System.

This is a live document that will be continuously updated as required throughout the duration of construction works.

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
1	Dust Generation Particulate Emissions (General)	• Install shade cloth on perimeter fencing • Vehicle corridors will be clearly identified and restricted to control vehicle access onsite. • Limit vehicle speed onsite to 20km/hr • Fixed and mobile (water tanker) water sprays • Reduce work activities /stop work during moderate to high wind velocity periods. • Maintain equipment. Smokey plant to be stopped until repair works completed. Turn off vehicle engines whilst not in use (no long periods of idling)	✓	✓	✓		Daily	Weekly		As required		SS
1	Dust Generation (Demolition)	Breakers and crushing equipment to be fitted with dust filtration equipment or water sprays to control dust emissions.			✓		Daily	Weekly during works	✓	As required		SS
1	Dust Generation (Construction)	• Minimise areas of site disturbed, and stage works where possible. • Dust suppression strategies to be used, i.e., water sprays, soil binders, hydro mulching, controlled speed onsite, road base + shaker grids. • Stockpiled topsoils and rubble will be restricted to 4m high. Stabilise if in-situ for >4-6months. On site drilling or coring operations will be undertaken by equipment fitted with air filtration equipment.	✓	✓			Daily	Weekly		As required		SS
2	Odour	• If odorous materials uncovered, recover immediately. • Seek advice from consultant regarding soil /materials management.		✓		✓	Daily	Weekly		As required		SS
3	Greenhouse	• Ensure purchased electrical products/whitegoods products comply with specification for CFCS & energy ratings • Low solvent paints to be used as a priority • Building to conform to AGBR or Green Star performance criteria • Deliveries / transport from site effectively planned to limit inefficient transport, assist back loading etc		✓						As required	✓	CA SS

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
4	Stormwater (Discharge from sedimentation basins, flooding)	• Water quality to meet ANZECC Water Quality Guidelines. → Conduct water quality test (external test company) NTU and TSS to determine the best treatment and acceptable levels – (Generally) PH 6.5- 8.5, Turbidity <50NTU, No visible oil & grease • Obtain advice for use of flocculants to settle sediment from water. • Sedimentation pond to be maintained at low levels to ensure capacity during rainfall event. • DO NOT DISCHARGE IF CONTAMINANTS SUSPECTED. Obtain advice.	✓	EP-001		✓	Daily during discharge	Weekly		As required	✓	SS
5	Adjoining waterways (dewatering, soil erosion & runoff)	• Temporary drainage systems will be established to divert clean waters around the land development areas as appropriate. • Erect silt fences, bunds and construct swale drains. • Concrete Bunded washouts plastic lined • Inspect at least weekly & after rainfall.		EP-001		✓	Daily during discharge	Weekly		As required	✓	SS
5	Adjoining waterways (dewatering, soil erosion & runoff)	• Maintain and/or replace as required. • Refer NSW Department of Housing's Managing Urban Stormwater (2004). • Street sweepers will be employed on regular basis.										
6	Sewer (Trade waste)	• No paints or other chemical to be poured down drains. • If required, obtain trade waste licence for discharge or local council approval.		EP-001		✓				As required	✓	SS
7	Land (Acid sulphate soils, contaminated soils, imported fill)	• Stop work if unexpected potentially contaminated soils are encountered. • Obtain waste classification from consultant in accordance with EPA guidelines Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes (June 2004) www.environment.nsw.gov.au/waste/envguidlns/index.htm.	✓		✓	✓	Daily	Weekly	✓	As required	✓	SS

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
		• Where required a Remediation Action Plan will be developed and implemented. • Sign off by Site Auditor may be required to validate clean-up. • Any groundwater or ponded rainwater will be tested and classified by consultants prior to disposal. • Check Geotech requirements. Ensure soil classification suitable for land use i.e. Schools, residential, commercial etc.	✓	EP-002	✓	✓	Daily	Weekly	✓	As required	✓	SS
7	Land	• Potential for acid sulphate soils will be assessed based on the sites proximity to low-lying coastal areas e.g., coastal plains, wetlands and mangroves where the surface elevation is less than five metres above mean sea level. • If odorous soils (rotten egg gas) or grey/yellowed mottled soils encountered, stop work. • If suspected, consultant to prepare Acid Sulphate Soil Management Plan (ASSMP). • Excavation and neutralisation to be supervised by consultants as per ASSMP. • The requirements to import fill will be minimised by utilising on site cut material wherever possible. • All analysis certificates shall be handed over as part of the completion documents to the client. • Record all imported fill on Form 25.08 - Product Identification & Traceability. • Mark up locations where fill compacted in site plan. Survey if required.										
8	Resources - water, materials, energy	• For design and construct jobs, refer to the design specification for ESD requirements and product choices. • Buy local wherever possible to reduce impacts of transport on environment.		✓		✓					✓	PM
9	Noise	• Refer to SSD for noise restrictions and working hours. Approved working hours are reflected in Section 2.4. • Use hoarding or acoustic mats as required. • Situate generators and plant away from sensitive receivers. • Turn off machinery. Maintain equipment and stop noisy plant until repaired. • No early deliveries.	✓		✓	✓	Daily	Weekly	✓	As required	✓	SS

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
10	Vibration	• Conduct dilapidation report prior to work starting. • Limit the use of vibratory rollers, rock breakers, impact piling etc adjacent to buildings (>7m). • Regenerated noise may also transfer through bedrock and building structures. • Obtain advice if required.	✓		✓	✓	Daily	Weekly	✓	As required	✓	SS
11	Community Concerns	• Provide information (e.g., Signage, letterbox drops) to community on programmed works • Provide contact name for inquires. • Advice locals of “noisy” work. • If required in noise sensitive areas and/or in response to complaints, engage consultants to undertake monitoring at nominated receivers. • Vehicles will not be permitted to queue outside the site or in residential areas unless a defined area is established which does not adversely impact on neighbours.	✓				Daily	Weekly		As required		PM SS
12	Flora	• Review planning documentation to determine the presence of any protected, threatened or significant flora. Obtain approvals as required. • Engage arborist to develop tree management plan or refer DA and arborist reports. • Education and training at site toolbox meetings and induction. • Report all sightings to the site manager. • Fence or barricade protected flora at the drip zone. Erect Keep Out signage. • Do not stack materials under/against trees. • The potential for reuse of vegetative wastes by mulching, chipping or on-site placement of trunks or limbs shall be reviewed for each project.	✓	✓		✓	Daily	Weekly		As required	✓	SS
13	Fauna	• All native animals protected. • Review planning documentation to determine the presence of any protected, threatened or significant fauna. Obtain approvals as required. • Site rules/induction to include information regarding of the • For injured animals, to relocate call WIRES	✓	✓		✓	Daily	Weekly	✓	As required	✓	SS

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
14 15	Waste Litter	• Hazardous materials surveys to be completed. • Materials to be removed prior to demolition • Registers and waste disposal requirements as per Work Cover and EPA requirements for removal, storage, transport and disposal. • General site wastes –use one bin system and sort in contractors' yard to produce quantities of material for recycling, reuse, disposal etc. • Empty drums are to be taken off-site for disposal. • Empty drums shall be crushed prior to recycling/disposal. • Do not overfill skip bins. Provide plenty for use. Cover where potential for windblown litter.	✓	EP-002	✓	✓	Daily	Weekly	✓	As required	✓	SS
16	Landfilling	• Reduce, reuse and then dispose • Landfill space scare leading to increased tipping costs • Dispose of hard construction wastes for recycled gravels and sands • Do not send soil to landfill until alternatives for beneficial reuse have been explored as per consultant's advice. • Consideration should be given to chipping of the vegetation and reuse • Reuse packaging to protect works		EP-002			Daily	Weekly		As required	✓	SS

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
17	Chemicals	• Chemicals to be stored in bunded areas (impervious + 110% of largest container) away from stormwater drains & pits. • Refer Workcover Code of Practice for Storage & Handling of Dangerous Goods, EPA Guidelines for Bunding & Spill Management. Appropriate chemicals storage is in conformance with: → AS 1940 The Storage and Handling of Flammable and Combustible Liquids → Storage and Handling of Dangerous Goods workover Code of Practice 2005– refer p. 86 • EPA requirements http://www.environment.nsw.gov.au/mao/bundingspill.htm • Ponded water within bunds will not be discharged to stormwater. • Fuel and hydraulic leaks to be cleaned up immediately. • Drilling muds to be contained within bunds and reused. • Liquid paints NOT to be poured down drains. Spread on waste cardboard or similar and leave to dry. Paint brushes to be rinsed and paint solids allowed to settle. Container of paint solids to be disposed to liquid waste facility. • Construct concrete washout pit for washout, away from stormwater drains. Send back to batch plant where possible.	✓	EP-002 EP-005 EP-006	✓		Daily	Weekly	✓	As required		SS
	Chemicals	• Concrete cuttings to be contained and wetvac to prevent runoff into stormwater drains. • Storage of bulk fuels (>200L) on site is prohibited. All refuelling shall be undertaken by a mobile facility with appropriate spill control and containment control equipment. • MSDS's must be provided to the Site supervisor prior to a chemical being received on site and by subcontractors using chemicals/products.	✓	EP-002 EP-005 EP-006	✓		Daily	Weekly	✓	As required		SS

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
18	Traffic	• Develop and implement traffic management plans. Submit to local council as required. • Signage and notices regarding disruptions. • Use crushed concrete, mulches etc along site access roads. • Install shakers and wheel wash as required. • Organise regular street sweeping. • Haulage routes and rules will be provided to subcontractors prior to commencing on site. • All loads of soil, demolition wastes, general wastes etc are to be tarped.	✓	TMPs		✓	Daily	Weekly		As required		SS
19	Aboriginal heritage	• Education and training at site toolbox meetings and induction. • It is illegal to destroy heritage items. • Review local or regional environmental plans, or on the State Heritage Register is to be consulted prior to work starting onsite. • Obtain excavation permit issued by the Heritage Council of NSW if required. • Any heritage relics or sites discovered during construction shall be reported to the NSW Heritage Office. • Work in the subject area to cease until specialist advice is obtained. • The area will be fenced, and signs erected to restrict access. • Heritage consultants may be required to provide advice on demolition/construction processes and finishes.	✓	✓		✓	Daily	Weekly		As required	✓	SS
20	European heritage	• Education and training at site toolbox meetings and induction. • It is illegal to destroy heritage items. • Check the Aboriginal Heritage Information Management System (AHIMS). • Also check the register of the National Estate. • Obtain approval from NPWS (Section 90 consent).	✓	✓		✓	Daily	Weekly		As required	✓	SS

Environmental Aspect		Environmental Actions, Controls and Criteria	Operational Controls				Effectiveness of Controls			Checking, Corrective & Preventative Action		Resp.
21	Emergency Preparedness:	• Spill kit onsite. • Refer to the MSDS for advice and procedures. • All spills must be reported to the FM & cleaned up. Complete RCC Accident /Incident report. • Sed pond pumped out regularly to maintain capacity in case of emergency • Ensure you know where stormwater drains are and have materials to block them in case of a fire.	✓	✓			Daily	Weekly		As required		SS

4.8 ENVIRONMENTAL CONTROL MAPS OR PLANS

The environmental control maps and/or plans that are relevant to the Project construction works are:

- Site context plans provided within this CEMP.
- Tree protection zones, shown within the arborist report for both sites.
- Sensitive receivers relating to the noise and vibration impacts of the construction works, presented in the Construction Noise & Vibration Management Sub-Plan.
- Erosion and sediment control measures, shown on the erosion and sediment control plans within the Construction Soil & Water Management Sub-Plan.

4.9 ENVIRONMENTAL MANAGEMENT DOCUMENTS

The environmental management documents that will be implemented as part of the environmental management system include:

- Environmental Site Inspection Checklist
- Complaints Register
- Hazardous substances register
- Waste register
- High Risk Works Project Assessment
- Asbestos (Hazmat) Register
- Imported/Exported Materials Register
- Sub-Contractor high risk safe work method statement (where environmental risks are present)

4.10 COMPLIANCE MONITORING AND REPORTING

As this EMP is a CEMP, and only applicable to the construction phase of the development, the post approval compliance monitoring and reporting requirements (which apply to operation/occupation) do not apply.

An operational management plan will be prepared by the Applicant, which will address the post approval compliance monitoring and reporting requirements of the project.

4.11 ENVIRONMENTAL AUDITING

This development will be audited in accordance with the Department's Independent Audit Post Approval Requirements.

4.12 ENVIRONMENTAL INCIDENT AND EMERGENCY PLANNING, PREPAREDNESS AND RESPONSE

Project Personnel Responsible for Managing Environmental Incidents and Emergencies

- Project Manager
- Site Manager

- WHS&E Manager
- Business Systems & Environmental Manager

Contact Details for Emergency Services (ambulance, fire brigade, police, spill clean-up services and others if relevant)

ORGANISATION	NAME	PHONE (W)	PHONE (M)
WorkCover	-	Hotline for incident reporting 13 10 50	
Fire Brigade/HAZMAT	Emergency	000	
Police	Emergency	000	
Ambulance/Medical	Emergency	000	
Environment Protection Authority (EPA)	-	02 9211 4723 Head Office 02 9995 5000 Parramatta	After Hours Pollution line 131 555
SSD – Dept of Planning Compliance contact	-		

Location of On-Site information on hazardous materials, including safety data sheets and spill containment materials

Information on hazardous materials, including safety data sheets and spill containment materials will be located in or adjacent to the project first aid shed. This will be located in the location deemed most suitable for the progress/status of works at any time.

4.13 CORRECTIVE AND PREVENTATIVE ACTIONS

incident management and reporting

Incident reporting and Investigation refer to internal management system.

Definitions:

Class 1: Dangerous occurrence, or actual harm to an ecosystem, property loss or clean up exceeds $10,000 (as prescribed in 2.1.) Class 1 incidents and some cases Class 2 (as determined by senior management) will be investigated, as directed by BS Environmental Manager, WHS Head of Safety and/or where required initiate the RCC Business Continuity Plan

Form 03 0 Investigation Report will be completed by the BS Environmental Manager or Senior Safety Advisors and the original forwarded to the Project Manager and reviewed by the BS Environmental Manager WHS Head of Safety and reported to Senior management and Executives/Board.

Class 2: Major Leak, spill or escape off site of liquids, near miss/dangerous occurrence i.e. plant/equip damage, disruption to services. Note: Some Class 2 will be investigated at the discretion of the BSM / WHS Head of Safety

Class 3: Minor Leak, spill or escape off site of liquids all less than >10lts, Dust, Vibration

The Site Manager/Supervisor will ensure that all Class 2 and Class 3 incidents in or around the site, involving RCC personnel, subcontractors, visitors or passers-by, external authorities, Unions etc. are reported regardless of how minor they appear at the time of the occurrence.

Duty to Notify Environment Protection Authority (EPA) of Pollution Incident – notifiable incident

Pollution Incident means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed on the premises, but it does not include an incident or set of circumstances involving only the emission of noise.

Incidents that require a (Duty to Notify) to the regulatory authorities EPA Pollution line (phone 131 555) under section 148 of the Protection of the Environmental Operations Act 1997 (POEO Act) are:

- If the actual or potential harm to the health or safety of human beings or ecosystems is not trivial,
- If actual or potential loss or property damage (including clean-up costs) associated with a pollution incident may exceed $10,000

For all Notifiable Incidents, the following activities should be undertaken:

- The incident site must not be disturbed until an inspector arrives at the scene or directs otherwise, this may include plant, substance, structure or thing associated with the incident. The person with management or control of the workplace is responsible for preserving the incident site, so far as reasonably practicable
- The incident site will be preserved unless it prevents any action needed to:
  - minimise the risk of further notifiable incident
  - facilitate a EPA investigation

For Regulator "reportable incidents", the Supervisor will notify the Project Manager, Business Systems Environmental Manager and or WHS Head of Safety to seek advice, then immediately prepare the submission of Notification to the regulator.

Business Systems Environmental Manager and or WHS Head of Safety will confirm and organise legal representation to assist in the preparation of the reports and initiate the RCC Business Continuity Plan

In some contracts it is a requirement to notify the Client's Representative immediately e.g. GC21 Contracts and relevant DPIE SSD reportable incidents

incident debrief / closure

Where an investigation is undertaken and it is determined that an "incident debrief " is to be carried out using Form 04.10, the Incident debrief will be distributed to all relevant stakeholders and Senior / Executive Management.

Outcomes of Investigations / findings may initiate an internal Alert for distribution.

Non Conformance

In the event of breach in the requirements of the EMP, such as:

- Non compliance with the RCC/ subcontractors SWMS or other environmental procedures;
- Non complying activities noted during site inspections (high risk or potential for legal breach);

- Following concerns regarding potential breaches in environmental legislation raised by RCC, the client or other stakeholders such as local council or the EPA;
- Changes to the RCC system or subcontractors procedures, as a result of corrective or preventative action following and environmental incident, inspection or external audit.

Form 31.1 – Non Conformance Report or via Aconex will be completed and issued to the offending party.

Non Conformances will be registered in Form 31.2 Non Conformance Report Register or on soft copy.

A copy of the Non Conformance Notice will be forwarded to the Project Manager and the subcontractor, who will implement appropriate corrective action.

Additionally Contractors Notices or Main Contractor Notices may be issued in certain circumstances, as described in Section 2 of the PMP.

5 CEMP REVIEW AND REVISION PROCESS

To ensure this CEMP remains current and relevant to the project, it will be reviewed in accordance with Conditions A32 and A33 of the **SSD 9368 Conditions of Consent**.

Conditions A34 and A35 are shown below:

A32. Within three months of:
a) the submission of a compliance report under condition B27;
b) the submission of an incident report under condition A27;
c) the submission of an Independent Audit under condition C33; or
d) the issue of a direction of the Planning Secretary under condition A2 which requires a review,
the strategies, plans and programs required under this consent must be reviewed, and the Planning Secretary and the Certifier must be notified in writing that a review is being carried out.
A33. If necessary to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans, programs or drawings required under this consent must be revised, to the satisfaction of the Planning Secretary or Certifier (where previously approved by the Certifier). Where revisions are required, the revised document must be submitted to the Planning Secretary and / or Certifier for approval and / or information (where relevant) within six weeks of the review.
Note: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.

Where a review is required, the **CEMP Review Checklist (provided overleaf)** will be used. This will determine why a review is required, who needs to be involved in the review, if revision is required as a result of the review, and what the revision is, if required.

If this CEMP is revised, it will be submitted to the Department (and/or other party as required by the conditions of consent) for assessment and approval in accordance with the requirements of the relevant conditions of consent and the review process that was documented and approved in the earlier version/s.

The revised version of the revised EMP will be provided to the Department, and accompanied by information that identifies:

- what has changed and why it has been changed
- the proposed timeframe to implement the change.

A brief summary of the changes made and the circumstance/s that triggered the review and revision will also be included in the version control information.

Complete this checklist if a review of this CEMP or its sub-plans is triggered (see section 5 for applicable triggers).

CEMP Review Checklist		
	Person Completing Checklist:	**Date:**
1	Why is a review required? *Outline what has triggered the review. Use the triggers from Condition A32 & A33 of the SSD Consent.*	
2	What sections of the CEMP and/or Sub-Plans require a review? *List all that apply.*	
3	Notify the Planning Secretary that a review is being carried out, with a description of the extent of the review. *Provide evidence of notification.*	
4	Who is required to be involved in the review? *Identify the relevant consultants, project staff and/or authorities who may need to be involved in the review.*	
5	Conduct review. Do the CEMP sections and/or Sub-Plans being reviewed still address the specific requirements of the development? **If Yes**, no revision is required. State why no revision is required and file a completed copy of this checklist for reference. No further action is required. **If no**, revision is required. Go to step 6. *Note – if a review has been triggered, the specific trigger will generally highlight what information in the CEMP or it's Sub-Plans is not adequately addressing the specific requirements of the development.*	
6	Revise CEMP and/or relevant Sub-Plans. Engage with relevant stakeholders where required. Consult with relevant parties about revision where required.	

CEMP Review Checklist		
7	Issue updated CEMP and/or Sub-Plans to the Planning Secretary (and/or other party as required by the conditions of consent) for assessment and approval (if approval is required).	
8	Provide a summary that identifies: - What has changed and why it has been changed - The proposed timeframe to implement the change	
9	Ensure revision information and the circumstances that triggered the review is included in the version control information of the revised document.	

6 APPENDICES

6.1 EMP PREPARATION CHECKLIST

Requirement	Plan Reference	Yes/No/Not Applicable
Document preparation and endorsement		
Has the EMP been prepared in consultation with all relevant stakeholders as per the requirements of the conditions of consent? (Section 4.1)	Appendix 6.2	Yes
Have the views of the relevant stakeholders been taken into consideration? Have appropriate amendments been made to the EMP and does the EMP clearly identify the location of any changes? (Section 4.1)	Throughout, Sub-Plans.	Yes
Has the EMP been internally approved by an authorised representative of the proponent or contractor? (Section 4.2)	Revision Register, Page 5	Yes
Version and content		
Does the EMP describe the proponent's Environmental Management System (EMS) (if any), and identify how the EMP relates to other documents required by the conditions of consent? (Section 3.5.1)	Section 4.1	Yes
Does the EMP include the required general content and version control information? (Section 3.1)	Pages 2-5	Yes
Does the EMP have an introduction that describes the project, scope of works, site location and any staging or timing considerations? (Section 3.2)	Section 1 & Section 2	Yes
Does the EMP reference the project description? (Section 3.3)	Section 2, Page 12	Yes
Does the EMP reference a Community and Stakeholder Engagement Plan (or similar) or include community and stakeholder engagement actions (if required)? (Section 3.4)	Section 3	Yes
Have all other relevant approvals been identified? Has appropriate information been provided regarding how each approval is relevant? (Section 4)	N/A	N/A
Has the environmental management structure and responsibilities been included? (Section 3.5.2)	Section 4	Yes
Does the EMP include processes for training of project personnel and identify how training and awareness needs will be identified? (Section 3.5.3)	Section 4.4	Yes

Does the EMP clearly identify the relevant legal and compliance requirements that relate to the EMP? (Section 3.5.3)	Section 4.3	Yes
Does the EMP include all the conditions of consent to be addressed by the EMP and identify where in the EMP each requirement has been addressed? (Section 3.5.13)	CEMP Condition Compliance Table, Pages 6-9	Yes
Have all relevant guidelines, policies and standards been identified, including details of how they are relevant? (Section 3.5)	N/A	N/A
Is the process that will be adopted to identify and analyse the environmental risks included? (Section 3.5.5)	Appendix 6.3	Yes
Have all the environmental management measures in the EIA been directly reproduced into the EMP? (Section 3.5.7)	Throughout, Sub-Plans	Yes
Have any additional environmental management measures been included in the EMP? (Section 3.5.7)	N/A	N/A

6.2 RECORD OF CONSULTATION

CEMP Consultation Requirements		
#	Condition	Location
B13	The Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) must be prepared to achieve the objective of ensuring safety and efficiency of the road network and address, but not be limited to, the following: (b) be prepared in consultation with Council and TfNSW;	A Sub-Plan specific consultation summary for Condition B13 has been prepared and provided with the Construction Traffic and Pedestrian Management Sub-Plan. See Appendix 6.7.
B14	The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following: (d) include strategies that have been developed with the community for managing high noise generating works; (e) describe the community consultation undertaken to develop the strategies in condition B17(d);	A CCS in accordance with Condition B10 has been prepared and provided with the Construction Noise and Vibration Management Sub-Plan. See Appendix 6.8.
B16	The Applicant must prepare a Construction Soil and Water Management Sub-Plan (CSWMSP) and the plan must address, but not be limited to the following: (a) be prepared by a suitably qualified expert, in consultation with Council;	A Sub-Plan specific consultation summary for Condition B19 has been prepared and provided with the Construction Soil and Water Management Sub-Plan. See Appendix 6.9.

6.3 PROJECT ENVIRONMENTAL RISK MATRIX/ASSESSMENT

The Project Environmental Risk Matrix/Assessment is not embedded in this document; it is provided as an attached appendix so that it can be displayed/updated/revised in isolation if required.

RICHARD CROOKES CONSTRUCTIONS

Appendix 1 Environmental Risk Matrix

Construction

Project: MOD SCHOO

Developed by:

RCC Objectives and Targets / KPIs:
<3 Environmental Notices issued by EPA or Local Council annually
Action community complaints within 24 hours, no repeat complaints for same issue
Investigate non effective operational controls / environmental incidents and report

RICHARD CROOKES CONSTRUCTIONS

Environmental Aspect - also consider if any legislation applies to activity or environmental aspect. See Intranet Legal and Other Requirements Table

Activity, Product or Service Strike out non relevant items	Assessment of Significant Environmental Impact (no controls)	1 dust	2 odour	3 greenhouse	4 storm water	5 Adjoining waterways	6 sewer	7 land	8 resources/water	9 resources/materials	10 resources/energy	11 noise	12 vibration	13 community concerns	14 flora	15 fauna	16 waste / chemicals	17 landfilling	18 litter	19 traffic	20 aboriginal heritage	21 European heritage	Impact - No Controls. Refer to EMPs or Operational Controls Table Appendix 4 of PMP
Site Set Up	likelihood	l			u	r	a								m	m				a			1.photochemicalsmog, visualamenity 4.pollution of aquatic ecosystem 15.loss of threatened species/protected 19.community disturbance, mud tracking 6.pollution of aquatic ecosystem
	consequence	2			3	1	3								1	a				3			
	risk	2			2	3	1								3	1				1			
	Signify=yes, n=no	**Y**			**Y**	**N**	**Y**								**N**	**Y**				**Y**			
Demolition	likelihood	r			r							r	r	r			u	r	a	a		m	19.community disturbance, mud tracking on public roads 21.loss of culturalartefacts, buildings, structures
	consequence	1			1							1	1	1			1	1	3	3		3	
	risk	3			3							3	3	3			3	3	1	1		2	
	Signify=yes, n=no	**N**			**N**							**N**	**N**	**N**			**N**	**N**	**Y**	**Y**		**Y**	18.visualamenity, pollution
Hazardous Materials Removal - Asbestos, Lead Paint, SMF	likelihood	u			u									u			u	u	a			m	1.photochemicalsmog, visualamenity 4.pollution of aquatic ecosystem 18.visualamenity, pollution 21.loss of cultural artefacts, buildings,
	consequence	3			3									2			4	2	3			3	
	risk	2			2									3			2	3	1			2	
	Signify=yes, n=no	**Y**			**Y**									**N**			**Y**	**N**	**Y**			**Y**	15.non efficient use of materials, chemical pollution 18.visualamenity, pollution
Site Stripping & Bulk Earthworks, Transport of spoil, Importation of fill	likelihood	m		l	l	r					a	a	a	l	m	m		2		a	u		1.photochemicalsmog, visualamenity 3.globalwarming 4.pollution of aquatic ecosystem 10.use of scarce/non renewable resources 11.community disturbance 12.human discomfort, damage to buildings 13.stakeholder interactions 14.loss of habitat 15.loss of threatened species/protected species #N/A 19.community disturbance, mud tracking on public roads
	consequence	3		3	3	1					4	4	4	3	3	3		3		3	4		
	risk	2		2	2	3					1	1	1	2	2	2		#N/A		1	2		
	Signify=yes, n=no	**Y**		**Y**	**Y**	**N**					**Y**	**Y**	**Y**	**Y**	**Y**	**Y**		**#N/A**		**Y**	**Y**		
Remediation	likelihood	u	r	u	u	r						u	u	u			u	u		a	u	m	11.community disturbance 12.human discomfort, damage to buildings 3.globalwarming 4.pollution of aquatic ecosystem 16.non efficent use of materials, chemical pollution 17.reduction in landfill space, loss of recyclables 19.community disturbance, mud tracking on public roads 20.loss of culturalartefacts 21.loss of culturalartefacts, buildings, structures
	consequence	2	2	3	3	1						3	3	2			4	3		3	4	3	
	risk	3	3	2	2	3						2	2	3			2	2		1	2	2	
	Signify=yes, n=no	**N**	**N**	**Y**	**Y**	**N**						**Y**	**Y**	**N**			**Y**	**Y**		**Y**	**Y**	**Y**	
Dewatering	likelihood	r			r	r	r		r														
	consequence	1			1	1	1		1														
	risk	3			3	3	3		3														
	Signify=yes, n=no	**N**			**N**	**N**	**N**		**N**														
Detailed excavation / In ground Services	likelihood	l			a	r						a					m	m					1.photochemicalsmog, visualamenity 4.pollution of aquatic ecosystem 16.non efficent use of materials, chemical 17.reduction in landfill space, loss of recyclables 11.community disturbance
	consequence	2			3	1						3					3	3					
	risk	2			1	3						1					2	2					
	Signify=yes, n=no	**Y**			**Y**	**N**						**Y**					**Y**	**Y**					
Foundations - piering / anchors	likelihood	r			r							r	r	r									
	consequence	1			1							1	1	1									
	risk	3			3							3	3	3									
	Signify=yes, n=no	**N**			**N**							**N**	**N**	**N**									
Foundations - piling	likelihood	l			l	r						a	a	m			m	m					1.photochemicalsmog, visualamenity 4.pollution of aquatic ecosystem 12.human discomfort, damage to buildings 13.stakeholder interactions 16.non efficent use of materials, chemical 11.community disturbance 17.reduction in landfill space, loss of recyclables
	consequence	3			3	1						4	4	2			4	3					
	risk	2			2	3						1	1	2			1	2					
	Signify=yes, n=no	**Y**			**Y**	**N**						**Y**	**Y**	**Y**			**Y**	**Y**					

RICHARD CROOKES CONSTRUCTIONS

Appendix 1 Environmental Risk Matrix

Construction

Project: MOD SCHOO

Developed by:

RCC Objectives and Targets / KPIs:
<3 Environmental Notices issued by EPA or Local Council annually
Action community complaints within 24 hours, no repeat complaints for same issue
Investigate non effective operational controls / environmental incidents and report

RICHARD CROOKES CONSTRUCTIONS

Environmental Aspect - also consider if any legislation applies to activity or environmental aspect. See Intranet Legal and Other Requirements Table

Activity, Product or Service Strike out non relevant items	Assessment of Significant Environmental Impact (no controls)	1 dust	2 odour	3 greenhouse	4 storm water	5 Adjoining waterways	6 sewer	7 land	8 resources/water	9 resources/materials	10 resources/energy	11 noise	12 vibration	13 community concerns	14 flora	15 fauna	16 waste / chemicals	17 landfilling	18 litter	19 traffic	20 aboriginal heritage	21 European heritage	Impact - No Controls. Refer to EMPs or Operational Controls Table Appendix 4 of PMP
Structure - formwork, reinforcement, concrete & curing, post tensioning	likelihood				r	r						1	1				m			a			19.community disturbance, mud tracking
	consequence				1	1						3	3				2			3			
	risk				3	3						2	2				2			1			11.community disturbance
	Signify=yes,n=no				**N**	**N**						**Y**	**Y**				**Y**			**Y**			12.human discomfort, damage to buildings
Wet trades: Blockwork, brickwork, render, waterproof membranes	likelihood				m					a							m					m	4.pollution of aquatic ecosystem
	consequence				2					1							2					3	9.use of scare/non renewable resources
	risk				2					2							2					2	16.non efficent use of materials, chemical
	Signify=yes,n=no				**Y**					**Y**							**Y**					**Y**	21.loss of cultural artefacts, buildings, structures
Services - hydraulic, electrical, mechanical, incl. cable chasing, concrete coring	likelihood	m			u							1					m		a			m	1.photochemical smog, visual amenity, 18.visual amenity, pollution, 21.loss of cultural artefacts, buildings,
	consequence	2			2							3					2		2			3	
	risk	2			3							2					2		2			2	11.community disturbance
	Signify=yes,n=no	**Y**			**N**							**Y**					**Y**		**Y**			**Y**	16.non efficent use of materials, chemical pollution
Roofing	likelihood									a		1					m		a				9.use of scare/non renewable resources
	consequence									1		3					2		2				11.community disturbance
	risk									2		2					2		2				16.non efficent use of materials, chemical
	Signify=yes,n=no									**Y**		**Y**					**Y**		**Y**				18.visual amenity, pollution
Finishes - **Internal:** partitions, ceilings, joinery, door hanging **Wet trades:** Gyprocking, painting, tiling, floor finishes,	likelihood									a		1	u				m		a				9.use of scare/non renewable resources, 18.visual amenity, pollution
	consequence									1		3	1				2		2				11.community disturbance
	risk									2		2	3				2		2				16.non efficent use of materials, chemical pollution
	Signify=yes,n=no									**Y**		**Y**	**N**				**Y**		**Y**				
External works - pavements, landscaping, lighting	likelihood	m			u	r			r			1	u				m	m		a		m	1.photochemical smog, visual amenity, 11.community disturbance, 17.reduction in landfill space, loss of recyclables, 19.community disturbance, mud tracking on public roads, 21.loss of culturalartefacts, buildings, structures
	consequence	2			2	1			1			3	1				2	2		3		3	
	risk	2			3	3			3			2	3		#N/A		2	2		1		2	#N/A, 16.non efficent use of materials, chemical pollution
	Signify=yes,n=no	**Y**			**N**	**N**			**N**			**Y**	**N**		**#N/A**		**Y**	**Y**		**Y**		**Y**	

6.4 ENVIRONMENTAL POLICY

The Richard Crookes Constructions Pty Ltd Environmental Policy is not embedded in this document, it is provided as an attached appendix so that it can be displayed/updated/revised in isolation if required.

ENVIRONMENTAL
POLICY

Richard Crookes Constructions Pty Limited promotes and encourages a sustainable environment throughout our business activities and sources our supplies and services in ways that prevent pollution and promote compliance with legal and other requirements.

The company implements Environmental Management System to aid us in meeting our corporate responsibilities. The System is certified by Global-Mark as meeting the requirements of AS/NZS ISO 14001:2016 Environmental Management Systems.

These form part of the company's Project Management Plans and are supported by company procedures and guidelines.

Management intends that all employees of our company, relevant subcontractors and suppliers, are made aware of their environmental responsibilities and the environmental impacts associated with their activities, products and services.

Our company objectives for continual improvement in environmental management include:

- Reducing the number of environmental notices issued on the projects by implementing a program of inductions, training and monitoring.
- Minimising the impacts to the community through the development of project specific Environmental, Traffic management plans, stakeholder consultation plans and by timely and appropriate response to complaints.
- Minimising impacts on the environment using dust, soil and water, waste and chemical management practices that are regularly inspected and maintained.
- Achieve a waste minimisation figure of 85% through monthly reporting

The Continual improvement of the project environmental management plans and progress with achieving the company's objectives will be reviewed during management meetings, project reviews and following the results of internal and external audits.

The Policy will be made available to the public and interested parties on request. This Policy will be reviewed every two years.

Jamie Crookes
Managing Director
26th February 2020

6.5 ASBESTOS MANAGEMENT PLAN

The Asbestos Management Plan is an internal RCC document used to manage asbestos if encountered on site and will also form part of the RCC PMP.

RICHARD CROOKES
CONSTRUCTIONS

MOD SCHOOLS
1157

ASBESTOS MANAGEMENT PLAN

[Publish Date]

This plan has been approved for use by the following:

Approved by / Date

Project Manager

Approved by / Date

Craig Richmond, Business Systems , QA/Env Manager

Approved by / Date

Simon Dayball Group WHS Manager

Approved by / Date

Ian West, General Manager – Commercial & Risk

AUTHORITY POSITION	COMPANY NAME	NO. OF COPIES
Jaron Hoffenberg	TSA	1 copy
<Project Manager>	Richard Crookes Constructions	1 copy
<Site Manager>	Richard Crookes Constructions	1 copy

REVISION REGISTER

REVISION DATE	REVISION DESCRIPTION	PMS INITIALS (ACCEPTANCE OF CHANGES)
25/02/22	Original issue	TH

POSITION	NAME	REVISIONS			
SITE ENGINEER	**GEORGE DENNY-SMITH**	**<DATE>**	**<DATE>**	**<DATE>**	**<DATE>**

CONTENTS

ACM MANAGEMENT PLAN TRAINING REGISTER

Name	Project Position	Signature	Trained By	Tool box date

1 INTRODUCTION

1.1 PURPOSE

The management of asbestos containing materials is important to ensure the Asbestos Containing Material (ACM) are not damaged nor deteriorate to such an extent that site workers, public, external contractors or visitors are unnecessarily exposed to airborne asbestos fibres.

The requirements of the contractor site induction and permit to work system will aid in the management of ACM's throughout the site. Any other unexpected finds that are or could be potentially hazardous will follow the same protocol as ACM.

1.2 GENERAL PRINCIPLES

The RCC's principles of asbestos management have been adapted from general principles published in the Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)]. These principles are summarised below:

- Consideration should be given to the removal of ACM during any renovations, refurbishments or maintenance work in preference to other control measures such as encapsulation, enclosure and sealing.
- The WHS Regulation requires all ACM within the construction area to be labelled. (Refer 6.3 Labelling)
- Where ACM is identified or presumed, the locations and type of ACM are to be recorded in the ACM Register located within the Asbestos management plan folder.
- A risk assessment must be performed on all identified or presumed ACM.
- Control measures must be established to prevent exposure to airborne asbestos fibres and should take into account the results of risk assessments conducted for the identified or presumed ACM.
- All workers and contractors on site etc. must be advised of the ACM Register at time of induction, and as requested, permitted access to the register for their review
- Only competent persons should undertake the identification of ACM.
- All workers and contractors on site where ACM are present or presumed to be present, and all other persons who may be exposed to ACM as a result of being on the premises, must be provided with full information on the occupational health and safety consequences of exposure to asbestos and appropriate control measures. The provision of this information should be recorded.
- Reasonable steps must be taken to identify all possible locations of ACM within the site.
- Once a risk assessment has been completed and controls established, a SWMS is to be developed and submitted to RCC'S site management team for approval

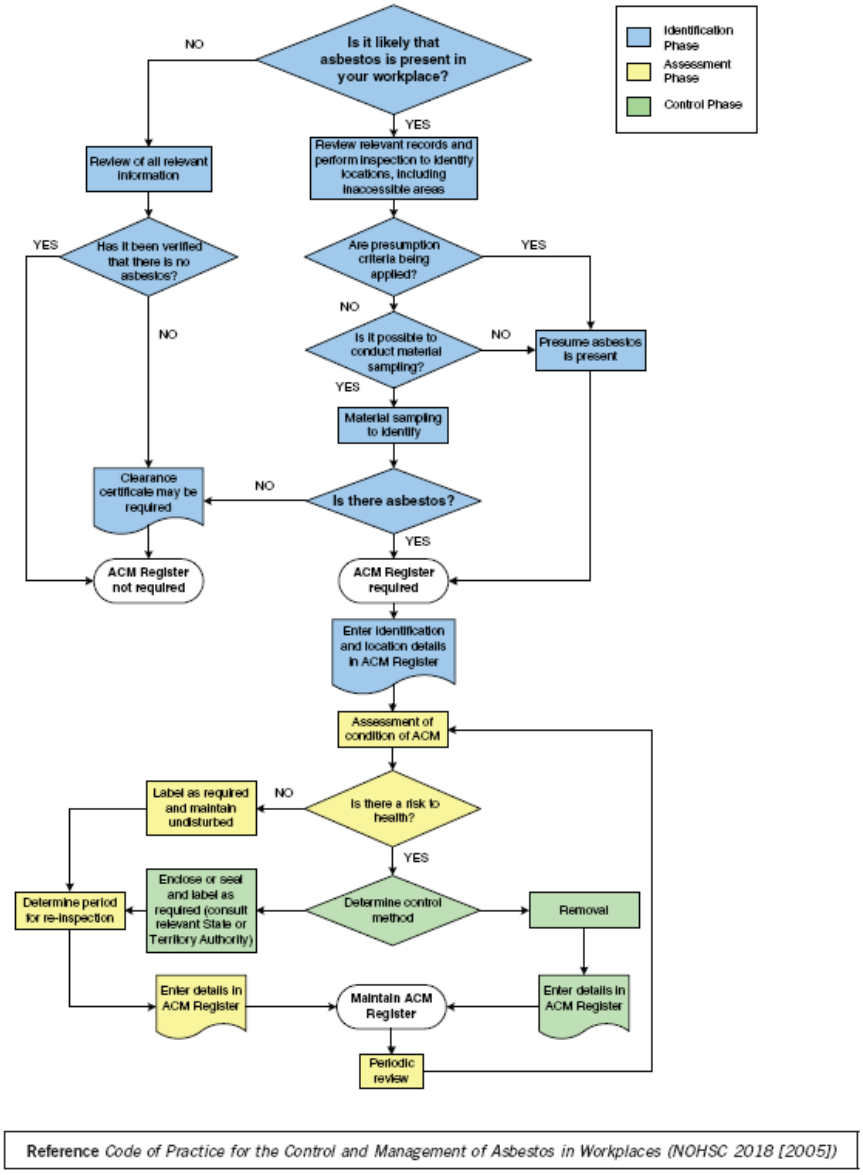


Figure 1: General principles of an asbestos management plan

Source: Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)]

2 OBJECTIVES

- Remove all high-risk asbestos items where possible.
- Deliver effective asbestos management work programs.
- Ensure that no one is exposed to airborne asbestos fibres.
- Ensure compliance with this Asbestos Management Plan.
- Ensure the asbestos database and register is accurate.
- Comply with State and Commonwealth legislation.
- Remove asbestos containing items when and where possible

3 REGULATORY REQUIREMENTS

This asbestos management plan is consistent with removal, encapsulation, transport, and disposal or otherwise potential disturbance of asbestos containing materials. All these activities shall be performed in accordance with relevant Commonwealth and State Acts, Regulations, Codes of Practice, Advisory Standards and Industry Standards.

3.1 STATE LEGISLATIVE REQUIREMENTS – NEW SOUTH WALES

Relevant State legislation includes:

- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2017

3.2 CODE OF PRACTICE/GUIDES

Key Codes of Practice and Guidance Notes include:

- Code of Practice for the Management and Control of Asbestos in the Workplaces [NOHSC: 2018 (2005)].
- COP- How to Manage and Control Asbestos in the workplace - Oct 2018
- COP- How to safely remove asbestos - Oct 2018

3.3 RCC REQUIREMENTS

- Project Managers (PM) /Site Managers (SM) must be notified before asbestos removal work commences.
- Any new asbestos identified must be explicitly notified to the PM/SM.
- All Staff and Contractors must comply with this Plan.
- Tenants and other interested parties must be notified of the asbestos removal work in advance and asbestos awareness training shall be made available to those persons affected by the asbestos work.

4 ORGANISATIONAL RESPONSIBILITIES

Person / Party	Responsibility
Construction Manager (CM), Project Manager (PM)	▪ Ensure all staff and contractors are aware of and comply with the plan. ▪ Project management ▪ Identification and bringing to the attention of appropriate staff, any suspect material ▪ Ensure all contractors working on asbestos are aware of and meet the requirement of the plan. ▪ Notify Adjacent neighbours, property owners work type and time frame
Site Manager (SM) Health Safety and Environmental Coordinator (HSE)	▪ Obtain from Subcontractor, copy of Safework Notification (Requirement of RCC Asbestos removal permit) ▪ Ensure project personnel (including contractors) are inducted ▪ Surveying, identification and arranging for sampling of suspected asbestos containing materials by competent persons. ▪ Training and awareness RCC relevant staff ▪ Manage the asbestos works program and removal program ▪ Respond to incidents ▪ Document preparation, recording and filing ▪ Manage asbestos inspection contractor
Contractors (C) and Trades Staff (TS)	▪ Not to impact on an ACM without complying with the plan ▪ To bring to the attention of the SM/HSE any suspect material ▪ Refer to the plan for guidance to identify, manage, and remove asbestos ▪ Apply for Asbestos Permit to Work when performing asbestos removal work that requires notification. ▪ Undergo RCC Contractor Induction ▪ Develop a site specific asbestos removal control plan, SWMS and Risk Assessment prior to performing the asbestos removal work

5 CONTROL OF ASBESTOS HAZARDS

As part of the asbestos survey or subsequent resurvey, a 'Competent Person' is required to assess the risk posed by the ACM by completing a Risk Assessment; this will determine what, if any, control measures may be required. Generally, there are four control options available to select:

- Leave in-situ and manage
- Seal / encapsulate
- Enclose / isolate
- Remove

The controls are to be appropriate to the risk of the ACM in question. The following information should be used as a guideline when determining the correct control measure for management of the ACM risks.

If the ACM is friable, and there is a risk to health from exposure, it should be removed.

If the ACM is bonded and in a stable condition, encapsulation may be appropriate if the ACM is unsealed. Encapsulation is not necessarily required if the ACM is unsealed but it does provide another "barrier" to the potential release of asbestos fibre as well as prolonging the lifespan of the material by providing protection against UV and environmental elements etc.

ACM that are bonded, stable and sealed, which are unlikely to be disturbed during normal activities, can be left in-situ and managed, but need to be recorded in the ACM Register.

ACM within the works zone must be removed prior to the commencement of demolition, partial demolition, renovation or refurbishment if they are likely to be disturbed by those works. This is in accordance with the NOHSC Code of Practice for the Safe Removal of Asbestos [NOHSC: October 2018]

5.1 REMOVAL OF ACM

5.1.1 LICENSED CONTRACTORS

ACM falls into two broad categories (bonded and friable) and the category the ACM falls under will determine how the ACM is removed. If the ACM is classified as friable (e.g. sprayed limpet, pipe lagging, millboard insulation, vinyl sheet floor coverings with asbestos backing material, etc.) it is necessary to engage a contractor who holds a current AS-A class license for friable asbestos removal. The holder of an AS-A licence is also permitted to removed Bonded ACM

If the ACM is classified as bonded ACM (e.g. asbestos cement wall linings, Super Six roof sheeting, vinyl floor tiles, Zelemite electrical boards, etc.) the ACM may be removed by the contractor who holds a current AS-B licence for bonded asbestos removal. The holder of an AS-B licence is not permitted to remove friable ACM.

5.1.2 SAFEWORK – NOTIFICATION

For Bonded ACM, in quantities greater than 10m^2, requiring a licensed contractor (AS-B) to complete the removal works, a Safework (Regulator) Notification is required to be lodged by the Licensed Contractor.

The Notification is required to be lodged a minimum of seven (7) working days prior to starting the removal works. Safework (Regulator) will review the application and return the first two pages, stamped with an official Safework (Regulator) approval. No works are to proceed prior to the receipt of the Notification.

RCC will require a copy of the Safework (Regulator) stamped 'Notification' prior to issuing an RCC Asbestos removal permit.

5.1.3 SAFEWORK – PERMIT

For all Friable removal works, regardless of quantity, a suitably licensed contractor (AS-A) must apply to Safework (Regulator) for a Permit prior to removal works progressing.

The Permit application is required to be lodged a minimum of seven (7) working days prior to starting the removal works. Safework (Regulator) will review the application and return the first two pages stamped with an official Safework (Regulator) approval and, issue a separate numbered Permit. No works are to proceed prior to the receipt of the permit.

RCC will require a copy of the Safework (Regulator) 'Permit' and the application form prior to issuing an RCC Asbestos removal permit.

5.1.4 AIRBORNE FIBRE MONITORING

Airborne fibre monitoring must be conducted during and after the removal of all friable ACM by an independent competent person. For Bonded ACM, air monitoring is conducted as part of the clearance certificate (where required) or as requested by RCC, client or Hygienist. Air monitoring is conducted during the removal works to check the effectiveness of control measures implemented by the contractor (e.g. isolating the removal work area with a sealed, airtight enclosure fitted with negative air generating units, etc.).

Air monitoring is also conducted after the ACM has been completely removed and the work area has passed a satisfactory visual inspection to determine whether the area is safe to reoccupy by unprotected persons.

5.1.5 CLEARANCE CERTIFICATES

For all Friable ACM removal works or, as requested by the client or RCC for Bonded works, before an area can be re-occupied post asbestos removal, a clearance inspection must be carried out. The clearance inspection must be undertaken by an independent competent person only and a clearance certificate must be obtained from that competent person. Clearance monitoring is a mandatory requirement for all friable asbestos removal works and is recommended for bonded ACM removal works particularly when the bonded ACM is located internally or near sensitive receptors.

The complete removal of all ACM must be verified with a written clearance certificate which must include details of a satisfactory clearance inspection conducted by the independent competent person. If clearance air monitoring has been conducted, the results of the clearance monitoring must be included as part of the clearance certificate as well.

5.1.6 WASTE

All asbestos waste shall be disposed of at an approved landfill disposal site by licensed contractors, and in accordance with the requirements of The Legislation. Transport and disposal of asbestos waste shall be carried out only in a manner that will prevent the liberation of asbestos fibres into the atmosphere.

To achieve "final completion" of an asbestos removal activity, RCC require verification that the asbestos waste has been transported and disposed of in accordance with State/Territory legislative requirements. A copy of the EPA Waste Tracking document is the required documentation for disposal, and a copy of the necessary License for carrying out this removal and disposal is the required documentation for transportation.

5.2 RECORD KEEPING

RCC shall maintain detailed records of all activities relating to asbestos works which have been undertaken on site. The records kept should include:

- Copies of all asbestos survey/audit reports, including updates and amendments. (RCC ACM Registers)
- Copies of all Safework (Regulator) notifications and permits
- Risk Assessments and SWMS documents.
- RCC Asbestos removal permits
- RCC Air Monitoring and Clearance certificate records
- Records pertaining to the informing of employees/contractors about the presence of asbestos on site, and those employees have been appropriately trained in safe work procedures and practices.
- Clearance certificates indicating areas are safe to reoccupy after asbestos abatement works; and
- Airborne fibre monitoring results
- Previous versions of the asbestos register

All documentation is to be retained in the one file structure under the heading of Asbestos Management. All asbestos related records and documents are to be retained for a period of 30 years.

5.3 LABELLING

Current State and Territory legislation specify the requirements for some form of labelling in buildings. [NOHSC: 2018 (2005)] states all in-situ ACM's should be labelled where practicable. The words 'should' and 'practicable' in the Code of Practice allow some flexibility in the approach to labelling. Similar flexibility is allowed under State and Territory workplace health and safety legislation.

RCC has advised that individual labelling of ACM is to be determined by a Competent Person usually nominated by the client however may not be necessary in every instance.

All friable and high risk asbestos situations, as well as any location containing ACM's where regular maintenance or repair work is likely to be carried must be labelled.

In locations where ACM has been identified within close proximity to the work area, but not required to be removed or disturbed, should be labelled or sign posted warning of 'Asbestos containing material, do not disturb' or in wording similar.

Ref: WHS Regulation, Chapter 8, Asbestos- Clause 469

An asbestos removalist must ensure that:

a) Signs alerting persons to the presence of asbestos are placed to indicate where the asbestos removal work is being carried out, and

b) Barricades are erected to delineate the asbestos removal area.

5.4 WARNING SIGNS

All site areas which are known or suspected to contain ACM's shall have a warning sign at every main entry and around the perimeter of the isolated ACM area. An asbestos register exists for the site and a point of contact must be contacted before undertaking any works.

The warning sign must be clearly visible from all directions leading onto the area.

5.5 SAFE WORK PRACTICES

Prior to commencing any works on RCC sites, such as demolition, refurbishment, maintenance or installation of new equipment, the asbestos register must be consulted to determine if any ACM are present which may be disturbed. This ACM must be removed before commencement of the work. If unknown materials, or undocumented materials suspected of containing asbestos are encountered during building works, stop work and follow the Incident response procedures shown in figure 7.0.

If a project is likely to impinge upon ACM, the principal contractor (RCC) must assess the requirement for a licensed asbestos removalist to perform the asbestos removal work. A Safework permit / Notification may be required as part of an RCC, Asbestos Permit to work, prior to the asbestos removal work commencing.

5.5.1 MAINTENANCE PROCEDURES

Maintenance tasks that may impact on ACM are to be performed under controlled conditions to prevent the distribution of airborne asbestos fibres. [NOHSC: 2018 (2005)] has procedures for certain maintenance tasks and these must be followed. These maintenance tasks include:

- The drilling of asbestos containing materials
- Sealing, painting, coating of asbestos cement products
- Cleaning leaf litter from the gutters of asbestos cement roofs
- Replacing cabling in asbestos cement conduits or boxes
- Working on electrical mounting boards (switchboards) containing asbestos

5.5.2 TOOLS AND EQUIPMENT

Tools and equipment to be used for asbestos removal jobs are required to minimise the generation of airborne asbestos fibres. High-speed abrasive power or pneumatic tools such as angle grinders, sander, saws and high speed drills must never be used. Hand tools are preferred over power tools.

At the end of the removal work, all tools should be:

Decontaminated (i.e. fully dismantled and cleaned under controlled conditions as described in the Code, or

Disposed of in sealed containers similar to that for disposal of the ACM waste product.

Vacuum cleaners used for asbestos cleaning must comply with:

- AS 3544-1988 (Industrial Vacuum Cleaners for Particulates Hazardous to Health) and
- AS4260-1997 High Efficiency Particulate Air Filters (HEPA) - Classification, construction and performance.

5.5.3 RCC ASBESTOS REMOVAL PERMIT

An RCC Asbestos Removal Permit form must be completed for any work on ACM.

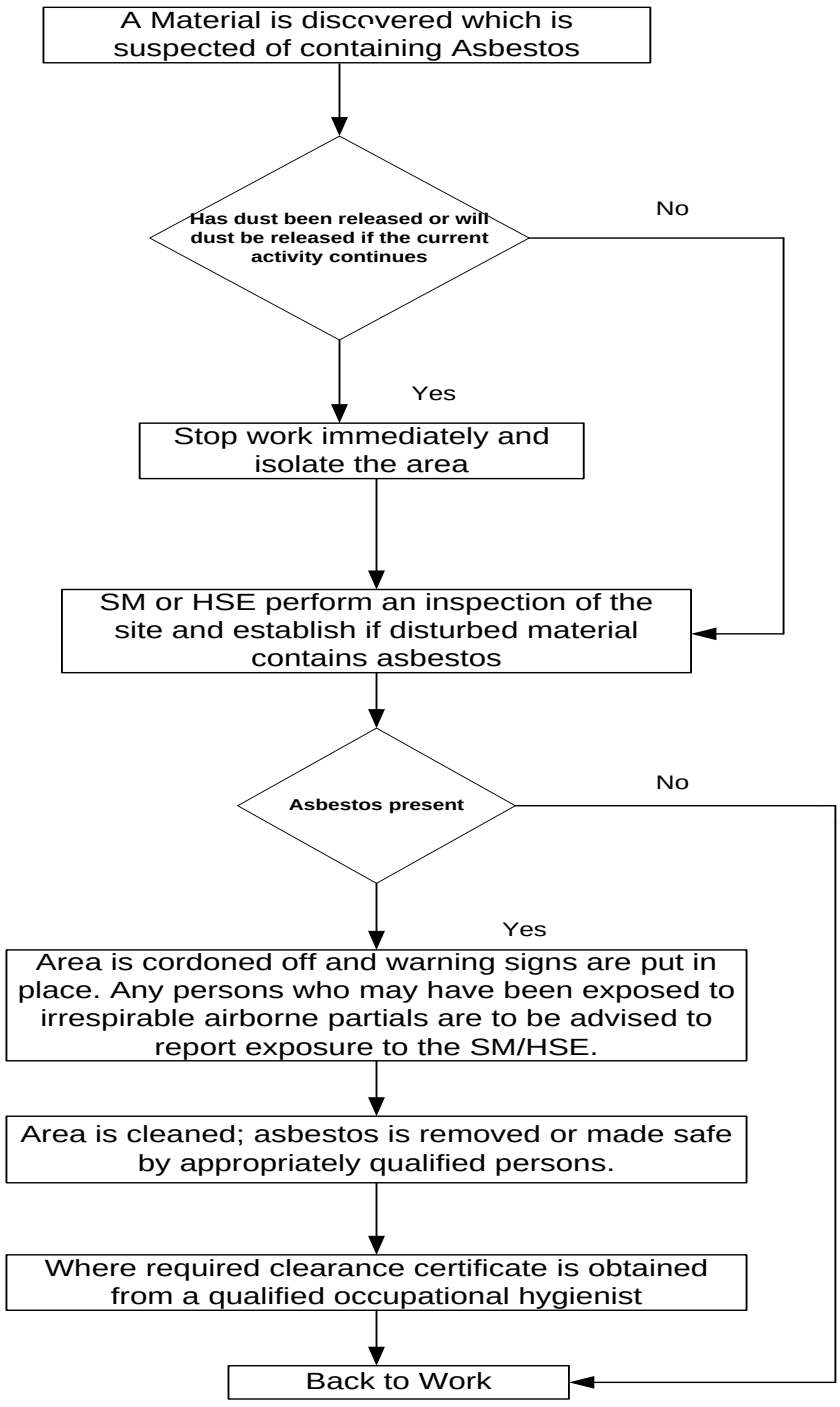
Before being issued with an Asbestos Removal Permit, individuals will be required to peruse the RCC Asbestos Management Plan and the Asbestos Register. Where practicable, contractors should be made aware of the requirements of the plan prior to tendering to ensure they allow for such requirements when quoting.

The Asbestos Removal Permit is designed to ensure appropriate work practices are employed when working with ACM. The Asbestos Removal Permit will document what ACM's are to be removed, encapsulated or otherwise protected, prior to the contracted works proceeding. The Asbestos Removal Permit will also check other requirements such as the need for barricading and airborne fibre monitoring.

The Demolisher or asbestos removal contractor will be responsible to ensure that their workers are aware of their responsibilities and abide by the requirements of the permit.

RCC's Site Manager or HSE Coordinator shall be advised immediately of any incidents of non-compliance with the RCC Asbestos Management plan or the Code.

6 INCIDENT RESPONSE FLOW CHART



7 DOCUMENTATION REQUIREMENTS

7.1 ASBESTOS CONTAINING MATERIAL (ACM) REGISTER FORM 21.1A

The RCC ACM register will be generated where no report has been received from the client or when additional ACM items have been identified but not listed in previous reports.

The RCC ACM register and the clients ACM report will be monitored and signed off where required, when ACM works are completed.

Supporting information that should be included in the register is:

- Register of ACM items
- Register of items which were samples but found to contain no asbestos
- Certificates of analysis
- Photos
- Floor plans with asbestos containing items marked up

7.2 ASBESTOS REMOVAL PERMIT FORM 21.1B

The RCC Asbestos removal permit is required to be completed prior to any ACM removal / remedial works.

The requirements for supporting documentation are listed within the permit.

7.3 ASBESTOS CONTAINING MATERIAL (ACM) AIR MONITORING & CLEARANCE CERTIFICATE RECORD FORM 21.1C (NOTE: 1 FORM PER ACTIVITY / ITEM)

Asbestos Containing Material (ACM) Air Monitoring & Clearance Certificate Record is used to collate all associated documentation involved in the identification, removal, remediation, transport and disposal of logged ACM.

8 TRAINING

8.1 ASBESTOS AWARENESS TRAINING

Asbestos awareness training provides participants with a general overview of asbestos including history and background; asbestos types and properties; common asbestos situations; health effects; risk in perspective and management of asbestos. Conducted by RCC person,or RTO . ACT region training conducted by MBA or other ATO accredited company mandatory for Act Workers.

8.2 ASBESTOS REMOVAL TRAINING

This course is typically provided by an external registered training organisation (RTO) to personnel who intend to remove bonded ACM, pre-requisite for obtaining a Safework recognised licence

APPENDIX 1 – 21.11 ASBESTOS CONTAINING MATERIAL (ACM) REGISTER

Project Name:				Report date:			
Project Number:							
Item No.	Date Entered	Entered by	Location of ACM	Sample Tested Y/N	Asbestos Bonded / Friable / NA	Description of ACM type & condition, remedial works planned (Scattered pieces, sheeting, pipe lagging etc.)	Date work completed

APPENDIX 2 – 21.11A ASBESTOS REMOVAL PERMIT

Project Name:		Company Performing Work:	
Contractors Contact:		Position:	
Location of works:			
Description of Work:			
RCC Asbestos Register – Item Identification number:			

Asbestos Type

Bonded Less than 10m² □	No License or Permit / Application required	
Bonded Greater than 10m² □ AS-B Lic. No:_____	Copy of WorkCover Stamped, Notification to be obtained from contractor prior to start.	
Friable □ AS-A Lic. No: _____	Copy of WorkCover stamped, Permit application to be obtained from contractor prior to start.	WorkCover Permit No: _____

Permit begins	Permit expires
Date: / / Time: am/pm	Date: / / Time: am/pm
Date: / / Time: am/pm	Date: / / Time: am/pm
Date: / / Time: am/pm	Date: / / Time: am/pm
Date: / / Time: am/pm	Date: / / Time: am/pm

RCC Emergency Contact information

Name of RCC Contact:		Tel:	( )

Authorisation by company representative

The above work is authorised to proceed subject to the following action being taken prior to work starting and procedures being maintained for the duration of the work.

RCC Representative Name:	Position:	Signature:

	Yes	N/A		Yes	N/A
Work area has been inspected prior to works proceeding			Contractor has read the requirements of the RCC, ACM Management plan		
Risk Assessment completed			Disposal method established		
Will the area be occupied during the works			Air conditioning / Mechanical ventilation isolated:		
Is it necessary to vacate the building during the works			Electrical isolated (Written confirmation from Electrician required)		
SWMS reviewed by RCC			Signage / Barricades in place		
Air monitoring required			Clearance certificate required		

Weekly Review of Permit

	Week 1	Week 2	Week 3	Week 4
Signature and position of person issuing the permit:				
Signature of the person conducting the Work:				

APPENDIX 3 – 21.11B ASBESTOS CONTAINING MATERIAL (ACM) AIR MONITORING AND CLEARANCE CERTIFICATE RECORD

In all Friable removal works and in other cases where requested by RCC or the client, a clearance certificate may be required post completion of ACM removal works. Clearance certificates may require air monitoring to be conducted during the removal process. All monitoring records are to be maintained and kept for a period of 30 years post completion. Separate form required for each location.

Project Name:		Project Number :	

Clearance Certificate location / item details

RCC ACM Register No: (Refer to ACM register)	Item description, type & Location (Wall sheeting, Bonded)	Removed		Date removed
		Yes	No	

Air Monitoring Results

Monitoring Unit ID;	Sample location	Start time (24hour)	Finish time (24 Hour)	Average flow rate (mL)	Fibres / Fields	Result Fibres/mL

Completion sign off by competent person

Copy of final clearance certificate attached ☐				Copy of waste transport receipt attached ☐		
Copy of waste disposal dockets attached ☐				Copy of ACM work permit attached ☐		
Name:		Position:		Signature:	Date:	

APPENDIX 4 – 40.3 SAFE WORK METHOD STATEMENT: REMOVAL OF BONDED ASBESTOS SCATTERED AT RANDOM

[PCBU Contractor Name, contact details]		**Principal Contractor (PC) [Name, contact details]**	
Works Manager: Contact Phone:		**Date SWMS provided to PC:**	**Revision No:**
Work activity/trade:		**Project Name::**	
HIGH RISK CONSTRUCTION WORK: HRCW	Risk of a person falling more than 2 metres (*Note*: in some jurisdictions this is 3 metres)	Work on a telecommunication tower	Demolition of load-bearing structure
	Likely to involve disturbing asbestos	Temporary load-bearing support for structural alterations or	Work in or near a confined space
	Work in or near a shaft or trench deeper than 1.5 m or a tunnel	Use of explosives	Work on or near pressurised gas mains or piping
	☐ Work on or near chemical, fuel or refrigerant lines	Work on or near energised electrical installations or services	☐ Work in an area that may have a contaminated or flammable atmosphere
	☐ Tilt-up or precast concrete elements	☐ Work on, in or adjacent to a road, railway, shipping lane or other traffic corridor in use by traffic other than	☐ Work in an area with movement of powered mobile plant
	☐ Work in areas with artificial extremes of temperature	☐ Work in or near water or other liquid that involves a risk of drowning	☐ Diving work
Person responsible for ensuring compliance with		**Date SWMS received:**	
What measures are in place to ensure compliance with the SWMS?			
Person responsible for reviewing SWMS control measures:		**Date SWMS received by reviewer:**	
How will the SWMS control measures be			

Review date:		**Reviewer's signature:**	

Procedure (in steps):	Possible Hazards	Control Measures
Break the job down into steps. Each of the steps should accomplish some major tasks and be logical	Situation with potential to harm – injury, illness, damage, environmental impact Eg.loss of control of plant	What actions are necessary to eliminate or minimise the hazards – elimination, substitution, isolation, engineers solutions and lastly PPE
Isolation / protection of Asbestos containing material (ACM)	Disturbance of ACM Incorrect removal	Isolate identified material by removing workers form the area and barricading off minimum radius of 5 metres – Danger tape. Warning signage to be placed at the barrier to area warning of ACM Restrict access to one entry point ONLY Asbestos register to be updated in accordance with ACM Register. Initiate RCC ACM works permit process
Establish works area / removal area	Unauthorised entry to areas	Identify the boundary for the works area i.e the location where ACM is to be removed from and identify with danger tape and signage advising ACM removal in progress. Identify area for removal site i.e. the isolated region around the works,identify with danger tape & signage warning of restricted access ACM removal works in progress.
Protection of surrounding areas / adjoining structures	Adjoining areas contaminated by removal process	Prior to any removal: Protection in the form of 200 micron plastic to be secured to protect adjoining finishes (Floors / walls) Isolation / lock out of mechanical ventilation required prior to starting
Sealing of ACM prior to removal	Disturbance of ACM Water run off Electrical outlets i.e. switches, lights, outlets, alarms etc.	Ensure all electrical items are isolated from supply. Ensure all Any drains within the area to be protected. PPE as identified above. Low pressure coarse spray to be applied to all faces / edges. A mixture of water & PVA solution or detergent or paint can be used as a wetting agent. Ensure surface is saturated but minimise run off Ensure ACM is saturated through it's full depth prior to removal / disturbing.

		Spray all accessible voids where dust may exist
Removal process	Damage to sheets General disturbance Manual handling	Determine methodology for removal Remove any loose sections prior to removing fixed sheets. Ensure all disturbed areas remain saturated, re-apply dampening method as required. Avoid breaking sheets where possible. Should sheets continually break, reassess method of removal. Support sheets prior to removing fixings Where possible, remove nails / fixings or punch nail heads through sheeting. 2 person lifts for heavy or awkward materials. PPE as specified above.
Packaging waste	Packages become loose and tear Materials spill onto ground Manual handling	**For small pieces**, ACM to be packaged into man-handleable packages, enclosed in heavy duty 200 micron plastic. (Bag or wrap) Where possibility of tearing is identified 2 layers may be required. Bags to be labelled with appropriate warnings similar to ' Caution Asbestos' or Asbestos within, do not open bag. Where bags are used, opening to be twisted and folded over and fixed with tape or other means. **For larger sections**, skips may be used but must be in good condition. Skip is to be lined in 2 layers of 200 micron plastic. ACM must be kept wet. Once skip is full, it's contents must be sealed with the plastic sheeting.
Clean up	Adjoining areas contaminated by removal process Manual handling	Ensure all disturbed areas remain saturated, re-apply dampening method as required. Start from the top and work down cleaning ledges, sills & high flat areas that ACM can settle. Remove any loose items. Start cleaning and removing plastic from furthest workpoint from exit working towards the exit point. The use of an Asbestos vacuum is permitted for dry decontamination cleaning. All waste to be disposed of in Same way to ACM. (Lined bin, plastic bag 200 micron) All PPE to remain on till area is decontaminated.

		Scrape / clean off excess materials from boots, tools etc with damp rag, into Asbestos waste bag. All disposable PPE to be placed in Asbestos waste bag and not re-used.
Disposal of waste	Incorrect disposal of waste	Materials to be disposed of at registered waste management fascility, capable of receiving Hazardous waste. Receipts of waste disposal to be collected and recorded in Asbestos register.
Other items as identified		

Project _____ Company _____

I/We the undersigned, employees of _____, declare that I/we have attended "Work Activity Training" in the tasks to be performed on this project and have had an opportunity to participate in the development / review of the SWMS. We acknowledge that all work will be performed in the manner described within the Safe Work Method Statement.

Date	Employee Name (print)	Certificate/Licence No.:	Signature	SWMS Trainer Name

Project: (List Project Name)	**Signed by Senior Management Company Rep.**
Contractor: Richard Crookes Constructions. Lvl 3. 4 Broadcast Wav. Artarmon NSW 2064	**Signature:** (Who has reviewed the SWMS)
Description of Work: SWMS - Removal of BONDED Asbestos containing material ONLY (ACM) quantity less than 10 square metres (Non licensed - Minor works) **Revision date:**	**Title:** (Your title)
	Date: (Date reviewed prior to release)

Potential Environmental Impacts:			
Air (odour, dust, fumes)	☑	Spills to ground	☑
Noise	☐	Soil Erosion	☐
Vibration	☐	Contamination/Haz materials	☑
Spills to drains/waterways	☑	Traffic / community	☐
Flora	☐	Fauna	☐
Waste:	☑	Other:	

Safety Equipment	
Fire extinguishers	☐
Barricades	☑
Ventilation	☐
Lighting	☐
Ladders/mobile scaffold	☐
Traffic control	☐
Welding screens	☐
Dust extraction	☐
Emergency response	☐

Permits	
Hot Work	☐
Excavation	☐
Confined Space	☐
Tag out / Lock out	☐
Formwork stripping	☐
Fall Arrest Systems	☐
Scaffold	☐
Other: RCC Asbestos Permit to Work	

Personal Protective Equipment (PPE)	
Hard Hat	☑
High Vis. Clothing	☐
Steep capped boots	☑
Face Shield/Welding Shield	☐
Safety Glasses	☑
Gloves	☑
Hearing Protection	☐
Fall Protection/Harness	☐
Other Task Specific: Face mask - Type 2 Cartridge, Disposable over-alls (Non - Velcro type).	

Procedure (in steps):	Possible Hazards	Risks	Inherant Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
Break the job down into steps. Each of the steps should accomplish some major tasks and be logical	Situation with potential to harm – injury, illness, damage, environmental impact Eg.loss of control of plant	List Eg. Damage to plant, buildings etc,injury or death, spills	Refer to RCC Risk Assessment Calculator F 21.5 Score 1, 2, 3	What actions are necessary to eliminate or minimise the hazards – elimination, substitution, isolation, engineers solutions and lastly PPE	Refer to RCC Risk Assessment Calculator F 21.5 Score 1, 2, 3	
Isolation / protection of Asbestos	Disturbance of ACM	Dust inhalation	1	Isolate identified material by removing	3	HSE

Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk

Procedure (in steps):	Possible Hazards	Risks	Inherant Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
containing material (ACM)	Incorrect removal	Long term heath effects Cross contamination Whole of site closure		workers form the area and barricading off minimum radius of 5 metres – Danger tape. Warning signage to be placed at the barrier to area warning of ACM Restrict access to one entry point ONLY Asbestos register to be updated in accordance with ACM Register. Initiate RCC ACM works permit process		SM
Establish works area / removal area	Unauthorised entry to areas	Workers exposed to ACM	2	Identify the boundary for the works area i.e the location where ACM is to be removed from and identify with danger tape and signage advising ACM removal in progress. Identify area for removal site i.e. the isolated region around the works, identify with danger tape & signage warning of restricted access ACM removal works in progress.	3	SM, HSE Competent Person
Protection of surrounding areas / adjoining structures	Adjoining areas contaminated by removal process	Workers exposed to ACM	1	Prior to any removal: Protection in the form of 200 micron plastic to be secured to protect adjoining finishes (Floors / walls) Isolation / lock out of mechanical ventilation required prior to starting	3	Competent Person
Sealing of ACM prior to removal	Disturbance of ACM	Cross contamination	2	Ensure all electrical items are isolated	3	Competent

Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk

Procedure (in steps):	Possible Hazards	Risks	Inherant Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
	Water run off Electrical outlets i.e. switches, lights, outlets, alarms etc.	to other areas Electrocution Explosion Slips / falls		from supply. Ensure any drains within the area are protected. PPE as identified above. Low pressure coarse spray to be applied to all faces / edges. A mixture of water & PVA solution or detergent or paint can be used as a wetting agent. Ensure all exposed surfaces (where exposed) are saturated but minimise run off, prior to removal / disturbing. Ensure ACM is saturated (where exposed), prior to removal / disturbing. Spray all accessible voids where dust may exist		Person
Removal process	Damage to sheets General disturbance Manual handling	Workers exposed to ACM Dust generation Cross contamination to other areas Strains / cuts	1	Determine methodology for removal Remove any loose sections prior to removing fixed sheets. Ensure all disturbed areas remain saturated, re-apply dampening method as required. Avoid breaking sheets where possible. Should sheets continually break, reassess method of removal. Support sheets prior to removing fixings Where possible, remove nails / fixings or punch nail heads through sheeting. 2 person lifts for heavy or awkward	3	Competent Person

Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk

Procedure (in steps):	Possible Hazards	Risks	Inherant Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
				materials. PPE as specified above.		
Packaging waste	Packages become loose and tear Materials spill onto ground Manual handling	Workers exposed to ACM Dust generation Whole of site closure Environmental damage Strains / cuts	1	**For small pieces**, ACM to be packaged into man handle-able packages, enclosed in heavy duty 200 micron plastic. All asbestos waste must be double bagged or wrapped in 2 layers of 0.2mm plastic Bags to be labelled with appropriate warnings similar to 'Caution Asbestos' or Asbestos within, do not open bag. Where bags are used, opening to be twisted and folded over and fixed with tape or other means.	3	Competent Person
Clean up	Adjoining areas contaminated by removal process Manual handling	Workers exposed to ACM Dust generation Environmental damage Strains	1	Ensure all disturbed areas remain saturated, re-apply dampening method as required. Start from the top and work down cleaning ledges, sills & high flat areas that ACM can settle. Remove any loose items. Start cleaning and removing plastic from furthest work point from exit working towards the exit point. The use of an Asbestos vacuum is permitted for dry decontamination cleaning. All waste to be disposed of in Same	3	SM HSE Competant Person

Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk

Procedure (in steps):	Possible Hazards	Risks	Inherant Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
				way to ACM. (Lined bin, plastic bag 200 micron) All PPE to remain on till area is decontaminated. Scrape / clean off excess materials from boots, tools etc with damp rag, into Asbestos waste bag. All disposable PPE to be placed in Asbestos waste bag and not re-used.		
Disposal of waste	Incorrect disposal of waste	Environmental contamination Environmental fines imposed People exposed Commercial disgrace	1	Materials to be disposed of at registered waste management facility, capable of receiving Hazardous waste. Receipts of waste disposal to be collected and recorded in Asbestos register.	3	SM
Other items as identified						

Details of Site Supervisory staff		
Name:	Qualification:	Certificates of Competence / Safework Approvals required:

Training Required to Complete Work
General WHS Induction Training
Work activity training – (Asbestos awareness training)
SWMS Training
Manual Handling training
Personal protective equipment
Other: RCC Asbestos Management Plan

Plant & Equipment: (Log books to be supplied)	

Codes of Practice, Legislation, etc. applicable :
Act: Work Health & Safety Act 2011 Protection of the Environment Operations Act 1997
Regulation: Work Health & Safety Regulation 2017
Codes of Practice: COP For the safe removal of Asbestos [NOHSC:2018 (2005)] COP- How do manage and control asbestos in the workplace-Oct 2018 COP- How to safely remove asbestos- Oct 2018
Hygienists report, if submitted.

Project Company

I/We the undersigned, employees of _____, declare that I/we have attended "Work Activity Training" in the tasks to be performed on this project and have had an opportunity to participate in the development / review of the SWMS. We acknowledge that all work will be performed in the manner described within the Safe Work Method Statement.

Date	Employee Name (print)	Certificate/Licence No.:	Signature	SWMS Trainer Name

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richardcrookes.com.au

Delivering Certainty

6.6 UNEXPECTED FINDS PROTOCOL –CONTAMINATION

The unexpected finds protocol for contamination and associated communications procedure has been prepared by Greencap Environmental for the Project.

It is not embedded in this document; it is supplied as an attached appendix so that it can be displayed/updated/revised in isolation if required.

GREENCAP
Going Further in Managing Risk

Level 2 / 11 Khartoum Road
North Ryde NSW 2113
Australia
T: (02) 9889 1800

DETAILED SITE INVESTIGATION

January 2019
J160656

GROUP GSA

Proposed Alex Avenue Public School, Schofields NSW

C122140 : NB

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The Client will ensure that Greencap has access to all sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services is not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

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Document Control

Document Quality Management Details		
Report Name:	Detailed Site Investigation	
Site Details:	Corner of Farmland Drive and future realignment of Pelican Road, Schofields NSW 2762	
Project Number:	J157372	
Client Name:	Group GSA, c/o Richard Crookes Construction	
Client Number:	C122140	
Signatures:	Prepared By:  Nicole Boukarim **Consultant** - Environment	Authorised By:  Matthew Barberson **Team Manager** - Environment

Issue Status

Version No.	Date	Creator	Reviewer
Draft	14/12/2018	Nicole Boukarim	Matthew Barberson
1	21/12/2018	Nicole Boukarim	Matthew Barberson
2	15/01/2019	Nicole Boukarim	Matthew Barberson
3	21/01/2019	Nicole Boukarim	Matthew Barberson

Document Circulation

No of Copies	Type	Customer Name	Position & Company
1	Electronic	Frederic Terreaux	Group GSA – Associate Director

Executive Summary

Greencap Pty Ltd (Greencap) was engaged by Richard Crookes Construction ('RCC') to undertake a Detailed Site Investigation (DSI) at the site of proposed school: Alex Avenue Public School ('the site').

This Detailed Site Investigation report has been prepared by Greencap Pty Ltd ('Greencap') on behalf of Schools Infrastructure NSW (SINSW) (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18_9368) for the new Alex Avenue Public School at the corner of Farmland Drive and future realignment of Pelican Road in Schofields (the site). The site is legally described as proposed Lots 1 and 2, being part of existing Lot 4 in DP1208329 and Lot 121 in DP1203646.

Refer to Figure 1, Appendix A for site location and boundary. Alex Avenue Public School is the proposed to be constructed on the approximately 2.5 ha site.

Richard Crookes has been appointed by SINSW as the head contractor for the project, as of January 2019.

Objective and Scope

The purpose of this DSI is to identify potential sources of contamination and contaminants of concern on the site, evaluate the presence of contamination in the identified areas of concern, close out any data gaps specified in the Preliminary Site Investigation (PSI) report for the site and assess site suitability for its intended use as a Primary School. This report will subsequently also provide recommendations for remediation actions and/or further investigations if required.

To achieve the above-mentioned project objectives, the following scope was undertaken: a desktop study and review of previously developed PSI Report, a site walkover, soil sampling, laboratory analysis, and preparation of this report.

Chemical results obtained from these investigations were compared with applicable human health and ecological criteria and regulation threshold levels for further investigation and corrective action. Consequently, the site Conceptual Site Model (CSM) was updated to inform the decision-making process for further investigations and remedial actions. Specifically, this DSI provides conclusions regarding the suitability of the land for future land use consistent with *Residential A* defined in the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) ('NEPM', NEPC, 2013), which includes Children's day care centres, preschools and Primary Schools.

Response to SEARs

This DSI is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 18_9368. The table below identifies the SEARs and relevant reference within this report.

Table 1: SEARs and Relevant Reference

SEARs Item	Relevant report Reference
12. Contamination Assess and quantify any **soil** and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55	Soil contamination: This DSI including attached Salinity Report (Appendix B)

While no significant potential sources of groundwater contamination were identified as a result of this DSI, groundwater testing was outside the scope of this investigation. For information specific to groundwater and groundwater contamination, other reports prepared for the site may be referred to, none of which Greencap was involved in preparing.

Findings and Conclusion

This DSI report satisfies the conditions of Clause 7 (subclause 3) of SEPP 55 (Remediation of Land).

The results of this investigation indicated the surface soil quality on site satisfied the land use standards for its intended use as a Primary School. This Detailed Site Investigation did not identify any unacceptable human health or ecological risk associated with the surface soil quality.

This investigation did not reveal any analysis results that require further investigation. All analysis results for the contaminants of potential concern were below applicable criteria for the site. Furthermore, the findings of the soil salinity report identified no evidence of any current existing significant salinity hazard/risk on the site. Therefore, the site is considered suitable for the intended land use as the Proposed Alex Avenue Public School, consistent with '*Residential A'* land use as defined in the NEPM.

Recommendations

As a result of the findings of this investigation, Greencap recommends the following action:

- Any material to be taken off-site must be classified in accordance with the NSW EPA Waste Classification Guidelines (2014).

Detailed Site Investigation

Group GSA c/o Richard Crookes Construction

Cnr of Farmland Drive & future realignment of Pelican Road, Schofields NSW

Table of Contents

1 Introduction and Background

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This Detailed Site Investigation report has been prepared by Greencap Pty Ltd ('Greencap') on behalf of Schools Infrastructure NSW (SINSW) (the Applicant). Richard Crookes has since been appointed by SINSW as the head contractor for the project, as of January 2019. This report accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18_9368) for the new Alex Avenue Public School at the corner of Farmland Drive and future realignment of Pelican Road in Schofields (the site). The site is legally described as proposed Lots 1 and 2, being part of existing Lot 4 in DP1208329 and Lot 121 in DP1203646.

The new school will cater for approximately 1,000 primary school students and 70 full-time staff upon completion. The proposal seeks consent for:

- Construction of a 2-storey library, administration and staff building (Block A) comprising:
    - School administrative spaces including reception;
    - Library with reading nooks, makers space and research pods;
    - Staff rooms and offices;
    - Special programs rooms;
    - Amenities;
    - Canteen;
    - Interview rooms; and
    - Presentation spaces.
- Construction of four 2-storey classroom buildings (Block B) containing 40 home-bases comprising:
    - Collaborative learning spaces;
    - Learning studios;
    - Covered outdoor learning spaces;
    - Practical activity areas; and
    - Amenities.
- Construction of a single storey assembly hall (Block C) with a performance stage and integrated covered outdoor learning area (COLA). The assembly hall will have OOSH facilities, store room areas and amenities;
- Associated site landscaping and open space including associated fences throughout and games courts;
- Pedestrian access points along both Farmland Drive and the future Pelican Road;
- Substation on the north-east corner of the site; and
- School signage to the front entrance.

All proposed school buildings will be connected by a covered walkway providing integrated covered outdoor learning areas (COLAs). School staff will use the Council car park for the adjacent sports fields pursuant to a Joint Use agreement. The proposed School pick up and drop off zone will also be contained within the future shared car park and will be accessed via Farmland Drive.

2 Project Objectives

This DSI provides further assessment of the site following a Preliminary Site Investigation (PSI) previously prepared for the site by Environmental Investigation Services (EIS, August 2017).

The purpose of this DSI report is to identify potential sources of contamination and contaminants of concern on the site, evaluate the presence of contamination in the identified areas of concern, close out any data gaps specified in the Preliminary Site Investigation (PSI) report for the site, and assess site suitability for its intended use as a Primary School. This report will subsequently also provide recommendations for remediation actions and/or further investigations if required.

In particular, this DSI provides conclusions regarding the suitability of the land for future land use consistent with *Residential A* defined in the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) ('NEPM', NEPC, 2013), which includes Children's day care centres, preschools and Primary Schools.

3 Response to SEARs

This DSI is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 18_9368. The table below identifies the SEARs and relevant reference within this report.

Table 1: SEARs and Relevant Reference

SEARs Item	Relevant report Reference
12. Contamination Assess and quantify any **soil** and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55	Soil contamination: This DSI including attached Salinity Report (Appendix B) Groundwater contamination: Addressed in water-related reports prepared, external to Greencap contribution

While no significant potential sources of groundwater contamination were identified as a result of this DSI, groundwater testing was outside the scope of this investigation. For information specific to groundwater and groundwater contamination, other reports prepared for the site may be referred to, none of which Greencap was involved in preparing.

4 Project Scope

To achieve the above project objectives, the following scope of work was undertaken. Where relevant, the scope was undertaken with reference to the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (2013 amendment, referred to here as the 'NEPM') as well as other relevant guidance;

4.1 Desktop Review

A desktop review was undertaken, which encompassed the following:

- Review of the Preliminary Site Investigation (PSI) previously prepared for the site by Environmental Investigation Services (EIS, August 2017).
- Review of Council records and aerial photographs to help identify landfilling, including potential asbestos landfill;
- Review of available references relating to the local topography, geology, hydrogeology, acid sulfate soils risks, and salinity risks; and
- Preparation of relevant safety information (JSEA and SWMS) and requesting underground service plans from Dial Before You Dig data base.

4.2 Site Walkover and Soil Contamination Investigation

A detailed site walkover was undertaken on the 16th November 2016, by suitably qualified Greencap scientists to identify: key site features, any visible Asbestos Containing Materials (ACM) on surface soils and any visible signs of possible salinity effects.

Soil sampling and analysis was undertaken for the site, which involved the following:

- Engagement of an excavation sub-contractor for test pitting;

- Soil sampling consisting of the following:
  - Test pitting, soil logging and soil sampling at 15 locations to a depth of maximum 1 metres below ground level (mBGL) or 0.5 mBGL into natural soil profile (whichever is encountered first)—*applies to the fill area noted in the PSI Report* (EIS, 2017);
  - Test pitting, soil logging and soil sampling at 20 locations to a depth of maximum 0.5 mBGL—*applies to the rest of the site for sampling density coverage*.
- At each sample location, a field log was completed by a suitably qualified Greencap scientist, detailing a description of the soil texture, odours, pH and any other notable inclusions;
- Quality Assurance and Quality Control (QA/QC) samples were collected at a rate of 1 duplicate sample per 10 primary samples. Eurofins Australia was used as the primary laboratory (approx. 1 in 20 intra-laboratory duplicates), while ALS was used as the secondary laboratory (1 in 20 inter-laboratory duplicates);
- Soil sample submission to a NATA-Accredited laboratory for chemical analysis of relevant combinations of the following Chemicals of Potential Concern (CoPC):
  - Total Recoverable Hydrocarbons (TRH);
  - Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN);
  - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
  - Polycyclic Aromatic Hydrocarbons (PAH);
  - Organochlorine pesticides (OCPs)
  - Organophosphate pesticides (OPPs);
  - Polychlorinated biphenyls (PCBs);
  - Asbestos in soils (presence/ absence); and
  - Salinity Characteristics (total soluble salts, soluble chloride, electrical conductivity, saturated resistivity).

4.3 Reporting

Reporting scope included the following:

- Preparation of this DSI Report evaluating the overall site condition including the contamination concerns identified in the PSI and laboratory results of the analysed soil samples. This report has been prepared in accordance with the NSW EPA (2011) '*Guidelines for Consultants Reporting on Contaminated Sites'* and relevant schedules from the NEPM.
- Preparation of a Salinity Report in accordance with the Department of Land and Water Conservation (2002) *Site investigation for urban salinity* (refer to Appendix B).

5 Site Description Summary

The site location and boundary are depicted in Figure 1, Appendix A. The site is currently vacant vegetation-covered land, zoned as "R3: Infrastructure: Educational Establishment". The site covers a surface area of approximately 2.5ha and is currently in initial planning stages of development as a Primary School site consisting of several buildings and both sealed and unsealed outdoor areas.

The site occupies the northern portion of Lot 4 in Deposited Plan (DP) 1208329 (hereafter referred to as 'proposed Lot 2') and a small area of Lot 121 DP1203646 (hereafter referred to as 'proposed Lot 1').

General site information is provided in Table 12. Site locality and layout maps are provided in Figure 1 and Figure 2.

Table 1: Site Information		
Site Address:	Corner of Farmland Drive and future realignment of Pelican Road, Schofields NSW 2762	
Property Identification:	Proposed Lot 2: Part of Lot 4 DP1208329	
	Proposed Lot 1: Part of Lot 121 DP1203646	
Local Government Area	City of Blacktown	
Approximate Area:	~2.5ha	
Current Zoning:	SP2: Infrastructure: Educational Establishment	
Current Site Use:	Vacant land	
Proposed Site Use:	Primary School – Alex Avenue Public School	
Surrounding Site Use:	**North**	Under construction during the investigation
	East	Under construction during the investigation
	South	Vacant grass and vegetation-covered land
	West	Vacant grass-covered land (to be future road: planned realignment of Pelican Road)
Surface Water Bodies:	**West/South-west**	An unnamed creek is located approximately 275m south of the site.

5.1 Site Surrounds and Sensitive Receptors

During the time of this investigation, the site was bound to the south and west by vacant land, occupied by grass and sparse vegetation. Information provided by Hayball Pty Ltd indicates that the area directly east of the site is a council park under construction at the time of this investigation. Multi-unit residential development is to be built west of the site, in addition to the planned realignment of Pelican Road. The areas to the north was observed to be under construction, presumably for medium-density (single-dwelling) residential development. Further west of the site, Schofields Zone Substation was located to the north-west whole. An unnamed creek was located to the far south-west, south of Lot 4 DP1208329.

5.1.1 On-Site Receptors

While no existing human receptors were identified on-site during the investigation, during development of the site, on-site human receptors will include civil workers and other personnel involved in the site construction works.

Following the completion and occupation of the Primary School, human sensitive receptors on site will include: school staff (including teaching and administrative staff and cleaners), students and other temporary visitors to the site such as parents, maintenance workers, as well as workers involved in any future development work on the site.

No ecological receptors were identified on the site.

5.1.2 Off-Site Receptors

Off-site human receptors include residents and visitors of the neighbouring residential areas to the north and east of the site. No human offsite receptors were identified to the site's immediate south and west due to the absence of any information regarding proposed uses of these areas, and at the time of this investigation both areas consist of vacant, grass-covered land.

The unnamed creek located down-gradient, approximately 460m south-west of the site is considered to be the nearest potential ecological receptor.

5.2 Site Setting

The site is underlain by Middle Triassic Bringelly Shale of the Wianamatta Group. This is characterised by shale, carbonaceous claystone, claystone, laminate, fine-to medium-grained lithic sandstone and rare coal and tuff. The site soil landscape is the Blacktown Residual soil landscape. Fill material was noted in the site PSI, consisting of two small stockpiles identified in the central area of the site (less than 1 tonne each) (EIS, 2017).

The elevation of the site ranges generally between 37-43 mAHD. The site slopes down-gradient towards the south, with the highest elevation at the north-eastern corner of the site. Topographic contours are presented in the PSI Appendix (EIS, 2017).

Based on site topography, surface water runoff is expected flow in a southern direction, towards the unnamed creek south of the site. Infiltration into on-site aquifers is also expected across the site due to the absence of any sealed surfaces or built structures. The PSI identified porous, extensive aquifers of low to moderate productivity on the site. Regional groundwater is expected to flow in a southern/south-western direction consistent with the regional topography. However, the possibility remains that groundwater flow may not follow this expected direction, particularly as groundwater data and water table depth were not available for the site and its surrounds, therefore further investigation would be required for confirmation.

6 Summary of Key Findings of the PSI (EIS, 2017)

A stage 1 Preliminary Site Investigation (PSI) was undertaken by EIS in August 2017.

The PSI identified three potential contamination sources on the site:

- Fill material identified on site during the site walkover;
- Former agricultural land use in the northern portion of the site; and
- The general use of pesticides on the site.

It was noted that based on the scope of works undertaken as part of the assessment, that the historical land uses and these potential sources of contamination would not preclude the proposed development of the school.

Based on review of historical information collected as part of the assessment, the site has remained largely vacant from 1956 to present. Surrounding areas appeared to be used for rural and agricultural purposes such as grazing. During the site walkover conducted by EIS no visible or olfactory indicators of contamination were identified, with the exception of two small stockpiles identified in the central area of the site (less than 1 tonne each).

The PSI recommended the following:

- Assessment of soil contamination conditions on the site, including soil sampling and analysis; and
- A Stage 2 Detailed Site Investigation (DSI) if the site following review of the findings.

The PSI identified areas of high risk dryland salinity directly west-adjacent to the site, with minor overlap onto the site's far south-western corner.

The PSI also included review of Australian Dryland Salinity Assessment 2000. Based on the derived maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050", the land directly west-adjacent to the site were identified as areas of high salinity hazard/risk, with minor overlap along the site's lower western boundary and far south-western corner.

6.1 PSI Site boundary

It should be noted that the site boundary for which the PSI pertains, has since been changed and finalised, and as a result, the PSI does not encompass the entirety of the site.

The site boundary for which the PSI pertains to, consisted of Proposed Lot 2 of the site, but did not include proposed lot 1. Furthermore, the PSI site boundary extended further south, past the finalised/actual site southern boundary.

The finalised site boundary (to which this DSI pertains) has since been expanded to include both proposed lots, and also does not extend as far south as was originally marked as part of the PSI investigation.

7 Sampling Density and Rationale

Total area of the open surfaces at the School was estimated as ~ 2.5 ha. In order to comply with the sampling density requirements for systematic assessment provided in NSW EPA (1995) 'Sampling Design Guidelines', a minimum of 35 investigation locations were required for the soil assessment. This sampling density corresponds to 14 points per hectare and is designed to capture a hotspot with a diameter greater than or equal to 31.5 m with 95% confidence. The vertical extent of the investigation targeted the depth of fill material (where encountered). Test pits were terminated with the observation/ sampling of natural material (maximum 1.0 m into natural soil).

In the scope of this assessment 35 surface samples were collected and analysed. As depicted in Figure 2, sample locations were selected in a grid pattern to ensure adequate site coverage.

8 Field Investigations

8.1 Site Walkover

A site walkover was conducted on the 16th November 2018 and 10th December 2018 by qualified Greencap consultants to visually inspect the site, corroborate site features with those identified in the PSI report, and assess the proposed site sampling design prior to beginning soil sampling. Photographs from the site inspection are provided in Appendix C.

Site observations made during the walkover were consistent with those detailed in the PSI. The site was confirmed to be vacant land, dominated by grass-covered land with sparse tree cover clustered in the south-western corner of the site, with no sealed surfaces or built structures observed on the site. (Refer to Photos 1-8). Local site topography was observed to slop generally to the south (refer to photos 3, 4 & 5), with small mounds/undulating areas along the southern boundary, presumed to be areas of fill material (refer to photo 3). Based on the observed topography and observed site surfaces, surface water drainage on the site is expected to be dominated by infiltration, with excess water runoff directed south of the site, towards a natural drainage channel identified far south of the site.

A visual inspection of surface soil conditions and the presence of any potential asbestos-containing material (ACM) on the site ground-surface was undertaken. There was no visual evidence of potential asbestos containing materials (ACM) observed on the surface of the Site and no ACM fragments were encountered at

any of the 35 test pit locations during excavation. It is noted that due to dense vegetation coverage in the far south-east of the site obscuring soil visibility, some areas of surface soil could be visually assessed.

The following observations were made during the site walkover:

- There was no olfactory evidence of odours detected on the site;
- There was no visual evidence of chemical spillage or surface staining observed on the site;
- There were no sealed surfaces or built structures (permanent or temporary) present on the site;
- There was no visual evidence of underground storage tanks (e.g. fill points, dip points, breather lines) or above ground storage tanks observed;
- The two stockpiles of fill material identified in the PSI report were located as described. Refer to Figure 3 for stockpile locations;
- There was no visual evidence of phytotoxic impact (i.e. plant stress or dieback) observed on the site with the exception of the bare patch of, otherwise-grass-covered, soil within proposed Lot 1, described below (refer to Photo 11);
- No visible indicators of salinity were identified on proposed Lot 2 of the site such as bare and scaled soil patches, visible salt crystals or white crusts, black soil staining or salt-impacted vegetation growth; and
- A visible indicator of salinity was identified on proposed Lot 1 of the site in the form of a bare/scaled patch of soil at test pit location TP29A (refer to Figure 2 for test pit locations), suggesting dryland salinity impact to vegetation growth. However, no visible salt crystals, white crusts, or black soil staining was observed in this location, nor on the remainder of the site. Vegetation growth immediately surrounding the observed clear patch appeared consistent with the remainder of the site vegetation type, and did not suggest salt-impacted vegetation species occurrence (refer to Photo 11).

8.2 Observed Soil Stratigraphy

The soil profiles encountered across the site were relatively consistent. Surface soils generally consisted of silt material followed by clay.

Below the silt material (natural top soils or fill material) was firm to stiff, red clay with moderate to high plasticity, generally mottled orange/yellow and grey, with grey mottling increasing with depth. Natural clay was generally encountered at depths between 0.2-0.3m Below Ground Level (BGL) across all sample locations.

All test pits were terminated in presumed natural material.

The visible soil profiles encountered are presented in Photos 10-12 Appendix C. Material descriptions of the soil encountered at each sample location are provided in the borehole logs presented in Appendix D.

8.2.1 Fill Material Encountered on Site

Fill material consisted of brown clay-silt or silt and contained some organic plant root material and foreign material such as ceramic, plastic and bituminous asphalt fragments. The surface silt material encountered in the following test pits was deemed to be fill material: TP1, TP2, TP4, TP8, TP9 and TP12. Refer to Figure 2, Appendix A.

8.2.2 Natural Soils

In all remaining test pits, only natural clay-silt or clay soils was encountered, with no evidence to suggest it was fill material.

9 Assessment Criteria

An assessment criterion has been selected to provide an appropriate indication of the environmental status and suitability of the site for the intended land use as a primary school. Greencap refers to the National Environment Protection Council (NEPC) (2013) - *National Environment Protection (Assessment of Site Contamination) Amendment Measure, 1999* (ASC NEPM, 2013) for site assessment criteria.

Typically for contaminant concentration to be considered acceptable for the respective land use criteria, the data set must conform to the following requirements:

- 95% upper confidence limit (UCL) of the arithmetic mean of analytical results is below the site criteria.
- Arithmetic (or geometric in cases where the data is log normally distributed) mean is below the site criteria.
- Standard deviation is less than 50% of the site criteria.
- No single sample analytical result is greater than 250% of the site criteria.

9.1 Investigation Levels

The investigation levels presented in this section are derived from toxicity of substances and estimated exposure of humans under the specified land use scenario.

9.1.1 Health Investigation Levels for Soil

The applicable health-based investigation levels (HILs) for this investigation will include the following:

- HIL A – Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools.

These HILs are taken from the NEPM (2013) and are presented for reference in Table 2. These HILs will be applied to the open surfaces of the site.

Table 2: HILs for Soil Contaminant

Chemical	HIL A [1] (mg/kg)
Metals	
Arsenic [2]	100
Cadmium	20
Chromium (VI)	100
Copper	6,000
Lead [3]	300
Mercury (inorganic)	40
Nickel	400
Zinc	7,400
PAH	
Carcinogenic PAHs (as BaP TEQ) [4]	3
Total PAHs [5]	300

Notes:

1. Generic land uses are described in detail in Schedule B7 Section 3 of the NEPM 2013
2. Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability may be important and should be considered where appropriate (refer Schedule B7).

3. Lead: HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate).
4. Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their TEFs (potency relative to B(a)P) adopted by CCME 2008 (refer Schedule B7). The B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products.

PAH species	TEF	PAH species	TEF
Benzo(a)anthracene	0.1	Benzo(g,h,i)perylene	0.01
Benzo(a)pyrene	1	Chrysene	0.01
Benzo(b+j)fluoranthene	0.1	Dibenz(a,h)anthracene	1
Benzo(k)fluoranthene	0.1	Indeno(1,2,3-c,d)pyrene	0.1

5. Total PAHs: HIL is based on the sum of the 16 PAHs most commonly reported for contaminated sites (WHO 1998). The application of the total PAH HIL should consider the presence of carcinogenic PAHs and naphthalene (the most volatile PAH). Carcinogenic PAHs reported in the total PAHs should meet the B(a)P TEQ HIL. Naphthalene reported in the total PAHs should meet the relevant HSL.

9.1.2 Ecological Investigation Levels for Soil

The ecological investigation levels (EILs) assigned by the ASC NEPC (2013) *Schedule B5c - EILs for As, Cr, Cu, DDT, Pb, Naphthalene, Ni and Zn* are adopted for this assessment. This guideline presents the methodology for deriving terrestrial EILs using both fresh and aged (i.e. > 2 years old) contamination for soil with the following land use types:

- Areas of ecological significance;
- Urban residential / public open space; and
- Commercial / industrial.

The methodology has been developed to protect soil processes, soil biota (flora and fauna) and terrestrial invertebrates and vertebrates. The current land use on site is primary school and hence the EILs for "Urban residential / public open space" have been adopted for this assessment.

The values presented for zinc, chromium (III), copper and lead are added contaminant limits (ACL) based on added concentrations.

The EIL is calculated from the sum of the ACL and the ambient background concentration (ABC) to derive the site-specific soil quality guideline (SQG) taking into account the effect caused by pH, exchangeable cations, iron and total organic carbon in soil that can affect concentration toxicity data. ACLs are based on soil characteristics of pH, CEC and clay content. Values presented for arsenic and naphthalene are generic EILs based on total concentrations and fresh contaminants. The EIL for lead has been calculated using the most conservative SQG value based upon the reported pH and exchangeable cation values. A summary of the EILs for aged contamination in soil (>2 years) for the current land use are presented in Table 3.

Table 3: Site Specific EILs			
Analyte	Ambient background concentration (mg/kg)[1]	Added contaminant limit (mg/kg)	EIL – Urban residential and public open space (mg/kg)
Arsenic [2]	13	100	113
Naphthalene	ND	170	170
Chromium (III)	17	400	417
Copper	9.4	190	199
Lead	19	1,100	1,119
Nickel	< 5	170	170
Zinc	11	270	281

Notes:

1. Ambient background concentrations (ABC) were determined using natural soil samples analysed from TP23 during this investigation.
2. Added contaminant limits were determined using Tables 1B(1-5), Schedule B1, NEPC (2013); and the following sample analysis results: pH of 5.5 and CEC of 10meq/100g. >10% clay content.

9.2 Screening Levels

9.2.1 Health screening levels (HSLs) for soil

For petroleum hydrocarbons, health screening levels (HSLs) have been derived in ASC NEPM (2013) based upon fraction ranges of hydrocarbons together with soil texture classes. The applied soil texture class is determined according to the observed stratigraphy during field assessment.

Soils encountered on site consisted of clay-silt and clay. In order to safely cover the risks associated with the fill material, a conservative approach was taken and silt soil texture was used for the selection of HSLs to be applied.

The HSL criteria, whilst non-limiting (NL) for vapour intrusion, are provided to prevent the occurrence of phase-separated hydrocarbons (PSH). Fractions F3 (>C16-C34) and F4 (>C34-C40) are semi-volatile and are not of concern for vapour intrusion, however, exposure to human receptors can occur via direct pathways such as dermal contact. The HSL criteria are summarised below in Table 4.

9.2.2 Ecological screening levels (ESLs) for soil

For petroleum hydrocarbons, ESLs have been derived in ASC NEPM (2013) based upon fraction ranges of hydrocarbons, BTEXN and benzo(a)pyrene (BaP) components together with soil texture classes. These ESLs are of low reliability except for the volatile and semi-volatile hydrocarbon fractions which are of moderate reliability. Nonetheless the ESLs will be adopted for the investigation due to the sensitivity of the proposed site use as a primary school.

The adopted ESLs are designed to be protective of soil fauna, soil processes, and plants. The ASC NEPM (2013) states that these factors only apply within the rhizome (i.e. zone in the top two metres of soil) and as such ESL criteria need not be applied to chemical results below this depth. These ESL values are included below in Table 4.

9.2.3 Management limits for hydrocarbon fractions F1-F4 in soil

Management limits for F1 and F2 are applied after consideration of relevant ESL and HSL criteria and are generally to be protective for dermal contact risk. The adopted management limits are based on fine grained soils with criteria summarised below in Table 4.

Table 4: Management Limits, ESLs and HSLs (mg/kg Dry Soil)				
Analyte	Soil Texture	HSL A/ B	ESLs	Management Limits
Land use: Residential				
F1 (C_6- C_{10})	Coarse	40 (0 - < 1m) 65 (1 - < 2m) 100 (2 - < 4m) 190 (4m+)	180 *	700
	Fine			800
F2 (>C_{10}-C_{16})	Coarse	230 (0 - < 1m)	120 *	1,000
	Fine			
F3 (>C_{16}-C_{34})	Coarse	----	300	2,500
	Fine		1,300	3,500
F4 (>C_{34}-C_{40})	Coarse	----	2,800	10,000
	Fine		5,600	
Benzene	Coarse	0.6 (0 - < 1m) 0.7 (1 - < 2m) 1 (2 - < 4m) 2 (4m+)	50	----
	Fine		65	
Toluene	Coarse	390 (0 - < 1m)	85	----
	Fine		105	
Ethyl-benzene	Coarse	----	70	----
	Fine		125	
Xylenes	Coarse	95 (0 - < 1m) 210 (1 - < 2m)	105	----
	Fine		45	
Naphthalene	Coarse	4 (0 - < 1m)	170	----
	Fine			
Benzo(a)pyrene	Coarse	----	0.7	----
	Fine		0.7	

Note: 1. * Moderate reliability criteria

10 Results

10.1 Analytical Schedule

Soil samples were submitted to a NATA-Accredited laboratory *Eurofins* for chemical analysis of relevant combinations of the following Chemicals of Potential Concern (CoPC):

- Total Recoverable Hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN);
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
- Polycyclic Aromatic Hydrocarbons (PAH);
- Organochlorine pesticides (OCPs)
- Organophosphate pesticides (OPPs);
- Polychlorinated biphenyls (PCBs);
- Asbestos in soils (presence/ absence); and
- Salinity Characteristics (total soluble salts, soluble chloride, electrical conductivity, saturated resistivity).

10.2 Soil Results

Analytical results for soil samples were compared against the assessment criteria (refer to Section 8) and presented on the results summary table in Appendix E (refer to Appendix F for laboratory transcripts). All analysis results were either non-detect (ND; not detected to the Limit of reporting) or below the applicable human health and ecological criteria for all samples.

10.3 Salinity

Due to the relatively consistent soils encountered across the site, the analysed samples are assumed to be characteristic of the soils at similar depths across the site. All samples were classed as non-saline (salinity effects mostly negligible) and non-aggressive for steel and concrete corrosivity according to applicable Australian standards and guidelines.

While the shallow soils sampled were all classified as non-sodic or sodic, the sample taken from depth 0.8-0.9m BGL was classified as highly sodic based on analysis results.

Further details of salinity investigation conducted as part of this DSI are detailed in the Salinity report attached in Appendix B.

10.4 Asbestos in soils

There was no visual evidence of potential asbestos containing materials (ACM) observed on the surface of the Site and no ACM fragments were encountered at any of the 35 test pit locations during excavation.

All soil samples analysed for asbestos by a NATA-Accredited Laboratory, returned negative results for asbestos detected at the reporting limit of 0.01% w/w, and no respirable fibres detected. Refer to Appendix E: Sample Analysis Summary.

10.5 QA/QC Procedures

The evaluation of the QA/QC procedures (refer to Appendix G) demonstrate that the established measurement data quality objectives for this project have been met and the data set is considered to be reliable.

Chain-of-Custody documentation for sample transfer from the site to the laboratory can be found in Appendix F.

11 Conceptual Site Model

A Conceptual Site Model (CSM) of the site can be formed by considering the geophysical characteristics of the site, the contaminant source, potential receptors to site contamination, and the pathways to the receptors. The CSM, as required by the NEPC (2013), is an iterative process constantly being updated during the investigation process as more information becomes available. The following CSM is presented based on the results of this DSI.

11.1 Sources

No on-site sources of contamination were identified on the site as a result of this investigation. The soil on site, however, shall be noted as a potential source of dust.

11.1.1 Chemicals of Potential Concern

Sample analysis results indicated no elevated levels of any of the chemical analytes listed in Section 9.1. However, there is always a possibility (for any site) to encounter contamination outside of the investigation points.

11.2 Pathways

Pathways identified for the fill material:

- Inhalation, ingestion, and dermal contact with contaminants in soil by utility workers during services works; and
- Creation of dust/vapour during potential demolition, excavation or development works where soils are disturbed.

11.3 Receptors

During development of the site, human receptors on site will include civil workers and other personnel involved in the site construction works.

Following the completion and occupation of the Primary School, human sensitive receptors on site will include: school staff (including teaching and administrative staff and cleaners), students and other temporary visitors to the site such as parents, maintenance workers, as well as workers involved in any future development work on the site.

Off-site human receptors include construction workers, residents and visitors of the neighbouring properties.

11.4 Source, Pathway, and Receptor Analysis

As a result of this investigation a CSM has been developed to assess actual or potential risks to human health and the environment. In this scope, a contaminant source, pathway and receptor analysis has been conducted with no identified linkages for the site. This excludes general considerations that are relevant to dust and unexpected finds.

12 Conclusions

This Detailed Site Investigation did not identify any unacceptable human health or ecological risk associated with the surface soil quality. Therefore, it can be concluded that the surface soil within the site boundary is suitable for its intended use as a primary school, consistent with '*Residential A'* land use as defined in the NEPM. This DSI report satisfies the conditions of Clause 7 (subclause 3) of SEPP 55 (Remediation of Land).

This investigation revealed no evidence to suggest a requirement for remediation of the site with respect to land contamination, for its intended use.

13 Recommendations

As a result of the findings of this investigation, Greencap recommends the following:

- Any material to be taken off-site must be classified in accordance with the NSW EPA Waste Classification Guidelines (2014).

14 References

- NEPC (1999), *National Environment Protection (Assessment of Site Contamination) Amendment Measure (ASC NEPM. 2013 amendment).*
- NSW OEH (2011), *Guidelines for Consultants Reporting on Contaminated Sites.*
- Department of Primary industries NSW (2014) *Salinity training Manual – Salinity Identification, Causes and Management.*
- Environmental Investigation Services (EIS*) (2017) Report to Hayball on Preliminary Environmental Site Assessment for Proposed New Primary School Development at 34-38 Schofields Rd, Schofields NSW.* (EIS PSI)
- Department of Land and Water Conservation (2002), '*Site investigations for Urban Salinity'*
- *AS 2159-2009: Australian Standard – Piling – Design and Installation* (Amendment No.1).

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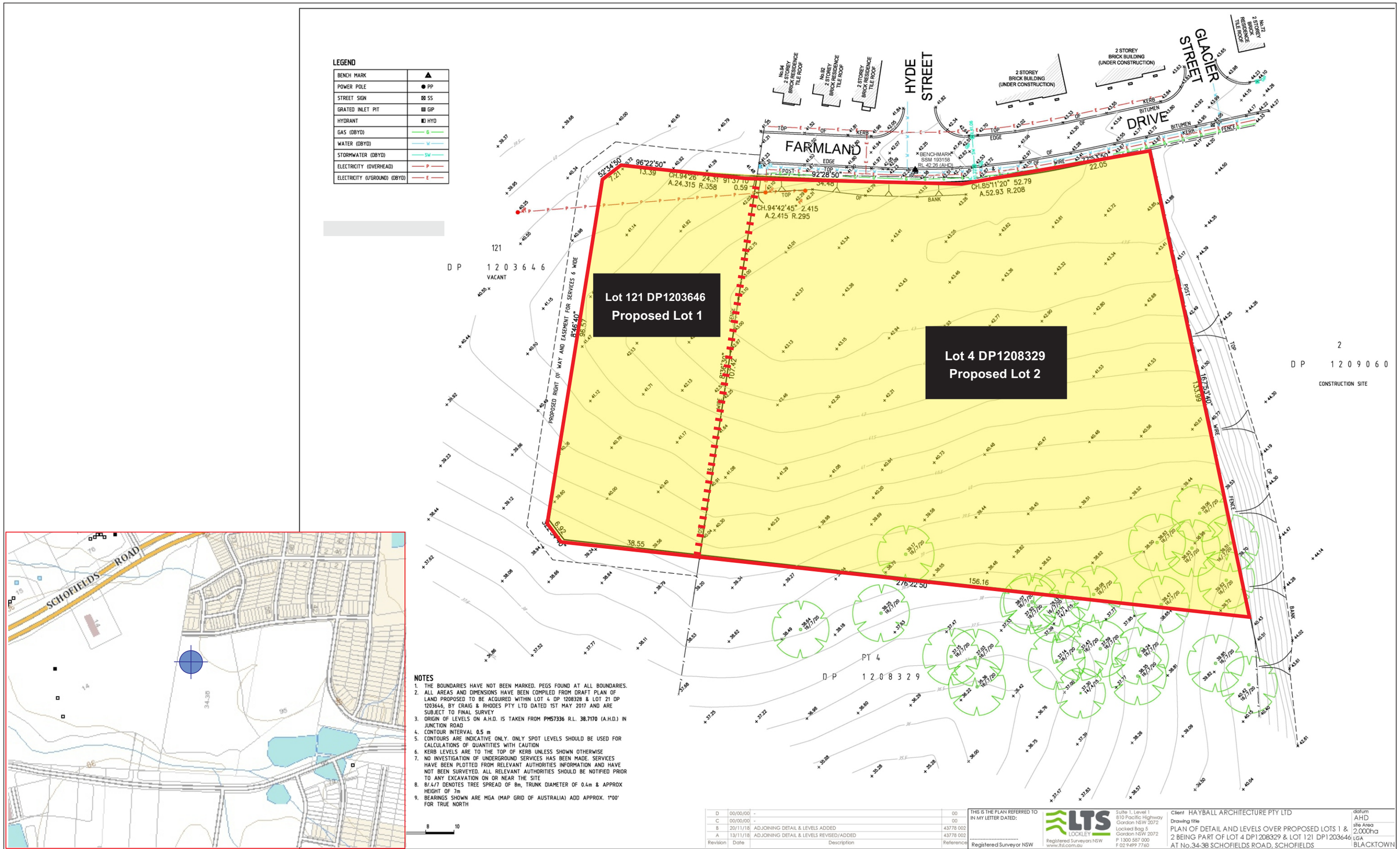
Detailed Site Investigation

Group GSA

Cnr of Farmland Dr & the future realignment of Pelican Rd, Schofields NSW 2762

Appendix A: Figures



Legend:

- Site Boundary

Metres
0 25 50

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Client Name:	Group GSA (c/o Richard Crookes Construction)				
Client Number:	C107881	Project Number: J160656			
Project Description:	Detailed Site Assessment				
Address:	Cnr Farmland Dr & future realignment of Pelican Rd, Schofields NSW 2762				
Prepared:	NXB	Reviewed:	MB	Date:	21/01/2019
Figure 1	Site Location and Regional Context				

Legend:

- Site Boundary
- Test-pit Sample Locations

Metres
0 25 50

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Prepared:	NXB	Reviewed:	MB	Date:	21/01/2019
Figure 1	Sample Locations				

Legend:

- Site Boundary
- Test-pit Sample Locations
- Locations of Salinity Tested Samples
- Test-pit Locations Containing Fill Material

Metres
0 25 50

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Prepared:	NXB	Reviewed:	MB	Date:	21/01/2019
Figure 1	Locations Samples Tested for Salinity & Encountered Fill Material				

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Detailed Site Investigation

Group GSA

Cnr of Farmland Dr & the future realignment of Pelican Rd, Schofields NSW 2762

Appendix B: Salinity Report

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SALINITY REPORT

January 2019
J160656

GROUP GSA

Proposed Alex Avenue Public School, Schofields NSW

C107881: NXB

Document Control

Document Quality Management Details		
Report Name:	Salinity Report	
Site Details:	Cnr Farmland Dr and future realignment of Pelican Rd, Schofields NSW 2762	
Project Number:	J160656	
Client Name:	Group GSA c/o Richard Crookes Construction	
Client Number:	C107881	
Signatures:	Prepared By:  Nicole Boukarim **Consultant -** Environment	Authorised By:  Matthew Barberson **Team Manager -** Environment

Issue Status

Version No.	Date	Creator	Reviewer
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1	21/12/2018	Nicole Boukarim	Matthew Barberson
2	15/01/2019	Nicole Boukarim	Matthew Barberson
3	21/01/2019	Nicole Boukarim	Matthew Barberson

Document Circulation

No of Copies	Type	Customer Name	Company & Position
1	Electronic	Frederic Terreaux	Associate Director – Group GSA

Salinity Report

Group GSA c/o Richard Crookes Construction

Cnr Farmland Dr and future realignment of Pelican Rd, Schofields NSW

Table of Contents

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This Report should be read in whole and should not be copied in part or altered. The Report as a whole sets out the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the report.

1. Introduction and Background

Greencap Pty Ltd ('Greencap') was engaged by Richard Crookes Construction (RCC) on behalf of the NSW Department of Education to undertake a Detailed Site Investigation (DSI) for the property at the Cnr Farmland Dr and future realignment of Pelican Rd, Schofields NSW 2762 ('the site'). The site is currently undeveloped and occupies the northern portion of Lot 4 in Deposited Plan (DP) 1208329 (proposed Lot 2) and a small area of Lot 121 DP1203646 (proposed Lot 1). A salinity report was required as part of the DSI, following the findings of a Preliminary Site Investigation (PSI) previously prepared for the site by Environmental Investigation Services (EIS, August 2017). The PSI identified a small portion of the western side of the site as an area of potentially high hazard/risk of dryland salinity.

A proposed Primary School – Alex Avenue Public School – is to be constructed on the 25,250 m^2 site, consisting of several buildings and both sealed and unsealed outdoor areas. Site location and boundary is depicted in Figure 1 in the Figures section of the DSI Report.

This Salinity Report should be read in conjunction with the DSI report it is an attachment of.

2. Project Objective

The objective of this report was to address the PSI salinity findings of the Preliminary Site investigation conducted by EIS (EIS PSI) in 2017 and assess dryland salinity risk on site. The Site was identified to be directly adjacent to area classified as high hazard or risk defined for years 2000, 2010, 2050 by a Dryland Salinity Assessment, Land and Property information (a division of the department of Finance and Services) 2017 in the EIS PSI, 2017.

3. Methodology and Scope of Work

In order to achieve the above objectives, the following scope of works was undertaken, by taking into consideration the NSW Department of Primary Industries' *Salinity Training Manual* (2014) and the *Site investigations for Urban Salinity* (Department of Land and Water Conservation, 2002), referred to herein as "DPI Salinity Manual" and "The SIUS" respectively:

- A desktop review of site history and environmental context, including review of PSI report (reference here), particularly local topography, geology and hydrogeology, as well as salinity findings;
- A detailed site walkover and surface soil assessment was carried out to evaluate current site use, condition, visible signs of salinity (e.g. bare soil patches, plant dieback etc.), and surrounding site uses.
- Greencap conducted salinity analytical testing at 5 locations across the site. These locations were selected based on the results of the initial surface walkover inspection, as well as for the purposes of ensuring adequate coverage of the site and the encountered soil-types. Field logs from each test pit and borehole location are included in Appendix D and contain a description of the soil profile material, odours, and any other pertinent information. Test pit locations are indicated on Figure 2.
- The analytical analysis was conducted by a NATA-Accredited laboratory, Eurofins mgt., and the samples were analysed for the following analytes:
  - Chloride
  - Conductivity (1:5 aqueous extract at 25°C)
  - Exchangeable Sodium Percentage (ESP)
  - pH (1:5 Aqueous extract at 25°C)
  - Resistivity

- Sulphate (as SO_4)
- Magnesium (exchangeable)
- Potassium (exchangeable)
- Sodium (exchangeable)
- Calcium (exchangeable)
- Cation Exchange Capacity

- Following the receipt of final laboratory results Greencap prepared this report in accordance with *Site investigations for Urban Salinity* (Department of Land and Water Conservation, 2002), stating our findings providing recommendations for further work and management if required.

Further detail on the methodology is provided in section 7.3 of the DSI Report.

3.1 Assessment Criteria and Sample Design

Sampling density was determined using the SIUS recommendations for land use deemed to be moderately intensive construction. Total area of the site is estimated to be ~25,500 m^2.

Five samples were collected and analysed, in accordance with the recommended sampling density of 0.5-4 laboratory samples per km^2 including (<1 per type profile)[1]. Two soil profiles were encountered across the site with shallow layers consisting generally of a silt or clay-silt, and deeper soil profile consisting of natural clay. Accordingly, at least two samples were taken of each profile, and sample locations were selected to ensure adequate site coverage. Care was also taken to target the western side of the site (TP16 and TP29A) in order to target the mapped dryland salinity hazard potential identified in the PSI. Areas in which any visual indicators of salinity were observed were also targeted for sampling (TP29A).

4. Site Description

The site is underlain by Middle Triassic Bringelly Shale of the Wianamatta Group. This is characterised by shale, carbonaceous claystone, claystone, laminate, fine-to medium-grained lithic sandstone and rare coal and tuff. The site soil landscape is the Blacktown Residual soil landscape. Fill material was noted in the site PSI, consisting of two small stockpiles identified in the central area of the site (less than 1 tonne each) (EIS, 2017).

The elevation of the site ranges generally between 37-43 mAHD. The site slopes down-gradient towards the south, with the highest elevation at the north-eastern corner of the site. Topographic contours are presented in the PSI Appendix (EIS, 2017).

Based on site topography, surface water runoff is expected flow in a southern direction, towards the unnamed creek south of the site. Infiltration into on-site aquifers is also expected across the site due to the absence of any sealed surfaces or built structures. The PSI identified porous, extensive aquifers of low to moderate productivity on the site. Regional groundwater is expected to flow in a southern/south-western direction consistent with the regional topography. However, the possibility remains that groundwater flow may not follow this expected direction, particularly as groundwater data and water table depth were not available for the site and its surrounds.

[1] Table 1. Recommended Levels of Site Description, *Site investigations for Urban Salinity* (Department of Land and Water Conservation, 2002).

4.1 Salinity Mapping

The EIS PSI included review of Australian Dryland Salinity Assessment 2000.

This Assessment included mapping of dryland salinity risk and hazard mapping for 2000, 2020 and 2050 within NSW. Areas of risk are based on groundwater levels and air photo interpretation. Based on the derived maps "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050", the land directly west-adjacent to the site were identified as areas of high salinity hazard/risk, with minor overlap along the site's lower western boundary and far south-western corner.

Dryland salinity occurs when deep-rooted native vegetation is replaced with shallow-rooted annuals, leading to increased water leakage to the groundwater system. As a result, the rise in groundwater level brings salt to the soil surface.

Refer to EIS Appendix A, for the Dryland Salinity findings and mapping.

5. Field Observations

5.1 Site Walkover

A site walkover was conducted on the 16th November 2018 and 10th December 2018, by qualified Greencap consultants. Photographs from the site walkovers are provided in Appendix C of the DSI.

During the site walkover, an inspection of any visible indicators of salinity on the site was undertaken. The following observations were made during the site walkover:

Proposed Lot 1 of the site:

- There was no visual evidence of salt crystals or white crusts on any soil surfaces;
- There was no visual evidence of black staining on soils;
- There was no visual evidence of puffy soil surfaces;
- There was no visual evidence of phytotoxic impact (i.e. plant stress or dieback) observed on the site with the exception of the bare patch of otherwise-grass-covered soil in proposed Lot 1, described below (refer to Photo 11); and
- One bare/scaled patch of soil was identified at test pit location TP29A (refer to Figure 2 for test pit locations), suggesting potential dryland salinity impact to vegetation growth. However, no additional indicators (e.g. salt crystals, black soil staining etc) were observed in this location. Vegetation growth immediately surrounding the observed clear patch appeared consistent with the remainder of the site vegetation type, and did not suggest salt-impacted vegetation species occurrence (refer to Photo 11).

Proposed Lot 2 of the site:

- There was no visual evidence of bare and scaled soil patches;
- There was no visual evidence of salt crystals or white crusts on any soil surfaces;
- There was no visual evidence of black staining on soils;
- There was no visual evidence of puffy soil surfaces; and
- There was no visual evidence of phytotoxic impact (i.e. plant stress or dieback) observed to trees or grasses.

For further general site observations noted during the site inspection, refer to section 7 of the DSI report.

5.2 Field observations of soil

The soil profiles encountered across the site were relatively consistent. Surface soils generally consisted of silt material followed by clay. Below top soils or fill material was firm to stiff, red clay with moderate to high plasticity, generally mottled orange/yellow and grey, with grey mottling increasing with depth. Natural clay was generally encountered at depths between 0.2-0.3m Below Ground Level (BGL) across all sample locations.

All soil layers sampled for salinity testing are considered to have been naturally-occurring soils.

The visible soil profiles encountered are presented in Photos 10-12 Appendix C. Material descriptions of the soil encountered at each sample location are provided in the borehole logs presented in Appendix D.

6. Soil Analysis Results

6.1 Results summary

Table 1. Summary of Salinity Lab Analysis Results

Analyte	LOR	Units	TP2	TP15	TP16	TP24	TP29A
			0.60-0.70	0.80-0.90	0.10-0.30	0.10-0.20	0.15-0.30
Chloride	5	ppm	24	46	< 5	14	170
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	47	87	11	100	97
Exchangeable Sodium Percentage (ESP)	0.1	%	7.9	20	2	5.8	9.1
pH (1:5 Aqueous extract at 25°C)	0.1	pH units	5.7	5.2	6.1	5.4	6.8
Resistivity*	0.5	ohm.m	210	110	940	93	100
Sulphate (as SO4)	30	ppm	140	82	< 30	52	<30
Magnesium (exchangeable)	0.5	meq/100g	5.7	9.2	3.2	7.1	6.7
Potassium (exchangeable)	0.1	meq/100g	0.4	0.6	0.2	0.3	0.5
Sodium (exchangeable)	0.1	meq/100g	0.8	2.8	0.2	1	1.4
Calcium (exchangeable)	0.1	meq/100g	3.5	1.0	5.3	8.2	6.3
Cation Exchange Capacity	0.05	meq/100g	10	14	8.8	16	15

7. Key Findings & Discussion

7.1 Soil Salinity

Using the electrical conductivity (1:5) results, EC_e values were determined using a correction factor of soil texture to determine the soil salinity class for each sample, tabulated below.

Soil texture was determined using the field testing methods outlined the DPI Salinity Manual.

All analysed samples are classed as non-saline, including samples TP16 and TP29A which were sampled from the area identified by the PSI as a forecasted area of high hazard/risk (Refer to Section 4.1 of this report). In addition, sample TP29A was observed to be an area bare of vegetation and was targeted as a possible salinity-impacted area.

Table 2. Calculated Soil Salinity Classifications					
Sample ID	**Sample depth (m)**	**Soil Type[2]**	**Conversion factor[3]**	**EC_e (dS/m)**	**Soil Salinity Class**
TP2	0.60-0.70	Heavy clay	6.7	0.32	Non-saline (1.5-2 dS/m)
TP15	0.80-0.90	Medium clay	6.7	0.58	Non-saline (1.5-2 dS/m)
TP16	0.10-0.30	Clay loam	8.6	0.95	Non-saline (1.5-2 dS/m)
TP24	0.10-0.20	Clay loam	8.6	0.86	Non-saline (1.5-2 dS/m)
TP29A	0.15-0.3	Loam	9.5	0.92	Non-saline (1.5-2 dS/m)

7.2 Sodicity and Permeability

Sodicity relates to the likely dispersion on wetting, and soil shrinking/swelling properties. When wet, sodic soils create impermeable layers and impeding water movement in the soil.

Sodicity is expressed as the Exchangeable Sodium Percentage (ESP). While saline soils are high in total soluble salts, including any combination of ions (e.g. sodium, calcium or magnesium etc), sodic soils are exclusively high in exchangeable sodium ions.

Using the guidelines for categorising soil sodicity provided in the DPI Salinity Manual, the Sodicity of the analysed samples are summarised below. Refer to Figure 2 for sample locations.

Table 3. Sodicity rating of analysed samples			
Sample ID	**Sample depth (m)**	**ESP (%)**	**Sodicity Rating[4]**
TP2	0.60-0.70	7.9	Sodic (6-15%)
TP15	0.80-0.90	20	Highly Sodic (> 15%)
TP16	0.10-0.30	2	Non-sodic (< 6%)
TP24	0.10-0.20	5.8	Non-sodic (< 6%)
TP29A	0.15-0.3	9.1	Sodic (6-15%)

[2] Soil texture was determined using the field testing methods outlined in Chapter 12 of the DPI Salinity Manual (2014).

[3] Conversions made using *Table 12.4*: *Conversion factors for soil groups,* DPI Salinity Manual (2014), adapted from Slavich and Petterson (1993).

[4] Source: Northcote and Skene (1992), cited in DPI Manual.

Sodicity is the presence of a high amount exchangeable sodium ions relative to other exchangeable cations (positively charged ions) in soil.

Based on the above, the sample taken from TP15 is notably sodic (although not saline). The high sodium in sodic soils may cause poor drainage issues, as water infiltration is likely to be impeded at this depth, which may lead to potential tunnel erosion. Waterlogging is common in sodic soils as swelling and dispersion of clay particles clog pores and hence reduce internal drainage of the soil.

These results are likely to be characteristic of the clay encountered throughout the site at this depth. Similarly, the non-sodic surface layers in samples TP16-TP9A were also encountered at the majority of test pits and can be assumed to be characteristic of the surface soils on the site.

7.3 Corrosivity

All soil samples returned results consistent with AS2159 for soils classified as non-aggressive for concrete and steel corrosivity.

Table 4. Results Comparison with AS2159 Exposure Conditions for **Non-aggressive soils**

Analyte	Units	Exposure conditions for Steel	Exposure conditions for Concrete	TP2	TP15	TP16	TP24	TP29A
				0.60-0.70	0.80-0.90	0.10-0.30	0.10-0.20	0.15-0.3
Chloride	ppm	<5000	–	24	46	< 5	14	170
pH (1:5 Aqueous extract at 25°C)	pH units	>5	>5.5	5.7	5.2	6.1	5.4	6.8
Resistivity	ohm.m	<5000	<5000	210	110	940	93	100
Sulphate (as SO4)	ppm	<5000	–	140	82	< 30	52	< 30

Although the pH of TP15 exceeded the exposure limit for non-aggressive soils for concrete, (to 'moderate aggressiveness'), all other variables for this sample were below the non-aggressive soil exposure conditions, and this condition on its own does not pose a concrete corrosivity risk.
Furthermore, chloride concentration, which is useful indicator subsoil salinity, was notably well below chloride toxicity critical levels[5] provided in the DPI Salinity Manual for all samples.

7.4 Evaluation and Management

This soil salinity assessment did not reveal any analysis results that require further investigation, nor any that would require specific management of salinity risk or corrosivity risk.

All samples were classed as non-saline (salinity effects mostly negligible) and non-aggressive for steel and concrete corrosivity according to the SIUS and AS2159 respectively.

While the shallow soils sampled were all classified as non-sodic or sodic, sample TP15, taken from depth 0.8-0.9m BGL was classified as highly sodic based on analysis results. Due to the relatively consistent soils encountered across the site, the high sodicity of sample TP15 is likely to be characteristic of other soils at similar depths across the site. However, due to the depth of this highly sodic material (0.8-0.9m BGL), the risk of potential impact on development is decreased provided that an upper non-sodic surface layer of silt is not completely removed. According to site plans it the area that TP15 was taken from corresponds to the location of the "shared plaza area" east-adjacent to Block C. Therefore, risks associated with potential decreased soil structure in this area, caused by the deeper soil's sodicity, as well as potential for concrete corrosivity is also reduced. Further risk is also minimised if infiltration of water of effluent is designed to suit the site conditions.

[5] Levels of chloride toxicity in subsoil for sensitive species: Non-toxic: <300 mg/kg, and toxic: <600 mg/kg.

Dryland salinity occurs due to rising groundwater levels bringing salt to the soil surface, often as a result of the removal of deep-rooted native vegetation, causing increased water infiltration into groundwater systems. Due to the future presence of sealed surfaces that will be on the site following construction of the primary school, the risk of increased water infiltration on the site is reduced. However, consideration may be given to the vegetation present on the site post-development.

8. Data Gaps

Data gaps identified in this investigation are noted to include water table depth, and groundwater data including data regarding the identified on-site aquifer, which were not available for review for the site and its surrounds.

9. Conclusions & Recommendations

The investigation did not reveal any analysis results that require further investigation, nor any significant soil salinity contamination or sources of salinity on the site. The findings of this assessment identified no evidence of any current existing significant salinity contamination or risk on the site. Therefore, the site is considered suitable for the intended land use as a primary school and is unlikely to require significant salinity-specific management.

Potential data gaps are noted to include groundwater data and water table depth which were not available for the site and its surrounds.

As a result of this investigation, Greencap recommends maintenance of proper drainage controls on the site during site development/construction.

10. References

- NSW Department of Primary Industries (2014) '*Salinity Training Manual*: Salinity Identification, causes and Management';
- Department of Land and Water Conservation (2002), '*Site investigations for Urban Salinity';*
- *AS 2159-2009: Australian Standard – Piling – Design and Installation* (Amendment No.1); and
- NSW OEH (2011), Guidelines for Consultants Reporting on Contaminated Sites.

January 2019

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Detailed Site Investigation

Group GSA

Cnr of Farmland Dr & the future realignment of Pelican Rd, Schofields NSW 2762

Appendix C: Field Photographs

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Site Photographs: 16 November & 10 December 2018

Photo 1. Northern boundary of site along Schofields Road, view east.

Photo 2. Proposed Lot 1, view north-east.

Photo 3. Proposed Lot 2, view north-west

Photo 4. Proposed Lot 2, south of the site, view north

Photo 5. Proposed Lot 2, view south.

Photo 6. Two stockpiles observed on proposed Lot 2, corresponding to description and location of those identified in the PSI.

Photo 7. Proposed Lot 1, view west.

Photo 8. Proposed Lot 1 (and Lot 21), view north-east.

Photo 9. Identified path of bare soil, indicating potential dryland salinity impact, view north.

Photo 10. TP3 with visible soil profile transition on the right-hand side from silt to clay.

Photo 11. TP6 – minimal upper layer of silt, followed by clay characteristic of the site.

Photo 12. TP15, red clay followed by red and grey mottled clay

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Cnr of Farmland Dr & the future realignment of Pelican Rd, Schofields NSW 2762

Appendix D: Borehole Logs

TEST PIT NUMBER TP1

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					Grass FILL: Firm, brown, clayey SILT, rootlets, bitumen fragments 1cm diameter ~ <0.5%	TP1 (0.1-0.2)	No olfactory evidence of contamination Moisture (D) PID (0.1)
			0.5			NATURAL: Firm, orange/red, silty CLAY, yellow mottling, high plasticity, increases in grey mottling with depth	TP2 (0.5-0.6)	Moisture (DM) PID (0.1)
			1.0			Borehole TP1 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP2

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					Grass FILL: Firm, light brown, clayey silty SAND, low plasticity, rock fragments approximately 1cm diameter, rootlets	TP2 (0.01-0.2)	No olfactory evidence of contamination Moisture (D) PID (0.0)
			0.5			NATURAL: Firm, orange/red sandy CLAY, red mottling, high plasticity, grey mottling with depth	TP2 (0.6-0.7)	Moisture (DM) PID (0.0)
			1.0			Borehole TP2 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP3

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass NATURAL: Firm, high density, clayey SILT, with rootlets and other organic matter		No olfactory evidence of contamination
							TP3 (0.1-0.2)	Moisture (D) PID (0.1)
			0.5			NATURAL: Red/orange, CLAY, medium density, high plasticity, increase in grey and yellow mottling with dapth		
							TP3 (0.7-0.8)	Moisture (DM) PID (0.2)
			1.0			Borehole TP3 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP4

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass FILL: Firm, light brown, clayey silty SAND, low plasticity, wood chips and roots ~3%		No olfactory evidence of contamination
							TP4 (0.1-0.2)	Moisture (D) PID (0.1)
			0.5					
							TP4 (0.8-0.9)	Moisture (DM) PID (0.0)
			1.0			Borehole TP4 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP5

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					NATURAL: Loose, brown, gravelly sandy SILT, gravel is ~ 2cm diameter subrounded sandstone		No olfactory evidence of contamination
							TP5 (0.1-0.2)	Moisture (DM) PID (0.0)
						NATURAL: Stiff, red, CLAY		
			0.5				TP5 (0.5-0.6)	Moisture (M) PID (0.0)
						Borehole TP5 terminated at 0.5m (Target depth reached)		
			1.0					
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP6

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass NATURAL: Still, brown clayey SILT with grass roots (no observed rocks)	TP6 (0.0-0.2)	No olfactory evidence of contamination Moisture (DM) PID (0.2)
						NATURAL: Firm, red and yellow mottled CLAY, medium plasticity, yellow mottling increases with depth		
			0.5				TP6 (0.5-0.6)	Moisture (M) PID (0.1)
			1.0			Borehole TP6 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP7

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass NATURAL: Soft to firm CLAY with organic matter (roots)	TP7 (0.1-0.2)	No olfactory evidence of contamination Moisture (D) PID (0.1)
						NATURAL: Firm, red, CLAY, low plasticity, roots	TP7 (0.3-0.4)	Moisture (DM) PID (0.0)
			0.5			Yellow mottling & high plasticity with depth		
			1.0			Borehole TP7 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP8

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			FILL: Loose, brown, sandy SILT with pieces of wood (15%)		No olfactory evidence of contamination
							TP8 (0.1-0.2)	Moisture (DM) PID (0.0)
			0.5			NATURAL: Firm, red, CLAY		
							TP8 (0.7-0.8)	Moisture (M) PID (0.1)
			1.0			Borehole TP8 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP9

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			FILL: Soft, brown, salny SILT with rootlets and wood pieces	TP9 (0.1-0.3)	No olfactory evidence of contamination Moisture (DM) PID (0.3)
			0.5			NATURAL: Firm, red, CLAY	TP9 (0.4-0.6)	Metal spool noted @0.3m Moisture (M) PID (0.0) Natural black coal inclusions noted (2%) @0.5m
			0.6			Borehole TP9 terminated at 0.6m (Target depth reached)		
			1.0					
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP10

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					Grass NATURAL: Firm, dark brown silty SAND, organis matter (grass roots)		No olfactory evidence of contamination
							TP10 (0.2-0.3)	Moisture (D) PID (0.2)
			0.5			NATURAL: Firm, red CLAY, grey/yellow mottling which increases with depth, low plasticity, @ 0.5-0.5 large light grey boulder encountered - flat, angular fine grained sandstone		
							TP10 (0.6-0.7)	Moisture (M) PID (0.3)
			1.0			Borehole TP10 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP11

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					Grass		No olfactory evidence of contamination
						NATURAL: Loose, light brown, clayey silty SAND, low plasticity	TP11 (0.1-0.3)	Moisture (D) PID (0.1) FD2 taken @ 0.1-0.3
			0.5			NATURAL: Firm, red/brown CLAY, clay grades to yellow/orange @ 0.7m	TP11 (0.6-0.7)	Moisture (DM) PID (0.3)
			1.0			Borehole TP11 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP12

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.5			FILL: Loose, light brown, gravelly SAND. Gravel is ~1-5cm diameter sub rounded rock, plastic pipe and golf ball noted ~0.5m	TP12 (0.3-0.5)	2m3 soil mound No odour Moisture (D) PID (0.4) FD1 taken @ 0.3-0.5
			1.0			NATURAL: Firm, red, CLAY with white mottling	TP12 (1.3-1.4)	Moisture (DM) PID (0.1)
			1.5			Borehole TP12 terminated at 1.5m (Target depth reached)		
			2.0					
			2.5					

TEST PIT NUMBER TP13

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass FILL: Loose, light brown clayey silty SAND, low plasticity, rock fragments 3cm diameter ~5%	TP13 (0.01-0.1)	No olfactory evidence of contamination Moisture (D) PID (0.0)
			0.5			NATURAL: Firm, red CLAY, high plasticity, orange mottling increases with depth, minor natural coal lens 0.5%, grey mottling at 0.8m	TP13 (0.3-0.5)	Moisture (DM) PID (0.0)
			1.0			Borehole TP13 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP14

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					NATURAL: Loose, brown, SILT with rootlets	TP14 (0-0.1)	No olfactory evidence of contamination Moisture (DM)
						NATURAL: Stiff, red CLAY		PID (0.0)
			0.5				TP14 (0.4-0.6)	Moisture (M) PID (0.0)
						Borehole TP14 terminated at 0.6m (Target depth reached)		
			1.0					
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP15

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass FILL: Stiff, dark brown clayey SILT with roots, no rocks	TP15 (0.1-0.2)	No olfactory evidence of contamination Moisture (D) PID (0.0)
			0.5			NATURAL: Stiff, red CLAY with grey and yellow mottling, medium plasticity, rootlets		
			1.0			NATURAL: Grey CLAY with yellow mottling, firm, high plasticity, rootlets	TP15 (0.8-0.9)	Moisture (DM) PID (0.0)
			1.5			Borehole TP15 terminated at 1m (Target depth reached)		
			2.0					
			2.5					

TEST PIT NUMBER TP16

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass NATURAL: Firm, light brown, sandy clayey SILT, low plasticity		No olfactory evidence of contamination Moisture (DM) PID (0.2)
						NATURAL: Firm, red/orange CLAY, orange increases with depth	TP16 (0.1-0.3)	
			1.0			Borehole TP16 terminated at 1m (Target depth reached)		

TEST PIT NUMBER TP17

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					Grass		No olfactory evidence of contamination
						FILL: Firm, brown, clayey SILT with rootlets	TP17 (0.25-0.35)	Moisture (D) PID (0.0)
			0.5			NATURAL: Stiff, orange-gold CLAY with black mottling (minor), low plasticity, some white/cream mottline (minor)	TP17 (0.85-0.95)	Moisture (D) PID (0.0)
			1.0			Borehole TP17 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP18

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					REWORKED NATURAL: Brown, SILT, medium density, tree and grass roots		No olfactory evidence of contamination
							TP18 (0.1-0.2)	Moisture (DM) PID (0.0)
			0.5			NATURAL: Stiff red/orange and gret nottled CLAY, low plasticity		
			1.0			Borehole TP18 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP19

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed					NATURAL: Loose, brown, clayey SILT with rootlets		No olfactory evidence of contamination
						NATURAL: Stiff, red, CLAY	TP19 (0.3-0.3)	Moisture (M) PID (0.0)
			0.5			Borehole TP19 terminated at 0.5m (Target depth reached)		
			1.0					
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP20

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass FILL: Loose light brown, clayey SILT, low plasticity	TP20 (0.01-0.1)	No olfactory evidence of contamination Moisture (DM) PID (0.1)
			0.5			NATURAL: Red/orange CLAY, orange mottling increases with depth		
			1.0			Borehole TP20 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP21

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass NATURAL: Loose light brown sandy clayey SILT		No olfactory evidence of contamination
						NATURAL: Firm yellow/orange CLAY, yellow mottling, yellow content increase with depth	TP21 (0.2-0.3)	Moisture (M) PID (0.0)
			0.5					
						NATURAL: Grey weathered shale, minor natural coal inclusions		
			1.0			Borehole TP21 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP22

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.5			Grass NATURAL: Loose light brown, clayey SILT, minor rock fragments, diameter 0.5cm ~0.1%, rootlets NATURAL: Firm red/orange CLAY, clay grades lighter with depth, grey mottling increases with depth	TP22 (0.1-0.2)	No olfactory evidence of contamination Moisture (D) PID (0.0)
			1.0			Borehole TP22 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP23

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.0			Grass		No olfactory evidence of contamination
						NATURAL: Loose yellow/light brown clayey SILT	TP23 (0.1-0.2)	Moisture (D)
			0.5			NATURAL: Firm orange/red CLAY, grades to red with depth		PID (0.1)
			1.0			Borehole TP23 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

BOREHOLE / TEST PIT J160656 - SCHOFIELDS DSI (TEST PITTING).GPJ TESTING TEMPLATE.GDT 23/1/19

TEST PIT NUMBER TP24

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 16/11/18 **COMPLETED** 16/11/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR McMahons **SLOPE** --- **BEARING** -

EQUIPMENT Excavator **TEST PIT LOCATION** _____

TEST PIT SIZE ~1m **LOGGED BY** NXB/JG **CHECKED BY** MB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
E	None Observed		0.5			Grass NATURAL: Firm brown clayey SILT, low plasticity NATURAL: Firm red CLAY, high plasticity, orange mottling increasing with depth	TP24 (0.1-0.2)	No olfactory evidence of contamination Moisture (DM) PID (0.2)
			1.0			Borehole TP24 terminated at 1m (Target depth reached)		
			1.5					
			2.0					
			2.5					

TEST PIT NUMBER TP25A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown silty clay with rootlets		No olfactory evidence of contamination
						NATURAL: Red, stiff clay	TP25A(0.2-0.3)	
			0.5			Borehole TP25A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP26A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown silty clay with rootlets		No olfactory evidence of contamination
						NATURAL: Red/brown, stiff clay	TP26A(0.1-0.3)	
			0.5			Borehole TP26A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP27A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown silty clay with rootlets		No olfactory evidence of contamination
						NATURAL: Red/brown, stiff clay	TP27A(0.2-0.3)	
			0.5			Borehole TP27A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP28A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown, firm gravelly clay-silt. Gravel is shale: 1-3cm diameter, flat (15%)	TP28A(0.2-0.4)	No olfactory evidence of contamination
			0.5			Borehole TP28A terminated at 0.4m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP29A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR _____ **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE _____ **LOGGED BY** MB **CHECKED BY** GB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Red and grey stiff clay	TP29A(0.15-0.3)	No olfactory evidence of contamination
			0.5			Borehole TP29A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP30A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown silty clay with rootlets		No olfactory evidence of contamination
						NATURAL: Brown/red, stiff clay	TP30A(0.2-0.3)	
			0.5			Borehole TP30A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP31A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown-red stiff clay	TP31A(0.1-0.2)	No olfactory evidence of contamination
			0.5			Borehole TP31A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP32A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Red stuff clay	TP32A(0.2-0.3)	No olfactory evidence of contamination
			0.5			Borehole TP32A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP33A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown firm, silty clay with rootlets		No olfactory evidence of contamination
						NATURAL: Red/brown stiff clay		
							TP33A(0.2-0.25)	
			0.5			Borehole TP33A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP34A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** _____ **DATUM** _____

EXCAVATION CONTRACTOR _____ **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE _____ **LOGGED BY** MB **CHECKED BY** GB

NOTES _____

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Red stiff clay	TP34A(0.1-0.2) & Field Dupliacte Sample FD2A	No olfactory evidence of contamination
			0.5			Borehole TP34A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

TEST PIT NUMBER TP35A

GREENCAP

CLIENT C107881 - Richard Crookes Construction **PROJECT NAME** Detailed Site Investigation

PROJECT NUMBER J160656 **PROJECT LOCATION** 34-38 Schofields Road, Schofields NSW

DATE STARTED 10/12/18 **COMPLETED** 10/12/18 **R.L. SURFACE** **DATUM**

EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---

EQUIPMENT Manual **TEST PIT LOCATION** Proposed Lot 1 of site

TEST PIT SIZE **LOGGED BY** MB **CHECKED BY** GB

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification	Material Description	Samples Tests Remarks	Additional Observations
						NATURAL: Brown firm silty clay with rootlets		No olfactory evidence of contamination
						NATURAL: Red stiff clay with yellow/brown mottling	TP35A(0.15-0.25)	
			0.5			Borehole TP35A terminated at 0.3m (Target depth reached)		
			1.0					
			1.5					

January 2019

GREENCAP
Going Further in Managing Risk

Detailed Site Investigation

Group GSA

Cnr of Farmland Dr & the future realignment of Pelican Rd, Schofields NSW 2762

Appendix E: Sample Analysis Results Summary Table

GREENCAP
Going Further in Managing Risk

J160656
Alex Ave Public School, Schofields
Detailed Site Investigation
Soil Analysis Data Summary

December 2018

				Sample ID				TP1	TP2	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11	TP12	TP13
				Sample Depth (m)				0.1-0.2	0.01-0.2	0.6-0.7	0.1-0.2	0.1-0.2	0.1-0.2	0.0-0.2	0.1-0.2	0.1-0.2	0.1-0.3	0.2-0.3	0.1-0.3	0.3-0.5	0.01-0.1
				Sample Date				16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18
Analyte	Units	LOR	(HIL-A)	HSL - A/B 0 - <1m	EIL	ESL - R (coarse)	ML (coarse)														
BTEX																					
Benzene	mg/kg	0.1		0.6		50		< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	mg/kg	0.1		-		-		< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	mg/kg	0.2		-		-		< 0.2	< 0.2	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	mg/kg	0.1		-		-		< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	mg/kg	0.1		390		85		< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	mg/kg	0.3		-		105		< 0.3	< 0.3	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Heavy Metals																					
Arsenic	mg/kg	2	100		113			12	14	-	7.8	8.6	9.8	10	8.7	5.2	8.5	7.3	10	4.5	8.4
Cadmium	mg/kg	0.4	20		-			< 0.4	< 0.4	-	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	mg/kg	5	100		417			18	12	-	9.3	9.1	13	13	11	7.7	12	7.9	13	15	12
Copper	mg/kg	5	6000		199			11	11	-	15	17	15	15	11	7.2	12	15	16	17	14
Lead	mg/kg	5	300		1,119			27	18	-	24	21	15	18	29	10	26	20	31	36	22
Mercury	mg/kg	0.1	40		-			< 0.1	< 0.1	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	mg/kg	5	400		170			7.2	5.9	-	6.6	7.7	< 5	8.7	6.9	< 5	5.8	8.3	7.1	9.4	6.4
Zinc	mg/kg	5	7400		281			31	25	-	38	43	29	44	31	21	30	42	43	99	26
Organochlorine Pesticides																					
4.4'-DDD	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
4.4'-DDE	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
4.4'-DDT	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
a-BHC	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Aldrin	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Aldrin and Dieldrin (Total)	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
b-BHC	mg/kg	0.1						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Chlordanes - Total	mg/kg	0.05						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
d-BHC	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
DDT + DDE + DDD (Total)	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Dieldrin	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Endosulfan I	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Endosulfan II	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Endosulfan sulphate	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Endrin	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Endrin aldehyde	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Endrin ketone	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
g-BHC (Lindane)	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Heptachlor	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Heptachlor epoxide	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Hexachlorobenzene	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Methoxychlor	mg/kg	0.05						-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	< 0.05	-	-	-	-
Toxaphene	mg/kg	1						-	< 1	-	-	< 1	-	-	< 1	-	< 1	-	-	-	-
Vic EPA IWRG 621 OCP (Total)	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Vic EPA IWRG 621 Other OCP (Total)	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Physical Properties																					
Moisture	%	1						7.8	9	12	11	10	14	9.1	8	20	11	9.7	10	8.7	11
Organophosphorus Pesticides																					
Azinphos-methyl	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Bolstar	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Chlorfenvinphos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Chlorpyrifos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Chlorpyrifos-methyl	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Coumaphos	mg/kg	2						-	< 2	-	-	< 2	-	-	< 2	-	< 2	-	-	-	-
Demeton-O	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Demeton-S	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Diazinon	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Dichlorvos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Dimethoate	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Disulfoton	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
EPN	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Ethion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Ethoprop	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Ethyl parathion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Fenitrothion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Fensulfothion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Fenthion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Malathion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Merphos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Methyl parathion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Mevinphos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Monocrotophos	mg/kg	2						-	< 2	-	-	< 2	-	-	< 2	-	< 2	-	-	-	-
Naled	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Omethoate	mg/kg	2						-	< 2	-	-	< 2	-	-	< 2	-	< 2	-	-	-	-
Phorate	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Pirimiphos-methyl	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Pyrazophos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Ronnel	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Terbufos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Tetrachlorvinphos	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Tokuthion	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Trichloronate	mg/kg	0.2						-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	< 0.2	-	-	-	-
Polychlorinated Biphenyls																					
Aroclor-1016	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Aroclor-1221	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Aroclor-1232	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Aroclor-1242	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Aroclor-1248	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Aroclor-1254	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Aroclor-1260	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Total PCB	mg/kg	0.1						-	< 0.1	-	-	< 0.1	-	-	< 0.1	-	< 0.1	-	-	-	-
Polycyclic Aromatic Hydrocarbons																					
Acenaphthene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Acenaphthylene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Anthracene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Benz(a)anthracene	mg/kg	0.5	3			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.5	3			0.7		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Benzo(a)pyrene TEQ (lower bound)	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.6	-			-		0.6	-	-	-	0.6	-	0.6	-	0.6	-	-	-	-	-
Benzo(a)pyrene TEQ (upper bound)	mg/kg	1.2	-			-		1.2	-	-	-	1.2	-	1.2	-	1.2	-	-	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.5	3			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Benzo(g.h.i)perylene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.5	3			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Chrysene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Dibenz(a.h)anthracene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Fluoranthene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Fluorene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Indeno(1.2.3-cd)pyrene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Naphthalene	mg/kg	0.5	-	4	170	170	-	< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Phenanthrene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Pyrene	mg/kg	0.5	-			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Total PAH	mg/kg	0.5	300			-		< 0.5	-	-	-	< 0.5	-	< 0.5	-	< 0.5	-	-	-	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions																					
TRH C10-36 (Total)	mg/kg	50						< 50	< 50	-	< 50	< 50	< 50	< 50	< 50	50	< 50	< 50	< 50	< 50	< 50
TRH C10-C14	mg/kg	20						< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C15-C28	mg/kg	50						< 50	< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH C29-C36	mg/kg	50						< 50	< 50	-	< 50	< 50	< 50	< 50	< 50	50	< 50	< 50	< 50	< 50	< 50
TRH C6-C9	mg/kg	20						< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20

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Total Recoverable Hydrocarbons - 2013 NEPM Fractions																				
Naphthalene	mg/kg	0.5				170	-	< 0.5	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16	mg/kg	50				120	1,000	< 50	< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)	mg/kg	50				-	-	< 50	< 50	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C40 (total)*	mg/kg	100				-	-	< 100	< 100	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C16-C34	mg/kg	100				300	2,500	< 100	< 100	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C34-C40	mg/kg	100				2,800	10,000	< 100	< 100	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH C6-C10	mg/kg	20				180	700	< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)	mg/kg	20				-	-	< 20	< 20	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Asbestos																				
Asbestos	g/g	0.01% w/w						<0.01%	-	-	<0.01%	-	<0.01%	<0.01%	-	-	<0.01%	<0.01%	-	<0.01%	-
Respirable fibres		ND						ND*	-	-	ND*	-	ND*	ND*	-	-	ND*	ND*	-	ND*	-
Salinity																				
Chloride	mg/kg	5						-	-	24	-	-	-	-	-	-	-	-	-	-
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	10						-	-	47	-	-	-	-	-	-	-	-	-	-
Exchangeable Sodium Percentage (ESP)	%	0.1						-	-	7.9	-	-	-	-	-	-	-	-	-	-
Magnesium (exchangeable)	meq/100g	0.1						-	-	5.7	-	-	-	-	-	-	-	-	-	-
pH (1:5 Aqueous extract at 25°C)	pH units	0.1						-	-	5.7	-	-	-	-	-	-	-	-	-	-
Potassium (exchangeable)	meq/100g	0.1						-	-	0.4	-	-	-	-	-	-	-	-	-	-
Resistivity	ohm.m	0.5						-	-	210	-	-	-	-	-	-	-	-	-	-
Sodium (exchangeable)	meq/100g	0.1						-	-	0.8	-	-	-	-	-	-	-	-	-	-
Sulphate (as SO4)	mg/kg	30						-	-	140	-	-	-	-	-	-	-	-	-	-
Cation Exchange Capacity																				
Calcium (exchangeable)	meq/100g	0.1						-	-	3.5	-	-	-	-	-	-	-	-	-	-
Cation Exchange Capacity	meq/100g	0.05						-	-	10	-	-	-	-	-	-	-	-	-	-

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	Sample ID						TP14	TP15	TP15	TP16	TP17	TP18	TP19	TP21	TP23	TP24	FD01	FD02
	Sample Depth (m)						0.0-0.1	0.1-0.2	0.8-0.9	0.1-0.3	0.25-0.35	0.1-0.2	0.2-0.3	0.2-0.3	0.2-0.3	0.1-0.2	FD01	FD02
	Sample Date						16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18	16/11/18
Analyte	Units	LOR	(HIL-A)	HSL - A/B 0 - <1m	EIL	ESL - R (coarse)	ML (coarse)											
BTEX																		
Benzene	mg/kg	0.1		0.6		50		< 0.1	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	mg/kg	0.1		-		-		< 0.1	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	mg/kg	0.2		-		-		< 0.2	< 0.2	-	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	mg/kg	0.1		-		-		< 0.1	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	mg/kg	0.1		390		85		< 0.1	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	mg/kg	0.3		-		105		< 0.3	< 0.3	-	-	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Heavy Metals																			
Arsenic	mg/kg	2	100		113			8.9	28	-	-	40	19	28	12	13	19	4.2	7.6
Cadmium	mg/kg	0.4	20		-			< 0.4	< 0.4	-	-	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	mg/kg	5	100		417			13	17	-	-	11	17	31	9.2	17	15	17	7.8
Copper	mg/kg	5	6000		199			15	21	-	-	28	18	25	33	9.4	34	27	12
Lead	mg/kg	5	300		1,119			26	27	-	-	33	23	31	13	19	17	43	22
Mercury	mg/kg	0.1	40		-			< 0.1	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	mg/kg	5	400		170			6	7.8	-	-	17	9	12	11	< 5	9.2	8.8	5.5
Zinc	mg/kg	5	7400		281			28	51	-	-	77	25	37	67	11	66	140	35
Organochlorine Pesticides																			
4.4'-DDD	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
4.4'-DDE	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
4.4'-DDT	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
a-BHC	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Aldrin	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Aldrin and Dieldrin (Total)	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
b-BHC	mg/kg	0.1						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Chlordanes - Total	mg/kg	0.05						-	-	-	-	< 0.1	-	-	-	-	-	-	-
d-BHC	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
DDT + DDE + DDD (Total)	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Dieldrin	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Endosulfan I	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Endosulfan II	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Endosulfan sulphate	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Endrin	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Endrin aldehyde	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Endrin ketone	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
g-BHC (Lindane)	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Heptachlor	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.05						-	-	-	-	< 0.05	-	-	-	-	-	-	-
Toxaphene	mg/kg	1						-	-	-	-	< 1	-	-	-	-	-	-	-
Vic EPA IWRG 621 OCP (Total)	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Vic EPA IWRG 621 Other OCP (Total)	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Physical Properties																			
Moisture	%	1						14	15	18	11	12	11	15	19	6.9	14	8.9	9.8
Organophosphorus Pesticides																			
Azinphos-methyl	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Bolstar	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Chlorfenvinphos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Chlorpyrifos-methyl	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Coumaphos	mg/kg	2						-	-	-	-	< 2	-	-	-	-	-	-	-
Demeton-O	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Demeton-S	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Diazinon	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Dichlorvos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Dimethoate	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Disulfoton	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
EPN	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Ethion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Ethoprop	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Ethyl parathion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Fenitrothion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Fensulfothion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Fenthion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Malathion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Merphos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Methyl parathion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Mevinphos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Monocrotophos	mg/kg	2						-	-	-	-	< 2	-	-	-	-	-	-	-
Naled	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Omethoate	mg/kg	2						-	-	-	-	< 2	-	-	-	-	-	-	-
Phorate	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Pirimiphos-methyl	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Pyrazophos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Ronnel	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Terbufos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Tetrachlorvinphos	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Tokuthion	mg/kg	0.2						-	-	-	-	< 0.2	-	-	-	-	-	-	-
Trichloronate	mg/kg	0.2						-	-	-	-	< 0.2							
Polychlorinated Biphenyls																			
Aroclor-1016	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Aroclor-1221	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Aroclor-1232	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Aroclor-1242	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Aroclor-1248	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Aroclor-1254	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Aroclor-1260	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Total PCB	mg/kg	0.1						-	-	-	-	< 0.1	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																			
Acenaphthene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Acenaphthylene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Anthracene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Benz(a)anthracene	mg/kg	0.5	3			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.5	3			0.7		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Benzo(a)pyrene TEQ (lower bound)	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.6	-			-		-	-	-	-	-	0.6	-	-	-	-	-	-
Benzo(a)pyrene TEQ (upper bound)	mg/kg	1.2	-			-		-	-	-	-	-	1.2	-	-	-	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.5	3			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Benzo(g.h.i)perylene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.5	3			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Chrysene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Dibenz(a.h)anthracene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Fluoranthene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Fluorene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Indeno(1.2.3-cd)pyrene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Naphthalene	mg/kg	0.5	-	4	170	170	-	-	-	-	-	-	< 0.5	-	-	-	-	-	-
Phenanthrene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Pyrene	mg/kg	0.5	-			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Total PAH	mg/kg	0.5	300			-		-	-	-	-	-	< 0.5	-	-	-	-	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions																			
TRH C10-36 (Total)	mg/kg	50						< 50	< 50	-	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH C10-C14	mg/kg	20						< 20	< 20	-	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C15-C28	mg/kg	50						< 50	< 50	-	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH C29-C36	mg/kg	50						< 50	< 50	-	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH C6-C9	mg/kg	20						< 20	< 20	-	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20

Total Recoverable Hydrocarbons - 2013 NEPM Fractions																			
Naphthalene	mg/kg	0.5				170	-	< 0.5	< 0.5	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16	mg/kg	50				120	1,000	< 50	< 50	-	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)	mg/kg	50				-	-	< 50	< 50	-	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C40 (total)*	mg/kg	100				-	-	< 100	< 100	-	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C16-C34	mg/kg	100				300	2,500	< 100	< 100	-	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C34-C40	mg/kg	100				2,800	10,000	< 100	< 100	-	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH C6-C10	mg/kg	20				180	700	< 20	< 20	-	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)	mg/kg	20				-	-	< 20	< 20	-	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Asbestos																			
Asbestos	g/g	0.01% w/w						-	<0.01%	-	-	-	-	-	-	<0.01%	-	-	-
Respirable fibres		ND						-	ND*	-	-	-	-	-	-	ND*	-	-	-
Salinity																			
Chloride	mg/kg	5						-	-	46	< 5	-	-	-	-	-	100	-	-
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	10						-	-	87	11	-	-	-	-	-	110	-	-
Exchangeable Sodium Percentage (ESP)	%	0.1						-	-	21	2	-	-	-	-	-	5.8	-	-
Magnesium (exchangeable)	meq/100g	0.1						-	-	9.2	3.2	-	-	-	-	-	7.1	-	-
pH (1:5 Aqueous extract at 25°C)	pH units	0.1						-	-	5.2	6.1	-	-	-	-	-	5.4	-	-
Potassium (exchangeable)	meq/100g	0.1						-	-	0.6	0.2	-	-	-	-	-	0.3	-	-
Resistivity	ohm.m	0.5						-	-	110	940	-	-	-	-	-	93	-	-
Sodium (exchangeable)	meq/100g	0.1						-	-	2.8	0.2	-	-	-	-	-	1	-	-
Sulphate (as SO4)	mg/kg	30						-	-	82	< 30	-	-	-	-	-	52	-	-
Cation Exchange Capacity																			
Calcium (exchangeable)	meq/100g	0.1						-	-	1	5.3	-	-	-	-	-	8.2	-	-
Cation Exchange Capacity	meq/100g	0.05						-	-	14	8.8	-	-	-	-	-	16	-	-

GREENCAP
Going Further in Managing Risk

J160656
Alex Ave Public School, Schofields
Detailed Site Investigation
Soil Analysis Data Summary

December 2018

	Sample ID						TP25A	TP26A	TP27A	TP28A	TP29A	TP30A	TP31A	TP32A	TP33A	TP34A	TP35A	FD01A
	Sample Depth (m)						0.2-0.3	0.1-0.3	0.2-0.3	0.2-0.4	0.1-0.3	0.2-0.3	0.1-0.2	0.2-0.3	0.2-0.25	0.1-0.2	0.15-0.25	(TP34A)
	Sample Date						10/12/18	10/12/18	10/12/18	10/12/18	10/12/18	10/12/18	10/12/18	10/12/18	10/12/18	10/12/18	10/12/18	10/12/18
Analyte	Units	LOR	(HIL-A)	HSL - A/B 0 - <1m	EIL	ESL - R (coarse)	ML (coarse)											
BTEX																		
Benzene	mg/kg	0.1		0.6		50		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	mg/kg	0.1		-		-		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	mg/kg	0.2		-		-		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	mg/kg	0.1		-		-		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	mg/kg	0.1		390		85		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	mg/kg	0.3		-		105		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Heavy Metals																		
Arsenic	mg/kg	2	100		113			7.6	9.7	14	28	19	12	20	9.3	8.2	7.7	5.8	13
Cadmium	mg/kg	0.4	20		-			< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	mg/kg	5	100		417			10	11	19	9	17	14	18	11	10	12	9.8	13
Copper	mg/kg	5	6000		199			14	16	17	22	41	27	20	16	18	15	13	20
Lead	mg/kg	5	300		1,119			22	21	19	22	22	19	39	21	23	23	17	14
Mercury	mg/kg	0.1	40		-			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	mg/kg	5	400		170			8.1	9.1	9.6	23	7.9	12	14	12	13	8.6	5.7	6.3
Zinc	mg/kg	5	7400		281			49	180	87	74	41	58	59	51	63	52	32	28
Organochlorine Pesticides																		
4.4'-DDD	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
4.4'-DDE	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
4.4'-DDT	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
a-BHC	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Aldrin	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Aldrin and Dieldrin (Total)	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
b-BHC	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Chlordanes - Total	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
d-BHC	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
DDT + DDE + DDD (Total)	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan I	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan II	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan sulphate	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Endrin	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Endrin aldehyde	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Endrin ketone	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
g-BHC (Lindane)	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.05						-	-	-	-	-	-	-	-	-	-	-	-
Toxaphene	mg/kg	1						-	-	-	-	-	-	-	-	-	-	-	-
Vic EPA IWRG 621 OCP (Total)	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Vic EPA IWRG 621 Other OCP (Total)	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Physical Properties																		
Moisture	%	1						8.2	7.8	9.7	8.6	6.4	12	9.4	9.7	10	12	6	6.3
Organophosphorus Pesticides																		
Azinphos-methyl	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Bolstar	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Chlorfenvinphos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Coumaphos	mg/kg	2						-	-	-	-	-	-	-	-	-	-	-	-
Demeton-O	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Demeton-S	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Diazinon	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Dichlorvos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Dimethoate	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Disulfoton	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
EPN	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Ethion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Ethoprop	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Ethyl parathion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Fenitrothion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Fensulfothion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Fenthion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Malathion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Merphos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Methyl parathion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Mevinphos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Monocrotophos	mg/kg	2						-	-	-	-	-	-	-	-	-	-	-	-
Naled	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Omethoate	mg/kg	2						-	-	-	-	-	-	-	-	-	-	-	-
Phorate	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Pirimiphos-methyl	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Pyrazophos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Ronnel	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Terbufos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Tetrachlorvinphos	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Tokuthion	mg/kg	0.2						-	-	-	-	-	-	-	-	-	-	-	-
Trichloronate	mg/kg	0.2						-	-	-	-	-							
Polychlorinated Biphenyls																		
Aroclor-1016	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1221	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1232	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1242	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1248	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1254	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Aroclor-1260	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Total PCB	mg/kg	0.1						-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																		
Acenaphthene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Acenaphthylene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Anthracene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Benz(a)anthracene	mg/kg	0.5	3			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.5	3			0.7		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Benzo(a)pyrene TEQ (lower bound)	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Benzo(a)pyrene TEQ (medium bound)	mg/kg	0.6	-			-		-	-	-	0.6	-	-	-	-	-	-	-	-
Benzo(a)pyrene TEQ (upper bound)	mg/kg	1.2	-			-		-	-	-	1.2	-	-	-	-	-	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.5	3			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Benzo(g.h.i)perylene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.5	3			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Chrysene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Dibenz(a.h)anthracene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Fluorene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Indeno(1.2.3-cd)pyrene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	0.5	-	4	170	170	-	-	-	-	< 0.5	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Pyrene	mg/kg	0.5	-			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Total PAH	mg/kg	0.5	300			-		-	-	-	< 0.5	-	-	-	-	-	-	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions																		
TRH C10-36 (Total)	mg/kg	50						< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	83	< 50
TRH C10-C14	mg/kg	20						< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C15-C28	mg/kg	50						< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH C29-C36	mg/kg	50						< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	83	< 50
TRH C6-C9	mg/kg	20						< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20

Total Recoverable Hydrocarbons - 2013 NEPM Fractions																			
Naphthalene	mg/kg	0.5				170	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16	mg/kg	50				120	1,000	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)	mg/kg	50				-	-	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C10-C40 (total)*	mg/kg	100				-	-	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C16-C34	mg/kg	100				300	2,500	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C34-C40	mg/kg	100				2,800	10,000	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH C6-C10	mg/kg	20				180	700	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)	mg/kg	20				-	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Asbestos																			
Asbestos	g/g	0.01% w/w						-	-	-	-	-	-	-	-	-	-	-	-
Respirable fibres								-	-	-	-	-	-	-	-	-	-	-	-
Salinity																			
Chloride	mg/kg	5						-	-	-	-	170	-	-	-	-	-	-	-
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	10						-	-	-	-	97	-	-	-	-	-	-	-
Exchangeable Sodium Percentage (ESP)	%	0.1						-	-	-	-	9.1	-	-	-	-	-	-	-
Magnesium (exchangeable)	meq/100g	0.1						-	-	-	-	6.7	-	-	-	-	-	-	-
pH (1:5 Aqueous extract at 25°C)	pH units	0.1						-	-	-	-	6.8	-	-	-	-	-	-	-
Potassium (exchangeable)	meq/100g	0.1						-	-	-	-	0.5	-	-	-	-	-	-	-
Resistivity	ohm.m	0.5						-	-	-	-	100	-	-	-	-	-	-	-
Sodium (exchangeable)	meq/100g	0.1						-	-	-	-	1.4	-	-	-	-	-	-	-
Sulphate (as SO4)	mg/kg	30						-	-	-	-	< 30	-	-	-	-	-	-	-
Cation Exchange Capacity																			
Calcium (exchangeable)	meq/100g	0.1						-	-	-	-	6.3	-	-	-	-	-	-	-
Cation Exchange Capacity	meq/100g	0.05						-	-	-	-	15	-	-	-	-	-	-	-

January 2019

GREENCAP
Going Further in Managing Risk

Detailed Site Investigation

Group GSA

Cnr of Farmland Dr & the future realignment of Pelican Rd, Schofields NSW 2762

Appendix F: Laboratory Analysis Reports & CoCs

Greencap NSW P/L
Level 2/11 Khartoum Road
North Ryde
NSW 2113

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Matthew Barberson**

Report **628453-S-V2**
Project name DSI - SCHOFIELDS
Project ID J157372
Received Date Nov 19, 2018

Client Sample ID			**TP1 0.1-0.2**	**TP2 0.01-0.2**	**TP2 0.6-0.7**	**TP3 0.1-0.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S18-No24369**	**S18-No24370**	**S18-No24371**	**S18-No24372**
Date Sampled			**Nov 16, 2018**	**Nov 16, 2018**	**Nov 16, 2018**	**Nov 16, 2018**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	-	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	-	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	-	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	-	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	54	56	-	59
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	-	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	-	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	-	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	-	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-	-

Client Sample ID			TP1 0.1-0.2	TP2 0.01-0.2	TP2 0.6-0.7	TP3 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24369	S18-No24370	S18-No24371	S18-No24372
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-	-
Fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-	-
2-Fluorobiphenyl (surr.)	1	%	94	-	-	-
p-Terphenyl-d14 (surr.)	1	%	77	-	-	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	< 0.1	-	-
4.4'-DDD	0.05	mg/kg	-	< 0.05	-	-
4.4'-DDE	0.05	mg/kg	-	< 0.05	-	-
4.4'-DDT	0.05	mg/kg	-	< 0.05	-	-
a-BHC	0.05	mg/kg	-	< 0.05	-	-
Aldrin	0.05	mg/kg	-	< 0.05	-	-
b-BHC	0.05	mg/kg	-	< 0.05	-	-
d-BHC	0.05	mg/kg	-	< 0.05	-	-
Dieldrin	0.05	mg/kg	-	< 0.05	-	-
Endosulfan I	0.05	mg/kg	-	< 0.05	-	-
Endosulfan II	0.05	mg/kg	-	< 0.05	-	-
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	-	-
Endrin	0.05	mg/kg	-	< 0.05	-	-
Endrin aldehyde	0.05	mg/kg	-	< 0.05	-	-
Endrin ketone	0.05	mg/kg	-	< 0.05	-	-
g-BHC (Lindane)	0.05	mg/kg	-	< 0.05	-	-
Heptachlor	0.05	mg/kg	-	< 0.05	-	-
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	-	-
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	-	-
Methoxychlor	0.05	mg/kg	-	< 0.05	-	-
Toxaphene	1	mg/kg	-	< 1	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	< 0.05	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.05	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 0.1	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 0.1	-	-
Dibutylchlorendate (surr.)	1	%	-	87	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	65	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	< 0.2	-	-
Bolstar	0.2	mg/kg	-	< 0.2	-	-
Chlorfenvinphos	0.2	mg/kg	-	< 0.2	-	-
Chlorpyrifos	0.2	mg/kg	-	< 0.2	-	-
Chlorpyrifos-methyl	0.2	mg/kg	-	< 0.2	-	-
Coumaphos	2	mg/kg	-	< 2	-	-
Demeton-S	0.2	mg/kg	-	< 0.2	-	-
Demeton-O	0.2	mg/kg	-	< 0.2	-	-
Diazinon	0.2	mg/kg	-	< 0.2	-	-
Dichlorvos	0.2	mg/kg	-	< 0.2	-	-

Client Sample ID			TP1 0.1-0.2	TP2 0.01-0.2	TP2 0.6-0.7	TP3 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24369	S18-No24370	S18-No24371	S18-No24372
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Dimethoate	0.2	mg/kg	-	< 0.2	-	-
Disulfoton	0.2	mg/kg	-	< 0.2	-	-
EPN	0.2	mg/kg	-	< 0.2	-	-
Ethion	0.2	mg/kg	-	< 0.2	-	-
Ethoprop	0.2	mg/kg	-	< 0.2	-	-
Ethyl parathion	0.2	mg/kg	-	< 0.2	-	-
Fenitrothion	0.2	mg/kg	-	< 0.2	-	-
Fensulfothion	0.2	mg/kg	-	< 0.2	-	-
Fenthion	0.2	mg/kg	-	< 0.2	-	-
Malathion	0.2	mg/kg	-	< 0.2	-	-
Merphos	0.2	mg/kg	-	< 0.2	-	-
Methyl parathion	0.2	mg/kg	-	< 0.2	-	-
Mevinphos	0.2	mg/kg	-	< 0.2	-	-
Monocrotophos	2	mg/kg	-	< 2	-	-
Naled	0.2	mg/kg	-	< 0.2	-	-
Omethoate	2	mg/kg	-	< 2	-	-
Phorate	0.2	mg/kg	-	< 0.2	-	-
Pirimiphos-methyl	0.2	mg/kg	-	< 0.2	-	-
Pyrazophos	0.2	mg/kg	-	< 0.2	-	-
Ronnel	0.2	mg/kg	-	< 0.2	-	-
Terbufos	0.2	mg/kg	-	< 0.2	-	-
Tetrachlorvinphos	0.2	mg/kg	-	< 0.2	-	-
Tokuthion	0.2	mg/kg	-	< 0.2	-	-
Trichloronate	0.2	mg/kg	-	< 0.2	-	-
Triphenylphosphate (surr.)	1	%	-	74	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1221	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1232	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1242	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1248	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1254	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1260	0.1	mg/kg	-	< 0.1	-	-
Total PCB*	0.1	mg/kg	-	< 0.1	-	-
Dibutylchlorendate (surr.)	1	%	-	87	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	65	-	-
Chloride	5	mg/kg	-	-	24	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	47	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	5.7	-
Resistivity*	0.5	ohm.m	-	-	210	-
Sulphate (as SO4)	30	mg/kg	-	-	140	-
Exchangeable Sodium Percentage (ESP)	0.1	%	-	-	7.9	-
Magnesium (exchangeable)	0.1	meq/100g	-	-	5.7	-
Potassium (exchangeable)	0.1	meq/100g	-	-	0.4	-
Sodium (exchangeable)	0.1	meq/100g	-	-	0.8	-
% Moisture	1	%	7.8	9.0	12	11

Client Sample ID			TP1 0.1-0.2	TP2 0.01-0.2	TP2 0.6-0.7	TP3 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24369	S18-No24370	S18-No24371	S18-No24372
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	12	14	-	7.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	-	< 0.4
Chromium	5	mg/kg	18	12	-	9.3
Copper	5	mg/kg	11	11	-	15
Lead	5	mg/kg	27	18	-	24
Mercury	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Nickel	5	mg/kg	7.2	5.9	-	6.6
Zinc	5	mg/kg	31	25	-	38
Cation Exchange Capacity						
Calcium (exchangeable)	0.1	meq/100g	-	-	3.5	-
Cation Exchange Capacity	0.05	meq/100g	-	-	10	-

Client Sample ID			TP4 0.1-0.2	TP5 0.1-0.2	TP6 0.0-0.2	TP7 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24373	S18-No24374	S18-No24375	S18-No24376
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	61	57	63	56
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	-	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	-	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	< 0.5	-

Client Sample ID			TP4 0.1-0.2	TP5 0.1-0.2	TP6 0.0-0.2	TP7 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24373	S18-No24374	S18-No24375	S18-No24376
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	-	< 0.5	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	-	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	-	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	-	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	-	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	96	-	98	-
p-Terphenyl-d14 (surr.)	1	%	97	-	68	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	-	-	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	-	-	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	-	-	< 0.05
a-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
Aldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
b-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
d-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	-	-	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-	-	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	-	-	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	-	-	< 0.05
Toxaphene	1	mg/kg	< 1	-	-	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	80	-	-	85
Tetrachloro-m-xylene (surr.)	1	%	76	-	-	85
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	-	-	< 0.2
Bolstar	0.2	mg/kg	< 0.2	-	-	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	-	-	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	-	-	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	-	-	< 0.2

Client Sample ID			TP4 0.1-0.2	TP5 0.1-0.2	TP6 0.0-0.2	TP7 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24373	S18-No24374	S18-No24375	S18-No24376
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Coumaphos	2	mg/kg	< 2	-	-	< 2
Demeton-S	0.2	mg/kg	< 0.2	-	-	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	-	-	< 0.2
Diazinon	0.2	mg/kg	< 0.2	-	-	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	-	-	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	-	-	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	-	-	< 0.2
EPN	0.2	mg/kg	< 0.2	-	-	< 0.2
Ethion	0.2	mg/kg	< 0.2	-	-	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	-	-	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	-	-	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	-	-	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	-	-	< 0.2
Fenthion	0.2	mg/kg	< 0.2	-	-	< 0.2
Malathion	0.2	mg/kg	< 0.2	-	-	< 0.2
Merphos	0.2	mg/kg	< 0.2	-	-	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	-	-	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	-	-	< 0.2
Monocrotophos	2	mg/kg	< 2	-	-	< 2
Naled	0.2	mg/kg	< 0.2	-	-	< 0.2
Omethoate	2	mg/kg	< 2	-	-	< 2
Phorate	0.2	mg/kg	< 0.2	-	-	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	-	-	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	-	-	< 0.2
Ronnel	0.2	mg/kg	< 0.2	-	-	< 0.2
Terbufos	0.2	mg/kg	< 0.2	-	-	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	-	-	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	-	-	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	-	-	< 0.2
Triphenylphosphate (surr.)	1	%	83	-	-	85
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	-	-	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	80	-	-	85
Tetrachloro-m-xylene (surr.)	1	%	76	-	-	85
% Moisture	1	%	10	14	9.1	8.0
Heavy Metals						
Arsenic	2	mg/kg	8.6	9.8	10	8.7
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	9.1	13	13	11
Copper	5	mg/kg	17	15	15	11
Lead	5	mg/kg	21	15	18	29

Client Sample ID			TP4 0.1-0.2	TP5 0.1-0.2	TP6 0.0-0.2	TP7 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24373	S18-No24374	S18-No24375	S18-No24376
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Heavy Metals						
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	7.7	< 5	8.7	6.9
Zinc	5	mg/kg	43	29	44	31

Client Sample ID			TP8 0.1-0.2	TP9 0.1-0.3	TP10 0.2-0.3	TP11 0.1-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24377	S18-No24378	S18-No24379	S18-No24380
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	53	62	96	87
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	-
Acenaphthene	0.5	mg/kg	< 0.5	-	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	-
Anthracene	0.5	mg/kg	< 0.5	-	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	-	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	-	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Chrysene	0.5	mg/kg	< 0.5	-	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	-	-	-
Fluoranthene	0.5	mg/kg	< 0.5	-	-	-
Fluorene	0.5	mg/kg	< 0.5	-	-	-

Client Sample ID			TP8 0.1-0.2	TP9 0.1-0.3	TP10 0.2-0.3	TP11 0.1-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24377	S18-No24378	S18-No24379	S18-No24380
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	-
Naphthalene	0.5	mg/kg	< 0.5	-	-	-
Phenanthrene	0.5	mg/kg	< 0.5	-	-	-
Pyrene	0.5	mg/kg	< 0.5	-	-	-
Total PAH*	0.5	mg/kg	< 0.5	-	-	-
2-Fluorobiphenyl (surr.)	1	%	98	-	-	-
p-Terphenyl-d14 (surr.)	1	%	71	-	-	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	< 0.1	-	-
4.4'-DDD	0.05	mg/kg	-	< 0.05	-	-
4.4'-DDE	0.05	mg/kg	-	< 0.05	-	-
4.4'-DDT	0.05	mg/kg	-	< 0.05	-	-
a-BHC	0.05	mg/kg	-	< 0.05	-	-
Aldrin	0.05	mg/kg	-	< 0.05	-	-
b-BHC	0.05	mg/kg	-	< 0.05	-	-
d-BHC	0.05	mg/kg	-	< 0.05	-	-
Dieldrin	0.05	mg/kg	-	< 0.05	-	-
Endosulfan I	0.05	mg/kg	-	< 0.05	-	-
Endosulfan II	0.05	mg/kg	-	< 0.05	-	-
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	-	-
Endrin	0.05	mg/kg	-	< 0.05	-	-
Endrin aldehyde	0.05	mg/kg	-	< 0.05	-	-
Endrin ketone	0.05	mg/kg	-	< 0.05	-	-
g-BHC (Lindane)	0.05	mg/kg	-	< 0.05	-	-
Heptachlor	0.05	mg/kg	-	< 0.05	-	-
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	-	-
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	-	-
Methoxychlor	0.05	mg/kg	-	< 0.05	-	-
Toxaphene	1	mg/kg	-	< 1	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	< 0.05	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.05	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 0.1	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 0.1	-	-
Dibutylchlorendate (surr.)	1	%	-	74	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	69	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	< 0.2	-	-
Bolstar	0.2	mg/kg	-	< 0.2	-	-
Chlorfenvinphos	0.2	mg/kg	-	< 0.2	-	-
Chlorpyrifos	0.2	mg/kg	-	< 0.2	-	-
Chlorpyrifos-methyl	0.2	mg/kg	-	< 0.2	-	-
Coumaphos	2	mg/kg	-	< 2	-	-
Demeton-S	0.2	mg/kg	-	< 0.2	-	-
Demeton-O	0.2	mg/kg	-	< 0.2	-	-
Diazinon	0.2	mg/kg	-	< 0.2	-	-
Dichlorvos	0.2	mg/kg	-	< 0.2	-	-
Dimethoate	0.2	mg/kg	-	< 0.2	-	-
Disulfoton	0.2	mg/kg	-	< 0.2	-	-
EPN	0.2	mg/kg	-	< 0.2	-	-

Client Sample ID			TP8 0.1-0.2	TP9 0.1-0.3	TP10 0.2-0.3	TP11 0.1-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24377	S18-No24378	S18-No24379	S18-No24380
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Ethion	0.2	mg/kg	-	< 0.2	-	-
Ethoprop	0.2	mg/kg	-	< 0.2	-	-
Ethyl parathion	0.2	mg/kg	-	< 0.2	-	-
Fenitrothion	0.2	mg/kg	-	< 0.2	-	-
Fensulfothion	0.2	mg/kg	-	< 0.2	-	-
Fenthion	0.2	mg/kg	-	< 0.2	-	-
Malathion	0.2	mg/kg	-	< 0.2	-	-
Merphos	0.2	mg/kg	-	< 0.2	-	-
Methyl parathion	0.2	mg/kg	-	< 0.2	-	-
Mevinphos	0.2	mg/kg	-	< 0.2	-	-
Monocrotophos	2	mg/kg	-	< 2	-	-
Naled	0.2	mg/kg	-	< 0.2	-	-
Omethoate	2	mg/kg	-	< 2	-	-
Phorate	0.2	mg/kg	-	< 0.2	-	-
Pirimiphos-methyl	0.2	mg/kg	-	< 0.2	-	-
Pyrazophos	0.2	mg/kg	-	< 0.2	-	-
Ronnel	0.2	mg/kg	-	< 0.2	-	-
Terbufos	0.2	mg/kg	-	< 0.2	-	-
Tetrachlorvinphos	0.2	mg/kg	-	< 0.2	-	-
Tokuthion	0.2	mg/kg	-	< 0.2	-	-
Trichloronate	0.2	mg/kg	-	< 0.2	-	-
Triphenylphosphate (surr.)	1	%	-	96	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1221	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1232	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1242	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1248	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1254	0.1	mg/kg	-	< 0.1	-	-
Aroclor-1260	0.1	mg/kg	-	< 0.1	-	-
Total PCB*	0.1	mg/kg	-	< 0.1	-	-
Dibutylchlorendate (surr.)	1	%	-	74	-	-
Tetrachloro-m-xylene (surr.)	1	%	-	69	-	-
% Moisture	1	%	20	11	9.7	10
Heavy Metals						
Arsenic	2	mg/kg	5.2	8.5	7.3	10
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	7.7	12	7.9	13
Copper	5	mg/kg	7.2	12	15	16
Lead	5	mg/kg	10	26	20	31
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	5.8	8.3	7.1
Zinc	5	mg/kg	21	30	42	43

Client Sample ID			TP12 0.3-0.5	TP13 0.01-0.1	TP14 0.0-0.1	TP15 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24381	S18-No24382	S18-No24383	S18-No24384
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	91	53	61	55
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
% Moisture	1	%	8.7	11	14	15
Heavy Metals						
Arsenic	2	mg/kg	4.5	8.4	8.9	28
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	15	12	13	17
Copper	5	mg/kg	17	14	15	21
Lead	5	mg/kg	36	22	26	27
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	9.4	6.4	6.0	7.8
Zinc	5	mg/kg	99	26	28	51

Client Sample ID			TP15 0.8-0.9	TP16 0.1-0.3	TP17 0.25-0.35	TP18 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24385	S18-No24386	S18-No24387	S18-No24388
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	-	< 20	< 20
TRH C10-C14	20	mg/kg	-	-	< 20	< 20
TRH C15-C28	50	mg/kg	-	-	< 50	< 50
TRH C29-C36	50	mg/kg	-	-	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	-	-	< 50	< 50

Client Sample ID			TP15 0.8-0.9	TP16 0.1-0.3	TP17 0.25-0.35	TP18 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24385	S18-No24386	S18-No24387	S18-No24388
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	-	-	< 0.1	< 0.1
Toluene	0.1	mg/kg	-	-	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	-	-	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	-	-	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	62	69
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	-	-	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	< 20	< 20
TRH >C10-C16	50	mg/kg	-	-	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	< 50	< 50
TRH >C16-C34	100	mg/kg	-	-	< 100	< 100
TRH >C34-C40	100	mg/kg	-	-	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	-	-	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	-	1.2
Acenaphthene	0.5	mg/kg	-	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	-	< 0.5
Anthracene	0.5	mg/kg	-	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Chrysene	0.5	mg/kg	-	-	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	-	< 0.5
Fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Fluorene	0.5	mg/kg	-	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	-	< 0.5
Naphthalene	0.5	mg/kg	-	-	-	< 0.5
Phenanthrene	0.5	mg/kg	-	-	-	< 0.5
Pyrene	0.5	mg/kg	-	-	-	< 0.5
Total PAH*	0.5	mg/kg	-	-	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	-	-	83
p-Terphenyl-d14 (surr.)	1	%	-	-	-	88
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	-	< 0.1	-
4.4'-DDD	0.05	mg/kg	-	-	< 0.05	-
4.4'-DDE	0.05	mg/kg	-	-	< 0.05	-
4.4'-DDT	0.05	mg/kg	-	-	< 0.05	-
a-BHC	0.05	mg/kg	-	-	< 0.05	-
Aldrin	0.05	mg/kg	-	-	< 0.05	-
b-BHC	0.05	mg/kg	-	-	< 0.05	-
d-BHC	0.05	mg/kg	-	-	< 0.05	-
Dieldrin	0.05	mg/kg	-	-	< 0.05	-

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	TP15 0.8-0.9 Soil S18-No24385 Nov 16, 2018	TP16 0.1-0.3 Soil S18-No24386 Nov 16, 2018	TP17 0.25-0.35 Soil S18-No24387 Nov 16, 2018	TP18 0.1-0.2 Soil S18-No24388 Nov 16, 2018
Organochlorine Pesticides						
Endosulfan I	0.05	mg/kg	-	-	< 0.05	-
Endosulfan II	0.05	mg/kg	-	-	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	-	-	< 0.05	-
Endrin	0.05	mg/kg	-	-	< 0.05	-
Endrin aldehyde	0.05	mg/kg	-	-	< 0.05	-
Endrin ketone	0.05	mg/kg	-	-	< 0.05	-
g-BHC (Lindane)	0.05	mg/kg	-	-	< 0.05	-
Heptachlor	0.05	mg/kg	-	-	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	-	-	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	-	-	< 0.05	-
Methoxychlor	0.05	mg/kg	-	-	< 0.05	-
Toxaphene	1	mg/kg	-	-	< 1	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	-	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	-	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	-	< 0.1	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	-	< 0.1	-
Dibutylchlorendate (surr.)	1	%	-	-	80	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	77	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	-	-	< 0.2	-
Bolstar	0.2	mg/kg	-	-	< 0.2	-
Chlorfenvinphos	0.2	mg/kg	-	-	< 0.2	-
Chlorpyrifos	0.2	mg/kg	-	-	< 0.2	-
Chlorpyrifos-methyl	0.2	mg/kg	-	-	< 0.2	-
Coumaphos	2	mg/kg	-	-	< 2	-
Demeton-S	0.2	mg/kg	-	-	< 0.2	-
Demeton-O	0.2	mg/kg	-	-	< 0.2	-
Diazinon	0.2	mg/kg	-	-	< 0.2	-
Dichlorvos	0.2	mg/kg	-	-	< 0.2	-
Dimethoate	0.2	mg/kg	-	-	< 0.2	-
Disulfoton	0.2	mg/kg	-	-	< 0.2	-
EPN	0.2	mg/kg	-	-	< 0.2	-
Ethion	0.2	mg/kg	-	-	< 0.2	-
Ethoprop	0.2	mg/kg	-	-	< 0.2	-
Ethyl parathion	0.2	mg/kg	-	-	< 0.2	-
Fenitrothion	0.2	mg/kg	-	-	< 0.2	-
Fensulfothion	0.2	mg/kg	-	-	< 0.2	-
Fenthion	0.2	mg/kg	-	-	< 0.2	-
Malathion	0.2	mg/kg	-	-	< 0.2	-
Merphos	0.2	mg/kg	-	-	< 0.2	-
Methyl parathion	0.2	mg/kg	-	-	< 0.2	-
Mevinphos	0.2	mg/kg	-	-	< 0.2	-
Monocrotophos	2	mg/kg	-	-	< 2	-
Naled	0.2	mg/kg	-	-	< 0.2	-
Omethoate	2	mg/kg	-	-	< 2	-
Phorate	0.2	mg/kg	-	-	< 0.2	-
Pirimiphos-methyl	0.2	mg/kg	-	-	< 0.2	-
Pyrazophos	0.2	mg/kg	-	-	< 0.2	-
Ronnel	0.2	mg/kg	-	-	< 0.2	-

Client Sample ID			TP15 0.8-0.9	TP16 0.1-0.3	TP17 0.25-0.35	TP18 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24385	S18-No24386	S18-No24387	S18-No24388
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Terbufos	0.2	mg/kg	-	-	< 0.2	-
Tetrachlorvinphos	0.2	mg/kg	-	-	< 0.2	-
Tokuthion	0.2	mg/kg	-	-	< 0.2	-
Trichloronate	0.2	mg/kg	-	-	< 0.2	-
Triphenylphosphate (surr.)	1	%	-	-	78	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1221	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1232	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1242	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1248	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1254	0.1	mg/kg	-	-	< 0.1	-
Aroclor-1260	0.1	mg/kg	-	-	< 0.1	-
Total PCB*	0.1	mg/kg	-	-	< 0.1	-
Dibutylchlorendate (surr.)	1	%	-	-	80	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	77	-
Chloride	5	mg/kg	46	< 5	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	87	11	-	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.2	6.1	-	-
Resistivity*	0.5	ohm.m	110	940	-	-
Sulphate (as SO4)	30	mg/kg	82	< 30	-	-
Exchangeable Sodium Percentage (ESP)	0.1	%	21	2.0	-	-
Magnesium (exchangeable)	0.1	meq/100g	9.2	3.2	-	-
Potassium (exchangeable)	0.1	meq/100g	0.6	0.2	-	-
Sodium (exchangeable)	0.1	meq/100g	2.8	0.2	-	-
% Moisture	1	%	18	11	12	11
Heavy Metals						
Arsenic	2	mg/kg	-	-	40	19
Cadmium	0.4	mg/kg	-	-	< 0.4	< 0.4
Chromium	5	mg/kg	-	-	11	17
Copper	5	mg/kg	-	-	28	18
Lead	5	mg/kg	-	-	33	23
Mercury	0.1	mg/kg	-	-	< 0.1	< 0.1
Nickel	5	mg/kg	-	-	17	9.0
Zinc	5	mg/kg	-	-	77	25
Cation Exchange Capacity						
Calcium (exchangeable)	0.1	meq/100g	1.0	5.3	-	-
Cation Exchange Capacity	0.05	meq/100g	14	8.8	-	-

Client Sample ID			TP19 0.2-0.3	TP21 0.2-0.3	TP23 0.2-0.3	TP24 0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-No24389	S18-No24390	S18-No24391	S18-No24392
Date Sampled			Nov 16, 2018	Nov 16, 2018	Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	54	56	112	53
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Chloride	5	mg/kg	-	-	-	100
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	-	110
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	-	5.4
Resistivity*	0.5	ohm.m	-	-	-	93
Sulphate (as SO4)	30	mg/kg	-	-	-	52
Exchangeable Sodium Percentage (ESP)	0.1	%	-	-	-	5.8
Magnesium (exchangeable)	0.1	meq/100g	-	-	-	7.1
Potassium (exchangeable)	0.1	meq/100g	-	-	-	0.3
Sodium (exchangeable)	0.1	meq/100g	-	-	-	1.0
% Moisture	1	%	15	19	6.9	14
Heavy Metals						
Arsenic	2	mg/kg	28	12	13	19
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	31	9.2	17	15
Copper	5	mg/kg	25	33	9.4	34
Lead	5	mg/kg	31	13	19	17
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	12	11	< 5	9.2
Zinc	5	mg/kg	37	67	11	66
Cation Exchange Capacity						
Calcium (exchangeable)	0.1	meq/100g	-	-	-	8.2
Cation Exchange Capacity	0.05	meq/100g	-	-	-	16

Client Sample ID			FD01	FD02
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S18-No24405	S18-No24406
Date Sampled			Nov 16, 2018	Nov 16, 2018
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	72	74
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100
% Moisture	1	%	8.9	9.8
Heavy Metals				
Arsenic	2	mg/kg	4.2	7.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	17	7.8
Copper	5	mg/kg	27	12
Lead	5	mg/kg	43	22
Mercury	0.1	mg/kg	< 0.1	< 0.1
Nickel	5	mg/kg	8.8	5.5
Zinc	5	mg/kg	140	35

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite B6			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Nov 23, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Nov 23, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 23, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Nov 23, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Melbourne	Nov 23, 2018	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins | mgt Suite B7			
Polycyclic Aromatic Hydrocarbons	Melbourne	Nov 23, 2018	14 Day
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Eurofins | mgt Suite B15			
Organochlorine Pesticides	Melbourne	Nov 23, 2018	14 Day
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Melbourne	Nov 23, 2018	14 Day
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Polychlorinated Biphenyls	Melbourne	Nov 23, 2018	28 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Chloride	Melbourne	Nov 23, 2018	28 Day
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
pH (1:5 Aqueous extract at 25°C as rec.)	Melbourne	Nov 23, 2018	7 Day
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Melbourne	Nov 23, 2018	28 Day
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Melbourne	Nov 23, 2018	7 Day
- Method: LTM-INO-4030 Conductivity			
Magnesium (exchangeable)	Melbourne	Nov 24, 2018	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity and ESP			
Potassium (exchangeable)	Melbourne	Nov 24, 2018	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity and ESP			
Sodium (exchangeable)	Melbourne	Nov 24, 2018	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity and ESP			
Cation Exchange Capacity	Melbourne	Nov 24, 2018	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
Exchangeable Sodium Percentage (ESP)	Melbourne	Nov 24, 2018	28 Day
- Method: LTM-MET-3060 - Cation Exchange Capacity (CEC) & Exchangeable Sodium Percentage (ESP)			
% Moisture	Melbourne	Nov 19, 2018	14 Day
- Method: LTM-GEN-7080 Moisture			

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Exchangeable Sodium Percentage (ESP)	%	< 0.1			0.1	Pass	
Magnesium (exchangeable)	meq/100g	< 0.1			0.1	Pass	
Potassium (exchangeable)	meq/100g	< 0.1			0.1	Pass	
Sodium (exchangeable)	meq/100g	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Cation Exchange Capacity							
Calcium (exchangeable)	meq/100g	< 0.1			0.1	Pass	
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	84			70-130	Pass	
TRH C10-C14	%	83			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	87			70-130	Pass	
Toluene	%	84			70-130	Pass	
Ethylbenzene	%	81			70-130	Pass	
m&p-Xylenes	%	78			70-130	Pass	
Xylenes - Total	%	79			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	99			70-130	Pass	
TRH C6-C10	%	79			70-130	Pass	
TRH >C10-C16	%	83			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	89			70-130	Pass	
Acenaphthylene	%	90			70-130	Pass	
Anthracene	%	77			70-130	Pass	
Benz(a)anthracene	%	120			70-130	Pass	
Benzo(a)pyrene	%	92			70-130	Pass	
Benzo(b&j)fluoranthene	%	95			70-130	Pass	
Benzo(g.h.i)perylene	%	80			70-130	Pass	
Benzo(k)fluoranthene	%	108			70-130	Pass	
Chrysene	%	111			70-130	Pass	
Dibenz(a.h)anthracene	%	94			70-130	Pass	
Fluoranthene	%	97			70-130	Pass	
Fluorene	%	89			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	77			70-130	Pass	
Naphthalene	%	98			70-130	Pass	
Phenanthrene	%	77			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pyrene	%	97			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
4.4'-DDD	%	79			70-130	Pass	
4.4'-DDE	%	99			70-130	Pass	
4.4'-DDT	%	88			70-130	Pass	
a-BHC	%	92			70-130	Pass	
Aldrin	%	90			70-130	Pass	
b-BHC	%	88			70-130	Pass	
d-BHC	%	86			70-130	Pass	
Dieldrin	%	107			70-130	Pass	
Endosulfan I	%	103			70-130	Pass	
Endosulfan II	%	98			70-130	Pass	
Endosulfan sulphate	%	98			70-130	Pass	
Endrin	%	115			70-130	Pass	
Endrin aldehyde	%	95			70-130	Pass	
Endrin ketone	%	95			70-130	Pass	
g-BHC (Lindane)	%	92			70-130	Pass	
Heptachlor	%	85			70-130	Pass	
Heptachlor epoxide	%	104			70-130	Pass	
Hexachlorobenzene	%	81			70-130	Pass	
Methoxychlor	%	75			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	72			70-130	Pass	
Dimethoate	%	71			70-130	Pass	
Ethion	%	99			70-130	Pass	
Fenitrothion	%	79			70-130	Pass	
Methyl parathion	%	74			70-130	Pass	
Mevinphos	%	71			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	82			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	105			80-120	Pass	
Cadmium	%	103			80-120	Pass	
Chromium	%	109			80-120	Pass	
Copper	%	112			80-120	Pass	
Lead	%	106			80-120	Pass	
Mercury	%	87			75-125	Pass	
Nickel	%	109			80-120	Pass	
Zinc	%	104			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M18-No26616	NCP	%	94			70-130	Pass	
Acenaphthylene	M18-No26616	NCP	%	99			70-130	Pass	
Anthracene	M18-No26616	NCP	%	90			70-130	Pass	
Benz(a)anthracene	M18-No26616	NCP	%	100			70-130	Pass	
Benzo(a)pyrene	M18-No26616	NCP	%	88			70-130	Pass	
Benzo(b&j)fluoranthene	M18-No26616	NCP	%	75			70-130	Pass	
Benzo(g.h.i)perylene	M18-No26616	NCP	%	83			70-130	Pass	
Benzo(k)fluoranthene	M18-No26616	NCP	%	88			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chrysene	M18-No26616	NCP	%	103			70-130	Pass	
Dibenz(a.h)anthracene	M18-No26616	NCP	%	80			70-130	Pass	
Fluoranthene	M18-No26616	NCP	%	87			70-130	Pass	
Fluorene	M18-No26616	NCP	%	100			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M18-No26616	NCP	%	71			70-130	Pass	
Naphthalene	M18-No26616	NCP	%	100			70-130	Pass	
Phenanthrene	M18-No26616	NCP	%	88			70-130	Pass	
Pyrene	M18-No26616	NCP	%	89			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S18-No24370	CP	%	86			70-130	Pass	
TRH C10-C14	S18-No24370	CP	%	74			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-No24370	CP	%	79			70-130	Pass	
Toluene	S18-No24370	CP	%	79			70-130	Pass	
Ethylbenzene	S18-No24370	CP	%	79			70-130	Pass	
m&p-Xylenes	S18-No24370	CP	%	77			70-130	Pass	
o-Xylene	S18-No24370	CP	%	78			70-130	Pass	
Xylenes - Total	S18-No24370	CP	%	77			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-No24370	CP	%	97			70-130	Pass	
TRH C6-C10	S18-No24370	CP	%	82			70-130	Pass	
TRH >C10-C16	S18-No24370	CP	%	72			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDD	M18-No22489	NCP	%	128			70-130	Pass	
4.4'-DDE	M18-No22489	NCP	%	128			70-130	Pass	
4.4'-DDT	M18-No22489	NCP	%	106			70-130	Pass	
a-BHC	M18-No22489	NCP	%	77			70-130	Pass	
Aldrin	M18-No22489	NCP	%	98			70-130	Pass	
b-BHC	M18-No22489	NCP	%	102			70-130	Pass	
d-BHC	M18-No22489	NCP	%	96			70-130	Pass	
Dieldrin	M18-No22489	NCP	%	96			70-130	Pass	
Endosulfan I	M18-No22489	NCP	%	99			70-130	Pass	
Endosulfan II	M18-No22489	NCP	%	82			70-130	Pass	
Endosulfan sulphate	M18-No22489	NCP	%	88			70-130	Pass	
Endrin	M18-No22489	NCP	%	104			70-130	Pass	
Endrin aldehyde	M18-No22489	NCP	%	83			70-130	Pass	
Endrin ketone	M18-No22489	NCP	%	101			70-130	Pass	
g-BHC (Lindane)	M18-No22489	NCP	%	87			70-130	Pass	
Heptachlor	M18-No22489	NCP	%	98			70-130	Pass	
Heptachlor epoxide	M18-No22489	NCP	%	96			70-130	Pass	
Hexachlorobenzene	M18-No22489	NCP	%	85			70-130	Pass	
Methoxychlor	M18-No22489	NCP	%	117			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	M18-No28383	NCP	%	95			70-130	Pass	
Dimethoate	M18-No28383	NCP	%	78			70-130	Pass	
Ethion	M18-No28383	NCP	%	122			70-130	Pass	
Fenitrothion	M18-No28383	NCP	%	79			70-130	Pass	
Methyl parathion	M18-No28383	NCP	%	72			70-130	Pass	
Mevinphos	M18-No28383	NCP	%	88			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1260	M18-No30380	NCP	%	100			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-No24370	CP	%	105			75-125	Pass	
Cadmium	S18-No24370	CP	%	108			75-125	Pass	
Chromium	S18-No24370	CP	%	109			75-125	Pass	
Copper	S18-No24370	CP	%	122			75-125	Pass	
Lead	S18-No24370	CP	%	104			75-125	Pass	
Mercury	S18-No24370	CP	%	89			70-130	Pass	
Nickel	S18-No24370	CP	%	121			75-125	Pass	
Zinc	S18-No24370	CP	%	121			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S18-No24381	CP	%	119			70-130	Pass	
TRH C10-C14	S18-No24381	CP	%	70			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-No24381	CP	%	85			70-130	Pass	
Toluene	S18-No24381	CP	%	90			70-130	Pass	
Ethylbenzene	S18-No24381	CP	%	100			70-130	Pass	
m&p-Xylenes	S18-No24381	CP	%	96			70-130	Pass	
o-Xylene	S18-No24381	CP	%	98			70-130	Pass	
Xylenes - Total	S18-No24381	CP	%	97			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-No24381	CP	%	80			70-130	Pass	
TRH C6-C10	S18-No24381	CP	%	106			70-130	Pass	
TRH >C10-C16	S18-No24381	CP	%	78			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-No24381	CP	%	114			75-125	Pass	
Cadmium	S18-No24381	CP	%	103			75-125	Pass	
Chromium	S18-No24381	CP	%	124			75-125	Pass	
Copper	S18-No24381	CP	%	135			75-125	Fail	Q08
Lead	S18-No24381	CP	%	113			75-125	Pass	
Nickel	S18-No24381	CP	%	123			75-125	Pass	
Zinc	S18-No24381	CP	%	148			75-125	Fail	Q08
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S18-No24393	CP	%	95			70-130	Pass	
TRH C10-C14	S18-No24393	CP	%	82			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-No24393	CP	%	86			70-130	Pass	
Toluene	S18-No24393	CP	%	84			70-130	Pass	
Ethylbenzene	S18-No24393	CP	%	86			70-130	Pass	
m&p-Xylenes	S18-No24393	CP	%	83			70-130	Pass	
o-Xylene	S18-No24393	CP	%	84			70-130	Pass	
Xylenes - Total	S18-No24393	CP	%	84			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-No24393	CP	%	98			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	S18-No24393	CP	%	90			70-130	Pass	
TRH >C10-C16	S18-No24393	CP	%	79			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-No24393	CP	%	106			75-125	Pass	
Cadmium	S18-No24393	CP	%	102			75-125	Pass	
Chromium	S18-No24393	CP	%	104			75-125	Pass	
Copper	S18-No24393	CP	%	110			75-125	Pass	
Lead	S18-No24393	CP	%	92			75-125	Pass	
Mercury	S18-No24393	CP	%	84			70-130	Pass	
Nickel	S18-No24393	CP	%	108			75-125	Pass	
Zinc	S18-No24393	CP	%	121			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S18-No24403	CP	%	109			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-No24403	CP	%	97			70-130	Pass	
Toluene	S18-No24403	CP	%	113			70-130	Pass	
Ethylbenzene	S18-No24403	CP	%	123			70-130	Pass	
m&p-Xylenes	S18-No24403	CP	%	125			70-130	Pass	
o-Xylene	S18-No24403	CP	%	123			70-130	Pass	
Xylenes - Total	S18-No24403	CP	%	124			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-No24403	CP	%	70			70-130	Pass	
TRH C6-C10	S18-No24403	CP	%	106			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-No24369	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S18-No24369	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S18-No24369	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S18-No24369	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-No24369	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-No24369	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-No24369	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-No24369	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-No24369	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-No24369	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S18-No24369	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S18-No24369	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S18-No24369	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S18-No24369	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S18-No24369	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S18-No24369	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S18-No24369	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	S18-No24369	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-No24369	CP	%	7.8	8.5	8.0	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-No24369	CP	mg/kg	12	12	<1	30%	Pass	
Cadmium	S18-No24369	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-No24369	CP	mg/kg	18	15	18	30%	Pass	
Copper	S18-No24369	CP	mg/kg	11	13	15	30%	Pass	
Lead	S18-No24369	CP	mg/kg	27	28	4.0	30%	Pass	
Mercury	S18-No24369	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-No24369	CP	mg/kg	7.2	7.0	3.0	30%	Pass	
Zinc	S18-No24369	CP	mg/kg	31	36	13	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M18-No25615	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	M18-No25615	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S18-No24710	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Methyl parathion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S18-No24710	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S18-No24710	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	S18-No24710	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	M18-No25615	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-No24370	CP	mg/kg	14	15	4.0	30%	Pass	
Cadmium	S18-No24370	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-No24370	CP	mg/kg	12	12	2.0	30%	Pass	
Copper	S18-No24370	CP	mg/kg	11	11	2.0	30%	Pass	
Lead	S18-No24370	CP	mg/kg	18	19	3.0	30%	Pass	
Mercury	S18-No24370	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-No24370	CP	mg/kg	5.9	6.1	4.0	30%	Pass	
Zinc	S18-No24370	CP	mg/kg	25	27	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	M18-No26700	NCP	mg/kg	14	13	12	30%	Pass	
Sulphate (as SO4)	M18-No26700	NCP	mg/kg	140	130	3.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-No24379	CP	%	9.7	9.6	1.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-No24380	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S18-No24380	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S18-No24380	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S18-No24380	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-No24380	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-No24380	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-No24380	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-No24380	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-No24380	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-No24380	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-No24380	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-No24380	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S18-No24380	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S18-No24380	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S18-No24380	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-No24380	CP	mg/kg	10	10	2.0	30%	Pass	
Cadmium	S18-No24380	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-No24380	CP	mg/kg	13	11	15	30%	Pass	
Copper	S18-No24380	CP	mg/kg	16	13	17	30%	Pass	
Lead	S18-No24380	CP	mg/kg	31	26	18	30%	Pass	
Mercury	S18-No24380	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-No24380	CP	mg/kg	7.1	7.0	2.0	30%	Pass	
Zinc	S18-No24380	CP	mg/kg	43	37	17	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-No24381	CP	mg/kg	4.5	4.4	2.0	30%	Pass	
Cadmium	S18-No24381	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-No24381	CP	mg/kg	15	14	<1	30%	Pass	
Copper	S18-No24381	CP	mg/kg	17	17	1.0	30%	Pass	
Lead	S18-No24381	CP	mg/kg	36	36	1.0	30%	Pass	
Mercury	S18-No24381	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-No24381	CP	mg/kg	9.4	9.2	2.0	30%	Pass	
Zinc	S18-No24381	CP	mg/kg	99	100	2.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-No24389	CP	%	15	16	4.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-No24392	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S18-No24392	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S18-No24392	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S18-No24392	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-No24392	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-No24392	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-No24392	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-No24392	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-No24392	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-No24392	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-No24392	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-No24392	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S18-No24392	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S18-No24392	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S18-No24392	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-No24392	CP	mg/kg	19	18	3.0	30%	Pass	
Cadmium	S18-No24392	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-No24392	CP	mg/kg	15	13	11	30%	Pass	
Copper	S18-No24392	CP	mg/kg	34	31	7.0	30%	Pass	
Lead	S18-No24392	CP	mg/kg	17	16	5.0	30%	Pass	
Mercury	S18-No24392	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-No24392	CP	mg/kg	9.2	8.6	7.0	30%	Pass	
Zinc	S18-No24392	CP	mg/kg	66	61	7.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-No24393	CP	mg/kg	10	10	<1	30%	Pass	
Cadmium	S18-No24393	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-No24393	CP	mg/kg	13	13	1.0	30%	Pass	
Copper	S18-No24393	CP	mg/kg	14	14	<1	30%	Pass	
Lead	S18-No24393	CP	mg/kg	47	47	1.0	30%	Pass	
Mercury	S18-No24393	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-No24393	CP	mg/kg	5.7	5.7	<1	30%	Pass	
Zinc	S18-No24393	CP	mg/kg	48	48	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-No24399	CP	%	15	14	6.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-No24402	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-No24402	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-No24402	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-No24402	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-No24402	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-No24402	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-No24402	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-No24402	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-No24402	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-No24402	CP	mg/kg	18	18	1.0	30%	Pass	
Cadmium	S18-No24402	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-No24402	CP	mg/kg	24	23	2.0	30%	Pass	
Copper	S18-No24402	CP	mg/kg	22	21	2.0	30%	Pass	
Lead	S18-No24402	CP	mg/kg	22	21	2.0	30%	Pass	
Mercury	S18-No24402	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-No24402	CP	mg/kg	17	16	2.0	30%	Pass	
Zinc	S18-No24402	CP	mg/kg	39	40	2.0	30%	Pass	

Comments

This report has been revised (V2) to exclude samples S18-No24393 - S18-No24404 as per client's request.

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference

Authorised By

Nibha Vaidya	Analytical Services Manager
Chris Bennett	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Julie Kay	Senior Analyst-Inorganic (VIC)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Certificate of Analysis

Greencap NSW P/L
Level 2/11 Khartoum Road
North Ryde
NSW 2113

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention:	Matthew Barberson
Report	628453-V2-AID
Project Name	DSI - SCHOFIELDS
Project ID	J157372
Received Date	Nov 19, 2018
Date Reported	Nov 27, 2018

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name DSI - SCHOFIELDS
Project ID J157372
Date Sampled Nov 16, 2018
Report 628453-V2-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
TP1 0.1-0.2	18-No24369	Nov 16, 2018	Approximate Sample 72g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
TP3 0.1-0.2	18-No24372	Nov 16, 2018	Approximate Sample 69g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
TP5 0.1-0.2	18-No24374	Nov 16, 2018	Approximate Sample 81g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
TP6 0.0-0.2	18-No24375	Nov 16, 2018	Approximate Sample 61g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
TP9 0.1-0.3	18-No24378	Nov 16, 2018	Approximate Sample 56g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
TP10 0.2-0.3	18-No24379	Nov 16, 2018	Approximate Sample 66g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
TP12 0.3-0.5	18-No24381	Nov 16, 2018	Approximate Sample 88g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
TP15 0.1-0.2	18-No24384	Nov 16, 2018	Approximate Sample 60g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
TP23 0.2-0.3	18-No24391	Nov 16, 2018	Approximate Sample 62g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Nov 19, 2018	Indefinite

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to “non-bonded / friable”.
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

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NSW 2113

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Matthew Barberson**

Report **632214-S**
Project name
Project ID J157372
Received Date Dec 10, 2018

Client Sample ID			**TP25A**	**TP26A**	**TP27A**	**TP28A**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S18-De12277**	**S18-De12278**	**S18-De12279**	**S18-De12280**
Date Sampled			**Dec 10, 2018**	**Dec 10, 2018**	**Dec 10, 2018**	**Dec 10, 2018**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	105	98	91	97
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	-	1.2
Acenaphthene	0.5	mg/kg	-	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	-	< 0.5
Anthracene	0.5	mg/kg	-	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Chrysene	0.5	mg/kg	-	-	-	< 0.5

Client Sample ID			TP25A	TP26A	TP27A	TP28A
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-De12277	S18-De12278	S18-De12279	S18-De12280
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	-	< 0.5
Fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Fluorene	0.5	mg/kg	-	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	-	< 0.5
Naphthalene	0.5	mg/kg	-	-	-	< 0.5
Phenanthrene	0.5	mg/kg	-	-	-	< 0.5
Pyrene	0.5	mg/kg	-	-	-	< 0.5
Total PAH*	0.5	mg/kg	-	-	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	-	-	76
p-Terphenyl-d14 (surr.)	1	%	-	-	-	73
% Moisture	1	%	8.2	7.8	9.7	8.6
Heavy Metals						
Arsenic	2	mg/kg	7.6	9.7	14	28
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	10	11	19	9.0
Copper	5	mg/kg	14	16	17	22
Lead	5	mg/kg	22	21	19	22
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	8.1	9.1	9.6	23
Zinc	5	mg/kg	49	180	87	74

Client Sample ID			TP29A	TP30A	TP31A	TP32A
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-De12281	S18-De12282	S18-De12283	S18-De12284
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	70	53	67	68
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100

Client Sample ID			TP29A	TP30A	TP31A	TP32A
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-De12281	S18-De12282	S18-De12283	S18-De12284
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Salinity* (1:5 aqueous extract calc. from EC at 25C)	1	mg/kg	68	-	-	-
% Moisture	1	%	6.4	12	9.4	9.7
Heavy Metals						
Arsenic	2	mg/kg	19	12	20	9.3
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	17	14	18	11
Copper	5	mg/kg	41	27	20	16
Lead	5	mg/kg	22	19	39	21
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	7.9	12	14	12
Zinc	5	mg/kg	41	58	59	51

Client Sample ID			TP33A	TP34A	TP35A	FD1A
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S18-De12285	S18-De12286	S18-De12287	S18-De12288
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	83	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	83	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	62	68	75	92
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
% Moisture	1	%	10	12	6.0	6.3

Client Sample ID			TP33A	TP34A	TP35A	FD1A
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S18-De12285**	**S18-De12286**	**S18-De12287**	**S18-De12288**
Date Sampled			**Dec 10, 2018**	**Dec 10, 2018**	**Dec 10, 2018**	**Dec 10, 2018**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	8.2	7.7	5.8	13
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	10	12	9.8	13
Copper	5	mg/kg	18	15	13	20
Lead	5	mg/kg	23	23	17	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	13	8.6	5.7	6.3
Zinc	5	mg/kg	63	52	32	28

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite B6			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Dec 17, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Dec 17, 2018	14 Day
- Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 17, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 17, 2018	14 Day
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Melbourne	Dec 17, 2018	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins | mgt Suite B7			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 16, 2018	14 Day
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Salinity* (1:5 aqueous extract calc. from EC at 25C)	Melbourne	Dec 16, 2018	21 Day
- Method: LTM-INO-4030			
% Moisture	Melbourne	Dec 10, 2018	14 Day
- Method: LTM-GEN-7080 Moisture			

eurofins | mgt

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

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Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name: Greencap NSW P/L
Address: Level 2/11 Khartoum Road
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Project Name:
Project ID: J157372

Order No.:
Report #: 632214
Phone: 02 9889 1800
Fax: 02 9889 1811

Received: Dec 10, 2018 7:39 PM
Due: Dec 17, 2018
Priority: 5 Day
Contact Name: Matthew Barberson

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						HOLD	Salinity* (1:5 aqueous extract calc. from EC at 25C)	Moisture Set	Eurofins | mgt Suite B7	Eurofins | mgt Suite B6
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X
Sydney Laboratory - NATA Site # 18217										
Brisbane Laboratory - NATA Site # 20794										
Perth Laboratory - NATA Site # 23736										
External Laboratory										
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	TP25A	Dec 10, 2018		Soil	S18-De12277			X		X
2	TP26A	Dec 10, 2018		Soil	S18-De12278			X		X
3	TP27A	Dec 10, 2018		Soil	S18-De12279			X		X
4	TP28A	Dec 10, 2018		Soil	S18-De12280			X	X	
5	TP29A	Dec 10, 2018		Soil	S18-De12281		X	X		X
6	TP30A	Dec 10, 2018		Soil	S18-De12282			X		X
7	TP31A	Dec 10, 2018		Soil	S18-De12283			X		X
8	TP32A	Dec 10, 2018		Soil	S18-De12284			X		X
9	TP33A	Dec 10, 2018		Soil	S18-De12285			X		X

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Site # 23736

Company Name: Greencap NSW P/L
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Received: Dec 10, 2018 7:39 PM
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Priority: 5 Day
Contact Name: Matthew Barberson

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						HOLD	Salinity* (1:5 aqueous extract calc. from EC at 25C)	Moisture Set	Eurofins | mgt Suite B7	Eurofins | mgt Suite B6
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X
Sydney Laboratory - NATA Site # 18217										
Brisbane Laboratory - NATA Site # 20794										
Perth Laboratory - NATA Site # 23736										
10	TP34A	Dec 10, 2018		Soil	S18-De12286			X		X
11	TP35A	Dec 10, 2018		Soil	S18-De12287			X		X
12	FD1A	Dec 10, 2018		Soil	S18-De12288			X		X
13	FD2A	Dec 10, 2018		Soil	S18-De12289	X				
Test Counts						1	1	12	1	11

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	116			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	%	79			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	105			70-130	Pass	
Toluene	%	114			70-130	Pass	
Ethylbenzene	%	114			70-130	Pass	
m&p-Xylenes	%	110			70-130	Pass	
Xylenes - Total	%	111			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	99			70-130	Pass	
TRH C6-C10	%	110			70-130	Pass	
TRH >C10-C16	%	79			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	93			70-130	Pass	
Acenaphthylene	%	106			70-130	Pass	
Anthracene	%	104			70-130	Pass	
Benz(a)anthracene	%	111			70-130	Pass	
Benzo(a)pyrene	%	91			70-130	Pass	
Benzo(b&j)fluoranthene	%	88			70-130	Pass	
Benzo(g.h.i)perylene	%	93			70-130	Pass	
Benzo(k)fluoranthene	%	116			70-130	Pass	
Chrysene	%	107			70-130	Pass	
Dibenz(a.h)anthracene	%	109			70-130	Pass	
Fluoranthene	%	109			70-130	Pass	
Fluorene	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	100			70-130	Pass	
Naphthalene	%	95			70-130	Pass	
Phenanthrene	%	98			70-130	Pass	
Pyrene	%	105			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	105			80-120	Pass	
Cadmium	%	101			80-120	Pass	
Chromium	%	119			80-120	Pass	
Copper	%	102			80-120	Pass	
Lead	%	116			80-120	Pass	
Mercury	%	119			75-125	Pass	
Nickel	%	104			80-120	Pass	
Zinc	%	102			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	M18-De15719	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M18-De15719	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S18-De12278	CP	%	102			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S18-De12278	CP	%	93			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Toluene	S18-De12278	CP	%	93			70-130	Pass	
Ethylbenzene	S18-De12278	CP	%	108			70-130	Pass	
m&p-Xylenes	S18-De12278	CP	%	111			70-130	Pass	
o-Xylene	S18-De12278	CP	%	110			70-130	Pass	
Xylenes - Total	S18-De12278	CP	%	111			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S18-De12278	CP	%	92			70-130	Pass	
TRH C6-C10	S18-De12278	CP	%	98			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S18-De12278	CP	%	110			75-125	Pass	
Cadmium	S18-De12278	CP	%	102			75-125	Pass	
Chromium	S18-De12278	CP	%	117			75-125	Pass	
Copper	S18-De12278	CP	%	102			75-125	Pass	
Lead	S18-De12278	CP	%	116			75-125	Pass	
Mercury	S18-De12278	CP	%	113			70-130	Pass	
Nickel	S18-De12278	CP	%	104			75-125	Pass	
Zinc	S18-De12278	CP	%	80			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M18-De15980	NCP	%	94			70-130	Pass	
Acenaphthylene	M18-De15980	NCP	%	100			70-130	Pass	
Anthracene	M18-De15980	NCP	%	101			70-130	Pass	
Benz(a)anthracene	M18-De15980	NCP	%	106			70-130	Pass	
Benzo(a)pyrene	M18-De15980	NCP	%	117			70-130	Pass	
Benzo(b&j)fluoranthene	M18-De15980	NCP	%	109			70-130	Pass	
Benzo(g.h.i)perylene	M18-De15980	NCP	%	80			70-130	Pass	
Benzo(k)fluoranthene	M18-De15980	NCP	%	117			70-130	Pass	
Chrysene	M18-De15980	NCP	%	109			70-130	Pass	
Dibenz(a.h)anthracene	M18-De15980	NCP	%	87			70-130	Pass	
Fluoranthene	M18-De15980	NCP	%	109			70-130	Pass	
Fluorene	M18-De15980	NCP	%	101			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M18-De15980	NCP	%	83			70-130	Pass	
Naphthalene	M18-De15980	NCP	%	93			70-130	Pass	
Phenanthrene	M18-De15980	NCP	%	93			70-130	Pass	
Pyrene	M18-De15980	NCP	%	106			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S18-De12277	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M18-De16559	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M18-De16559	NCP	mg/kg	110	90	16	30%	Pass	
TRH C29-C36	M18-De16559	NCP	mg/kg	190	160	18	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S18-De12277	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S18-De12277	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S18-De12277	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S18-De12277	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S18-De12277	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S18-De12277	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S18-De12277	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S18-De12277	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M18-De16559	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-De12277	CP	mg/kg	7.6	7.3	4.0	30%	Pass	
Cadmium	S18-De12277	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-De12277	CP	mg/kg	10	11	4.0	30%	Pass	
Copper	S18-De12277	CP	mg/kg	14	13	11	30%	Pass	
Lead	S18-De12277	CP	mg/kg	22	20	9.0	30%	Pass	
Mercury	S18-De12277	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-De12277	CP	mg/kg	8.1	7.5	8.0	30%	Pass	
Zinc	S18-De12277	CP	mg/kg	49	44	10	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S18-De12278	CP	mg/kg	9.7	9.9	2.0	30%	Pass	
Cadmium	S18-De12278	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S18-De12278	CP	mg/kg	11	11	<1	30%	Pass	
Copper	S18-De12278	CP	mg/kg	16	16	1.0	30%	Pass	
Lead	S18-De12278	CP	mg/kg	21	21	1.0	30%	Pass	
Mercury	S18-De12278	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S18-De12278	CP	mg/kg	9.1	9.2	1.0	30%	Pass	
Zinc	S18-De12278	CP	mg/kg	180	180	1.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S18-De12280	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S18-De12281	CP	%	6.4	6.4	<1	30%	Pass	

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Nibha Vaidya	Analytical Services Manager
Joseph Edouard	Senior Analyst-Organic (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Julie Kay	Senior Analyst-Inorganic (VIC)
Chris Bennett	Senior Analyst-Metal (VIC)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

January 2019

GREENCAP
Going Further in Managing Risk

Detailed Site Investigation

Group GSA

Cnr of Farmland Dr & the future realignment of Pelican Rd, Schofields NSW 2762

Appendix G: QA-QC Procedures

Appendix E – QA/QC Procedures

Table of Contents

1 Introduction

The aim of quality control and quality assurance (QA/QC) is to deliver data that is:

- Representative of what is sampled;
- Precise;
- Accurate; and
- Reproducible.

As investigations involve both field and laboratory QA/QC, these are similarly divided. The objective of this document is to evaluate and identify the data quality objectives (DQOs) and the data quality indicators (DQIs), which are used to assess whether the DQOs have been met.

The NSW guideline documents used in the evaluation of the data set for this investigation are:

- NSW Department of Environment and Conservation (DEC) (2006). Contaminated sites: Guidelines for NSW Site Auditors Scheme (2nd edition);
- National Environment Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Amendment Measure;
- NSW Environment Protection Authority (EPA) (1995). Contaminated Sites: Sampling design guidelines; and
- NSW Office of Environment and Heritage (OEH) (2011). Contaminated sites: Guidelines for consultants reporting on contaminated sites.

Data quality is typically discussed in terms of precision, accuracy, representativeness, comparability and completeness. These are referred to as the PARCC parameters. The PARCC (and additional QA) parameters are discussed within this report.

The following items form part of the QA/QC appendix:

- Repeatability;
- Precision;
- Accuracy;
- Representativeness;
- Completeness;
- Comparability;
- Sensitivity;
- Holding times;
- Procedures for anomalous samples and confirmation checking.

Quality Assurance (QA) is "a *set of activities intended to establish confidence that quality requirements will be met*" (AS/NZS ISO 9000:2005).

This encompasses all actions, procedures, checks and decisions undertaken to ensure the accuracy and reliability of analysis results. It includes routine procedures which ensure proper sample control, data transfer, instrument calibration, the decisions required to select and properly train staff, select equipment

and analytical methods, and the day to day judgments resulting from regular scrutiny and maintenance of the laboratory system.

Quality Control (QC) is "*a set of activities intended to ensure that quality requirements are actually being met*" (AS/NZS ISO 9000:2005). In other words, the operational techniques and activities used to fulfill the requirements for quality.

These are the components of QA which serve to monitor and measure the effectiveness of other QA procedures by comparison with previously decided objectives. They include measurement of the quality of reagents, cleanliness of apparatus, accuracy and precision of methods and instrumentation, and reliability of all of these factors as implemented in a given laboratory from day to day.

A complete discussion of either of these terms or the steps for implementing them is beyond the scope of this document. It is widely recognised, however, that adoption of sound laboratory QA and QC procedures is essential and readers are referred to documentation available from the National Association of Testing Authorities (NATA), if further information is required.

2 Data Quality Objectives

The Data Quality Objectives (DQOs) process is a systematic approach used to define the type, quantity and quality of data supporting decisions which relate to the environmental condition of a site. Undertaking DQOs for site assessment and remediation is a requirement of the DEC (2006). *Contaminated sites: Guidelines for NSW Site Auditors Scheme*. The DQO process was formulated by the US EPA and provides sound guidance for a consistent approach to understanding site assessment and remediation.

The DQOs are defined in a series of seven steps, outlined and addressed in Table 1.

Table 1. Data Quality Objectives

Step	Description	Comment
1	**State the problem**	There may be a potential for human health and environmental risk associated with the surface soils at the site.
2	**Identify the decision**	Results of the Detailed Site Investigation (DSI) undertaken, provide sufficient data to inform the decision-making process for further investigations and remedial actions (if required).
3	**Identify the inputs for the decision**	Inputs to the decision will include the scientific data collected during the soil assessment, as part of the DSI. This will include but not be limited to: • Borehole logs and observations made by the field scientist; and • Laboratory analysis results of sampled site soils.
4	**Define the boundaries for the study**	Site boundaries are indicated in Figure 1, Appendix A. The horizontal boundary is limited to the provided site boundary of the proposed development on the site (a primary school). The vertical boundary was limited to the first 1m of the surface soils. The temporal boundary of the project is restricted to the timing of the investigations.
5	**Develop a decision rule**	The following decision rules are identified for the DSI: Chemicals of potential concern do not exist in any of the sampled soil material at concentrations which exceed the adopted site criteria. If systematic or judgmental samples fail these decision rules, then further assessment or remediation will be required.

6	**Specify tolerable limits on decision error**	Potential for decision errors will be minimised through an analysis of a site specific worst case scenario. In this context maximum values and peak concentrations of contaminants will be used for comparison against the acceptance criteria threshold concentrations.
7	**Optimise the design for obtaining data**	The following sampling design has been developed to provide the most resource-effective sampling and analysis: Total area of the open surfaces at the site is approximately 2.5 ha. To comply with the sampling density requirements for systematic assessment provided in NSW EPA (1995) 'Sampling Design Guidelines', a minimum of 35 investigation locations were required for the soil assessment. This sampling density corresponds to 14 points per hectare and is designed to capture a hotspot with a diameter greater than or equal to 31.5 m with 95% confidence.

The following measurement data quality indicators (MDQIs) have been established, based on the DQOs of this investigation, provided in Table 2 below.

Table 2. Measurement Data Quality Indicators (MDQIS)

Parameter	Procedure	Minimum Frequency	Criteria	
			(5 to 10x LOR[4])	>10x LOR
Precision	Field Duplicates	1 in 20 - metals	<80 RPD	<50 RPD
		1 in 20 - semi-volatiles	<100 RPD	<80 RPD
		1 in 20 - volatiles	<150 RPD	<130 RPD
	Lab Replicate*	1 in 20	<50 RPD	<30 RPD
Accuracy*	Reference Material	1 in 10	60% to 140%R	80% to 120%R
	Matrix spikes			
	Surrogate spikes			
Representativeness*	Reagent Blanks	1 per batch	No detection	
	Holding Times*	Every sample	-	
Blanks**	Trip Blank	1 per batch	No detection	
Sensitivity	Limit of Reporting	Every sample	LOR < ½ site criteria	

Notes:

1. RPD – relative percentage difference
2. %R – percent recovery
3. LOR – limit of reporting
4. 4 no limit at <5x LOR
5. * the MDQI is usually specified in the standard method. If not, use the default values set out in this table
6. ** only necessary when measuring dissolved metals and volatile organic compounds in water samples. It is noted that dedicated sampling equipment was utilised, therefore rinsate blanks were not required.

Standards Australia (AS4482.1) specifies that typical MDQIs for precision should be ≤50% RPD, although low concentrations and organic compounds in particular can be acceptably outside this range. The standard stipulates that ≤50% RPD be used as a 'trigger' and values above this level of repeatability must be noted and explained.

3 Quality Control and Quality Assurance

3.1 Measurement Data Quality Objectives

Step 7 of the DQO process is a focus on the quality of the information by measurement, that is, measurement data quality objectives (MDQOs). The aim of a quality control and quality assurance (QA/QC) is to deliver data that is representative of what is sampled, precise, accurate and reproducible. As investigations involve both field and laboratory QA/QC, these are similarly divided. The objective of this section is to provide the MDQOs and the measurement data quality indicators (MDQIs), which will be used to establish whether the DQOs have been met.

All soil sampling procedures need to be undertaken according to a standard procedure, for example those procedures set out in:

- NSW Environment Protection Authority (EPA) (1995). *Contaminated sites: Sampling design guidelines*;
- NSW OEH (2011). *Contaminated sites: Guidelines for consultants reporting on contaminated sites*;
- Standards Australia (2005). *Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds, (AS 4482.1)*; and
- Standards Australia (1999). *Guide to the investigation and sampling of sites with potentially contaminated soil, Part 2: Volatile substances, (AS 4482.2*).

The laboratories used should be NATA-accredited for the analytical methods performed. Containers, sample preservation (if necessary) and holding times should be consistent with industry practices as set out in NEPM and as defined by ASTM.

Measurement data quality is typically discussed in terms of precision, accuracy, representativeness, comparability and completeness. Although not necessarily considered in list order, the following items should form part of the QA/QC data evaluation:

- Measured Parameters: precision, accuracy, repeatability (comparability), blanks; and
- Assessed Parameters: completeness, representative of site conditions, sensitivity, and holding times.

These QA parameters and the criteria used to evaluate the analytical data obtained as a result of this investigation, are addressed below.

3.2 Repeatability (Field collected intra-laboratory duplicates)

These samples provide a check on the analytical performance of the laboratory. At least 5 percent of samples (1 in 20) per day of sampling from a site are collected in duplicate. For comparability of data, it is important that there is little delay in the sample submission. For split samples, due to error associated with field splitting, an RPD of between 80 and 150% (depending on the substance) will be allowed as the MDQI.

Any value >50% RPD will be noted and discussed, as per Standards Australia requirements, with respect to its acceptability for inclusion in the data-set.

3.3 Precision

Precision is a measure of the reproducibility of results, and is assessed on the basis of agreement between a set of replicate results obtained from duplicate analyses. The precision of a duplicate determination can be measured as relative percentage difference (RPD), and is calculated from the following equation:

$$RPD = \left| \frac{X1 - X2}{\left(\frac{X1 + X2}{2} \right)} \right| \times 100$$

where: X1 is the first duplicate value
X2 is the second duplicate value

The field duplicate (FD1) and inter lab duplicate (FT1) results and calculated RPDs are presented in the following reports. All results are within the acceptable range, RPD calculations area available in the Attachment (RPD Table) of this report.

3.4 Accuracy

Accuracy is a measure of the agreement between an experimental determination and the true value of the parameter being measured. The determination of accuracy can be achieved through the analysis of known reference materials or assessed by the analysis of matrix spikes. Accuracy is measured in terms of percentage recovery as defined by the following equation:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where: %R = percentage recovery of the spike
SSR = spiked sample result
SR = sample result (native)
SA = spike added

Laboratories calculate percentage recoveries of spiked compounds, which are evaluated against control or acceptance limits taken from the appropriate method or the Contract Laboratory Program Statement of Work. If the spike recovery for a sample does not fall within the prescribed control limits, laboratory based corrective action is required.

Surrogate spikes consist of spiking non-target compounds into the sample prior to analysis. The spiked compounds are expected to behave during analysis in the same way as the target compounds. Every sample is spiked prior to extraction or analysis with surrogate compounds that are representative of the analysis. If surrogate spike recovery does not meet the prescribed control limits, samples should be reanalysed.

Spike recover results and surrogate spike recover results are available in the Laboratory Analysis Reports (Appendix F).

3.5 Representativeness

3.5.1 Data Point Evaluation

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition.

Representativeness is primarily dependent on the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handling and analysis protocols, and use of proper chain-of-custody and documentation procedures. Blanks, holding times and field duplicates are all QA parameters that can assist in the analysis of representativeness for data point evaluation and will need to be analysed as part of the measurement data quality assessment.

3.5.2 Data Set Evaluation

Whether the data is representative of the site is checked in part by undertaking an evaluation of the whole data set to establish the data is compatible. Data compatibility is authenticated by confirming that the laws of chemistry are upheld (i.e. nitrate is not present when Eh is -250 mV), that intra-laboratory analysis relationships are consistent (i.e. BTEX is a subset of the TPH C_6-C_9 fraction), that observations and field measurements are in agreement with other field data and the laboratory data and that results are consistent with the geology, history and logic.

3.6 Completeness

The following information is required to check for completeness of data sets:

- chain-of-custody forms (completed by Greencap and the laboratory);
- sample receipt forms;
- all requested sample results reported;
- all blank data reported;
- all laboratory duplicates reported and relative percent differences (RPDs) calculated;
- all surrogate spike data reported;
- all matrix spike data reported; and
- NATA stamp on reports.

3.7 Comparability

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity, sampling procedures) under which separate sets of data are produced to ensure minimal common error. Data comparability should be demonstrated by the use of standardised sampling and analysis procedures. Data comparability was maintained by undertaking the investigations as follows:

- sampling during the monitoring program was conducted by trained Greencap field team using Greencap's standard operating procedures; and
- the same laboratories (Eurofins and Envirolab) were used for organic and inorganic analysis for all relevant samples using the same NATA approved analytical methods.

3.8 Sensitivity

When interferences are present in the sample, a loss of sensitivity can occur resulting in an increase in the method detection limit. In some instances (e.g. where one or more compounds have particularly high concentrations) the sample must be diluted for analysis. This increases the method detection limit by the dilution factor.

The detection limits achieved by the laboratory, when adjusted for interferences from the presence of other chemicals within the sampled matrix, must be less than half the site criteria for all analytes tested (i.e. 2 x LOR <site criteria).

3.9 Blanks

To meet the QC acceptance criteria, laboratory blanks should have no detectable concentrations of the target compounds.

3.10 Holding Times

Where standard holding times are exceeded, a discussion, using professional judgement, as to the integrity of the data will be required, taking into account such factors as field storage, laboratory storage and even sample jar characteristics.

3.11 Confirmation Checking

For blind duplicates, if one sample has more than two analytes exceeding the data quality objectives, the sample is carefully checked. If the error is not apparent, the sample is rejected. If more than three samples are rejected all the samples collected at that time are rejected. These samples are then re-sampled and reanalysed.

3.12 Field QA/QC

3.12.1 Details of Sampling Team

All fieldwork was conducted by qualified and experienced Greencap scientists trained in hazardous field investigation techniques and health and safety procedures.

3.12.2 Sampling Controls

Soil sampling for chemical analyses and the completion of field documentation entailing sample locations, soil borelogs and general field observations were conducted using Greencap standard operating procedures, and in accordance with the *Sampling Design Guidelines* (NSW EPA, 1995), NEPM (NEPC, 2013), AS4482.1-2005.

Boreholes were advanced by an excavator, allowing for ample collection using a decontaminated trowel. All sampling implements were cleaned between sampling locations, and gloves changed between sampling locations. Once collected, the samples were immediately transferred to laboratory-supplied air-tight sample containers of appropriate composition. These containers were then promptly stored on ice, to prevent the loss of potential volatile components and transported to a NATA accredited laboratory.

Samples were delivered to NATA accredited laboratories (Eurofins and Envirolab) under a completed Chain of Custody (CoC). Copies of the CoC documentation and laboratory analysis reports are provided in Appendix F of the main DSI report.

3.13 Laboratory QA/QC

3.13.1 Holding time

All analysed primary samples were extracted and analysed within acceptable holding times as defined in AS4482.1-2005.

As appropriate sampling procedure was followed and samples were kept refrigerated. No significant degradation to samples has been deemed to have occurred.

3.1 QA/QC Data Evaluation

RPD values for soil samples are tabulated in the attachment section of this report (QA/QC Attachment – RPD Tables). All RPD values for intra- and inter-laboratory samples were within the acceptable criteria defined in Table 2. Data quality objectives for all analysis undertaken on this project are reliable and accurate.

Extraction and analysis of primary samples were within the relevant prescribed holding times. As appropriate sampling procedure was followed and samples were kept refrigerated no significant degradation to samples is thought to have occurred.

The internal laboratory control results (blanks, duplicates and spikes) are considered to be acceptable. All results adhered to chemical laws or were not outside logical explanation. Based on information presented in Section 3 it can be confidently stated that the MDQO's for this project have been met and the data set is considered to be reliable.

4 QAQC Appendix References

- American Public Health Association (APHA) 2005, *Standard methods for the examination of water and waste-water*, 21st edition, APHA, Washington DC.
- Australian and New Zealand Environment and Conservation Council 1992, *Australian and New Zealand Guidelines for the assessment and management of contaminated sites,* Australia and New Zealand Environment Council, National Health and Medical Research Council, Melbourne, Victoria.
- Australian/New Zealand Standard 2008, *Quality management systems - Requirements* (AS/NZS ISO 9001:2008) Standards Australia/Standards New Zealand, Sydney/Wellington.
- International Organisation for Standardisation 2005, *Quality management systems – Fundamentals and vocabulary*, (ISO 9000:2005).Lock, WH 1996, *Composite sampling*, National Environmental Health Forum (NEHF), Adelaide, SA.
- National Environment Protection Council (NEPC) 1999, *National environment protection (assessment of site contamination) measure*, National Environment Protection Council, Adelaide, SA.
- NSW Department of Environment and Conservation (2006), Contaminated sites: Guidelines for NSW Site Auditors Scheme (2nd edition).
- NSW Environment Protection Authority (EPA) 1995, *Contaminated sites: Sampling design guidelines,* EPA NSW, Chatswood, NSW.
- NSW EPA 2011, *Contaminated sites: Guidelines for consultants reporting on contaminated sites,* EPA NSW, Chatswood, NSW.
- Rayment, GE & Higginson, FR 1992, Australian laboratory handbook of soil and water chemical methods, Inkarta Press, Melbourne.

5 QA/QC Attachment – RPD Table

SAMPLE BATCH DATA QA SUMMARY SHEET

Project Name: Detailed Site Assessment	**34-38 Schofields Road, Schofields**	**Project Number:**	**J157372 (J160656)**
Primary Laboratory:	**Eurofins**	**Lab Certificate Number:**	**628453-S & 632214-S**
Secondary Laboratory:	**Envirolab**	**Lab Certificate Number:**	**205951**
Date Sampled:	**16/12/2018**	**Sample Medium:**	**Soil**

Sample Information

Number of Primary Samples:	**2**	**Number of Triplicate (Interlab dup) Samples:**	**1**
Number of Duplicate Samples:	**2**	**Number of Other Field QAQC Samples:**	**0**

Documentation and Sample Handling Information

	Y/N	Comments
COC completed properly?	Y	Signed by both field scientists and labs personnel.
All requested analysis completed?	Y	
Samples received in appropriate condition for analysis?	Y	
Samples analysed within appropriate holding times?	Y	
Sample volumes sufficient for QC analysis?	Y	
Are there non-NATA accredited methods used?	N	
Chromatograms supplied as appropriate?	N/A	Not required
Laboratory reports signed by authorised personnel?	Y	

QAQC Sample Information (Method Blank - MB, Rinsate Blank - RB, Field Blank - FB, Trip Blank - TB)

Type	Sample ID	Comments
Lab Method Blanks	Method Blank	All results less than Limit Of Reporting (LOR)
Trip Blank	TB	All results less than Limit Of Reporting (LOR)

Trip Spike Information (BTEX)

Analyte	Spike Concentrations	Recovery Concentration	% Recovery	Comments
Benzene	-	-	105	Trip spike recoveries all pass lab control limits
Toluene	-	-	114	
Ethylbenzene	-	-	114	
meta- & para-Xylene	-	-	110	
Lead	-	-	116	

Laboratory Control Spike (LCS) Analyses

Analyte Group	Comments
TRH, BTEXN, Metals	All recoveries are within lab control limits

Matrix Spike (MS) Analyses

Analyte Group	Comments
TRH, BTEXN, Metals	All recoveries are within lab control limits

Laboratory Duplicates (LD) Analyses

Analyte Group	Comments
TRH, BTEXN, Metals	All values are within 30% acceptance limits

Field Duplicates (FD) Analyses

Analyte Group	Primary ID	Duplicate ID	Comments
TRH, Metals, BTEX	TP12 (0.3-0.5)	FD01	All FD1 RPD results within acceptable RPD criteria. TRH BTEX within acceptable RDP range. Elevated metal RPD. Results less than 5 times LOR, therefore considered acceptable.
TRH, Metals, BTEX	TP11 (0.1-0.3)	FD02	All FD1 RPD results within acceptable RPD criteria. TRH BTEX within acceptable RDP range. Elevated metal RPD. Results less than 5 times LOR, therefore considered acceptable.
TRH, Metals, BTEX	TP34A (0.1-0.2)	FD01A	All FD1 RPD results within acceptable RPD criteria. TRH BTEX within acceptable RDP range. Elevated metal RPD. Results less than 5 times LOR, therefore considered acceptable.

Inter-Lab Duplicates Analyses

Analyte Group	Primary ID	Duplicate ID	Comments
TRH, Metals, BTEX	TP05 (0.5-0.6)	FT1	All FT1 RPD results within acceptable RPD criteria

Surrogate Compound Monitoring Analyses

Analyte Group	Sample ID	Comments
TRH, Metals, BTEX	Primary Samples	For all regular sample matrices, NO surrogate recovery outliers occur.

Overall Comments

This batch has been validated and is considered suitable for interpretive use and site assessment

Note: Data validation assesses each analyte in terms of all the data validation variables and only the exceedances and outliers are reported in this form.
*When concentrations are less than the LOR for both primary and duplicate/triplicate results, not all RPDs are calculated

Performed By: **Nicole Boukarim** **Checked By: Matthew Barberson**
Date: **20/12/2018** **Date: 20/12/2018**

J157372
Field Duplicate/Triplicate RPDs
Detailed Site Assessment: 34-38 Schofields Road, Schofields NSW

							FD1	FT1
Our Label			**TP5 (0.5-0.6)**	**FT1**	**TP12(0.3-0.5)**	**FD01**		
Laboratory Label			S18-No24374	205951-1	S18-No24381	S18-No24405	**RPD Primary vs Duplicate**	**RPD Primary vs Interlab**
Sample Date			16/11/2018	16/11/2018	16/11/201	16/11/2018		
Sample Type			**PS**	**IL**	**PS**	**FD**		
Analyte	**Units**	**LOR**	**Result**					
BTEX								
Benzene	mg/kg	0.1	< 0.1	<0.2	< 0.1	< 0.1	N/A	N/A
Ethylbenzene	mg/kg	0.1	< 0.1	<1	< 0.1	< 0.1	N/A	N/A
m&p-Xylenes	mg/kg	0.1	< 0.2	<2	< 0.2	< 0.2	N/A	N/A
o-Xylene	mg/kg	0.2	< 0.1	<1	< 0.1	< 0.1	N/A	N/A
Toluene	mg/kg	0.1	< 0.1	<0.5	< 0.1	< 0.1	N/A	N/A
Xylenes - Total	mg/kg	0.3	< 0.3	<1	< 0.3	< 0.3	N/A	N/A
Heavy Metals								
Arsenic	mg/kg	2	9.8	7	4.5	4.2	7%	33%
Cadmium	mg/kg	0.4	< 0.4	<0.4	< 0.4	< 0.4	N/A	N/A
Chromium	mg/kg	5	13	9	15	17	13%	36%
Copper	mg/kg	5	15	8	17	27	45%	61%
Lead	mg/kg	5	15	17	36	43	18%	13%
Mercury	mg/kg	0.1	< 0.1	<0.1	< 0.1	< 0.1	N/A	N/A
Nickel	mg/kg	5	< 5	8	9.4	8.8	7%	N/A
Zinc	mg/kg	5	29	38	99	140	34%	27%
Total Recoverable Hydrocarbons - 1999 NEPM Fractions								
TRH C10-36 (Total)	mg/kg	< 50	< 50	<50	< 50	< 50	N/A	N/A
TRH C10-C14	mg/kg	< 20	< 20	<50	< 20	< 20	N/A	N/A
TRH C15-C28	mg/kg	< 50	< 50	<100	< 50	< 50	N/A	N/A
TRH C29-C36	mg/kg	< 50	< 50	<100	< 50	< 50	N/A	N/A
TRH C6-C9	mg/kg	< 20	< 20	<25	< 20	< 20	N/A	N/A
Total Recoverable Hydrocarbons - 2013 NEPM Fractions								
Naphthalene	mg/kg	0.5	< 0.5	<1	< 0.5	< 0.5	N/A	N/A
TRH >C10-C16	mg/kg	50	< 50	<50	< 50	< 50	N/A	N/A
TRH >C10-C16 less Naphthalene (F2)	mg/kg	50	< 50	<50	< 50	< 50	N/A	N/A
TRH >C10-C40 (total)*	mg/kg	100	< 100	<50	< 100	< 100	N/A	N/A
TRH >C16-C34	mg/kg	100	< 100	<100	< 100	< 100	N/A	N/A
TRH >C34-C40	mg/kg	100	< 100	<100	< 100	< 100	N/A	N/A
TRH C6-C10	mg/kg	20	< 20	<25	< 20	< 20	N/A	N/A
TRH C6-C10 less BTEX (F1)	mg/kg	20	< 20	<25	< 20	< 20	N/A	N/A

-: Not analysed
PS: Primary Sample
FD: Field Duplicate TP5 (1.4-1.5)
IL: Inter-Laboratory Duplicate
N/A: Not Applicable (RPDs not calculated where one or more result <PQL)

Acceptable RPDs:			<5 x LOR	
			>5 x LOR	

Acceptable RPD limits reached

J157372
Field Duplicate/Triplicate RPDs
Detailed Site Assessment: 34-38 Schofields Road, Schofields NSW

							FD2	FD01A
Our Label			**TP11 (0.1-0.3)**	**FD02**	**TP34A (0.1-0.2)**	**FD01A**		
Laboratory Label			S18-No24380	S18-No24406	S18-De12286	S18-De12288	**RPD**	**RPD**
Sample Date			16/11/2018	16/11/2018	10/12/2018	10/12/2018	**Primary vs**	**Primary vs**
Sample Type			**PS**	**FD**	**PS**	**FD**	**Duplicate**	**Duplicate**
Analyte	**Units**	**LOR**	**Result**					
BTEX								
Benzene	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	N/A	N/A
Ethylbenzene	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	N/A	N/A
m&p-Xylenes	mg/kg	0.1	< 0.2	< 0.2	< 0.2	< 0.2	N/A	N/A
o-Xylene	mg/kg	0.2	< 0.1	< 0.1	< 0.1	< 0.1	N/A	N/A
Toluene	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	N/A	N/A
Xylenes - Total	mg/kg	0.3	< 0.3	< 0.3	< 0.3	< 0.3	N/A	N/A
Heavy Metals								
Arsenic	mg/kg	2	10	7.6	7.7	13	27%	51%
Cadmium	mg/kg	0.4	< 0.4	< 0.4	< 0.4	< 0.4	N/A	N/A
Chromium	mg/kg	5	13	7.8	12	13	50%	10%
Copper	mg/kg	5	16	12	15	20	N/A	N/A
Lead	mg/kg	5	31	22	23	14	34%	40%
Mercury	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	N/A	N/A
Nickel	mg/kg	5	7.1	5.5	8.6	6.3	N/A	N/A
Zinc	mg/kg	5	43	35	52	28	21%	39%
Total Recoverable Hydrocarbons - 1999 NEPM Fractions								
TRH C10-36 (Total)	mg/kg		< 50	< 50	< 50	< 50	N/A	N/A
TRH C10-C14	mg/kg		< 20	< 20	< 20	< 20	N/A	N/A
TRH C15-C28	mg/kg		< 50	< 50	< 50	< 50	N/A	N/A
TRH C29-C36	mg/kg		< 50	< 50	< 50	< 50	N/A	N/A
TRH C6-C9	mg/kg		< 20	< 20	< 20	< 20	N/A	N/A
Total Recoverable Hydrocarbons - 2013 NEPM Fractions								
Naphthalene	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	N/A	N/A
TRH >C10-C16	mg/kg	50	< 50	< 50	< 50	< 50	N/A	N/A
TRH >C10-C16 less Naphthalene (F2)	mg/kg	50	< 50	< 50	< 50	< 50	N/A	N/A
TRH >C10-C40 (total)*	mg/kg	100	< 100	< 100	< 100	< 100	N/A	N/A
TRH >C16-C34	mg/kg	100	< 100	< 100	< 100	< 100	N/A	N/A
TRH >C34-C40	mg/kg	100	< 100	< 100	< 100	< 100	N/A	N/A
TRH C6-C10	mg/kg	20	< 20	< 20	< 20	< 20	N/A	N/A
TRH C6-C10 less BTEX (F1)	mg/kg	20	< 20	< 20	< 20	< 20	N/A	N/A

-: Not analysed
PS: Primary Sample
FD: Field Duplicate TP5 (1.4-1.5)
IL: Inter-Laboratory Duplicate
N/A: Not Applicable (RPDs not calculated where one or more result <PQL)

Acceptable	<5 x LOR	Any RPD acceptable
RPDs:	>5 x LOR	0 - 50% RPD acceptable

Acceptable RPD limits reached

6.7 UNEXPECTED FINDS PROTOCOL – ABORIGINAL AND NON-ABORIGINAL HERITAGE

The unexpected finds protocol for Aboriginal and non-Aboriginal heritage is not embedded in this document. It is supplied as an attached appendix so that it can be displayed/updated/revised in isolation if required.

Alex Avenue Public School, Schofields: Aboriginal cultural heritage assessment report

DRAFT REPORT

Prepared for Schools Infrastructure NSW

13 March 2019

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Document control

Version	Internal reviewer	Date issued
Draft version 01	Amanda Atkinson	21/12/2018
Draft version 02	James Cole	13/03/2019
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- TSA Management: Craig Butler and Jacqueline Sellen

Biosis staff involved in this project were:

- Dave Kazemi and Anne Murray for mapping.

Contents

Tables

Figures

Plates

Glossary

ACHA	Aboriginal Cultural Heritage Assessment
AHIP	Aboriginal Heritage Impact Permit
AHIMS	Aboriginal Heritage Information Management System
AR	Archaeological report
CBD	Central business district
Consultation Requirements	*Aboriginal cultural heritage consultation requirements for proponents* (DECCW 2010a)
DECCW	Department of Environment, Climate Change and Water (now OEH)
DP	Deposited Plan
EP&A Act	*Environmental Planning and Assessment Act 1979*
ICOMOS	International Council on Monuments and Sites
LALC	Local Aboriginal Land Council
NNTT	National Native Title Tribunal
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PAD	Potential archaeological deposit
RAPs	Registered Aboriginal Parties
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
The Code	*Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b)

Summary

Biosis Pty Ltd was commissioned by to undertake an Aboriginal cultural heritage assessment (ACHA) of the proposed the Alex Avenue Public School development at 34-38 Schofields Road, Schofields New South Wales (NSW) (the study area). The study area encompasses part of Lot 4 DP 1208329 and part of Lot 121 DP 1203646 and is located approximately 4.3 kilometres west of Rouse Hill and approximately 35.6 kilometres north-west of the Sydney central business district (CBD).

There are 94 Aboriginal cultural heritage sites registered with the Aboriginal Heritage Information Management System (AHIMS) register within vicinity of the study area.

The proposed development will be assessed as a State Significant Development (SSD) under Section 89(c) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Schedule 1 of the State Environmental Planning Policy (SEPP) (State and Regional Development) 2011(SSD 9368), under delegation from the Minister of Planning. In accordance with requirement 10 of the Secretary's Environmental Assessment Requirements (SEARs) issued for this development (22 June 2018); an assessment of Aboriginal cultural heritage is required in order to assess any potential impacts to Aboriginal cultural heritage the project may have.

The western portion of the study area has been subject to previous assessment and was included within Aboriginal Heritage Impact Permit (AHIP) C000550, issued to Landcom, trading as UrbanGrowth NSW, and commencing on 11 September 2014. The AHIP is for a period of five years, and is due to expire on 11 September 2019. There are no sites listed on the AHIP or in AHIMS which are located within the study area.

Consultation

The Aboriginal community was consulted regarding the heritage management of the project throughout its lifespan. Consultation has been undertaken as per the process outlined in the DECCW document, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a) (consultation requirements). The appropriate government bodies were notified and advertisements placed in the *Rouse Hill Times* newspaper (10 October 2018 and 28 November 2018), which resulted in the following Aboriginal organisations registering their interest (Table 1):

Table 1 List of registered Aboriginal parties and group contact

Organisation	Contact person
Aboriginal Archaeology Service	Andrew Williams
Barking Owl Aboriginal Corporation	Jody Kulakowski
Butucarbin Aboriginal Corporation	Jennifer Beale
Darug Aboriginal Land Care	Des Dyer
Darug Boorooberongal Elders Aboriginal Corporation	Gordon Workman
Darug Land Observations	Jamie and Anna Workman
Darug Tribal Aboriginal Corporation	Dirk Schmitt
Deerubbin Local Aboriginal Land Council	Steven Randall

Organisation	Contact person
Didge Ngunawal Clan	Lillie Carroll and Paul Boyd
Kamilaroi Yankuntjatjara Working Group	Phil Khan
Merrigarn Indigenous Corporation	Shaun Carroll
Muragadi	Jessie
Murra Bidgee Mullangari Aboriginal Corporation	Darleen Johnson

A search conducted by the Office of the Registrar, *Aboriginal Land Rights Act 1983* listed no Aboriginal Owners with land within the study area. A search conducted by the National Native Title Tribunal (NNTT) listed no Registered Native Title Claims, Unregistered Claimant Applications or Registered Indigenous Land Use Agreements within the study area.

Upon registration, the Aboriginal parties were invited to provide their knowledge on the study area and on the proposal provided in the project information and methodology documents in the Stage 3 consultation documentation. The responses did not provide any information on the cultural significance of the study area. Responses from the Registered Aboriginal Parties (RAPs) are included in Appendix 3.

Site officers from elected RAPs participated in the field survey and did not provide comment on the study area with regard to the proposal.

The outcome of the consultation process was that the RAPs considered the study area to have a moderate level of cultural significance, although that significance was not clearly defined and specific examples were not provided. The results of the consultation process are included in this document.

The recommendations that resulted from the consultation process are provided below.

Results

The ACHA undertook background research for the proposed study area. Key considerations arising from the background research include:

- The registered AHIMS sites in the vicinity of the study area are either isolated artefacts or artefact scatters.
- Sites have been primarily focused adjacent to higher order creeks and slopes with sporadic sites occurring on elevated areas.

Biosis undertook a field survey which identified one Aboriginal heritage site within the study area, an area of potential archaeological deposit (PAD) (Table 2). Alex Avenue PS PAD 1 consists of a crest and ridgeline through the northern part of the study area, continuing south into the simple slope. The presence of third and first order streams to the south and north suggest that this portion of the study area could have been a suitable location for a temporary camp site associated with resource gathering. Test excavations were conducted within the area of moderate archaeological potential between 18 and 26 February 2019. A total of 31 test pits were excavated as part of the test excavations and a total of three artefacts were recovered. The test excavations resulted in the identification of two new Aboriginal sites, Alex Avenue PS 01 (AHIMS pending) and Alex Avenue PS 02 (AHIMS pending).

Table 2 Site details

Site name	Site type	Significance	Type of harm before mitigated	Consequence of unmitigated harm	Consequence of mitigated harm	Site specific recommendations
Alex Avenue PS 01	Artefact	Low	Direct	Total loss of value	Impact cannot be avoided	No further archaeological works required; establish Care and Control agreement
Alex Avenue PS 02	Isolated artefact	Low	Direct	Total loss of value	Impact cannot be avoided	No further archaeological works required; establish Care and Control agreement

Management recommendations

Prior to any development impacts occurring within the study area, the following is recommended:

Recommendation 1: Conditions of AHIP C000550

Although SSD projects are not required to comply with Part 6 of the *National Parks and Wildlife Act 1974* (NPW Act), the Office of Environment and Heritage (OEH) advises that conditions of valid AHIPs are followed by SSDs in order to reduce the risk of impacting Aboriginal heritage values.

OEH also advises that the holder of the AHIP should be contacted to confirm the works that are intended on the area covered by the AHIP.

Recommendation 2: No further archaeological works required for Alex Avenue PS 01 and Alex Avenue PS 02

It is recommended that no further archaeological works are required for Alex Avenue PS 01 and Alex Avenue PS 02 prior to development impacts.

Recommendation 3: Preparation and lodgement of AHIMS site cards for Alex Avenue PS 01 and Alex Avenue PS 02

It is recommended that AHIMS site cards are prepared and lodged with AHIMS for newly identified sites Alex Avenue PS 01 and Alex Avenue PS 02, and that the site numbers are included in the final version of this report.

Following development impacts it will be necessary to update these AHIMS records with AHIMS site impact recording forms for Aboriginal sites Alex Avenue PS 01 and Alex Avenue PS 02. This should occur within four months following completion of development impacts or as otherwise stated in SSD approval conditions.

Recommendation 4: Long term care and control of artefacts

In consultation with TSA Management on behalf of School Infrastructure NSW (SINSW), it has been determined that there are a number of areas within the study area which will not be subject to development or landscaping as part of the proposed works and will be maintained as a natural ground areas in the south-eastern portion of the study area. It is proposed that the artefacts will be reburied on site somewhere within this location.

Recommendation 5: Discovery of unanticipated heritage items

Aboriginal objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the OEH. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the OEH and Aboriginal stakeholders.

Aboriginal ancestral remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. immediately cease all work at that location and not further move or disturb the remains
2. notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location
3. not recommence work at that location unless authorised in writing by OEH.

Recommendation 6: Continued consultation with registered Aboriginal stakeholders

As per the consultation requirements, it is recommended that the proponent provides a copy of this draft report to the Aboriginal stakeholders and considers all comments received. The proponent should continue to inform these groups about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project.

Recommendation 7: Lodgement of final report

A copy of the final report will be sent to the RAPs, the client, OEH and the AHIMS register for their records.

1 Introduction

1.1 Project background

This ACHA has been prepared by Biosis on behalf of the Schools Infrastructure NSW (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of an SSD Application (SSD 18_9368) for the new Alex Avenue Public School at the corner of Farmland Drive and future realignment of Pelican Road in Schofields (the study area) (Figure 1 and Figure 2). The study area is legally described as proposed Lots 1 and 2, being part of existing Lot 4 in DP1208329 and Lot 121 in DP1203646.

The new school will cater for approximately 1,000 primary school students and 70 full-time staff upon completion. The proposal seeks consent for:

- Construction of a 2-storey library, administration and staff building (Block A) comprising:
  - School administrative spaces including reception.
  - Library with reading nooks, makers space and research pods.
  - Staff rooms and offices.
  - Special programs rooms.
  - Amenities.
  - Canteen.
  - Interview rooms.
  - Presentation spaces.
- Construction of four 2-storey classroom buildings (Block B) containing 40 homebases comprising:
  - Collaborative learning spaces.
  - Learning studios.
  - Covered outdoor learning spaces.
  - Practical activity areas.
  - Amenities.
- Construction of a single storey assembly hall (Block C) with a performance stage and integrated covered outdoor learning area (COLA). The assembly hall will have OOSH facilities, store room areas and amenities.
- Associated site landscaping and open space including associated fences throughout and games courts.
- Pedestrian access points along both Farmland Drive and the future Pelican Road.
- Substation on the north-east corner of the site.
- School signage to the front entrance.

All proposed school buildings will be connected by a covered walkway providing integrated covered outdoor learning areas. School staff will use the Council car park for the adjacent sports fields pursuant to a Joint Use

agreement. The proposed School pick up and drop off zone will also be contained within the future shared car park and will be accessed via Farmland Drive.

The Aboriginal Cultural Heritage Assessment was required by the SEARs for SSD 18_9368 issued on 22 June 2018 and updated on the 2 October 2018 and 30 January 2019. This table identifies the SEARs and relevant reference within this report.

Table 3 SEARs and relevant references issued on the 22 June 2018, 2 October 2018 and 30 January 2019

SEARs item	Report reference
Identify and describe the Aboriginal cultural heritage values that exist across the whole area that would be affected by the development and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values must be conducted in accordance with the Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (OEH 2010), and guided by the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW 2011).	Section 4 and 5 of AR
Consultation with Aboriginal people must be undertaken and documented in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW 2010). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.	Section 4 and Appendix 1 of the ACHAR
Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.	Section 7 of AR and section 6 of ACHAR

The western portion of the study area has been subject to previous assessment and was included within AHIP C000550, issued to Landcom, trading as UrbanGrowth NSW, and commencing on 11 September 2014. The AHIP is for a period of five years, and is due to expire on 11 September 2019. There are no sites listed on the AHIP or in AHIMS which are located within the study area.

1.2 Study area

The study area encompasses part of Lot 4 DP 1208329 and part of Lot 121 DP 1203646 and is located approximately 7.8 kilometres north-north-west of Blacktown and approximately 34.5 kilometres north-west of the Sydney central business district (CBD) (Figure 1). It encompasses two hectares of private land and the adjacent road reserves.

The study area is within the:

- Blacktown Local Government Area
- Parish of Gidley

- County of Cumberland (Figure 2).

The study area is currently bounded on its northern side by Farmland Drive and Lot 121, DP 1203646, on its western side by Lot 121, DP 1203646, by Lot 121, DP 1203646 and Lot 4, DP 1208329 on its southern side, and by Lot 2, DP 1209060 on its eastern side.

1.3 Proposed development

School Infrastructure NSW are proposing to develop a new school on a Greenfields site with capacity for 1,000 students and 70 staff members. The study area will incorporate part of Lot 4, DP 1208329, and part of Lot 121, DP 1203646 (Plate 1, Plate 2, Plate 3, Plate 4). The project involves the following elements:

- Two two-storey Home Base buildings.
- A two-storey admin and staff building.
- A two-storey library.
- A hall and out of school hours care facilities.
- Three learning courtyards and sports court.
- Covered outdoor learning area and walkway.
- Interconnected external area.
- Two storey home base building.

Plate 1 Proposed development - landscape

Plate 2 Proposed development - ground floor

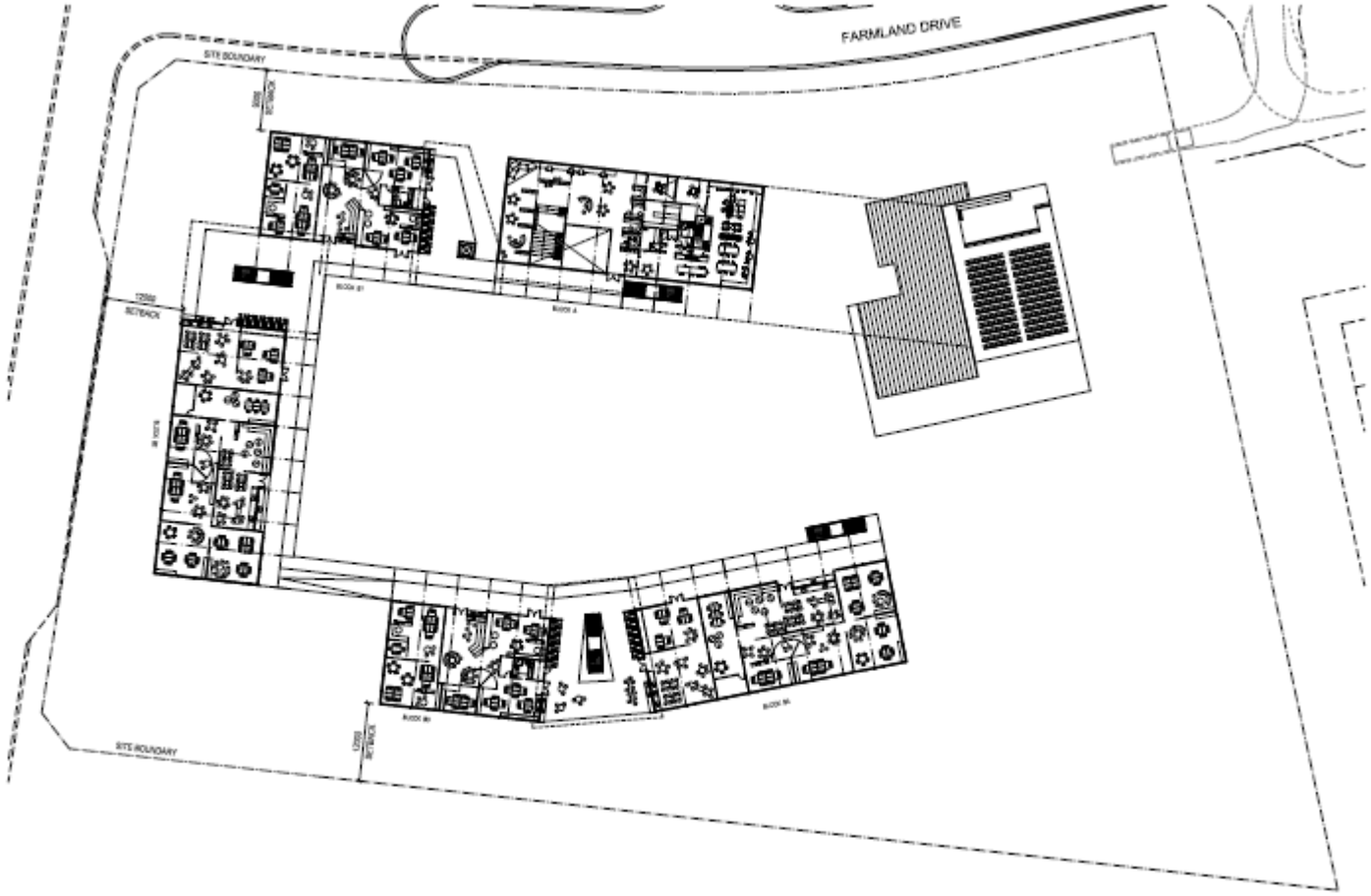


Plate 3 Proposed development - level one

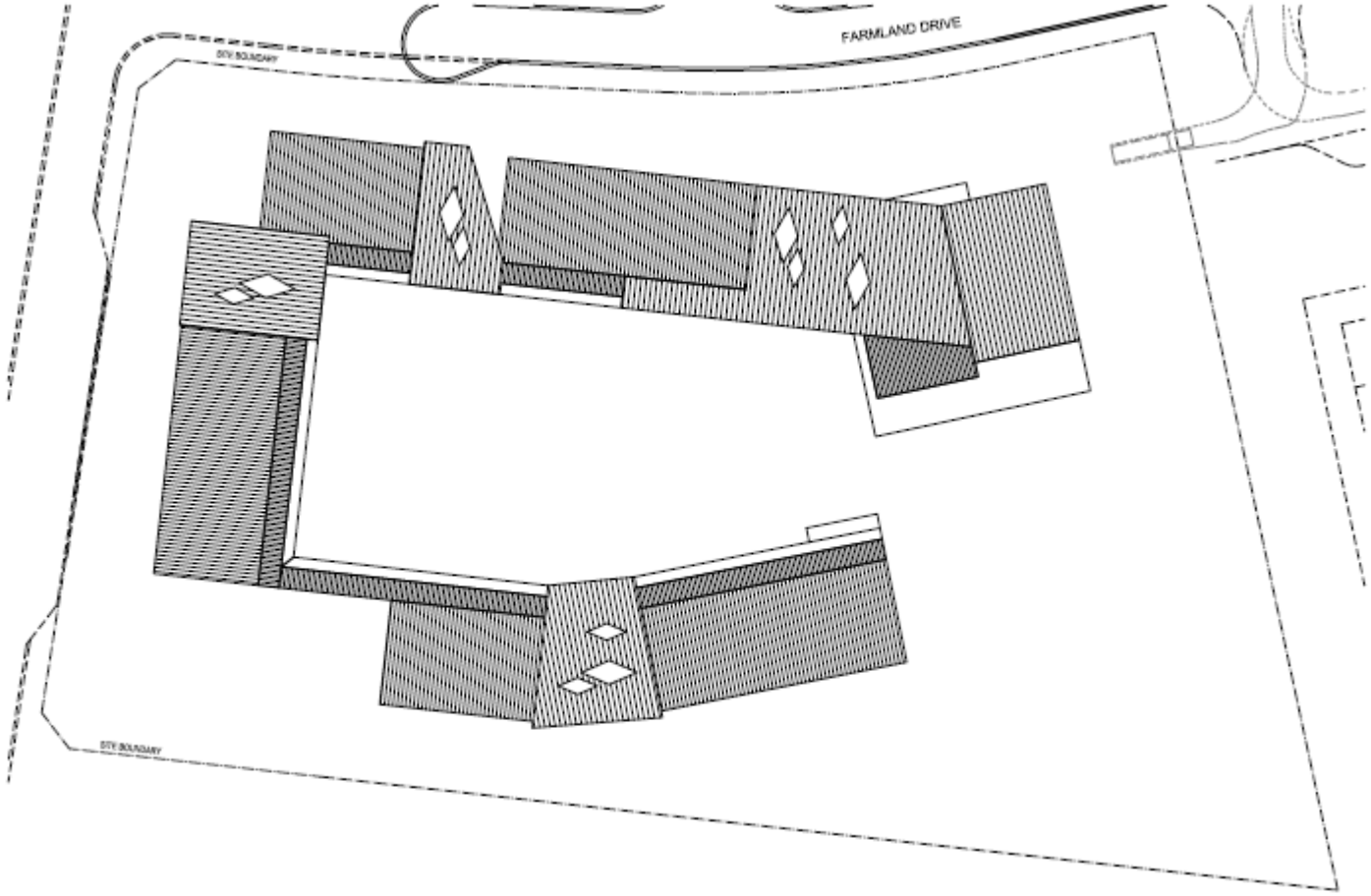


Plate 4 Proposed development - roof

1.4 Planning approvals

The proposed development will be assessed as a SSD under Section 89(c) of the EP&A Act and Schedule 1 of the SEPP (State and Regional Development) 2011. Other relevant legislation and planning instruments that will inform the assessment include:

- Blacktown Development Control Plan 2015
- Blacktown Local Environmental Plan 2015
- *National Parks and Wildlife Amendment Act 2010*
- NPW Act

1.5 Restricted and confidential information

Appendix 1 in the Archaeological Report (AR) (Appendix 5) contains AHIMS information which is confidential and not to be made public. This is clearly marked on the title page for the Attachment.

1.6 Aboriginal cultural heritage

1.6.1 General description

It is generally accepted that people have inhabited the Australian landmass for the last 50,000 years (Allen & O'Connell 2003). Dates of the earliest occupation of the continent by Aboriginal people are subject to continued revision as more research is undertaken. In NSW, according to Bowler et al. (2003), Aboriginal people have occupied the land for over 42,000 years. However, preliminary evidence presented by Biosis (2016) from a subsurface testing program in south-western NSW suggests Aboriginal people may have occupied the semi-arid zone of the region for 50,000 years.

The timing for the human occupation of the Sydney Basin is still uncertain. While there is some possible evidence for occupation of the region around 40,000 years ago, the earliest known radiocarbon date for the Aboriginal occupation of the Sydney Basin is associated with a cultural / archaeological deposit at Parramatta, which was dated to 30,735 ± 407 BP (Jo McDonald Cultural Heritage Management. 2005a, Jo McDonald Cultural Heritage Management. 2005b). Archaeological evidence of Aboriginal occupation of the Cumberland Plains indicates that the area was intensively occupied from approximately 4000 years BP. Such 'young' dates are probably more a reflection of the conditions associated with the preservation of this evidence and the areas that have been subject to surface and sub-surface archaeological investigations, rather than actual evidence of the Aboriginal people prior to this time.

Without being part of the Aboriginal culture and the productions of this culture, it is not possible for non-Aboriginal people to fully understand the meaning of site, objects and places to Aboriginal people – only to move closer towards understanding this meaning with the help of the Aboriginal community. Similarly, definitions of Aboriginal culture and cultural heritage without this involvement constitute outsider interpretations.

With this preface Aboriginal cultural heritage broadly refers to things that relate to Aboriginal culture and hold cultural meaning and significance to Aboriginal people (DECCW 2010a, p.3). There is an understanding in Aboriginal culture that everything is interconnected. In essence Aboriginal cultural heritage can be viewed as potentially encompassing any part of the physical and/or mental landscape, that is, 'Country' (DECCW 2010a, p.iii).

Aboriginal people's interpretation of cultural value is based on their 'traditions, observance, lore, customs, beliefs and history' (DECCW 2010a, p.3). The things associated with Aboriginal cultural heritage are continually and actively being defined by Aboriginal people (DECCW 2010a, p.3). These things can be associated with traditional, historical or contemporary Aboriginal culture (DECCW 2010a, p.3).

1.6.2 Tangible Aboriginal cultural heritage

Three categories of tangible Aboriginal cultural heritage may be defined:

- Things that have been observably modified by Aboriginal people.
- Things that may have been modified by Aboriginal people but no discernible traces of that activity remain.
- Things never physically modified by Aboriginal people (but associated with Dreamtime Ancestors who shaped those things).

1.6.3 Intangible Aboriginal cultural heritage

Examples of intangible Aboriginal cultural heritage would include memories of stories and 'ways of doing', which would include language and ceremonies (DECCW 2010a, p.3).

1.6.4 Statutory

Currently Aboriginal cultural heritage, as statutorily defined by the NPW Act, consists of objects and places which are protected under Part 6 of the Act.

Aboriginal objects are defined as:

> *any deposit, object or material evidence…relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*

Aboriginal places are defined as a place that is or was of special Aboriginal cultural significance. Places are declared under section 84 of the NPW Act.

1.6.5 Values

Aboriginal cultural heritage is valued by Aboriginal people as it is used to define their identity as both individuals and as part of a group (DECCW 2010a, p.iii). More specifically it is used:

- to provide a:
  - '*connection and sense of belonging to Country*' (DECCW 2010a, p.iii)
  - link between the present and the past (DECCW 2010a, p.iii)
- as a learning tool to teach Aboriginal culture to younger Aboriginal generations and the general public (DECCW 2010a, p.3)
- as further evidence of Aboriginal occupation prior to European settlement for people who do not understand the magnitude to which Aboriginal people occupied the continent (DECCW 2010a, p.3).

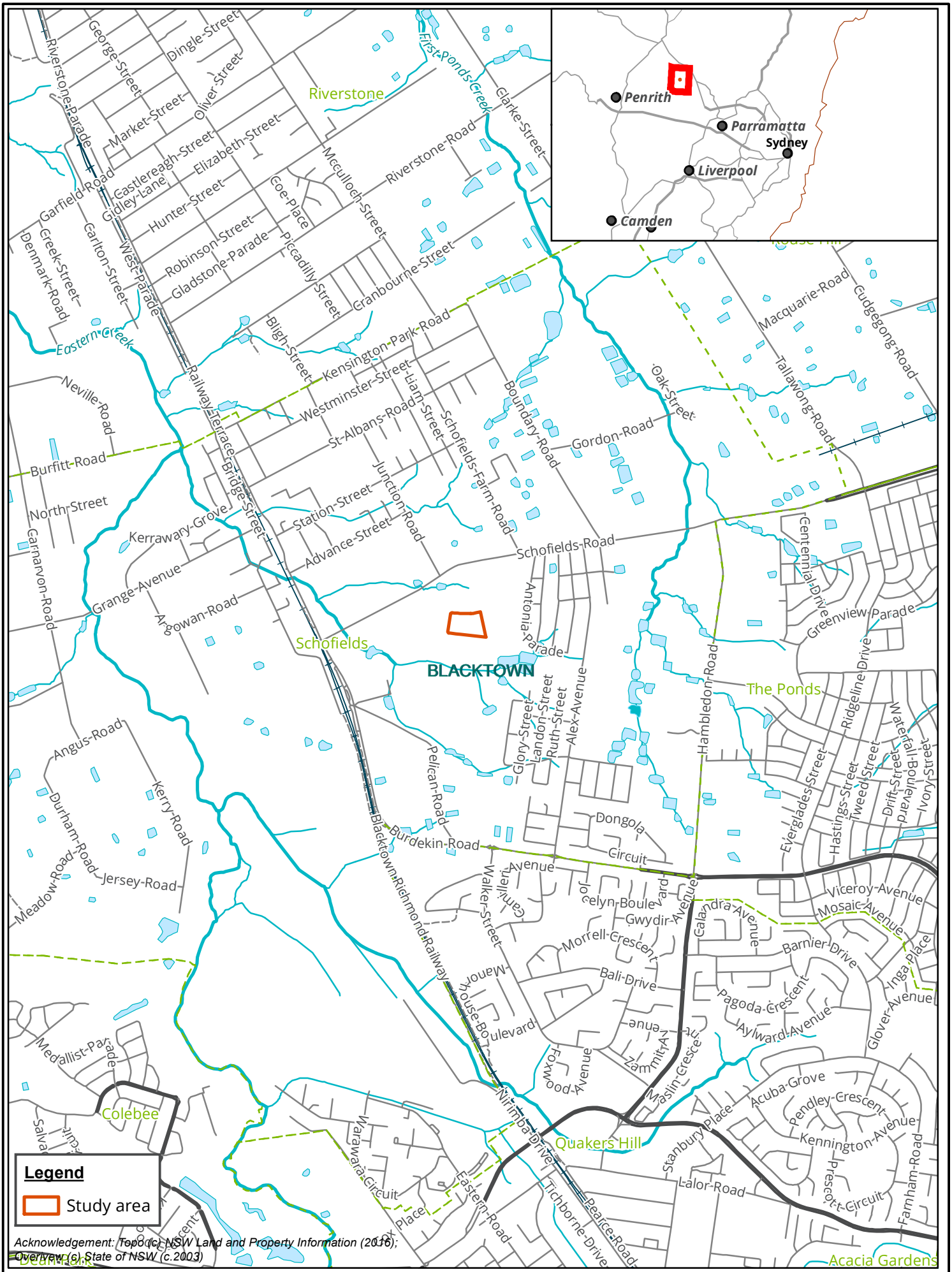
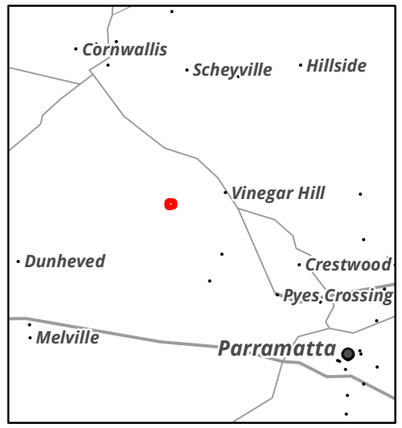


Figure 1:Location of the study area

Biosis Pty Ltd
Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27715
Date: 23 August 2018,
Checked by: AV, Drawn by: DK, Last edited by: skumar
Location:P:\27700s\27715\Mapping\

Acknowledgements: Basemap © Land and Property Information 2016



Legend

Study area

Figure 2: Study area detail

0 9 18 27 36 45

Metres

Scale: 1:800 @ A3

Coordinate System: GDA 1994 MGA Zone 55

N

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Sydney, Newcastle, Wangaratta & Wollongong

Matter: 27715,
Date: 14 September 2018,
Checked by: AV, Drawn by: DK, Last edited by: skumar
Location:P:\27700s\27715\Mapping
27715_F2_ProjectArea.mxd

2 Study area context

This section discusses the study area in regards to its landscape, environmental and Aboriginal cultural heritage context. This section should be read in conjunction with the archaeological report attached in Appendix 5. Background research has been undertaken in accordance with the code (DECCW 2010b).

2.1 Topography and hydrology

The study area lies within the Cumberland Plain, which is a broad and shallow basin that stretches westwards from Parramatta to the Hawkesbury-Nepean River and southwards from Windsor to Thirlmere. The study area is contained within the Wianamatta Group geological formation, specifically the Bringelly Shale geological unit. The Bringelly Shale formation is primarily composed of shale, with occasional calcareous claystone, laminate, and coal (Bannerman & Hazelton 1990, p.28). The formation also contains subsidiary sandstone bands, varying in thickness from one inch to five feet (Lovering 1954).

Common landform elements within these systems include hillslopes, crests, drainage depressions, valley flats, and stream channels. A review of topographic maps of the study area indicates that it is dominated by gentle slopes. Landform units present in the vicinity of the study area include crests, alluvial plains, hillslopes, and creek banks. The study area contains a crest which gradually descends to the west in the northern portion, and a simple slope descending south towards an open depression and a third order non-perennial stream, which is located outside of the study area.

Stream order is recognised as a factor which assists the development of predictive modelling in Sydney Basin Aboriginal archaeology, and has seen extensive use in the Sydney region, most notably by Jo McDonald Cultural Heritage Management (Jo McDonald Cultural Heritage Management 2000, Jo McDonald Cultural Heritage Management Pty Ltd 2005a, Jo McDonald Cultural Heritage Management Pty Ltd 2005b, Jo McDonald Cultural Heritage Management 2006, Jo McDonald Cultural Heritage Management 2008). Predictive models which have been developed for the region have a tendency to favour higher order streams as the locations of campsites as they would have been more likely to provide a stable source of water and by extension other resources which would have been used by Aboriginal groups.

The stream order system used for this assessment was originally developed by Strahler (1952). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Plate 5. As stream order increases, so does the likelihood that the stream would be a perennial source of water.

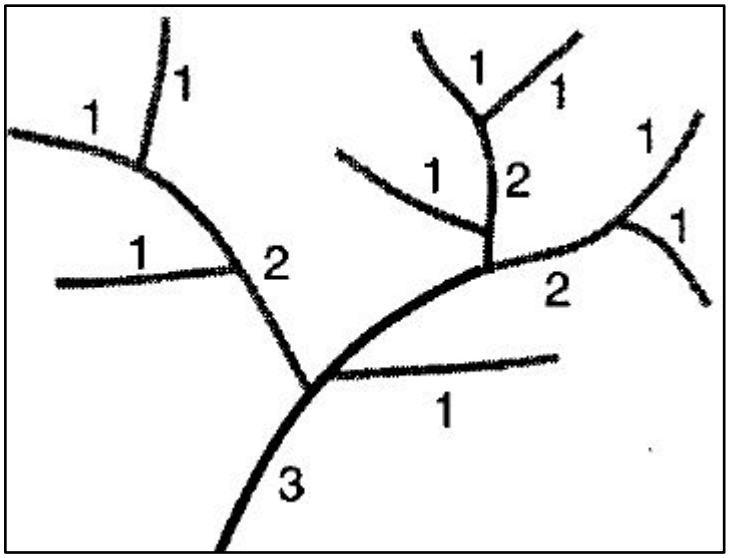


Plate 5 Diagram showing Strahler stream order (Ritter et al. 1995, p.151)

The nearest water course to the study area is a third order creek line approximately 50 metres to the south. Approximately 1.5 kilometres to the west is Eastern Creek, a fourth order creek line, which would have provided a more stable source of water. Flood mapping undertaken by Blacktown City Council indicates that the study area is outside of any flood risk extent areas (Plate 6).

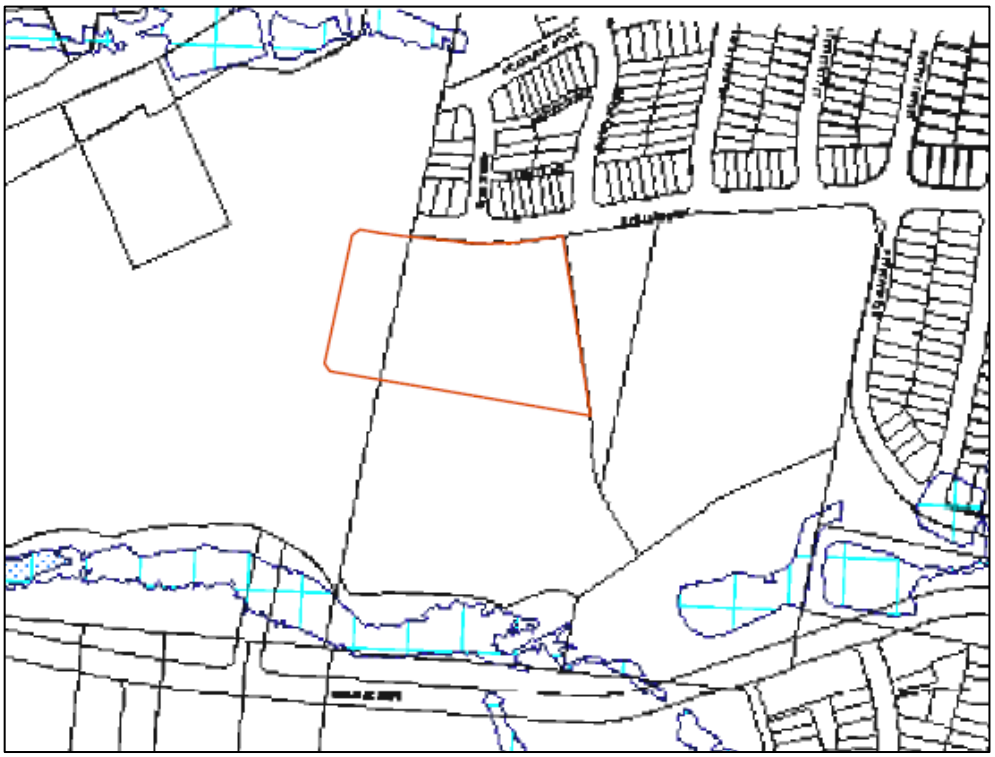


Plate 6 Flood risk extent areas in the vicinity of the study area (Source: Blacktown City Council)

2.2 Soil landscapes

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. They are defined by a combination of soils, topography, vegetation and weathering conditions. Soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

The study area is contained within the Blacktown soil landscape. This landscape is characterised by its low reliefs and gentle slope, and is generally associated with a landform pattern of gently undulating rises. The local relief is around 30 metres, with slopes of 5 per cent. The soil characteristics of this landscape are described in Table 4 below.

Table 4 Blacktown soil landscape characteristics (Bannerman & Hazelton 1990, pp.29–30)

Soil material	Description
bt1—Friable brownish black loam	This is a friable brownish black loam to clay loam with moderately pedal subangular blocky (2 – 20 mm) structure and rough-faced porous ped fabric. This material occurs as topsoil (A horizon). Colour is brownish black (10YR 2/2) but can range from dark reddish brown (5YR 3/2) to dark yellowish brown (10YR 3/4). Rounded iron indurated fine gravel-sized shale fragments and charcoal fragments are sometimes present. Roots are common.
bt2—Hardsetting brown clay loam	This is a brown clay loam to silty clay loam which is hardsetting on exposure or when completely dried out. It occurs as an A2 horizon. This material is water repellent when extremely dry. Colour is dark brown (7.5YR 4/3) but can range from dark reddish brown (2.5YR 3/3) to dark brown (10YR 3/3). Platy, iron indurated gravel-sized shale fragments are common. Charcoal fragments and roots are rarely present.
bt3—Strongly pedal, mottled brown light clay	This is a brown light to medium clay with strongly pedal polyhedral or sub-angular to blocky structure and smooth-faced dense ped fabric. This material usually occurs as subsoil (B horizon). Colour is brown (7.5YR 4/6) but may range from reddish brown (2.5YR 4/6) to brown (10YR 4/6). Frequent red, yellow or grey mottles occur often becoming more numerous with depth. Fine to coarse gravel-sized shale fragments are common and often occur in stratified bands. Both roots and charcoal fragments are rare.
bt4—Light grey plastic mottled clay	This is a plastic light grey silty clay to heavy clay with moderately pedal polyhedral to subangular blocky structure and smoothfaced dense ped fabric. This material usually occurs as deep subsoil above shale bedrock (B3 or C horizon). Colour is usually light grey (10YR 7/1) or, less commonly, greyish yellow (2.5YR 6/2). Red, yellow or grey mottles are common. Strongly weathered ironstone concretions and rock fragments are common. Gravel-sized shale fragments and roots are occasionally present. Charcoal fragments are rare.

On crests and ridges there can be up to 30 centimetres of friable brownish black loam (bt1) overlying 10-20 centimetres of hardsetting brown clay loam (bt2) and up to 90 centimetres strongly pedal brown mottled light clay (bt3). Soil horizons are generally clear and total soil depth is <100 centimetres, though bt1 material is occasionally absent. On upper slopes and midslopes there can be up to 30 centimetres of bt1 overlying 10-20 centimetres of bt2 and 20-50 centimetres of bt3, under which lies up to 100 centimetres of a light grey plastic mottled clay (bt4). Soil depth is <200 centimetres, and similar to crests and ridges soil horizons are clear and bt1 may be absent. On lower side slopes there can be up to 30 centimetres of bt1 overlying 10-30 centimetres

of bt2 and 40-100 centimetres of bt3, under which usually lies <100 centimetres of bt4; soil horizons are clear and total depth is >200 centimetres (Bannerman & Hazelton 1990, p.30).

Subsurface artefacts in the Blacktown soil landscape are typically located in the A horizon topsoil. In the Blacktown soil landscape, it is likely that any subsurface artefacts would be identified in the upper two stratigraphic profiles (bt1 and bt2). The soils described in Table 4 align closely with profiles described in nearby excavations at the Rouse Hill Anglican College, on the northern side of Rouse Road (Stephanie Garling Archaeological Consulting 2000, p.45). The descriptions given by Stephanie Garling Archaeological Consulting (2000) suggest that the bt1 profile had largely eroded away from the study area, and that the majority of the artefacts identified came from the bt2 profile. Raw material sources in the vicinity of the study area include silcrete quarries at Riverstone and Plumpton Ridge, which are located approximately 1 kilometres west (Archaeological & Heritage Management Solutions 2015, p.18).

Geotechnical investigations were undertaken in 2017 and 2018. Areas of stockpiling were noted in the central portion. Three boreholes were established within the study area in the 2017 investigations, which displayed similar soils in varying colours throughout, namely clayey silt up to 20-50 centimetres, overlying a silty clay extending to a depth of 110-200 centimetres, underlain by sandstone. Borehole 3 in the north-eastern portion of the study area identified 20 centimetres of silty sand fill material containing organic material and traces of clay (JK Geotechnics 2017). Similar results were found in the 2018 investigation, with 24 boreholes established (Greencap 2018).

2.3 Climate and rainfall

The climate in the Schofields area is classified as warm and temperate where summers are long and mild, with relatively dry winters. The mean monthly temperatures during the day range from 28.4°C in December to 17.4°C in July (Bureau of Meteorology 2018). Annual rainfall throughout the year ranges from 113.2 millimetres in February to 42.6 millimetres in July. The consistent amount of annual rainfall combined with mild temperatures would have made this region a desirable place for Aboriginal occupation.

2.4 Landscape resources

While the diverse natural environment would have provided vast and plentiful floral and faunal resources and the temperate climate would have made the area suitable for year-round occupation, the distance of the study area from permanent water sources would have detracted from its appeal as a long term occupation site. Although extensively cleared today, the Blacktown Soil Landscape typically supports dry sclerophyll forest; predominantly species of eucalypt, including Forest Red Gum, Narrow Leaved Ironbark, and Grey Box (Bannerman & Hazelton 1990, p.29). Broad Leaved Ironbark and White Stringy Bark are also occasionally present.

Within the Cumberland subregion of the Sydney Basin Bioregion there is a variety of vegetation types present, with Grey Box, Forest Red Gum, Narrow-leaved Ironbark woodland, and Spotted Gum are present on shale hills. Hard-leaved Scribbly Gum, Rough-barked Apple, and Old Man Banksia are identified on alluvial sands and gravels. Broad-leaved Apple, Cabbage Gum, Forest Red Gum, and Swamp Oak are present on river flats. Tall Spike Sush, and Juncus with Parramatta Red Gum is noted around lagoons and swamps (NSW National Parks and Wildlife Service 2003, p.193).

Native fauna that would have been present in the vicinity of the study area include: Australian Wood Duck, White-faced Heron, Eastern Long-necked Tortoise, Eastern Water Skink, Garden Skink, Welcome Swallow, Purple Swamphen, as well as arboreal fauna including owls, Ring- and Brush-tailed Possums, and gliders.

Plant resources were used in a variety of ways. Fibres were twisted into string which was used for many purposes including the weaving of nets, baskets and fishing lines. String was also used for personal adornment. Bark from eucalypts was used in the provision of shelter; a large sheet of bark being propped against a stick to form a gunyah (Attenbrow 2002). Swamp oak bark could be used for the making of canoes, and smooth-barked apple for the making of baskets and bowls.

As well as being important food sources, animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. For example, tail sinews are known to have been used to make fastening cord, while 'bone points', which would have functioned as awls or piercers, are often an abundant part of the archaeological record. Animals such as Brush-tailed Possums were highly prized for their fur, with possum skin cloaks worn fastened over one shoulder and under the other (Attenbrow 2002).

2.5 European land use history

The study area is located within a land grant of 100 acres (40.4686 hectares) initially made to Josh Ward in 1815, and later made to Joseph Pye on 19 October 1831 by Crown grant (Plate 7) (NSW Department of Lands, Vol. 1101 Fol. 101, Colonial Secretary's Office 1831). The study area remained under the ownership of the Pye family until 1938. The Pye family were known as orchardists and also grazed cattle, so it is possible that orcharding and/or grazing activities may have taken place within the study area (Windsor and Richmond Gazette 1897, 8; AHMS 2015). In 1938, part of the Pye lands were sold to Joseph and Harold Langlade, who established 'Langlade's Dairy'; several dairy-related structures were constructed east of the study area (AHMS 2015). It is likely the study area continued to be used for grazing purposes under their ownership, and that of subsequent owners, including the Geddes from 1949-c.1960 (master butcher), Gordons from 1960-1973 (horse trainer) and Jones' from 1973 (farmer) (NSW Department of Lands, Vol. 1932 Fol. 207).

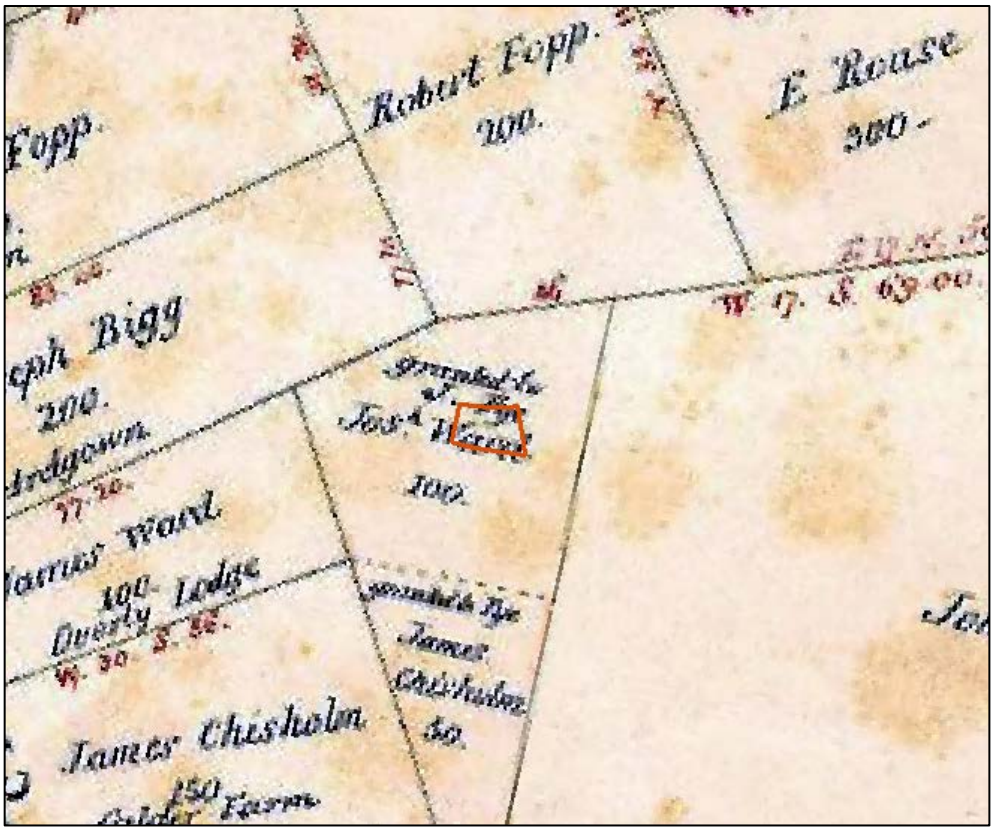


Plate 7 Extract from an 1833 Gidley Parish Map, with the study area highlighted (Source: NSW Land Registry Services)

Aerial photographs from the mid-20th century onwards reveal detail of the use and disturbance of the study area (Plate 8, Plate 9, Plate 10, Plate 11, Plate 12, Plate 13, Plate 14, Plate 15, Plate 16, Plate 17). Table 5 provides a summary of the changes to the study area from 1956 to 2018.

Table 5 Analysis of aerial photographs of the study area

Year	Comments
1956	A large proportion of the study area appears to have been ploughed, specifically in the northern sections. The southern areas retain some bushland but app has been partially cleared.
1961	Significant changes to the study area, with the installation of an unsealed oval track in the north-eastern portion of the study area; this may have been a horse track considering the ownership of the study area by a horse trainer at this time. Possibly some earthworks or terracing in the south and south-eastern portions of the study area. Some bushland has been retained in the south-eastern corner, and plough marks are also strongly evident.
1965	Similar to previous aerial, with the track less defined and sparser bushland in the south-eastern corner.
1970	The track appears to be out of use, having been grown over. Bushland in the south-eastern corner appears to be in similar condition to the previous aerial.
1978	Very little evidence of the track remains; possibly used for grazing animal stock.
1982	Several tracks run through the study area, and potentially an earthwork in the north-eastern corner.

Year	Comments
1991	Western portion of the study area has been developed for agricultural purposes, with grass cover appearing sparse in this area.
2005	An informal track appears to run across the south-eastern corner of the study area near the area of bush, while grass cover has increased in the western portion, with some earth scours remaining.
2009	The track running across the south-eastern corner is more defined, suggesting heavier use, with a further track running north-south in the central portion of the study area. There is an area of exposure in the south-western corner.
2018	Introduction of residential development north of the study area has resulted in some removal of topsoil along the northern boundary, and possible deposited materials just south of this exposure..

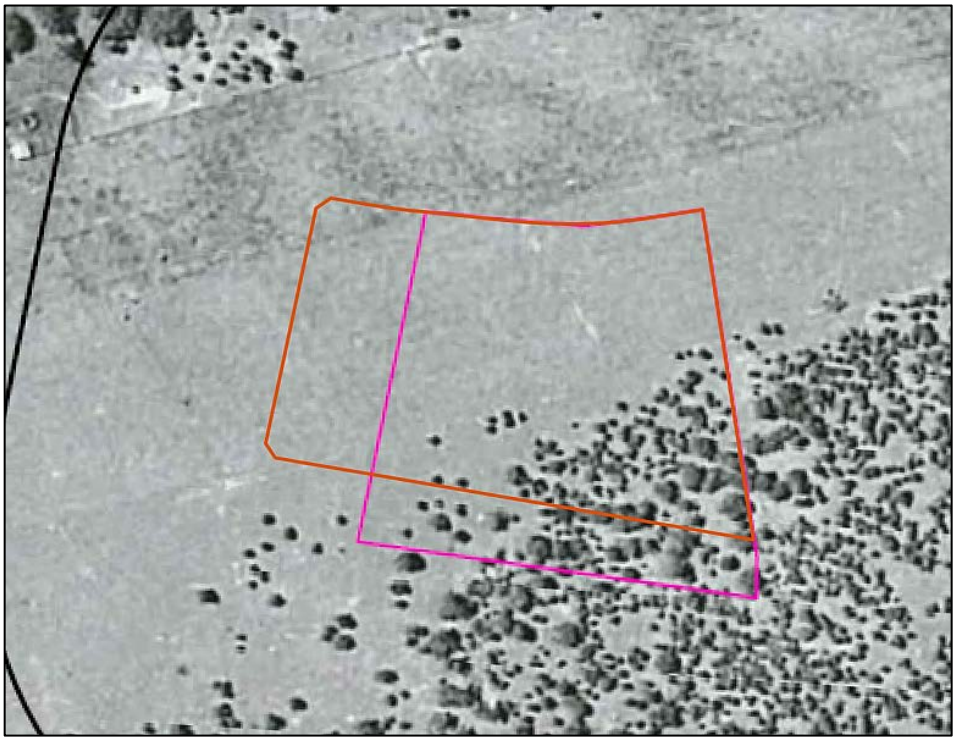


Plate 8 **1956 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 9 **1961 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 10 **1965 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 11 **1970 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 12 **1978 aerial of the study area (Source: NSW Spatial Services 2018)**

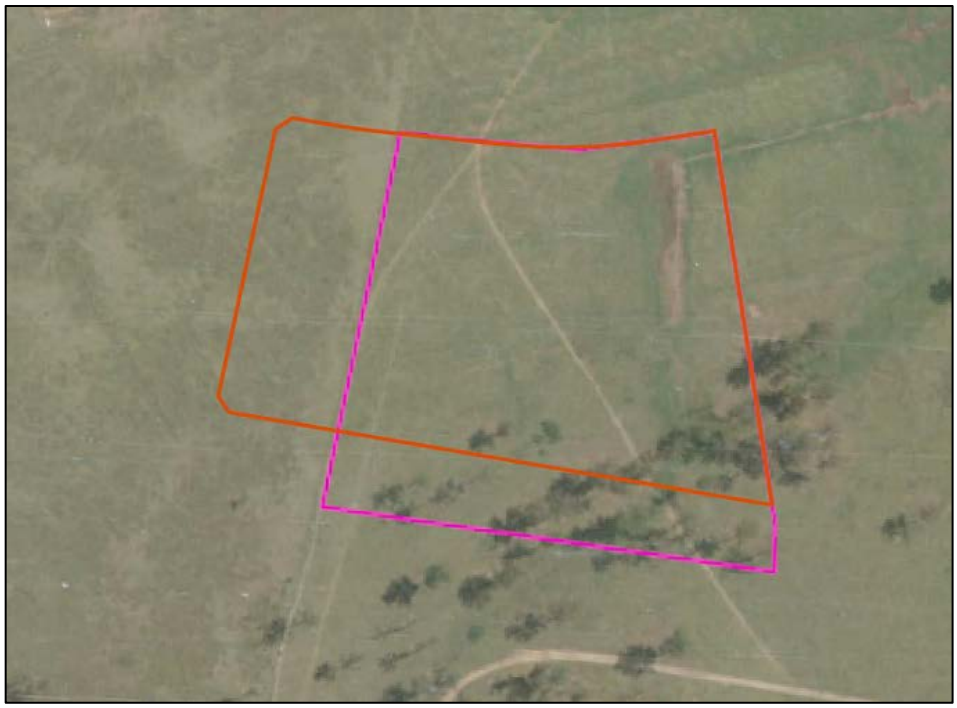


Plate 13 **1982 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 14 **1991 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 15 **2005 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 16 **2009 aerial of the study area, with the study area highlighted in red (please note the pink outline is the area assessed in Environmental Investigation Services 2017) (Source: Environmental Investigation Services 2017)**

Plate 17 **2018 aerial of the study area, with the study area highlighted in red (Source: GoogleMaps 2018)**

3 Aboriginal cultural heritage context

3.1 Ethnohistory

Our knowledge of Aboriginal people and their land-use patterns and lifestyles prior to European contact is mainly reliant on documents written by non-Aboriginal people. These documents are affected by the inherent bias of the class and cultures of their authors, who were also often describing a culture that they did not fully understand - a culture that was in a heightened state of disruption given the arrival of settlers and disease. Early written records can however be used in conjunction with archaeological information and surviving oral histories from members of the Aboriginal community in order to gain a picture of Aboriginal life in the region.

Despite a proliferation of Aboriginal heritage sites there is considerable ongoing debate about the nature, territory and range of pre-contact Aboriginal language groups in the greater Sydney region. These debates have arisen largely because, by the time colonial diarists, missionaries and proto-anthropologists began making detailed records of Aboriginal people in the late 19th century, pre-European Aboriginal groups had been broken up and reconfigured by European settlement activity. The following information relating to Aboriginal people on the Cumberland Plains is based on such early records.

There is some confusion relating to group names, which can be explained by the use of differing terminologies in early historical references. Language groups were not the main political or social units in Aboriginal life. Instead, land custodianship and ownership centred on the smaller named groups that comprised the broader language grouping. There is some variation in the terminology used to categorise these smaller groups; the terms used by Attenbrow (2002) will be used here. Attenbrow (2002, p.34) suggests that a total of four dialects were spoken in the Sydney region:

- *Darug coastal dialect/s - the Sydney Peninsula (north of Botany Bay, south of Port Jackson, west to Parramatta), as well as the country to the north of Port Jackson, possibly as far as Broken Bay*
- *Darug hinterland dialect - on the Cumberland Plain from Appin in the south to the Hawkesbury River in the north; west of the Georges River, Parramatta, the Lane Cove River and Berowra Creek*
- *Dharawal - from south side of Botany Bay, extending south as far as the Shoalhaven River; from the coast to the Georges River and Appin, and possibly as far west as Camden,*
- *Gundungurra - southern rim of the Cumberland Plain west of the Georges River, as well as the southern Blue Mountains.*

Early interactions between local Aboriginal groups in the Sydney region and European settlers varied in nature between peaceful and hostile. It was not long before the effects of colonisation proved detrimental to local groups, with farming practices employed by the settlers removing land that had until that point been used for subsistence (Attenbrow 2002).

Early observers made no note of the language of the local groups, and it was not until the latter part of the nineteenth century that the name Darug was used. Matthews (1901, p. 155, cited by Attenbrow 2002, p.32) stated that "The Dharuk speaking people adjoined the Thurrawal on the north, extending along the coast to the Hawkesbury River, and inland to what are now Windsor, Penrith, Campbelltown, and intervening towns". Subsistence activities varied based on the local landscapes, with Darug groups closer to the coast employing different food sources and means of hunting in order to survive, compared to those further inland (Kelleher Nightingale Consulting 2010, p.10).

After the arrival of European settlers the movement of Aboriginal hunter-gatherers became increasingly restricted. European expansion along the Cumberland Plain was swift and soon there had been considerable

loss of land to agriculture. This led to violence and conflict between Europeans and Aboriginal people as both groups sought to compete for the same resources (Brookes & Associates et al. 2003, p.16). At the same time diseases such as small pox were having a devastating effect on the Aboriginal population. Death, starvation and disease were some of the disrupting factors that led to a reorganisation of the social practices of Aboriginal communities after European contact. The formation of new social groups and alliances were made as Aboriginal people sought to retain some semblance of their previous lifestyle.

3.2 Aboriginal heritage located in the study area

The archaeological assessment of the study area identified the following Aboriginal sites in the study area:

- Alex Avenue PS 01 (AHIMS pending).
- Alex Avenue PS 02 (AHIMS pending).

The archaeological report attached in Appendix 5 provides details for the Aboriginal site identified during the archaeological assessment and shown on Figure 3. A brief description of each site is provided below.

Alex Avenue PS 01 (AHIMS pending)

Alex Avenue PS 01 consists of two artefacts, a grey brown chert distal fragment, recovered from Spit 3, TP11 and silcrete medial fragment, recovered from Spit 2, TP12, located on a simple slope in the south-western portion of the study area (Plate 18, Plate 19). Soils at this location consisted of three stratigraphic layers. Topsoils ranged from a dark brown silty clay of low compaction to a dark yellowish brown silty sand of low compaction. These overlaid a moderately compacted dark brown silty clay to a moderately compacted red silty clay followed by a highly compacted red clay. The base of this deposit was reached at 350 millimetres.

Plate 18 Overview of TP11 in Alex Avenue PS 01 (AHIMS pending), facing north

Plate 19 Section of TP12 in Alex Avenue PS 01 (AHIMS pending), facing north

Alex Avenue PS 02 (AHIMS pending)

Alex Avenue PS 02 consists of a single artefact, a complete silcrete flake, recovered from Spit 2, TP27, located on the edge of an open depression landform in the south-eastern portion of the study area (Plate 20). Soils at this location consisted of three stratigraphic layers, including a brown moderately compacted sandy silt, overlying a highly compacted brown silty sand, followed by a highly compacted red clay. The base of this deposit was reached at 380 millimetres.

Plate 20 Overview of TP27 within Alex Avenue PS 02 (AHIMS pending), facing north

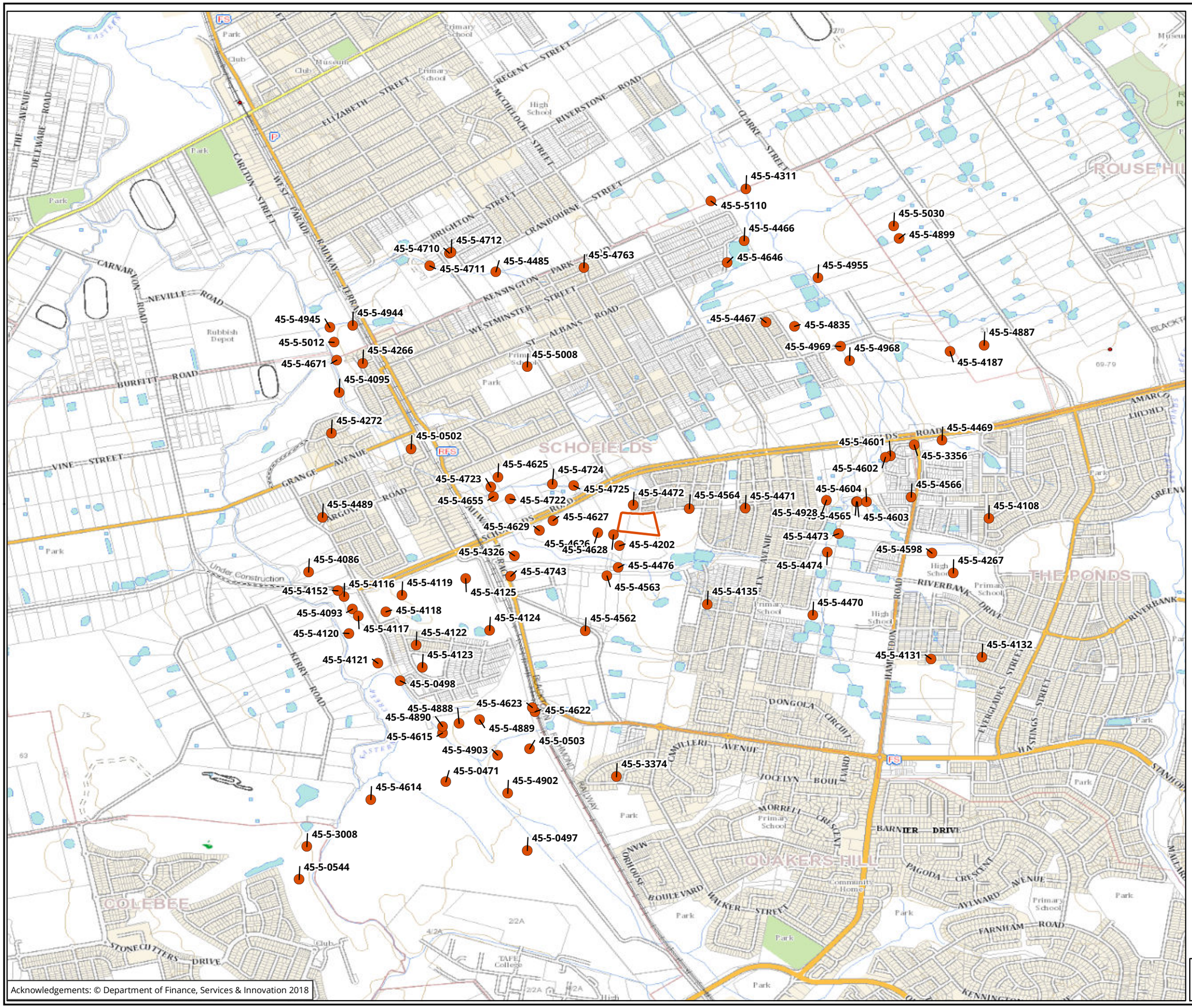
Figure 3 Aboriginal archaeological sites within the study area (to be finalised)

3.3 Interpretation of past Aboriginal land use

Previous archaeological surveys indicate that proximity to a permanent water supply is a primary factor in the determination of the location for past Aboriginal occupation (ENSR Australia Pty Ltd 2008, p.16). There appears to be a high correlation between the permanence of a water source and the complexity of sites. Lithic assemblages identified near permanent water sources suggest a greater range of activity (for example tool use, manufacture and maintenance, food processing and quarrying) while sites located near more ephemeral water sources indicate only transitory occupation (isolated knapping and discarded tools) (Kelleher Nightingale Consulting Pty Ltd 2008, p.7).

Based on the environmental context of the study area, it is likely that it would have supported Aboriginal occupation, being located on a crest, ridgeline and upper slope in the vicinity of a third order and first order stream. This location would have provided access to a range of animal and plant resources, as well as fresh water, making it an ideal location of occupation for Aboriginal people in the area. This statement is supported by the AHIMS data which has identified several Aboriginal sites located on the surrounding slopes in the vicinity of the current study area.

Two Aboriginal sites, Alex Avenue PS 01 and Alex Avenue PS 02, were identified within the study area as a result of test excavations. The presence of the artefacts on the slope and open depression landforms suggest the objects may have washed down the slope from higher ground, and as such may not be in their original context. It is not surprising that fewer artefacts were found here given the greater distance from Second Ponds Creek and is therefore consistent with the predictive statement that sites will be closer to permanent water sources, despite being within an elevated landform. The low density of artefacts identified within the study area indicate that Alex Avenue PS 01 and Alex Avenue PS 02 are 'background scatter'; it is considered unlikely that camping or knapping took place at these sites. It is likely that Aboriginal groups may have favoured the lower slope areas closer to the unnamed creek south of the study area, or Eastern Creek, west of the study area.



Acknowledgements: © Department of Finance, Services & Innovation 2018

Legend

- AHIMS Record

Figure 4: AHIMS search results in the vicinity of the study area

NOT TO BE MADE PUBLIC

0 200 400 600 800 1,000

Metres
Scale: 1:20,000 @ A3
Coordinate System: GCS GDA 1994

N

Biosis Pty Ltd

Ballarat, Brisbane, Canberra, Melbourne, Sydney,Wangaratta & Wollongong

Matter: 27715
Date: 10 September 2018,
Checked by: skumar, Generated by: skumar
Location:P:\27700s\27715\Mapping\27715_F6_AHIMS.mxd

4 Aboriginal community consultation

Consultation with the Aboriginal community has been undertaken in compliance with the consultation requirements as detailed below. A consultation log of all communications with RAPs is provided in Appendix 1.

4.1 Stage 1: Notification of project proposal and registration of interest

4.1.1 Identification of relevant Aboriginal stakeholders

In accordance with the consultation guidelines, Biosis Pty Ltd notified the following bodies regarding the proposal:

- Blacktown City Council
- Deerubbin Local Aboriginal Land Council (LALC)
- Greater Sydney Local Land Services
- National Native Title Tribunal (NNTT)
- NSW Native Title Services Corporation Limited (NTSCORP Limited)
- OEH
- Office of the Registrar, Aboriginal Land Rights Act 1983 of Aboriginal Owners

A list of known Aboriginal stakeholders in the Blacktown region was provided by OEH (a copy of this responses is provided in Appendix 2 and include:

- Amanda Hickey Cultural Services
- Barking Owl Aboriginal Corporation
- Bidjawong Aboriginal Corporation
- Billinga
- Cullendulla
- Darug Boorooberongal Elders Aboriginal Corporation
- Darug Land Observations
- Deerubbin Local Aboriginal Land Council
- Dharug
- Didge Ngunawal Clan
- Ginninderra Aboriginal Corporation
- Gulaga
- Gunyuu
- Badu
- Biamanga
- Bilinga Cultural Heritage Technical Services
- Butucarbin Aboriginal Corporation
- Darug Aboriginal Cultural Heritage Assessments
- Darug Custodian Aboriginal Corporation
- Darug Tribal Aboriginal Corporation
- Des Dyer – Darug Aboriginal Land Care
- Dhinawan-Dhigaraa Culture & Heritage Pty Ltd
- DJMD Consultancy
- Goobah Developments
- Gunjeewong Cultural Heritage Aboriginal Corporation
- Gunyuu Cultural Heritage Technical Services

- HSB Consultants
- Kawul Cultural Services
- Minnamunnung
- Munyunga Cultural Heritage Technical Services
- Murramarang
- Murrumbul Cultural Heritage Technical Services
- Nundagurri
- Phil Khan - Kamilaroi Yankuntjatjara Working Group
- Thauaira
- Tocomwall
- Walbunja
- Warragil Cultural Services
- Wingikara
- Wullung
- Yerramurra
- Jerringong
- Merrigarn Indigenous Corporation
- Mununga
- Murra Bidgee Mullangari Aboriginal Corporation
- Murrumbul
- Nerrigundah
- Pemulwuy CHTS
- Rane Consulting
- Thoorga Nura
- Wailwan Aboriginal Digging Group
- Walgalu
- Widescope Indigenous Group
- Wingikara Cultural Heritage Technical Services
- Wurrymay Consultancy

A search conducted by the Office of the Registrar, *Aboriginal Land Rights Act 1983* (NSW) listed no Aboriginal Owners with land within the study area. A search conducted by the NNTT listed no Registered Native Title Claims, Unregistered Claimant Applications or Registered Indigenous Land Use Agreements within the study area.

4.1.2 Public notice

In accordance with the consultation guidelines, a public notification was placed in the following newspaper:

- *Rouse Hill Times* (10 October 2018)
- *Rouse Hill Times* (28 November 2018)

The wrong version of the public notice was published on the 10 October 2018; therefore, an additional public notice was advertised on the 28 November 2018. No new Aboriginal parties registered for the project as a result of the republication. The advertisements invited Aboriginal people who hold cultural knowledge to register their interest in a process of community consultation to provide assistance in determining the significance of Aboriginal object(s) and/or places in the vicinity of the study area. A copy of the public notice is provided in Appendix 2.

4.1.3 Registration of Aboriginal parties

Aboriginal groups identified in Section 4.1.1 were sent a letter inviting them to register their interest in a process of community consultation to provide assistance in determining the significance of Aboriginal object(s) and/or places in the vicinity of the study area. In response to the letters and public notice, a total of 13 groups registered their interest in the project. Responses to registration from Aboriginal parties are provided in Appendix 2. A full list of Aboriginal parties who registered for consultation is provided below:

- Aboriginal Archaeology Service
- Barking Owl Aboriginal Corporation
- Butucarbin Aboriginal Corporation
- Darug Boorooberongal Elders Aboriginal Corporation
- Darug Land Observations
- Darug Tribal Aboriginal Corporation
- Deerubbin LALC
- Des Dyer - Darug Aboriginal Land Care
- Didge Ngunawal Clan
- Merrigarn Indigenous Corporation
- Muragadi
- Murra Bidgee Mullangari Aboriginal Corporation
- Phil Khan - Kamilaroi Yankuntjatjara Working Group

4.2 Stage 2: Presentation of information about the proposed project

On 5 November 2018 Biosis provided RAPs with details about the proposed development works (project information pack). A copy of the project information pack is provided in Appendix 3.

4.3 Stage 3: Gathering information about cultural significance

4.3.1 Archaeological assessment methodology information pack

On 5 November 2018, Biosis provided each RAP with a copy of the project methodology pack outlining the proposed Aboriginal cultural heritage assessment process and methodology for this project. RAPs were given 28 days to review and prepare feedback on the proposed methodology. A copy of the project methodology pack is provided in Appendix 3.

Murra Bidgee Mullangari Aboriginal Corporation, Darug Aboriginal Land Care, Darug Land Observations, Merrigarn, Butucarbin Aboriginal Corporation, and Aboriginal Archaeology Service all agreed with and supported the methodology. Darug Land Observations suggested that any artefacts recovered during test excavations should be reburied on site. Aboriginal Archaeology Service suggested that any artefacts collected could be displayed in a museum, local library or local government building or reburied in close proximity of the area.

4.3.2 Test excavations

The following groups participated in test excavations within the study area from 18 to 25 February 2019:

- Barking Owl Aboriginal Corporation
- Darug Aboriginal Land Care
- Deerubbin Local Aboriginal Land Council
- Kamilaroi Yankuntjatjara Working Group

4.3.3 Information gathered during fieldwork

No comments or information was supplied either on-site or through correspondence during the fieldwork period.

4.4 Stage 4: Review of draft Aboriginal cultural heritage assessment report

To be completed following the review and comments from RAPs after the statutory 28 day period.

5 Aboriginal cultural significance assessment

The two main values addressed when assessing the significance of Aboriginal sites are cultural values to the Aboriginal community and archaeological (scientific) values. This report will assess the cultural values of Aboriginal sites in the study area. Details of the scientific significance assessment of Aboriginal sites in the study area are provided in Appendix 5.

5.1 Introduction to the assessment process

Heritage assessment criteria in NSW fall broadly within the significance values outlined in the Australia International Council on Monuments and Sites (ICOMOS) *Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia ICOMOS 2013) (the Burra Charter). This approach to heritage has been adopted by cultural heritage managers and government agencies as the set of guidelines for best practice heritage management in Australia. These values are provided as background and include:

- **Historical significance** (evolution and association) refers to historic values and encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, a historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives *in situ*, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.
- **Aesthetic significance** (Scenic/architectural qualities, creative accomplishment) refers to the sensory, scenic, architectural and creative aspects of the place. It is often closely linked with social values and may include consideration of form, scale, colour, texture, and material of the fabric or landscape, and the smell and sounds associated with the place and its use.
- **Social significance** (contemporary community esteem) refers to the spiritual, traditional, historical or contemporary associations and attachment that the place or area has for the present-day community. Places of social significance have associations with contemporary community identity. These places can have associations with tragic or warmly remembered experiences, periods or events. Communities can experience a sense of loss should a place of social significance be damaged or destroyed. These aspects of heritage significance can only be determined through consultative processes with local communities.
- **Scientific significance** (Archaeological, industrial, educational, research potential and scientific significance values) refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects. Assessment of scientific value is often based on the likely research potential of the area, place or object and will consider the importance of the data involved, its rarity, quality or representativeness, and the degree to which it may contribute further substantial information.

The cultural and archaeological significance of Aboriginal and historic sites and places is assessed on the basis of the significance values outlined above. As well as the Burra Charter significance values guidelines, various government agencies have developed formal criteria and guidelines that have application when assessing the significance of heritage places within NSW. Of primary interest are guidelines prepared by the Australian

Government, the NSW OEH and the Heritage Branch, and the NSW Department of Planning and Environment. The relevant sections of these guidelines are presented below.

These guidelines state that an area may contain evidence and associations which demonstrate one or any combination of the Burra Charter significance values outlined above in reference to Aboriginal heritage. Reference to each of the values should be made when evaluating archaeological and cultural significance for Aboriginal sites and places.

In addition to the previously outlined heritage values, the OEH *Guidelines to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011) also specify the importance of considering cultural landscapes when determining and assessing Aboriginal heritage values. The principle behind a cultural landscape is that 'the significance of individual features is derived from their inter-relatedness within the cultural landscape'. This means that sites or places cannot be 'assessed in isolation' but must be considered as parts of the wider cultural landscape. Hence the site or place will possibly have values derived from its association with other sites and places. By investigating the associations between sites, places, and (for example) natural resources in the cultural landscape the stories behind the features can be told. The context of the cultural landscape can unlock 'better understanding of the cultural meaning and importance' of sites and places.

Although other values may be considered – such as educational or tourism values – the two principal values that are likely to be addressed in consideration of Aboriginal sites and places are the cultural/social significance to Aboriginal people and their archaeological or scientific significance to archaeologists and the Aboriginal community. The determinations of archaeological and cultural significance for sites and places should then be expressed as statements of significance that preface a concise discussion of the contributing factors to Aboriginal cultural heritage significance.

5.2 Cultural (social significance) values

Cultural or social significance refers to the spiritual, traditional, historical and/or contemporary associations and values attached to a place or objects by Aboriginal people. Aboriginal cultural heritage is broadly valued by Aboriginal people as it is used to define their identity as both individuals and as part of a group (DECCW 2010a, p.iii). More specifically it provides:

- a '*connection and sense of belonging to Country*' (DECCW 2010a, p.iii)
- a link between the present and the past (DECCW 2010a, p.3)
- a learning tool to teach Aboriginal culture to younger Aboriginal generations and the general public (DECCWa 2010 p.3)
- further evidence of Aboriginal occupation prior to European settlement for people who do not understand the magnitude to which Aboriginal people occupied the continent (DECCW 2010a, p.3).

It is acknowledged that Aboriginal people are the primary determiners of the cultural significance of Aboriginal cultural heritage.

5.3 Historic values

Historic significance refers to associations a place or object may have with a historically important person, event, phase or activity to the Aboriginal and other communities. The study area is not known to have any historic associations.

5.4 Archaeological (scientific significance) values

An archaeological scientific assessment was undertaken for the study area and is presented in detail as part of the attached Archaeological Report (Appendix 5).

5.5 Aesthetic values

Even though the study area demonstrates disturbances in some areas, it is a typical example of an undulating landform pattern with low reliefs and gentle slopes. The landscape of the study area is closely linked with Aboriginal cultural values and provides a context for Aboriginal sites that gives a strong sense of place. The local Aboriginal community strongly identifies with the landscape of the study area.

5.6 Statement of significance

The significance of sites was assessed in accordance with the following criteria:

- requirements of the code
- the Burra Charter
- *Guide to investigating and reporting on Aboriginal heritage.*

The combined use of these guidelines is widely considered to represent the best practice for assessments of Aboriginal cultural heritage. The identification and assessment of cultural heritage values includes the four values of the Burra Charter: social, historical, scientific and aesthetic values. The resultant statement of significance has been constructed for the study area based on the significance ranking criteria assessed in Table 6.

5.6.1 Statement of significance for Alex Avenue PS 01

Alex Avenue PS 01 consists of two sub-surface artefacts, a chert distal fragment with a hinge termination and retouch evidence, and a silcrete medial fragment, located on a slope landform approximately 180 m north of an unnamed third order creekline connected to Eastern Creek, approximately 1.5 km west of the site. The site contains moderate levels of disturbance from historical farming activities and represents a common site type within the area. Alex Avenue PS 01 is considered to be representative of opportunistic background scatter. The site has no direct historical or aesthetic associations, and has low scientific significance. The significance of Alex Avenue PS 01 has been assessed as low.

Table 6 Significance assessment criteria

Site name	Criteria	Ranking
Alex Avenue PS 01 AHIMS pending	Cultural – discussions with the local Aboriginal communities reflect that the site is moderate in value.	Moderate
	Historical – the site is not connected to any historical event or personage.	Low
	Scientific – the site possesses low archaeological values.	Low
	Aesthetic – the site is a typical example of an undulating landform pattern with low reliefs and gentle slopes.	Moderate

5.6.2 Statement of significance for Alex Avenue PS 02

Alex Avenue PS 02 consists of a single isolated sub-surface artefact, a complete silcrete flake with a flaked platform and feather termination, located on a slope landform approximately 180 m north of an unnamed third order creekline connected to Eastern Creek, approximately 1.5 km west of the site. The site contains moderate levels of disturbance from historical farming activities and represents a common site type within the area. Alex Avenue PS 02 is considered to be representative of opportunistic background scatter. The site has no direct historical or aesthetic associations, and has low scientific significance. The significance of Alex Avenue PS 02 has been assessed as low.

Table 7 Significance assessment criteria

Site name	Criteria	Ranking
Alex Avenue PS 02 AHIMS pending	Cultural – discussions with the local Aboriginal communities reflect that the site is moderate in value.	Moderate
	Historical – the site is not connected to any historical event or personage.	Low
	Scientific – the site possesses low archaeological values.	Low
	Aesthetic – the site is a typical example of an undulating landform pattern with low reliefs and gentle slopes.	Moderate

6 Development limitations and mitigation measures

Within the study area, there is one recorded Aboriginal sites that may be subject to harm. It is expected that the potential of harm to Aboriginal archaeological sites from the proposed development in the study area will be direct, with a total loss of value. Strategies to avoid or minimise harm to Aboriginal heritage in the study area are discussed below.

A summary of the potential impacts of the proposed works on known Aboriginal sites within the study area is provided in Table 8.

Table 8 Summary of potential archaeological impact

AHIMS site no.	Site name	Significance	Type of harm	Degree of harm	Consequence of harm
AHIMS # pending	Alex Avenue PS 01	Low	Direct	Complete	Total loss of value
AHIMS # pending	Alex Avenue PS 02	Low	Direct	Complete	Total loss of value

6.1 Potential risks to Aboriginal cultural heritage

The current proposed works within the study area include activities which will impact Alex Avenue PS 01 and Alex Avenue PS 02. The construction of the school buildings, facilities and associated infrastructure associated with the development will impact the majority of the area identified as holding archaeological potential within the study area. If not mitigated the impact may include:

- Vehicle movement within study area with potential compaction of surface soils.
- Earthworks, which will involve the removal of topsoil and subsoil.

Left unmitigated, these activities have potential to completely remove or disturb archaeological deposits and Aboriginal objects.

6.2 Avoiding harm to Aboriginal heritage

Harm cannot be avoided to the Aboriginal site within the study area as a part of the proposed works.

6.3 Management and mitigation measures

Ideally, heritage management involves conservation of sites through the preservation and conservation of fabric and context within a framework of 'doing as much as necessary, as little as possible' (Australia ICOMOS 2013). In cases where conservation is not practical, several options for management are available. For sites, management often involves the salvage of features or artefacts, retrieval of information through excavation or collection (especially where impact cannot be avoided) and interpretation.

Avoidance of impact to archaeological and cultural heritage sites through design of the development is the primary mitigation and management strategy, and should be implemented where practicable. It is not

possible for the proposed works to avoid impacts to the areas containing Alex Avenue PS 01 and Alex Avenue PS02 within the study area, and as such Alex Avenue PS 01 and Alex Avenue PS02 will be impacted by the proposed SSD project.

Alex Avenue PS 01 and Alex Avenue PS 02 have been assessed as holding low scientific significance. The two sites contained within the study area represent opportunistic background scatter and do not warrant further investigation. Accordingly, no further archaeological works are required within the study area prior to development impacts.

6.4 Long term management of Alex Avenue PS 01 and Alex Avenue PS 02

As part of this assessment, the long term management of the three artefacts recovered during test excavations must be addressed. In consultation with the TSA Management on behalf of SINSW, it has been determined that there are a number of areas within the study area which will not be subject to development or landscaping as part of the proposed works and will be maintained as a natural ground areas in the south-eastern portion of the study area. It is proposed that the artefacts will be reburied on site somewhere within this location.

7 Recommendations

The recommendations below respond specifically to the wishes of the RAPs. Recommendations regarding the archaeological value of the site, and the subsequent management of Aboriginal cultural heritage is provided in the archaeological report (Appendix 5).

Recommendation 1: Conditions of AHIP C000550

Although SSD projects are not required to comply with Part 6 of the *National Parks and Wildlife Act 1974* (NPW Act), the Office of Environment and Heritage (OEH) advises that conditions of valid AHIPs are followed by SSDs in order to reduce the risk of impacting Aboriginal heritage values.

OEH also advises that the holder of the AHIP should be contacted to confirm the works that are intended on the area covered by the AHIP.

Recommendation 2: No further archaeological works required for Alex Avenue PS 01 and Alex Avenue PS 02

It is recommended that no further archaeological works are required for Alex Avenue PS 01 and Alex Avenue PS 02 prior to development impacts.

Recommendation 3: Preparation and lodgement of AHIMS site cards for Alex Avenue PS 01 and Alex Avenue PS 02

It is recommended that AHIMS site cards are prepared and lodged with AHIMS for newly identified sites Alex Avenue PS 01 and Alex Avenue PS 02, and that the site numbers are included in the final version of this report.

Following development impacts it will be necessary to update these AHIMS records with AHIMS site impact recording forms for Aboriginal sites Alex Avenue PS 01 and Alex Avenue PS 02. This should occur within four months following completion of development impacts or as otherwise stated in SSD approval conditions.

Recommendation 4: Long term care and control of artefacts

In consultation with TSA Management on behalf of SINSW, it has been determined that there are a number of areas within the study area which will not be subject to development or landscaping as part of the proposed works and will be maintained as a natural ground areas in the south-eastern portion of the study area. It is proposed that the artefacts will be reburied on site somewhere within this location.

Recommendation 5: Discovery of unanticipated heritage items

Aboriginal objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the OEH. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the OEH and Aboriginal stakeholders.

Aboriginal ancestral remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

4. immediately cease all work at that location and not further move or disturb the remains
5. notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location
6. not recommence work at that location unless authorised in writing by OEH.

Recommendation 6: Continued consultation with registered Aboriginal stakeholders

As per the consultation requirements, it is recommended that the proponent provides a copy of this draft report to the Aboriginal stakeholders and considers all comments received. The proponent should continue to inform these groups about the management of Aboriginal cultural heritage sites within the study area throughout the life of the project.

Recommendation 7: Lodgement of final report

A copy of the final report will be sent to the RAPs, the client, OEH and the AHIMS register for their records.

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Appendices

Appendix 1 Consultation log

Stage 1 – Notification of project proposal and registration of interest

Step 1- Identification of Aboriginal people/parties with an interest in the proposed study area

Organisation contacted	Date and type of contact	Date and type of response	Response details
OEH	17/9/2018 – email	18/9/2018 – email	Provided a list of Aboriginal stakeholder groups in the Blacktown region
Native Title Services CORP Limited	17/9/2018 – email	N/A	N/A
Office of the Registrar, Department of Aboriginal Affairs	17/9/2018 – email	26/9/2018	The study area does not have any Registered Aboriginal Owners
Greater Sydney Local Land Services	17/9/2018 – email	24/9/2018 – email	Recommends contacting OEH for contact list of people and organisations who may have an interest in the project
NNTT	17/9/2018 – email	20/9/2018 – email	No native title registered in the study area
Blacktown City Council	17/9/2018 – email	18/10/2018 – email	Confirmed that stakeholder lists are confidential and recommended contacting OEH
Deerubbin Local Aboriginal Land Council	17/9/2018 – email	N/A	N/A

Step 2- Public advertisement

The public notice was published in the *Rouse Hill Times*. The wrong version of the public notice was published on the 10 October 2018; therefore, an additional public notice was advertised on the 28 November 2018. No new Aboriginal parties registered for the project as a result of the republication. A copy of the advertisements are provided in Appendix 2.

Step 3- Registration of interest

The registration period ran from the 3 October 2017 to 17 October 2018. Leeway was given to Aboriginal parties/groups who provided responses shortly after the close of this period and they have been registered as Aboriginal parties for consultation.

Organisation contacted	Date and type of contact	Date and type of response	Response details
Aboriginal Archaeology Service	N/A	10/10/2018 – email	Registered an interest
Amanda Hickey Cultural Services	3/10/2018 – letter	Date unknown – letter	Letter inviting registration of interest returned to sender; attempted to contact by phone but no response

Organisation contacted	Date and type of contact	Date and type of response	Response details
Badu	3/10/2018 – letter	N/A	N/A
Barking Owl Aboriginal Corporation	3/10/2018 – email	13/10/2018 – email	Registered an interest
Biamanga	3/10/2018 – email	N/A	N/A
Bidjawong Aboriginal Corporation	3/10/2018 – letter	N/A	N/A
Bilinga Cultural Heritage Technical Services	3/10/2018 – email	N/A	N/A
Billinga	3/10/2018 – email	N/A	N/A
Butucarbin Aboriginal Corporation	3/10/2018 – email	12/10/2018 – email	Registered an interest
Cullendulla	3/10/2018 – email	N/A	N/A
Darug Aboriginal Cultural Heritage Assessments	3/10/2018 – letter	N/A	N/A
Darug Boorooberongal Elders Aboriginal Corporation	3/10/2018 – email	N/A	N/A
Darug Boorooberongal Elders Aboriginal Corporation	3/10/2018 – email	4/10/2018 – email	Registered an interest
Darug Custodian Aboriginal Corporation	3/10/2018 – email	N/A	N/A
Darug Land Observations	3/10/2018 – email	15/10/2018 – email	Registered an interest
Darug Tribal Aboriginal Corporation	3/10/2018 – letter	10/10/2018 – email	Registered an interest
Deerubbin Local Aboriginal Land Council	3/10/2018 – letter	N/A	No response was received but Deerubbin LALC was registered for consultation
Des Dyer – Darug Aboriginal Land Care	3/10/2018 – letter	7/10/2018 – email	Registered an interest
Dharug	3/10/2018 – email	N/A	N/A
Dhinawan-Dhigaraa Culture & Heritage Pty Ltd	3/10/2018 – email	N/A	N/A
Dhinawan-Dhigaraa Culture & Heritage Pty Ltd	3/10/2018 – email	N/A	N/A
Didge Ngunawal Clan	3/10/2018 – email	3/10/2018 – email	Registered an interest
DJMD Consultancy	3/10/2018 – email	N/A	N/A

Organisation contacted	Date and type of contact	Date and type of response	Response details
Ginninderra Aboriginal Corporation	3/10/2018 – email	N/A	N/A
Goobah Developments	3/10/2018 – letter	N/A	N/A
Gulaga	3/10/2018 – email	N/A	N/A
Gunjeewong Cultural Heritage Aboriginal Coporation	3/10/2018 – email	N/A	N/A
Gunyuu	3/10/2018 – email	N/A	N/A
Gunyuu Cultural Heritage Technical Services	3/10/2018 – email	N/A	N/A
HSB Consultants	3/10/2018 – letter	N/A	N/A
Jerringong	3/10/2018 – email	N/A	N/A
Kawul Cultural Services	3/10/2018 – email	N/A	N/A
Merrigarn Indigenous Corporation	3/10/2018 – letter	13/10/2018 – email	Registered an interest
Minnamunnung	3/10/2018 – letter	N/A	N/A
Mununga	3/10/2018 – email	N/A	N/A
Munyunga Cultural Heritage Technical Services	3/10/2018 – email	N/A	N/A
Muragadi	N/A	13/10/2018 – email	Registered an interest
Murra Bidgee Mullangari Aboriginal Corporation	3/10/2018 – letter	13/10/2018 – email	Registered an interest
Murramarang	3/10/2018 – email	N/A	N/A
Murrumbul	3/10/2018 – email	N/A	N/A
Murrumbul Cultural Heritage Technical Services	3/10/2018 – email	N/A	N/A
Nerrigundah	3/10/2018 – email	N/A	N/A
Nundagurri	3/10/2018 – email	N/A	N/A
Pemulwuy CHTS	3/10/2018 – email	N/A	N/A
Phil Khan - Kamilaroi Yankuntjatjara Working Group	3/10/2018 – letter	3/10/2018 – phone	Registered an interest
Rane Consulting	3/10/2018 – email	N/A	N/A

Organisation contacted	Date and type of contact	Date and type of response	Response details
Thauaira	3/10/2018 – email	N/A	N/A
Thoorga Nura	3/10/2018 – email	N/A	N/A
Tocomwall	3/10/2018 – letter	N/A	N/A
Wailwan Aboriginal Digging Group	3/10/2018 – email	N/A	N/A
Walbunja	3/10/2018 – email	N/A	N/A
Walgalu	3/10/2018 – email	N/A	N/A
Warragil Cultural Services	3/10/2018 – email	N/A	N/A
Widescope Indigenous Group	3/10/2018 – letter	N/A	N/A
Wingikara	3/10/2018 – email	N/A	N/A
Wingikara Cultural Heritage Technical Services	3/10/2018 – email	N/A	N/A
Wullung	3/10/2018 – letter	N/A	N/A
Wurrymay Consultancy	3/10/2018 – email	N/A	N/A
Yerramurra	3/10/2018 – email	N/A	N/A

Step 4- Confirmation of RAPs

Organisation contacted	Date and type of contact	Date and type of response	Response details
OEH	20/12/2018 – email	N/A	N/A
Deerubbin Local Aboriginal Land Council	20/12/2018 – email	N/A	N/A

Stage 2 – Presentation of information about the proposed project

Step 1- Provision of project information pack

A copy of the information pack is provided in Appendix 3 and a copy of the covering email is provided following.

Organisation contacted	Date and type of contact	Date and type of response	Response details
Aboriginal Archaeology Serivice	5/11/2018 – email	N/A	N/A

Organisation contacted	Date and type of contact	Date and type of response	Response details
Barking Owl Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Butucarbin Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Des Dyer - Darug Aboriginal Land Care	5/11/2018 – email	N/A	N/A
Darug Boorooberongal Elders Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Darug Land Observations	5/11/2018 – email	N/A	N/A
Darug Tribal Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Deerubbin Local Aboriginal Land Council	5/11/2018 – email	N/A	N/A
Didge Ngunawal Clan	5/11/2018 – email	N/A	N/A
Merrigarn Indigenous Corporation	5/11/2018 – email	N/A	N/A
Muragadi	5/11/2018 – email	N/A	N/A
Murra Bidgee Mullangari Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Phil Khan - Kamilaroi Yankuntjatjara Working Group	5/11/2018 – letter	N/A	N/A

Stage 3 – Gathering information about cultural significance

Step 1- Provision of project methodology pack and consultation meeting

A copy of the methodology pack is provided in Appendix 3 and a copy of the covering email is provided following.

Organisation contacted	Date and type of contact	Date and type of response	Response details
Aboriginal Archaeology Serivice	5/11/2018 – email	3/12/2018 – email	Supports the methodology and suggests that recovered artefacts be reburied within the study area
Barking Owl Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Butucarbin Aboriginal Corporation	5/11/2018 – email	4/12/2018 – email	Supports the methodology

Organisation contacted	Date and type of contact	Date and type of response	Response details
Des Dyer - Darug Aboriginal Land Care	5/11/2018 – email	10/11/2018 – email	Supports the methodology
Darug Boorooberongal Elders Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Darug Land Observations	5/11/2018 – email	14/11/2018 – email	Supports the methodology and suggests that recovered artefacts be displayed in a museum, local library or local government building, or reburied within the study area
Darug Tribal Aboriginal Corporation	5/11/2018 – email	N/A	N/A
Deerubbin Local Aboriginal Land Council	5/11/2018 – email	N/A	N/A
Didge Ngunawal Clan	5/11/2018 – email	N/A	N/A
Merrigarn Indigenous Corporation	5/11/2018 – email	8/11/2018 – email	Supports the methodology
Muragadi	5/11/2018 – email	N/A	N/A
Murra Bidgee Mullangari Aboriginal Corporation	5/11/2018 – email	21/11/2018 – email	Supports the methodology
Phil Khan - Kamilaroi Yankuntjatjara Working Group	5/11/2018 – email	9/11/2018 – letter	Supports the methodology

Step 2- Field survey

Organisation contacted	Date and type of contact	Date and type of response	Response details
Deerubbin Local Aboriginal Land Council	15/11/2018 – phone	15/11/2018 – phone	Confirmed attendance for field survey

Step 3- Test excavations

Organisation contacted	Date and type of contact	Date and type of response	Response details
OEH	25/01/2019 – letter	31/01/2019 – email	Confirmed receipt of letter notifying of test excavations; requested digital copy of letter
Barking Owl Aboriginal Corporation	07/02/2019 – email	07/02/2019 – email	Confirmed attendance at test excavations
Deerubbin Local Aboriginal Land Council	07/02/2019 – email	08/02/2019 – email	Confirmed attendance at test excavations

Organisation contacted	Date and type of contact	Date and type of response	Response details
Des Dyer – Darug Aboriginal Land Care	07/02/2019 – email	07/02/2019 – email	Confirmed attendance at test excavations
Phil Khan - Kamilaroi Yankuntjatjara Working Group	07/02/2019 – email	14/02/2019 – email	Confirmed attendance at test excavations

Stage 4 – Review of draft report

To be completed following the review and comments from RAPs after the statutory 28 day period.

6.8 CONSTRUCTION TRAFFIC AND PEDESTRIAN MANAGEMENT SUB-PLAN

The Construction Traffic & Pedestrian Management Sub-Plan has been prepared by Jim's Traffic for the Project.

It is not embedded in this document; it is supplied as an attached appendix so that it can be displayed/updated/revised in isolation if required.

Version 2.2
11/03/2022

Construction Traffic Management Plan

Job Site 28 Farmland Drive,
Schofields, 2762

RICHARD CROOKES
CONSTRUCTIONS

Jim's Traffic Control

Table of Contents

Alex Avenue Public School (SSD 9368): Submission of Construction Traffic and Pedestrian Management Sub-Plan in accordance with Condition B16 & B13

Condition	Condition requirements	Document reference
B16	The Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) must address, but not be limited to, the following: (a) be prepared by a suitably qualified and experienced person(s);	Appendix F, CEMP rev 2 – 03/06/20: SSD 9368 - B16 - CTPMSP - Jims Traffic - v2.0 – 18/02/2022 Credentials, p24
	(b) be prepared in consultation with Council and TfNSW;	Council Consultation, p21
	(c) detail the measures that are to be implemented to ensure road safety and network efficiency during construction in consideration of potential impacts on general traffic, cyclists and pedestrians and bus services;	Environmental, p20-22
	(d) detail heavy vehicle routes, access and parking arrangements;	Egress, pp5-20
	(e) include a Driver Code of Conduct to: (i) minimise the impacts of earthworks and construction on the local and regional road network;	Drivers' Code of Conduct, p21
	(ii) minimise conflicts with other road users;	Drivers' Code of Conduct, p21

	(iii) minimise road traffic noise; and	Drivers' Code of Conduct, p21
	(iv) ensure truck drivers use specified routes;	Access/Egress of Vehicles, pp5-20
	(f) include a program to monitor the effectiveness of these measures; and	TCP Monitoring and Reporting, p24
	(g) if necessary, detail procedures for notifying residents and the community (including local schools), of any potential disruptions to routes.	Disruption to neighbours, p21
B13	(a) detailed baseline data;	Not applicable.
	(b) details of: (i) the relevant statutory requirements (including any relevant approval, license or lease conditions);	Traffic Control Signs and Devices, p 24
	(ii) any relevant limits or performance measures and criteria; and	Objectives, p4
	(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Objectives, p4
	(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Traffic Control Plan (TCP), p23
	(d) a program to monitor and report on the:	

	(i) impacts and environmental performance of the development;	TCP Monitoring and Reporting, p24
	(ii) effectiveness of the management measures set out pursuant to paragraph (c) above;	TCP Monitoring and Reporting, p24
	(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Environmental, p22
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Not applicable.
	(g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);	TCP Monitoring and Reporting, p24
	(ii) complaint;	See Richard Crookes Construction, CEMP, Section 14
	(iii) failure to comply with statutory requirements; and	TCP Monitoring and Reporting, p24
	(h) a protocol for periodic review of the plan.	TCP Monitoring and Reporting, p24

About This Project

Background:

This CTMP relates to SSDA 9368 for the stage 2 development of The Proposed Development.
Company responsible for Construction: Richard Crookes Construction®
Approved: TBC
Consent to Operate from: TBC
Consent to Lapse on: TBC

Location:

The Work Site is located at 28 Farmland Drive, Schofields, 2762

Figure 1 – Location of Work Site

Figure 2 – Location of Work Site

Purpose:

The Purpose of this report is to satisfy the TfNSW and Blacktown City Council's requirements and describe how Richard Crookes Construction® proposes to manage traffic and pedestrian movements safely whilst carrying out their respective activities.

Objectives:

The key objectives of this CTMP are:

- To satisfy TfNSW and Blacktown City Blacktown City council conditions related to Traffic, Transport and Access. Placeholder for Council Consultation to be organised following approval of consent from DPIE.
- To ensure no one is injured on the project and there is no property damage.
- To maximize the value and outcomes of traffic monitoring activities.
- To actively monitor traffic impacts related to the construction works so that information can be applied to the planning and implementation of traffic control plans.
- To minimise delays to traffic and consider the needs of all road users.
- Ensure compliance with relevant specifications and the TfNSW's – 'Traffic Control at Work Sites' Manual Version 6.

Construction

Construction Activities:

Stage 1: Site Leveling (2 weeks)
Stage 2: Site Establishment (1 week)
Stage 3: Construction (24 weeks)
Stage 3: Landscaping and finishing works (3 weeks).

Working Hours:

Monday – Friday: 7am – 6pm
Saturday: 8am – 1pm
No work is permitted on Sundays or Public Holidays

Work Zones:

There will be no Work Zones in place for this project. Works will be conducted from the confines of the site during construction.

Access/Egress of Vehicles:

Vehicles will move in and out of the site in a forward direction. A speed limit of 5km/h will be maintained at all times whilst within the site area. Advanced warning and directional signage will be placed upon entry and exit of the construction site. The signage will guide drivers to the construction site.

The vehicles' 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.

All exiting trucks will be loaded to their prescribed weight limits. All trucks will be covered by tarpaulin or like prior to exiting the site as required. All vehicles leaving the site must be free of mud or any other debris. The Site manager is responsible for all vehicles accessing and egressing the site. At points of vehicle egress the driver will ensure vehicles give way to pedestrians and cyclists before exiting.

During times of Access and Egress, certified TfNSW accredited Traffic Controllers will be on site.

This CTMP and all plans associated with it will be given to all drivers visiting the site prior to arrival.

Figure 3 – Main Access Route

Access Routes:

Access to the site will take place at one location. This will be from the Eastern end of Farmland Drive as seen below.

Vehicles accessing the site will use State roads unless otherwise stated in this document.

1. Vehicles will approach the site using the Access routes outlined in this document.
2. Vehicles accessing the site using either the Northern, Eastern, Southern or Western Access Routes below.
3. Vehicles accessing the site will do so as shown below moving in a forward direction.
4. Certified traffic controllers will be on site to assist with significant vehicle movements to the site.

Northern Access:

1276 A2
Riverstone NSW 2765

Head east on Windsor Rd/A2
4.9 km

Use the right 2 lanes to turn right onto Schofields Rd
3.3 km

Turn left onto Alex Ave
300 m

Turn right onto Farmland Dr
Destination will be on the left
650 m

28 Farmland Dr
Schofields NSW 2762

Eastern Access:

71 Huntingwood Dr
Huntingwood NSW 2766

Take M7, Richmond Rd, South St and Schofields Rd to Alex Ave in Schofields
17 min (16.9 km)

Head west on M4
84 m

At the Light Horse junction, Use the left lane to follow signs for M7 towards Newcastle
Toll road
Parts of this road may be closed at certain times or on certain days
8.3 km

Take the exit towards Richmond Rd/Blacktown/Windsor/Richmond
Toll road
400 m

Use the middle lane to turn right onto Rooty Hill Rd N (signs for Blacktown/Oakhurst)
190 m

Turn left onto Richmond Rd
3.1 km

Use the right 2 lanes to turn right onto South St
2.6 km

Continue onto Schofields Rd
2.1 km

Drive to Farmland Dr
2 min (1.0 km)

Turn right onto Alex Ave
300 m

Turn right onto Farmland Dr
Destination will be on the left
650 m

28 Farmland Dr
Schofields NSW 2762

Southern Access:

M7
Eastern Creek NSW 2766

Take M7 and Richmond Rd to Alex Ave in Schofields
16 min (16.5 km)

- Head north on M7
  Toll road
  8.0 km
- Take the exit towards Richmond Rd/Blacktown/Windsor/Richmond
  Toll road
  400 m
- Use the middle lane to turn right onto Rooty Hill Rd N (signs for Blacktown/Oakhurst)
  190 m
- Turn left onto Richmond Rd
  3.1 km
- Use the right 2 lanes to turn right onto South St
  2.6 km
- Continue onto Schofields Rd
  2.1 km

Drive to Farmland Dr
2 min (1.0 km)

- Turn right onto Alex Ave
  300 m
- Turn right onto Farmland Dr
  Destination will be on the left
  650 m

28 Farmland Dr
Schofields NSW 2762

Western Access:

31 Farrington St
Minchinbury NSW 2770

Take M7, Richmond Rd, South St and Schofields Rd to Alex Ave in Schofields
16 min (16.6 km)

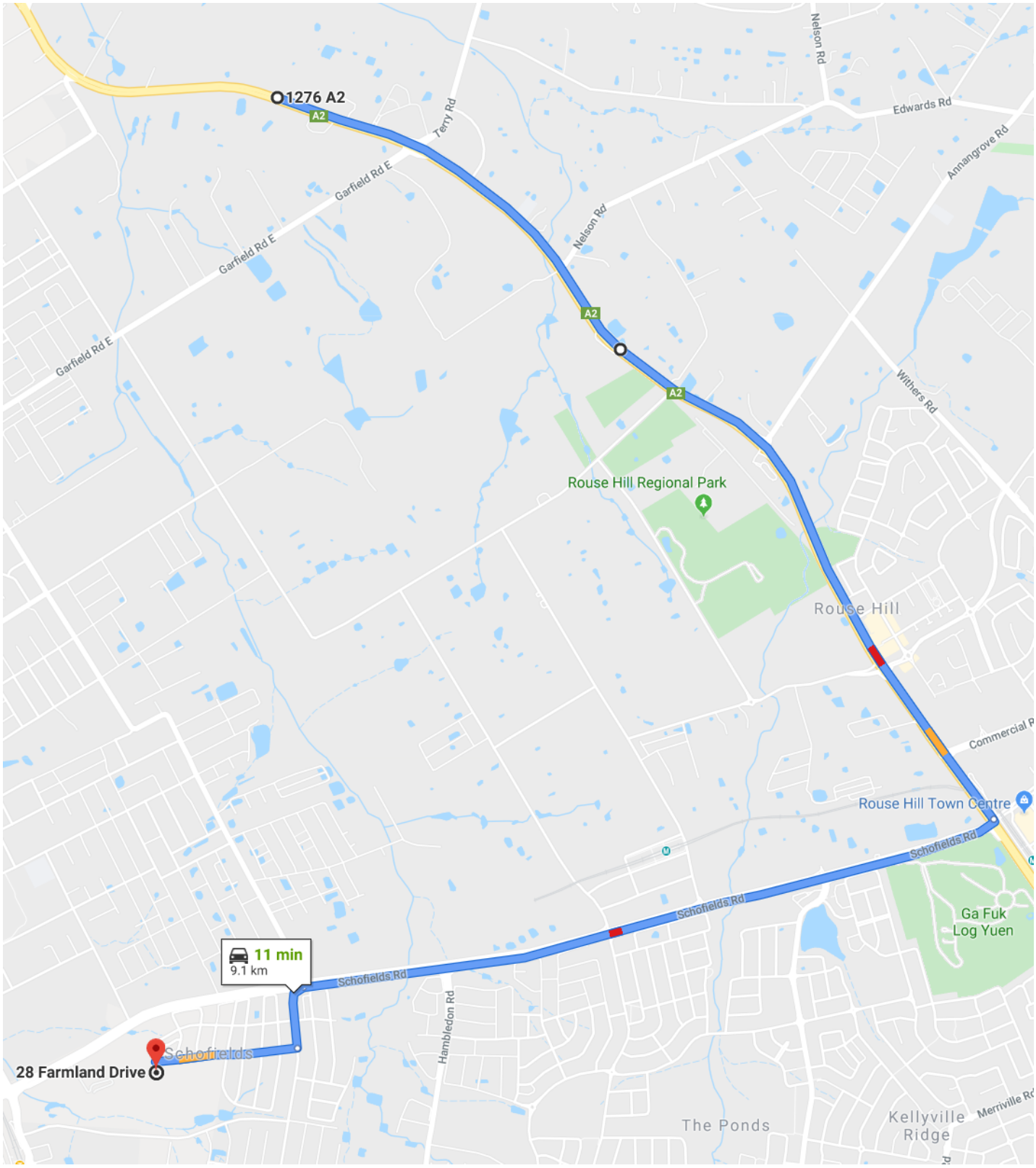
- Head east on M4
  120 m
- At the Light Horse junction, Use the left lane to follow signs for M7 towards Newcastle
  Toll road
  8.1 km
- Take the exit towards Richmond Rd/Blacktown/Windsor/Richmond
  Toll road
  400 m
- Use the middle lane to turn right onto Rooty Hill Rd N (signs for Blacktown/Oakhurst)
  190 m
- Turn left onto Richmond Rd
  3.1 km
- Use the right 2 lanes to turn right onto South St
  2.6 km
- Continue onto Schofields Rd
  2.1 km

Drive to Farmland Dr
2 min (1.0 km)

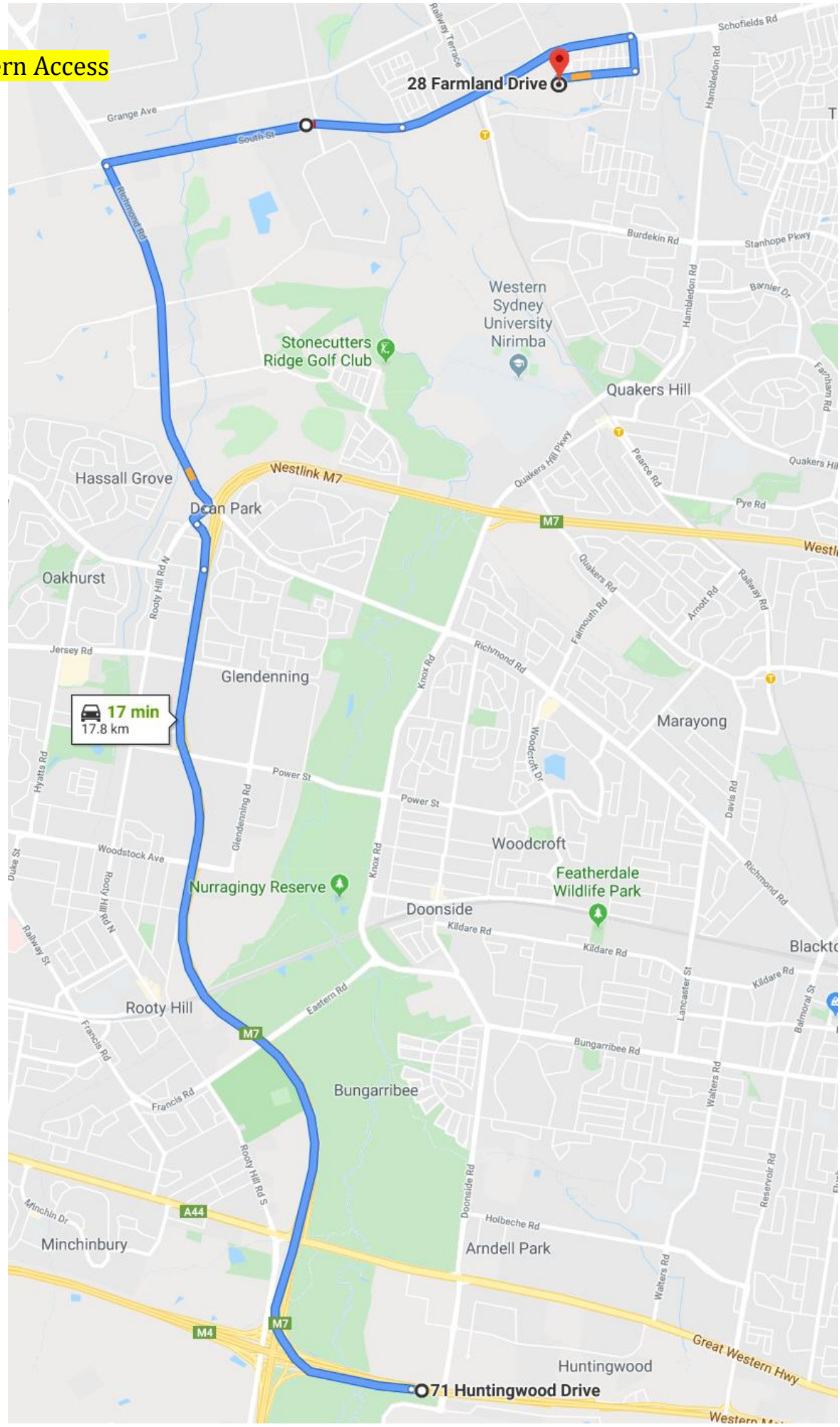
- Turn right onto Alex Ave
  300 m
- Turn right onto Farmland Dr
  Destination will be on the left
  650 m

28 Farmland Dr
Schofields NSW 2762

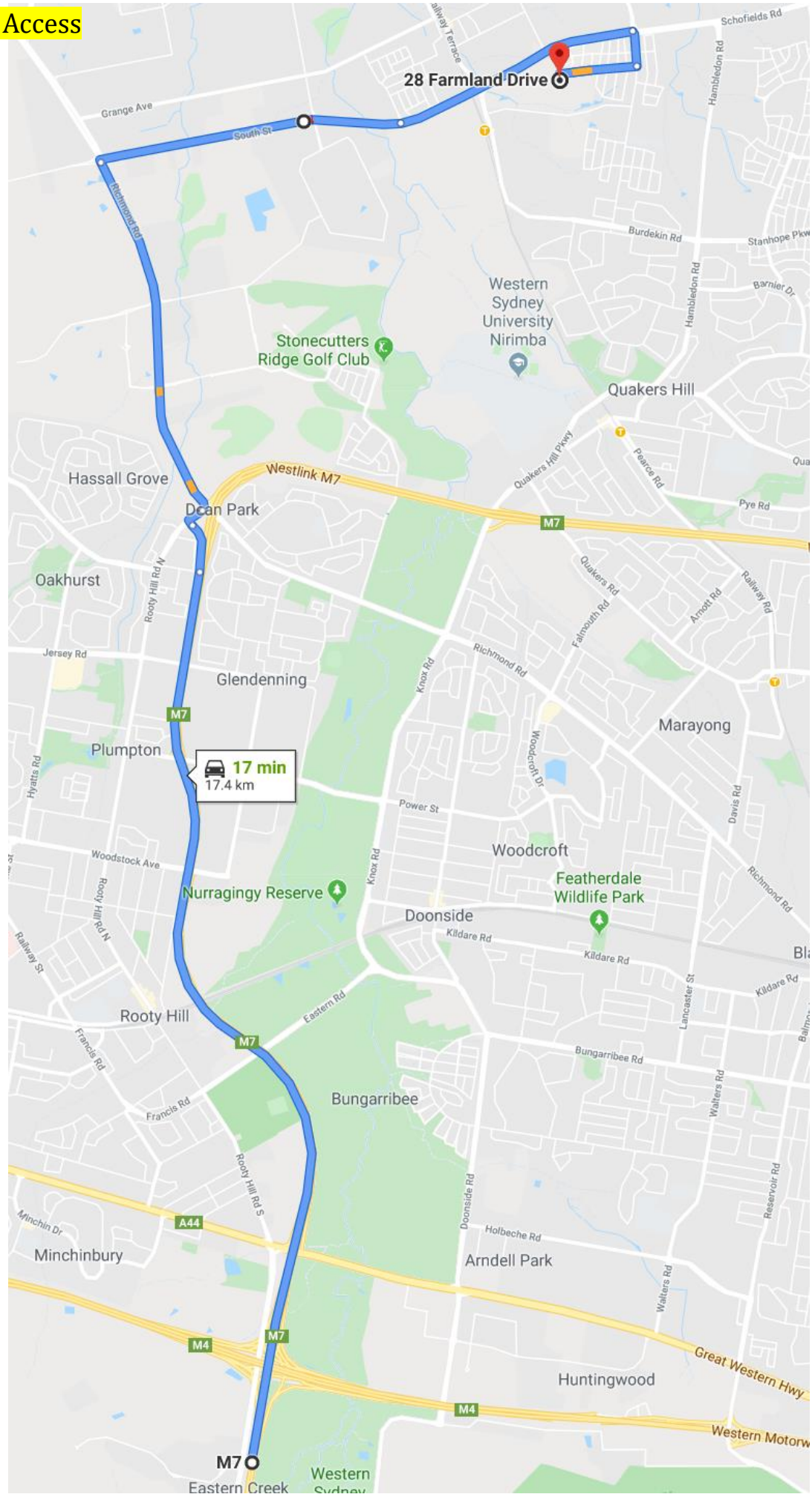
Northern Access



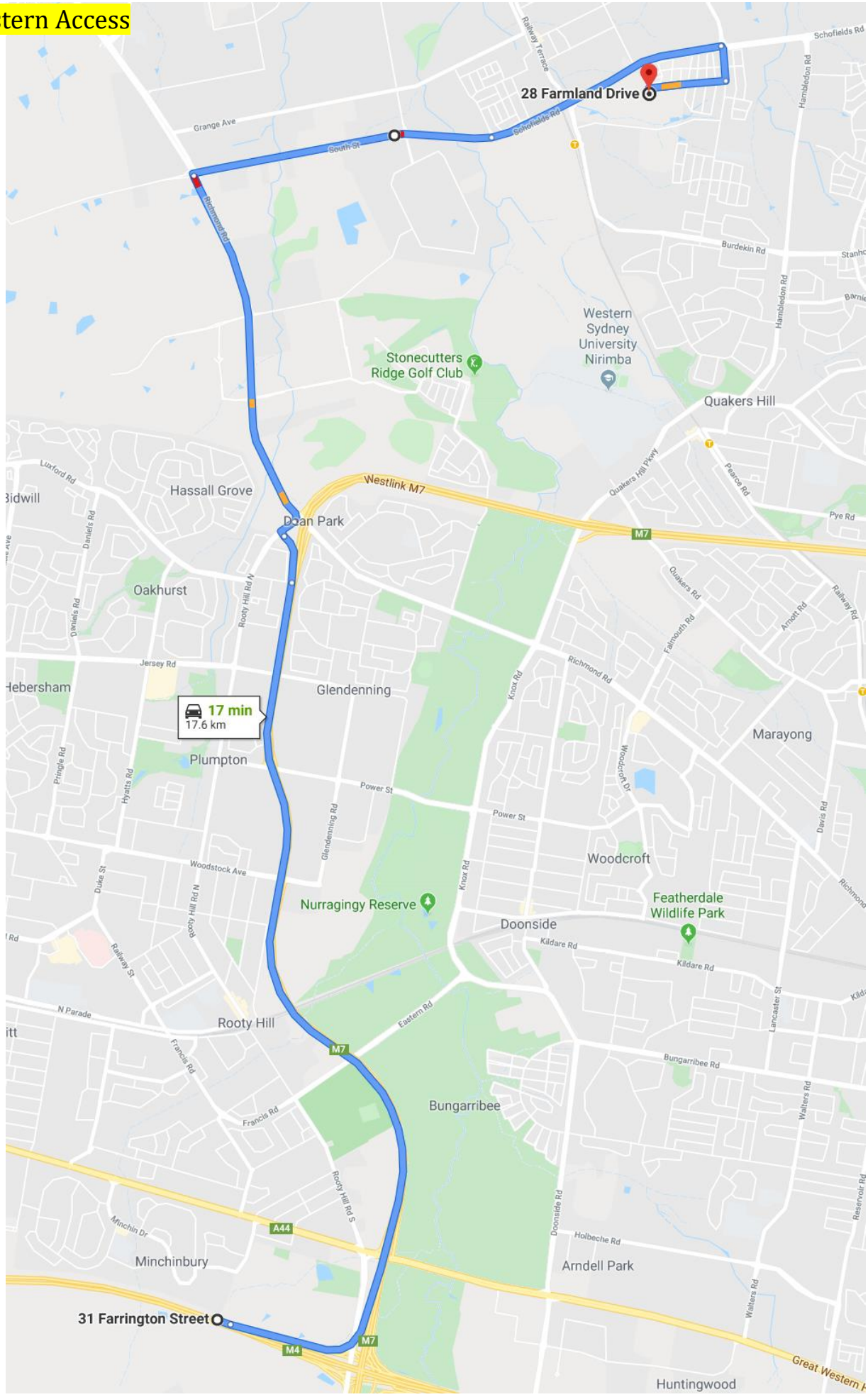
Eastern Access



Southern Access



Western Access



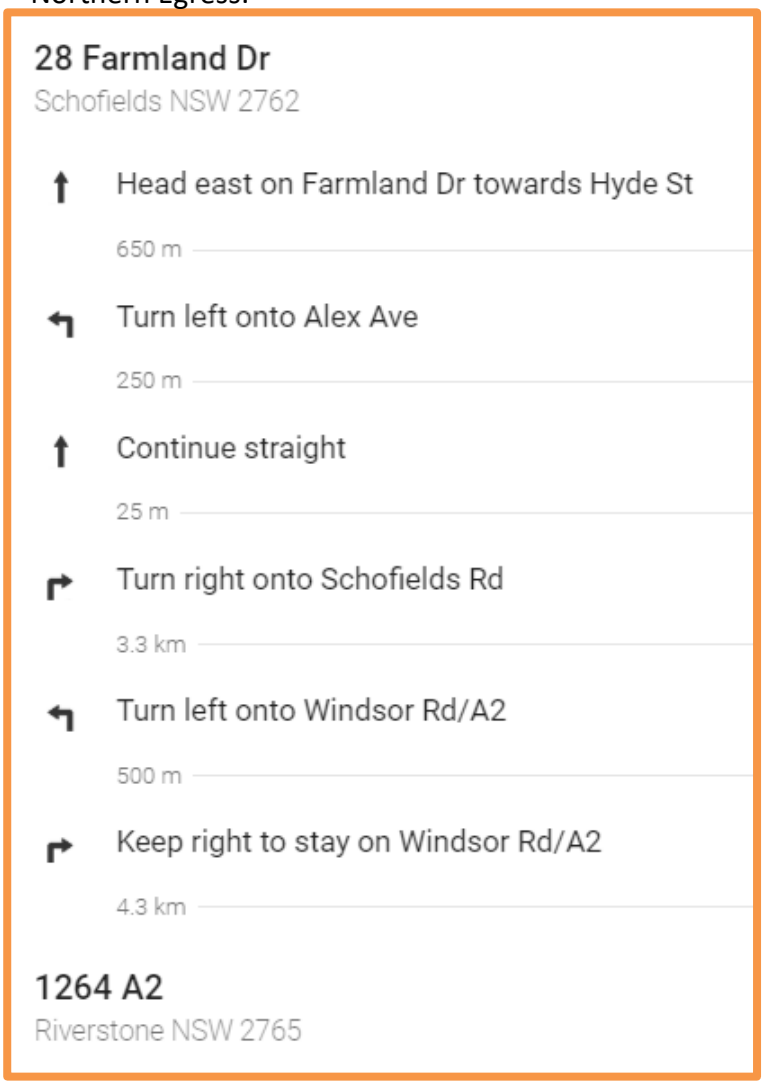
Egress:

Exiting trucks will be loaded to their prescribed weight limits. All trucks will be covered by tarpaulin or like prior to exiting the site as required and will exit the site on the following basis:

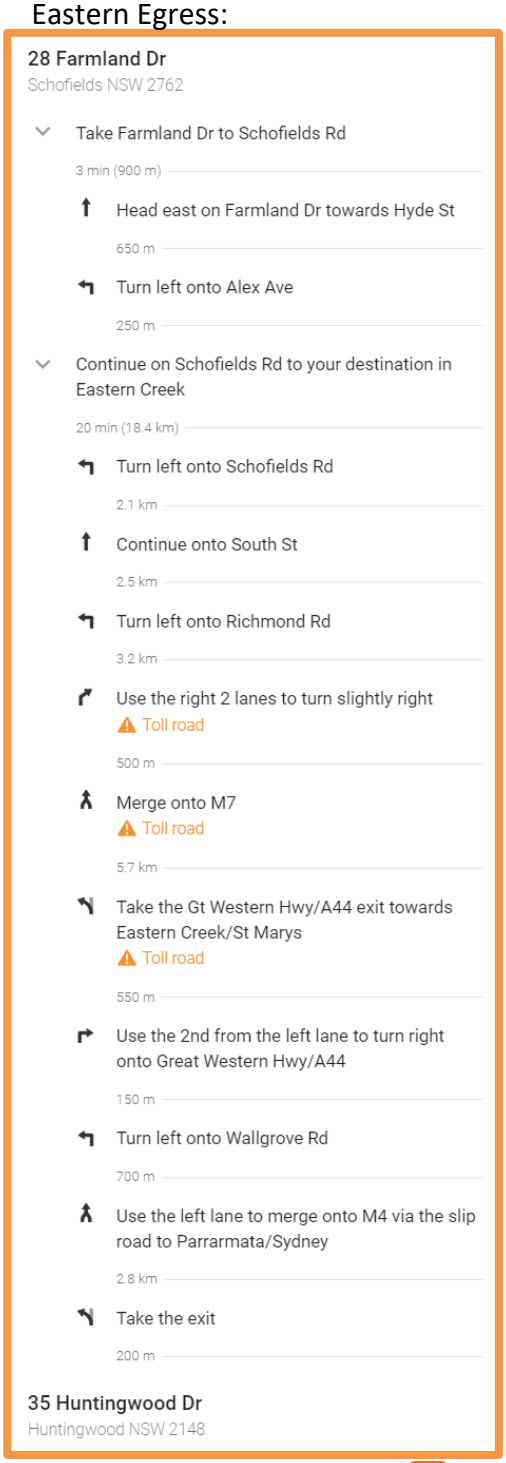
Egress from the site will be from one location as with the access point – Eastern end of Farmland Drive as seen below.

1. Vehicles will exit the site using caution and are to give way to pedestrians, cyclists or vehicles already on the road.
2. Vehicles exiting the site will follow either the Northern, Eastern, Southern or Western egress routes below.
3. Vehicles exiting the site will do so as shown below moving in a forward direction.

Northern Egress:



Eastern Egress:



Southern Egress:

28 Farmland Dr
Schofields NSW 2762

- Head east on Farmland Dr towards Hyde St
  650 m
- Turn left onto Alex Ave
  250 m
- Turn left onto Schofields Rd
  2.1 km
- Continue onto South St
  2.5 km
- Turn left onto Richmond Rd
  3.2 km
- Use the right 2 lanes to turn slightly right
  ⚠ Toll road
  500 m
- Merge onto M7
  ⚠ Toll road
  8.4 km

M7
Eastern Creek NSW 2766

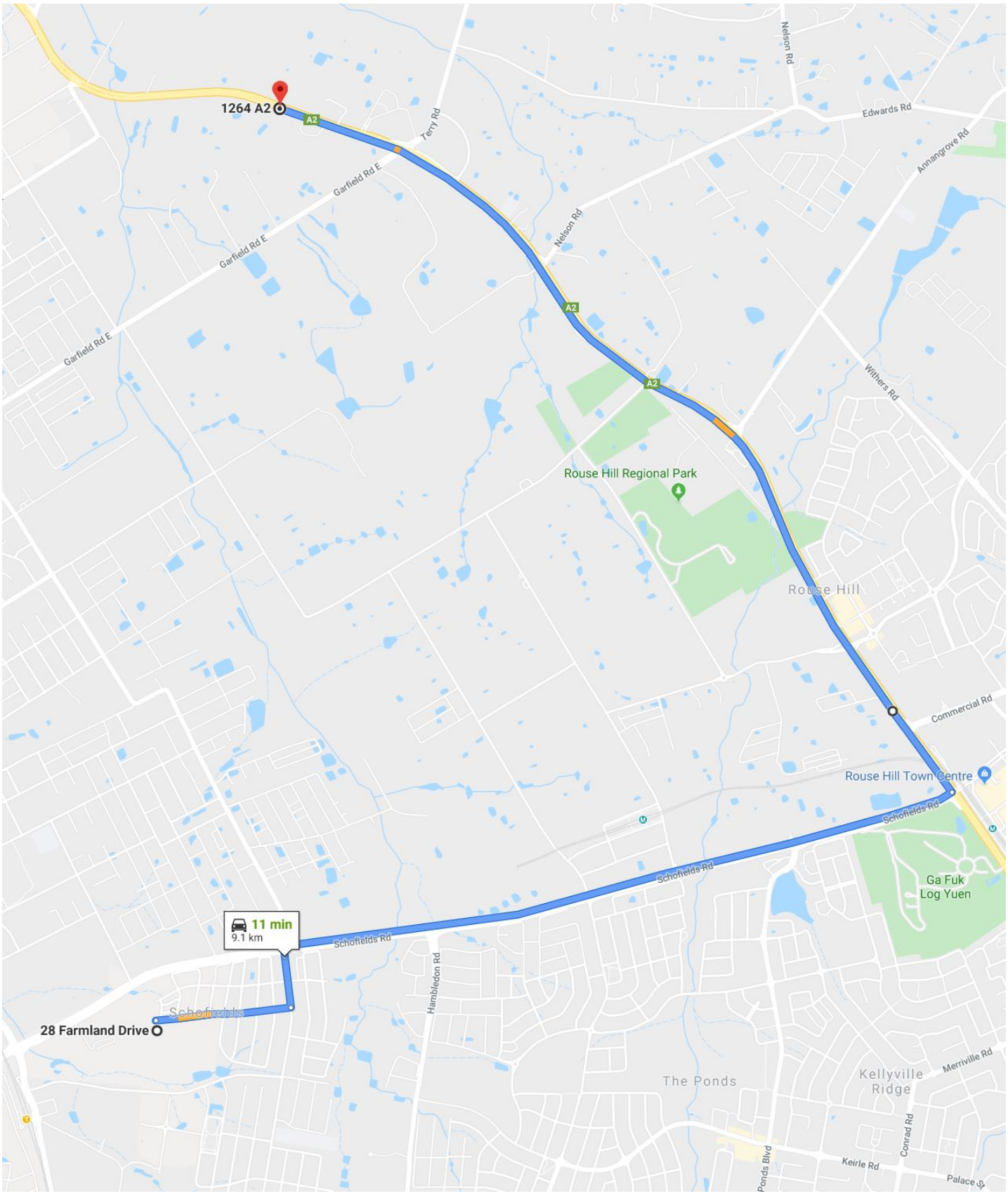
Western Egress:

28 Farmland Dr
Schofields NSW 2762

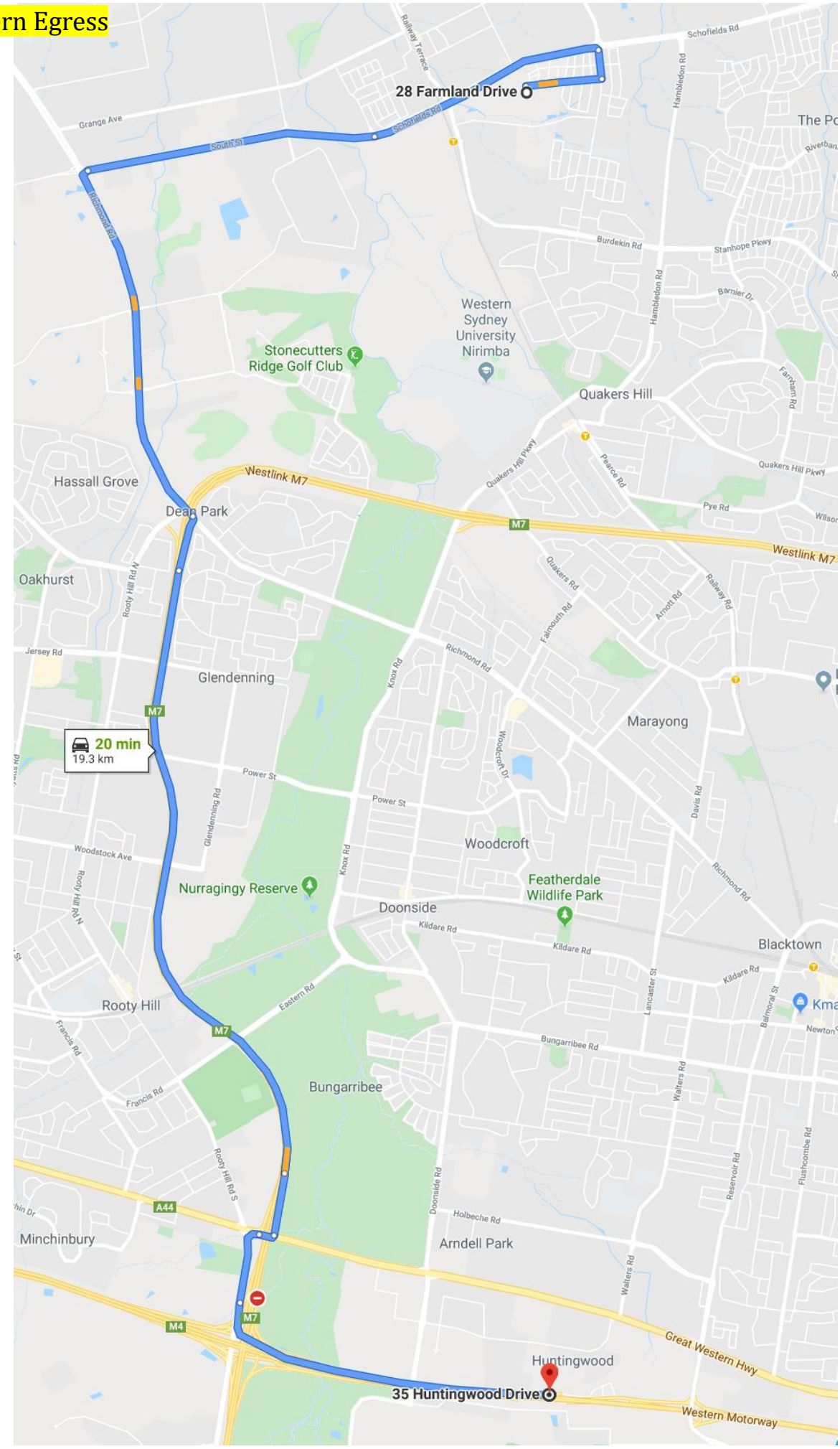
- Take Farmland Dr to Schofields Rd
  3 min (900 m)
  - Head east on Farmland Dr towards Hyde St
    650 m
  - Turn left onto Alex Ave
    250 m
- Continue on Schofields Rd. Take South St, Richmond Rd and M7 to Western Motorway/M4 in Eastern Creek
  20 min (17.7 km)
  - Turn left onto Schofields Rd
    2.1 km
  - Continue onto South St
    2.5 km
  - Turn left onto Richmond Rd
    3.2 km
  - Use the right 2 lanes to turn slightly right
    ⚠ Toll road
    500 m
  - Merge onto M7
    ⚠ Toll road
    5.7 km
  - Take the Gt Western Hwy/A44 exit towards Eastern Creek/St Marys
    ⚠ Toll road
    550 m
  - Use the 2nd from the left lane to turn right onto Great Western Hwy/A44
    150 m
  - Turn left onto Wallgrove Rd
    1.1 km
  - Turn right to merge onto Western Motorway/M4 towards Penrith/Blue Mts
    1.9 km

26 Barossa Dr
Minchinbury NSW 2770

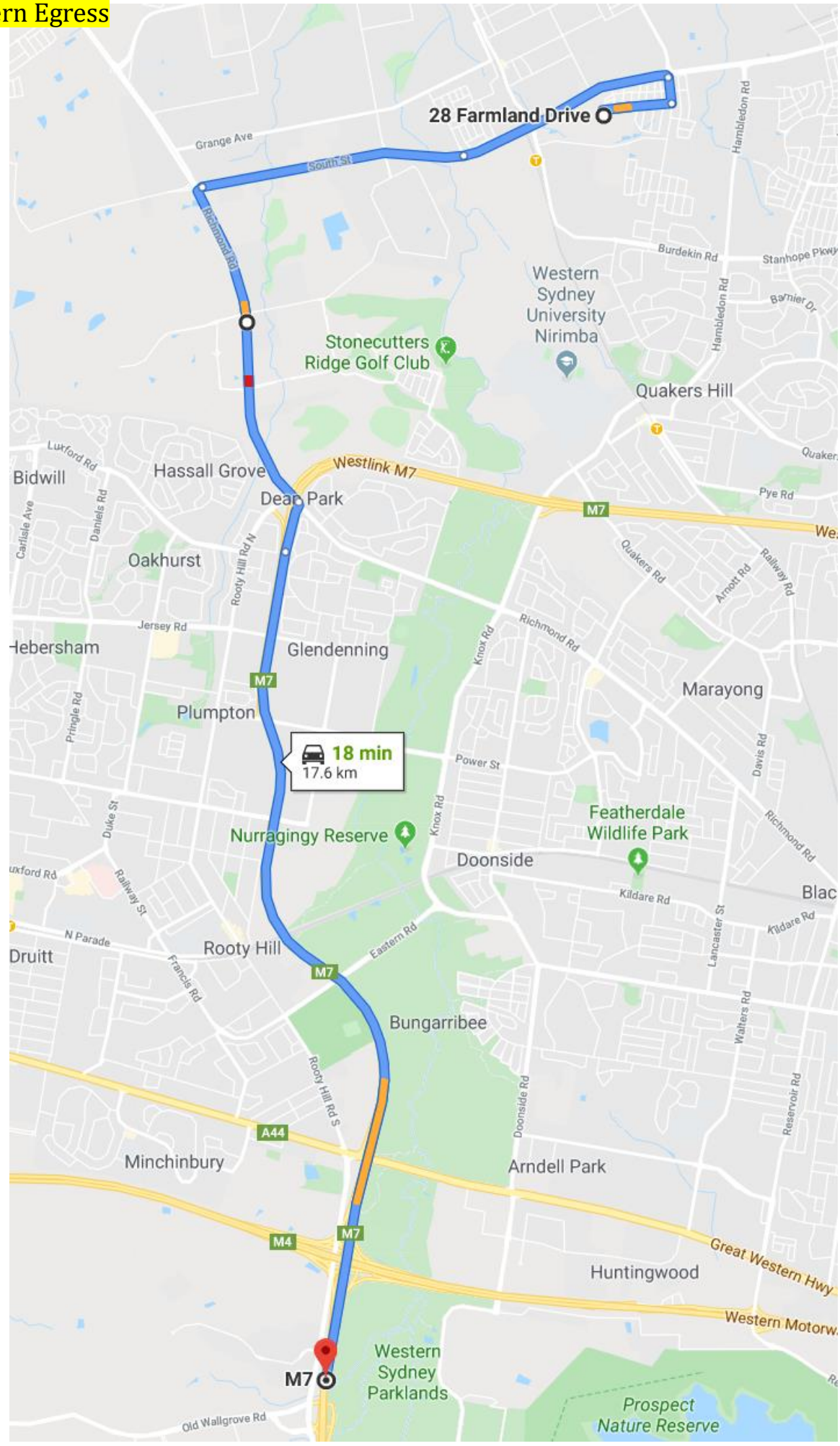
Northern Egress



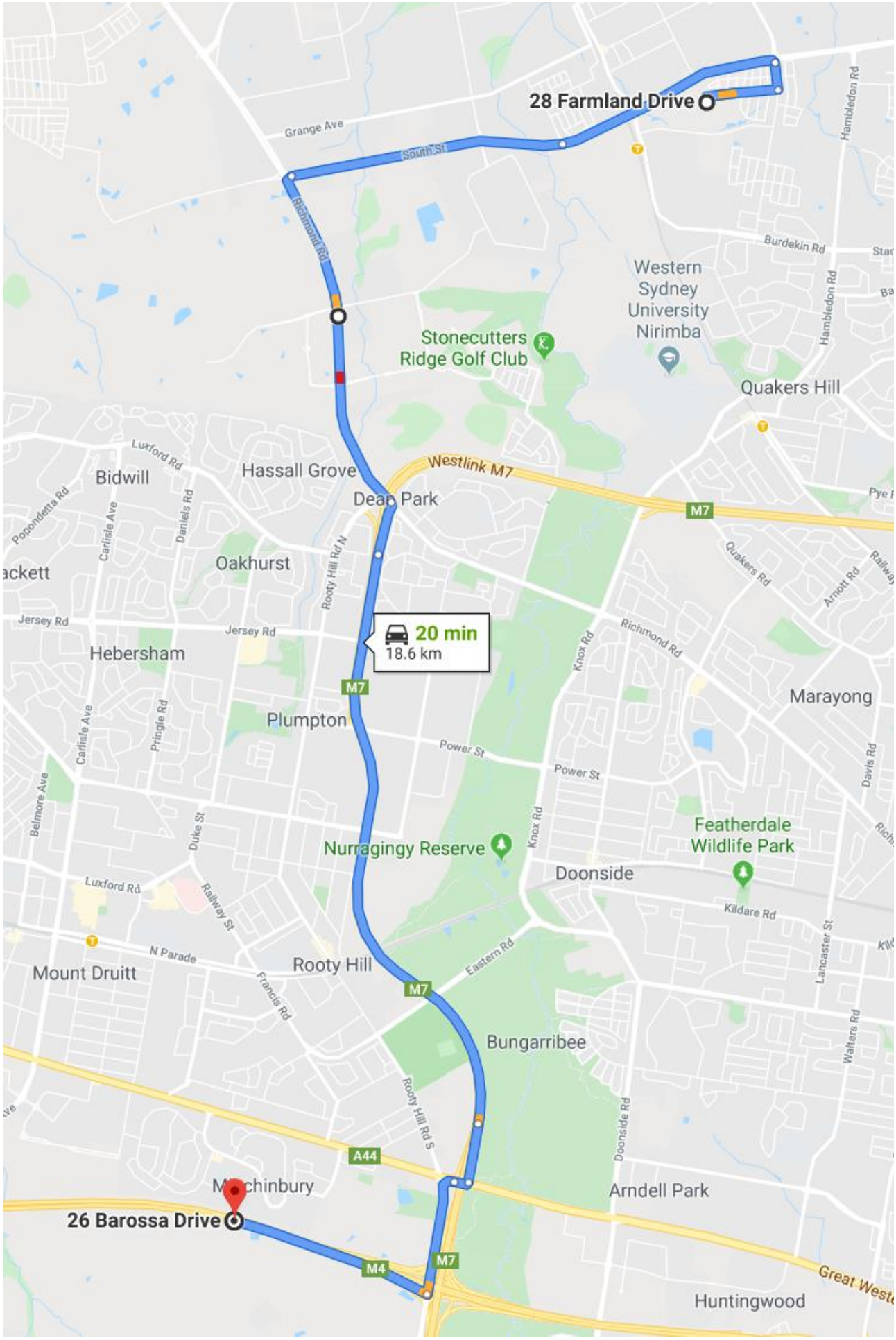
Eastern Egress



Southern Egress



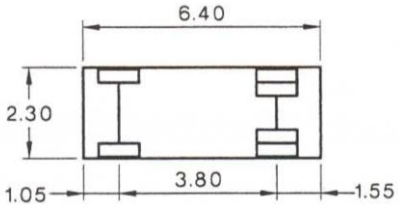
Western Egress



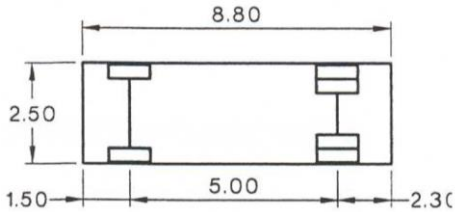
Transport Vehicles:

Richard Crookes Construction® will have an active and ongoing involvement in the management and monitoring of works during the construction phase. They will ensure, as previously mentioned, that no vehicle will make deliveries outside Blacktown City Council's approved DA times as well as that all delivery vehicles will arrive at pre-arranged times to the site. All vehicles approaching the work site will adhere to the road rules and observe any signage in place. At all times access to bike and footpaths will remain unobstructed and consultation with local residents will be ongoing.

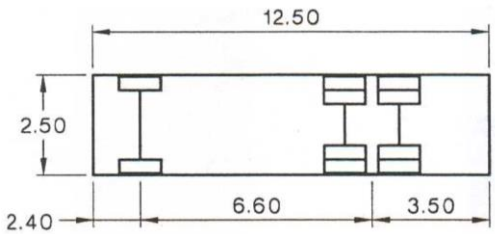
Loading and unloading of vehicles will be done onsite within the property boundaries. There will be a combination of small rigid vehicles (SRV's 6.4m), medium rigid vehicles (MRV's 8.8m), Heavy Rigid Vehicles (HRV's 12.5m) accessing and egressing from the site. The largest vehicle accessing and egressing the site will be an HRV.



(a) Small rigid vehicle
Clearance height 3.50
Design turning radius 7.1



(b) Medium rigid vehicle
Clearance height 4.50
Design turning radius 10.0



(c) Heavy rigid vehicle
Clearance height 4.50
Design turning radius 12.5

Stage	Movements at peak	Range of vehicles during stage	Largest Vehicle
Site Leveling	4-8/day	SRV, MRV, HRV	HRV
Site Establishment	3-5/day	MRV, HRV	HRV
Construction	6-12/day	SRV, MRV, HRV	HRV
Landscaping + Finishing Works	5-8/day	SRV, MRV, HRV	HRV

Tower Cranes and Mobile Cranes:

No tower cranes will be on site. Mobile cranes will be used onsite as required.

Site Sheds, Removal and Storage of Rubbish or Spoil:

All waste/material will be collected on site in a position for easy access for both use on site and removal by trucks. As previously described, all removal trucks will have the load covered by tarpaulin or other means to secure the load.

Impacts and Management

Road/Lane Closures:

The proposed works will not require any road or lane closures.

Pedestrians and cyclists:

All works will take into consideration pedestrians and cyclists. Advanced warning signage will be in place to warn pedestrians of the entry and exiting of vehicles to and from the site.

Only authorised personnel will be permitted within the building site unless accompanied by site management (1.8m chain wire fencing will surround the perimeter), if not inducted to the site. Whilst within the confines of the building site, all personnel will attire in correct PPE to ensure that they are visible to moving traffic.

No change to the footpaths/bike paths will be made, pedestrians will follow the pathways as normal, likewise for cyclists. Certified traffic controllers will be on site during times of vehicular movements and heavy loading.

Public Transport:

The works will not impact the local public transport network.

Schofields Station is located approx. 2.4km from the site. Bus routes 732 run along Lakeside Parade approx. 850m from the site.

Parking:

Contractors will be encouraged to use public transport and carpool where possible. Facilities will be provided on site for contractors to store tools to reduce the need to bring vehicles to site each day to carry their tools. There will be no onsite parking for the duration of the job. On street parking will be available for the duration of construction.

Emergency Vehicles:

Emergency services will not be affected by the proposed works. If the case, any emergency vehicle required for the site will be given priority and will enter from the Eastern end of Farmland Drive.

Access to Properties and Noise:

The works will not affect access to properties, using pre-arranged arrival times will help to control disturbance (with the required ongoing consultation with residents). Regarding noise impacts Richard Crookes Construction® will keep all noise associated with the works to a minimum. Likewise, no noise will be made outside the approved hours for the site.

Disruption to Neighbours/Residents:

During each stage of work the disruption to residents will be minimised by using the routes highlighted in this CTMP which aims to reduce travel distance through residential areas as well as eliminate movements through shopping and significant public areas. Disruption to neighbours will be minimised by using pre-arranged arrival times for construction vehicles, ensuring no construction vehicles are illegally parked on Council/RMS roads and by conducting a letterbox drop to affected neighbours if any out of hours or disruptive works are required.

Drivers' Code of Conduct:

The below detail the site-specific code of conduct for construction vehicle drivers in addition to the general code of conduct (provisioned by the drivers PCBU) applicable to the vehicle used:

- Be inducted to the site and follow site specific requirements covered in the site induction, toolbox talks, SWMS and pre-start meetings.
- Drivers will strictly adhere to the speed limits both outside and within the site. Speed limits inside the site are generally limited to 5km/h unless otherwise specified and require a spotter in busy/high pedestrian activity areas.
- Drivers must follow their PCBU's fatigue management scheme and ensure this meets the arrival/departure times of Richard Crookes Construction® prior to arriving to site. If timings conflict, the driver must negotiate with Richard Crookes Construction® to ensure a layover area is reserved for the incoming vehicles within the site.
- Compression breaking is to be kept to a minimum whilst within residential areas to minimise the creation of excessive noise that could disturb residents/neighbours.
- Vehicle noise will be kept to a minimum by turning vehicle engines off whilst stationary. Vehicles are not to stay in idle for long periods of time.
- All trucks are to be covered by tarpaulin or like prior to exiting the site. All vehicles leaving the site are to be free of mud or any other debris. Wheel wash facilities are to be used prior to leaving the site.
- Drivers will only use the approved access/egress routes identified within this CTPMP.
- Vehicles are not to park illegally on any RMS or council roads. Whilst within the site area they will be parked wholly within the work zone or site.
- Drivers must follow the instruction of traffic controllers for access/egress movements to the site.
- Ensure vehicles are wholly contained within the work zone and vehicles come to a complete stop before exiting the vehicle or beginning and loading/unloading.
- Heavy Vehicle Access to not occur during school zone hours.
- Drivers to remain within vehicle until within the site and parked in a secure location out of internal access/egress routes.

Council Consultation:

Richard Crookes Construction® will engage council and appropriate authorities' priority to the lodgement and initiation of the project.

Tree Protection:

There are no Tree protection zones indicated on this site.

Environmental:

A range of measures will be in place to manage and minimise any possible impact on the environment in regards to dust control and air emissions. Such measures will include, but not limited to:

- Containment and removal of any hazardous material in accordance with EPA regulations.
- Inclusion of wash down bays or shaker rams.
- Regular cleaning of streets.
- Erosion and Sediment control to perimeter and access road.
- Wheel wash facilities for all vehicles entering and exiting the site.
- Speed limits will be reduced on site to reduces dust and exhaust emissions.
- Monitoring of air emissions throughout the construction process similarly, noise pollution will be minimised through a range of measures such as:
    - Control of noise at source where practicable (e.g. using screenings, shielding).
    - Use of noise suppression covers when plant and machinery in operation.
    - Use of electrically powered plant where possible.
    - Where possible, noisy plant equipment will be kept away from sensitive noise boundaries or alternatively within enclosures.
- Stockpiling of sand, soil and other material shall be stored clear of any drainage line or easement, tree protection zone, water bodies, footpath, kerb or road surface.

A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible can be referenced in the Richard Crookes Construction® CEMP (Section 14, Table 11).

Post Approval – Consultation

Consultation needs to be meaningful, done with courtesy and respect and be well documented. These are people/ organisations that we need to be building meaningful relationships with.

Conditions of all consent can require consultation with a range of stakeholders. Consultation in the post approval world needs to be well documented to satisfy the condition requirements.

Examples include Council, service providers (eg. Electricity gas etc.), consult with local bus provider and TfNSW.

Read each condition carefully, any reference to consult triggers consultation.

Typically on State Significant Development, there will be a specific consultation condition as to how this piece can be appropriately addressed.

Consultation is not:

- A token gesture
- Done at the end of the piece of work,
- An email to the relevant stakeholder with no response;
- A meeting with the stakeholder with no meeting minutes.

Consultation is:

- Meaningful
- Done prior to the requirement,
- Captures an outcome,
- Identifies matters resolved,
- Identifies matters unresolved,
- Any disagreements are disclosed; and
- How we are going to address unresolved matters?

How to capture all the relevant details on consultation requirements? Any consultation requirement in a condition is required to be accompanied with the following table:

Education
School Infrastructure

Post Approval Consultation Record

B16 – Traffic and Pedestrian Management Sub-Plan

Identified Party to Consult:	Blacktown City Council – Traffic Engineers
Consultation type:	Email
When is consultation required?	Prior to commencement
Why	B16 – Construction Traffic and Pedestrian Management Sub-Plan, prepared in consultation with Council
When was consultation held	18 February 2022, via email
Identify persons and positions who were involved	**Andy Karklins** Traffic Management Officer **Tom Hemmett** Project Manager, Richard Crookes Construction **George Denny-Smith** Site Engineer, Richard Crookes Construction
Provide the details of the consultation	Consultation with Blacktown City Council has been undertaken in relation to Stage 2 works specifically, and the site and project more generally. This built on prior consultation done in Stage 1 of Galungara Public School. Email correspondence was sent to Blacktown City Council on 15 February 2022 to review and comment on the Construction Traffic and Pedestrian Management Sub-Plan. The purpose was to maintain the open dialogue between the project team and Council.
What specific matters were discussed?	The Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) was provided and reviewed by Mr Karklins. It was noted by Mr Karklins that the CTPMSP appears to be in order based on the information provided. It is the project managers responsibility to implement the traffic control measures as identified in the CTPMSP. Mr Karklins raise the following matter: • the TGS does not show actual distances between the proposed sign locations and it should comply with all requirements.
What matters were resolved?	Mr Karklins comment was included in a revise CTPMP issued by Jim's Traffic Control on 18 February 2022.
What matters are unresolved?	Nil
Any remaining points of disagreement?	No

How will SINSW address matters not resolved?	Not applicable

Traffic Control Plan (TCP)

A TCP is defined in the TfNSW TCWS Manual Version 6 as a diagram showing signs and devices arranged to warn traffic and guide it around, past or, if necessary through a work site or temporary hazard. The proposed TCP is located in Appendix B.

Objectives:

The provision of a save environment for road users and works staff is a key objective of Richard Crookes Construction®. The TCP was developed with the aim to:

- Warn drivers of changes to the usual road conditions.
- Inform drivers about changed conditions.
- Guide drivers through the work site.
- Ensure the safety for workers, motorists, pedestrians and cyclists.

Context:

The TCP's prepared were based on the principles and measured outlined in this CTMP, which details the road safety and traffic principles, strategies and measure that will be applied to enable Richard Crookes Construction® to fulfil its obligations and the requirements of relevant authorities.

The TCP's were designed to address the following issues where applicable:

- Use of traffic control devices.
- Speed limit requirements.
- Provision of pedestrian traffic and their safety.
- Provision for cyclists and their safety.
- Provision for vehicle and plant movements.
- Parking restrictions and parking facilities.
- Provision for trade vehicles and plant movements.
- Informing all site personnel of any high-risk areas.
- Providing adequate signage within the construction site for access and egress.

Traffic Controllers:

Only certified traffic controllers will undertake this activity. The placement of signs will be done so by a qualified Implement TCP Holders as per the Australian Standards 1742.

TCP Monitoring and Reporting:

Specific measures for TCP reporting will be taken. These will include, but not be limited to the following:

- The traffic control plan will be numbered, and a register maintained as a part of the CTMP.
- All traffic control devices and traffic control arrangements will be inspected daily to ensure the adequacy of such devices and arrangements as per the TfNSW TCWS Manual Version 6.
- Traffic management records and plans will be maintained as well as record/log.
- Richard Crookes Construction® may be required to provide records in the following event instances:
    - That a breach imposed by the NSW Police Service, on a motorist who does not comply with a regulatory sign is challenged in courts or,
    - In the event of an accident is alleged to have occurred when temporary traffic control is in place.
- Ongoing and frequent onsite reviews of traffic management setups and conditions will be reviewed with Richard Crookes Construction® for the duration of the project at (but not limited to):
    - The beginning of each new phase
    - The beginning of a new major activity (e.g. concrete pours, mobile crane usage etc)

Credentials:

The TCP was prepared by Dwayne Perera, TfNSW Prepare a Work Zone Traffic Management Plan Number 0052272006.

Traffic Control Signs and Devices:

Traffic control devices are an important tool for influencing the safety of road users, in particular where temporary traffic controls are implemented at work sites. During the construction of this project Richard Crookes Construction® will assess the warrant for traffic control devices in accordance with the relevant guides/standards such as: TfNSW TCWS Manual Version 6, Australian Standard – AS1742 Manual of uniform traffic control devices, and any relevant documents listed on the 'RMS Guide to Signs and Marketing reference list' to make sure that all the traffic control devices are installed and maintained correctly.

The provision of timely, clear and consistent messages to road users is essential. Richard Crookes Construction® will ensure all signs and devices installed during the construction of this project are:

- Assessed for use in accordance with the appropriate warrants.
- Manufactured in accordance with the requirements of the Australian Standards.
- Installed in accordance with the relevant guides and standards.
- Not contradictory to existing signs or markings.
- When unwarranted, covered or removed.
- Regularly maintained and repaired/replaced when damaged.

All signposting installed throughout the project will comply with the requirements outlined in the TfNSW TCWS Manual Version 6, AUSTROADS Guide to Traffic Engineering Practice, Part 8 – Traffic Control Devices and the Relevant parts of Australian Standard 1742.

Dwayne Perera

0400 350 182
Dwayne.perera@jimstrafficcontrol.com.au

Career Profile

Dwayne has substantial experience in traffic management design and operations, he has worked alongside members with 15yrs+ experience and has strong network of designers and auditors in his team. Dwayne has developed his reputation for working collaboratively with all parties to ensure safety is kept as a top priority whilst keeping realistic operating procedures in place.

Dwayne specialises in designing traffic management plans for complex intersection works, road widening, crane setups and large-scale construction projects.

Relevant Experiences

Covex Traffic and Management Pty Ltd

6-7 years

- Preparing Traffic Management Plans, Construction Traffic Management Plans and Traffic Control Plans for:
  - Large Commercial Development Sites
  - Small-Medium sized Residential Sites
  - Civil Roadworks
  - Community Events
  - Special Events (involving static and dynamic traffic control)
  - Crane Operations
- Liaising with Council, Police, TMC, RMS, Busses and surrounding stakeholders to organise permits for temporary works.

Sydney Traffic Control

2 years

- Preparing Traffic Management Plans, Construction Traffic Management Plans and Traffic Control Plans for:
  - Large Commercial Development Sites
  - Small-Medium sized Residential Sites
  - Civil Roadworks
- Liaising with Council, Police, TMC, Busses and surrounding stakeholders to organise permits for temporary works.

Major Projects

Road Widening and Intersection Works:

- Mamre Road, Orchard Hills
- Pittwater Road, Brookvale
- Camden Valley Way, Prestons
- Hornsby Hospital

Major Crane Operations:

- York Street, Sydney (Road Closure)
- George/Hunter/Margret Street, Sydney (Road Closure)
- Willoughby Road, Crows Nest (Road Closure)
- Macquarie Street, Liverpool (Road Closure)
- Palmer Street, Woolloomooloo (Road Closure)
- Hunter Street, Parramatta (Road Closure)
- Park Street, Sydney (Intersection Shutdown)
- Kurraba Road, Kurraba Point (Road Closure)
- Whale Beach Road, Whale Beach (Road Closure)
- Pitt Street, Sydney (Road Closure)

- Castlereagh Street, Sydney (Road Closure)

Large Construction/Related Work Sites

- Belmore Street, Burwood (B1 & B2 Buildings)
- Central Park
- Hornsby Hospital
- Brookvale Community Centre
- Arthur Phillips High School
- St Ives Primary School
- Epping Road Macquarie Park
- Elsie Street, Burwood
- Kingsway, Miranda
- Ramsay Road, Five Dock
- Devlin Street, Ryde
- Kerrs Road, Lidcombe
- Westmead Hospital
- Randwick Children's Hospital
- George Street, Sydney

Dynamic Traffic Movements:

- Campbell Parade, Bondi (Event for Street March)
- Riverview Road, Avalon Beach (Abnormal Load escort)
- Portland Street, Dover Heights (Abnormal Load escort)
- Town Hall Metro + Pitt Street Metro (Abnormal Load escort)

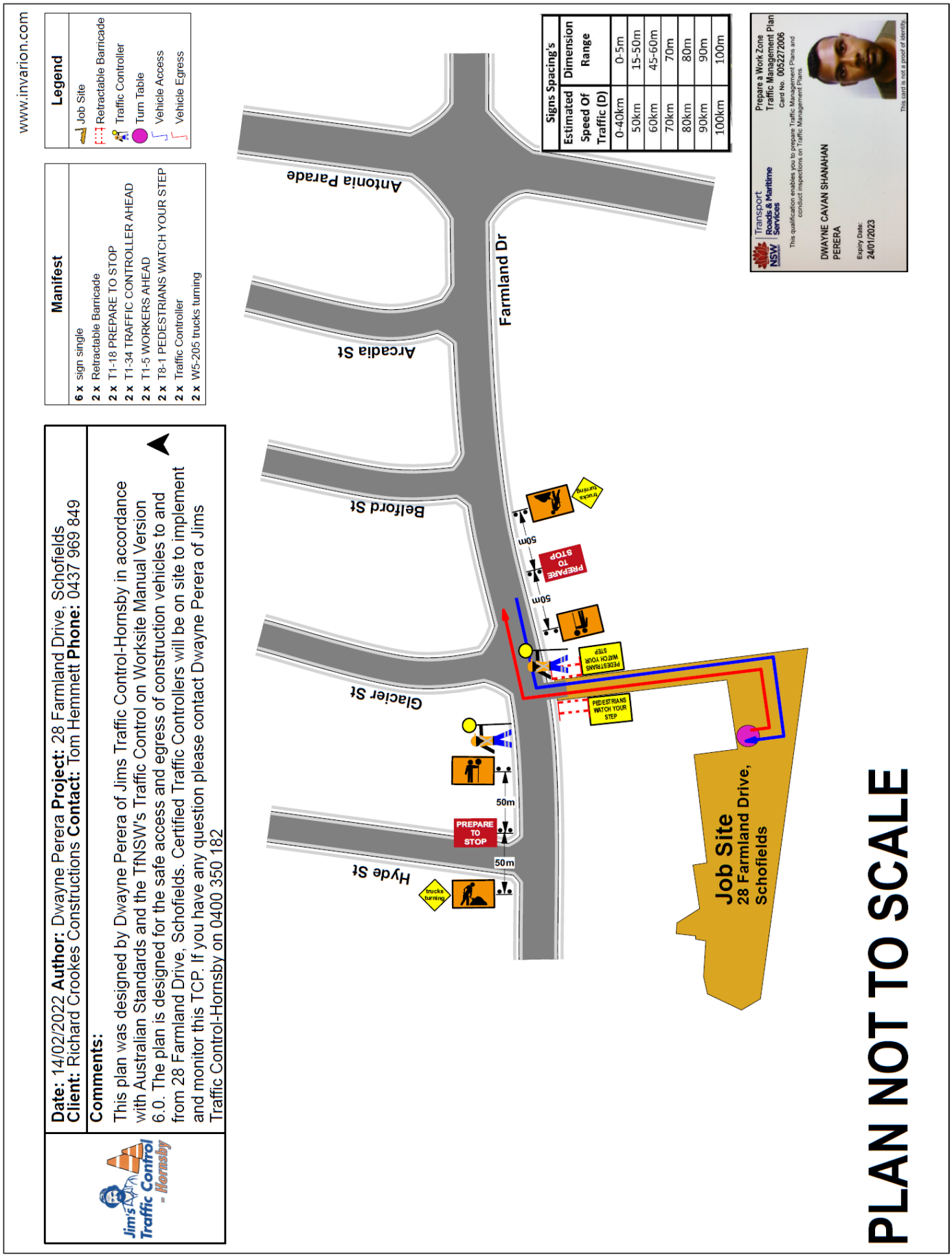
Qualifications

Prepare a Work Zone Traffic Management Plan (0052272006)
Implement Traffic Control Plans (0052351398)
Traffic Controller (0052227058)
Bachelor of Information Systems (Hons)

Referees

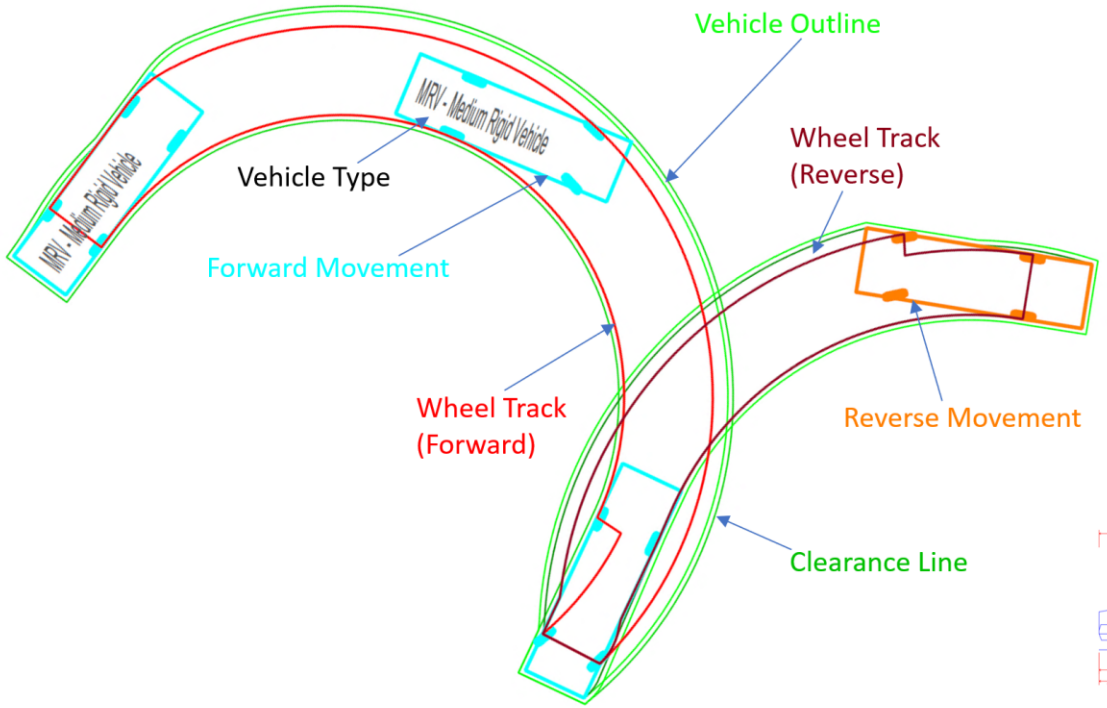
Available upon Request

Appendix A TCP and Swept Paths:

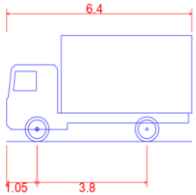


Swept Path Analysis Legend:

Road Boundary (boundary of the driveable road)	
Infrastructure Zone (exclusion zone for trees, power poles, traffic lights, barricades, fencing etc)	
Parking Zone (exclusion zone for legal street parking)	
Site Boundary	

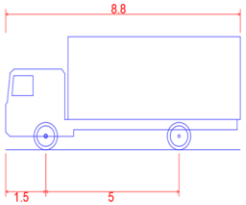


NOTE: Infrastructure and Parking Zones marked according to the significance of the vehicle path (i.e. they are marked if potentially impacted)



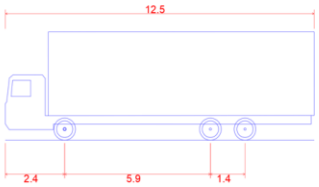
SRV - Small Rigid Vehicle

Overall Length	6.400m
Overall Width	2.330m
Overall Body Height	3.500m
Min Body Ground Clearance	0.398m
Track Width	2.330m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.100m



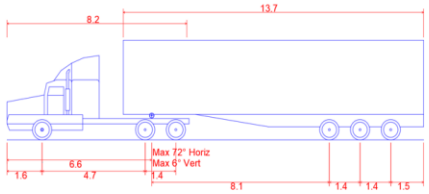
MRV - Medium Rigid Vehicle

Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10.000m



HRV - Heavy Rigid Vehicle

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

28 Farmland Drive, Scofield's Swept Path Diagram Farmland Drive, Turn Left into Site 12.5 x 2.5m Heavy Rigid Vehicle (0.3m Clearance)	Scale 1:500 @ A4 Plan Prepared by Jim's Traffic Control (Hornsby) Date 14/02/2022 Sheet 01

28 Farmland Drive, Scofield's Swept Path Diagram Site, Turn Right onto Farmland Drive 12.5 x 2.5m Heavy Rigid Vehicle (0.3m Clearance)	Scale 1:500 @ A4 Plan Prepared by Jim's Traffic Control (Hornsby) Date 14/02/2022 Sheet 02

Appendix B Site Schematics:

Appendix C RMS Road Limits and Special Signage:

5

LIGHT TRAFFIC ROADS

You must not use any road with a load limit sign if the total weight of your vehicle is the same as, or heavier than, the weight shown on the sign.

You may use a light traffic road when that road is your destination for a pick-up or delivery and there is no alternative route.

LOAD LIMIT SIGN

You must not drive past a BRIDGE LOAD LIMIT (GROSS MASS) sign or GROSS LOAD LIMIT sign if the total of the gross mass (in tonnes) of your vehicle, and any vehicle connected to it, is more than the gross mass indicated in the sign.

NO TRUCKS SIGN

Drivers of long or heavy vehicles except buses must not drive past a NO TRUCK sign unless the vehicle is equal to or less than the mass or length specified on the sign.

When the sign does not provide detailed information, no truck (ie GVM greater than 4.5 tonnes) is permitted to drive past the sign, unless the drivers' destination lies beyond the sign and it is the only route.

TRUCKS MUST ENTER SIGN

Heavy vehicle drivers must enter the area indicated by information on or with this sign.

WHERE HEAVY VEHICLES CAN STAND OR PARK

Heavy vehicles (GVM of 4.5 tonnes or more) or long vehicles (7.5 metres long or longer) must not stop on a length of road outside a built up area, except on the shoulder of the road. In a built up area they must not stop on a length of road for longer than one hour (buses excepted). For more information on where vehicles can stand or park, refer to the Road Users' Handbook.

Post Approval – Consultation

Consultation needs to be meaningful, done with courtesy and respect and be well documented. These are people/ organisations that we need to be building meaningful relationships with.

Conditions of all consent can require consultation with a range of stakeholders. Consultation in the post approval world needs to be well documented to satisfy the condition requirements.

Examples include Council, service providers (eg. Electricity gas etc.), consult with local bus provider and TfNSW.

Read each condition carefully, any reference to consult triggers consultation.

Typically on State Significant Development, there will be a specific consultation condition as to how this piece can be appropriately addressed.

Consultation is not:

- A token gesture
- Done at the end of the piece of work,
- An email to the relevant stakeholder with no response;
- A meeting with the stakeholder with no meeting minutes.

Consultation is:

- Meaningful
- Done prior to the requirement,
- Captures an outcome,
- Identifies matters resolved,
- Identifies matters unresolved,
- Any disagreements are disclosed; and
- How we are going to address unresolved matters?

How to capture all the relevant details on consultation requirements? Any consultation requirement in a condition is required to be accompanied with the following table:

Education
School Infrastructure

Post Approval Consultation Record

B15 – Traffic and Pedestrian Management Sub-Plan

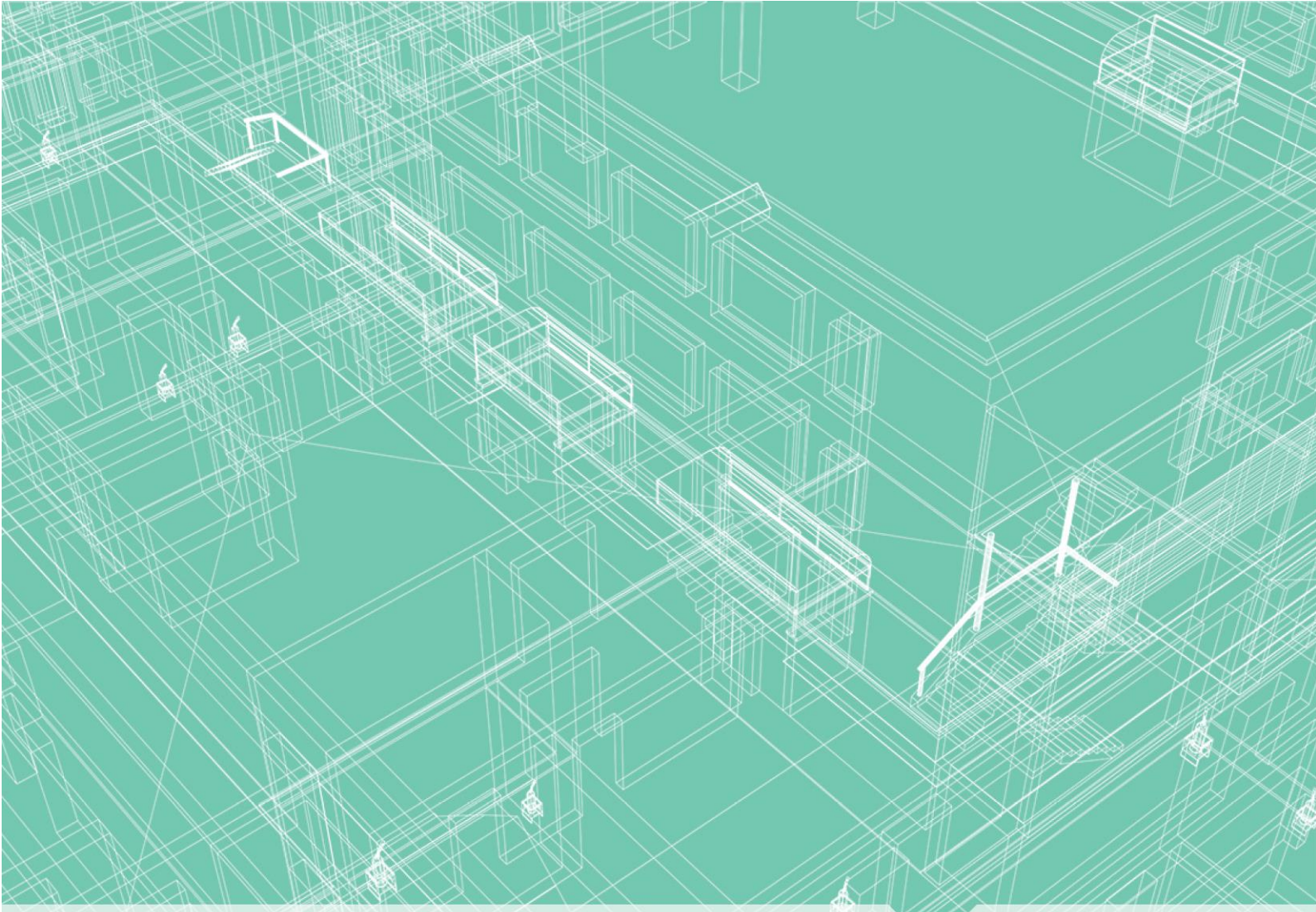
Identified Party to Consult:	Penrith City Council – Traffic Engineer
Consultation type:	Email
When is consultation required?	Prior to commencement
Why	B15 – Construction Traffic and Pedestrian Management Sub-Plan, prepared in consultation with Council
When was consultation held	28 February 2022, via email
Identify persons and positions who were involved	**Gavin Cherry** Development Assessment Coordinator, Penrith Council **Simone Muscat** Penrith Council **Tom Hemmett** Project Manager, Richard Crookes Construction **George Denny-Smith** Site Engineer, Richard Crookes Construction
Provide the details of the consultation	The Jordan Springs Public School project has an approved council DA for the Early Works completed onsite. The CTPMP sub-plan was also approved for Stage 1 works. RCC updated the site plan in the CTPMP to reflect a changed layout and operational school. Consultation with Penrith Council has been undertaken in relation to those works specifically, and the site and project more generally. The meeting held on 28 February 2022 reacquainted Council with the CTPMP and allowed them to comment and suggest amendments to the CTPMP. The purpose was to maintain open dialogue between the project team and Council.
What specific matters were discussed?	The Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) was provided to and reviewed by Mr Cherry. Mr Cherry made the following comments: • Construction truck movements should not be permitted during school zone hours (8-9:30am and 2:30-4pm, school days) to minimise interaction between trucks and people/children travelling to/from the school, especially at site driveway. • For pedestrian safety, the site personnel/TC also has to temporarily manage pedestrians walking on footpath for a short time when vehicles are entering/exiting the site. Construction vehicles exiting the site shall wait for a suitable gap in traffic under the supervision of TC. Pedestrians and through traffic on Lakeside Parade must not be stopped in anticipation.

	• The CTMP states that there will be no on-site parking for staff. However, there is a high demand of on-street parking surrounding the school, especially during school zone hours. Council has received multiple concerns of illegal parking on surrounding streets which could be exacerbated by the parking demand from construction staff. It is considered imperative that there is on-site parking for construction staff. • Swept paths show that the wheel tracks will encroach the nature strip and a temporary driveway widening is required to facilitate truck movements. • The TCP should also include warning signs on side streets.
What matters were resolved?	Mr Cherry's comments were included in an amended CTPMP prepared by Jim's Traffic Control
What matters are unresolved?	Nil
Any remaining points of disagreement?	No
How will SINSW address matters not resolved?	Not applicable

6.9 CONSTRUCTION NOISE & VIBRATION MANAGEMENT SUB-PLAN

The Construction Noise & Vibration Management Sub-Plan has been prepared by JHA Engineers for the Project.

It is not embedded in this document; it is supplied as an attached appendix so that it can be displayed/updated/revised in isolation if required.



CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

GALUNGARA PUBLIC SCHOOL – STAGE 2

ACOUSTIC SERVICES

JHA

JHASERVICES.COM

This report is prepared for the nominated recipient only and relates to the specific scope of work and agreement between JHA and the client (the recipient). It is not to be used or relied upon by any third party for any purpose.

DOCUMENT CONTROL SHEET

Project Number	210567
Project Name	Galungara Public School – Stage 2
Description	Construction Noise and Vibration Management Plan
Key Contact	Tom Hemmett

Prepared By

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Authorised	Marc Estimada

Revision History

Issued To	Revision and Date						
Richard Crookes Constructions	REV	P1	A	B			
	DATE	17/02/2022	18/02/2022	11/03/2022			
	REV						
	DATE						

JORGE REVERTER | ACOUSTIC GROUP MANAGER

Jorge is a Senior Acoustic Engineer with over 20 years of comprehensive experience in the acoustic consultancy field in Australia and Spain.

His experience includes a broad spectrum of acoustics projects covering: transport infrastructures, land planning, room acoustics, building acoustics, noise and vibration control for building services, environmental noise control and assessments, programming and computer modelling.

QUALIFICATIONS

BEng. Telecommunications - Acoustics, 1999. Universitat Politecnica Valencia (Spain)

MSc. Occupational Health and Safety, 2008. Universitat Jaume I (Spain)

AFFILIATIONS

Member of Australian Acoustical Society (MAAS)

KEY PROJECT EXPERIENCE

- Ultimo Public School
- Riverina Conservatorium of Music.
- University of Wollongong Electron Microscope, Wollongong.
- University of Sydney F07 Carslaw Extension LEES1, Sydney.
- UTS Central Project, Sydney.
- UNSW COFA, Paddington.
- Australian National University RSPE, Canberra.
- University of New South Wales - Myers Studio, Fig Tree Lane, COFA Recording Studios.
- St. Andrew's College (UoS), Sydney.
- Santa Sophia Catholic School, Box Hill.
- Science Technology Engineering & Mathematic School (STEM), Sydney Science Park.
- Munro Park Amphitheatre, Cairns.
- Armengol Theatre, Bellpuig (Spain).
- Palau de la Musica, Barcelona (Spain) – Concert Hall.
- Girona Auditorium and Exhibition Centre, Girona (Spain).
- Sydney Opera House. Forecourt waterproofing plus DT and JST Staging Equipment replacement.
- IESE, Barcelona (Spain).
- PLC Alpha Omega, Croydon.
- St. Rita's College, Brisbane.
- St. Marks Catholic College, Stanhope Gardens.
- Clancy Catholic College, West Hoxton.
- St. Anthony of Padua, Austral.
- Monaro High School, Cooma.
- St Patrick's, Sutherland.
- Darcy Road Public School, Wentworthville.
- TAFE Meadowbank.
- TAFE Design CLP.
- Hurstville Marist College.
- Hastings Secondary College Upgrade.
- Edmondson Park Public School.
- Mosman High School Upgrade, Mosman
- Hyatt Regency at 161 Sussex Street.
- Australian Film, Television and Radio School Teaching Spaces.
- NSW Health Infrastructure RAIR.
- High Court of Australia.
- PCYC Northern Beaches, Dee Why.
- Royal Commission into Institutional Responses to Child Abuse.
- East Sydney Community and Arts Centre.
- NSW Police Stations: Belmont, Toronto, Morriset, Taree, Queanbeyan, Broken Hill, Parramatta.

CONTENTS

Jordan Springs Public School (SSD 9368): Submission of Construction Noise and Vibration Management Sub-Plan in accordance with Condition B17

Condition	Condition requirements	Document reference
B17	The Construction Noise and Vibration Management Sub-Plan must address, but not be limited to, the following: (a) be prepared by a suitably qualified and experienced noise expert;	SSD 9368 - B17 - CEMP - CNVMSP – JHA Engineers – B Document control sheet
	(b) describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);	Section 4.1, Relevant codes and standards Section 7, Noise and Vibration Control Recommendations
	(c) describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	Section 7, Noise and Vibration Control Recommendations
	(d) include strategies that have been developed with the community for managing high noise generating works;	Section 7, Noise and Vibration Control Recommendations
	(e) describe the community consultation undertaken to develop the strategies in condition B8;	Section 7.5, Consultation and Notification Section 8, Conclusions Appendix B, Community Communication Strategy SSD9368-B17 - CTPMSP - Consultation - Stage 2
	(f) include a complaints management system that would be implemented for the duration of the construction; and	Appendix B, Community Communication Strategy
	(g) include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the management measures in accordance with Condition B12(d).	Section 7.9, Monitoring program Appendix B, Community Communication Strategy

B12	Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
	(a) detailed baseline data;	Section 4, Noise and vibration criteria
	(b) details of: (i) the relevant statutory requirements (including any relevant approval, license or lease conditions);	Section 4.1, Relevant codes and standards
	(ii) any relevant limits or performance measures and criteria; and	Section 4.2, Regulatory framework
	(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 5, Construction activities
	(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 7, Noise and Vibration Control Recommendations
	(d) a program to monitor and report on the: (i) impacts and environmental performance of the development;	Section 7.9, Monitoring program
	(ii) effectiveness of the management measures set out pursuant to paragraph (c) above;	Section 7.9, Monitoring program
	(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 7.7 Works timing restrictions and scheduling Section 7.8, Additional noise and vibration controls Section 7.9, Monitoring program
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 7.9, Monitoring program
	(g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);	Section 7.9, Monitoring program
	(ii) complaint;	Section 7.9, Monitoring program Community Communication Strategy

	(iii) failure to comply with statutory requirements; and	Section 7.9, Monitoring program Community Communication Strategy
	(h) a protocol for periodic review of the plan.	Section 7.8, Additional noise and vibration controls Section 8, Conclusions

SSD9368 B17 – Response to SINSW

SINSW comment	RCC response
No appendix G within this document similar to the comment made in the Jordan Springs CNVMP please adjust this condition satisfaction table	RCC has reviewed the condition satisfaction table. See updated table directing SINSW to accurate sub-plan sections.
Section 4.3 & 4.4 - update accurate page numbers for these sections	RCC has reviewed the condition satisfaction table. See updated table directing SINSW to accurate sub-plan sections.
there is no section 10.5 please update correctly	RCC has reviewed the condition satisfaction table. See updated table directing SINSW to accurate sub-plan sections.
No section 11 please update	RCC has reviewed the condition satisfaction table. See updated table directing SINSW to accurate sub-plan sections.
No section 13 please update	RCC has reviewed the condition satisfaction table. See updated table directing SINSW to accurate sub-plan sections.
No section 13 please update	RCC has reviewed the condition satisfaction table. See updated table directing SINSW to accurate sub-plan sections.
No section 13 please update	RCC has reviewed the condition satisfaction table. See updated table directing SINSW to accurate sub-plan sections.

1 INTRODUCTION

1.1 OVERVIEW

This Construction Noise and Vibration Management Plan (CNVMP) has been prepared by JHA Consulting Engineers on behalf of School Infrastructure NSW (SINSW) to address the Condition of Consent B17 of the State Significant Development Application (SSD18-9368) for the proposed Stage 2 of the Galungara Public School (the Proposal) located at Farmland Drive, Schofields.

The following documentation has been used for the preparation of this report:

- Architectural drawings of the proposed development prepared by GSA Architects.
- Noise data from the Construction Noise and Vibration Management Plan for Stage 1, prepared by Acoustic Logic.

This document and related work have been prepared following JHA Consulting Engineers Quality and Environmental Management Systems, which are based on AS/NZS ISO 9001:2015 and ISO 14001:2015.

1.2 PURPOSE OF THE CNVMP

The purpose of this CNVMP is to ensure that noise and vibration impacts due to Construction activities are appropriately managed in accordance with relevant legislation and standards, plus protection of nearby sensitive receivers. The objectives of this acoustic assessment are:

- Comply with the Conditions of Consent as per SSD18-9368.
- Identify noise sensitive receivers that will potentially be affected by the works.
- Establish the appropriate noise level and vibration criteria in accordance with the relevant standards, guidelines and legislation.
- Determine whether the relevant criteria can be achieved based on assumed construction works and plant for the noise assessments. Where applicable, provide recommendations for any necessary acoustic control measures that will need to be incorporated into the development or use in order to ensure with the assessment criteria.
- Provide recommendations for Construction Noise and Vibration Planning.

This CNVMP identifies the Contractor's obligations and the requirements to manage noise and vibration during construction such that the necessary allowances within the construction costs, programmes and work methodologies can be made. Relevant legislation, guidelines and standards are identified in this CNVMP.

1.3 NOISE AND VIBRATION ISSUES

This CNVMP addresses all works from construction works associated with the proposed development. The construction works will contribute noise and vibration emissions to the surrounding environment. Typically, this will comprise of continuous and intermittent noise and vibration from on-site construction equipment and plant equipment.

Construction noise associated with the project may include airborne and ground-borne noise impacts as follows:

- Airborne Noise: Proposed construction works will generate noise that will propagate through the air. Airborne noise generated by external construction activities is likely to impact on surrounding sensitive receivers.

- Ground-borne noise and vibration impacts: Construction and piling works have the potential to generate noise and vibration that propagates through the ground and building structural elements which is then radiated by vibrating wall and floor surfaces of nearby sensitive receivers.

1.4 RESPONSIBILITIES

The Main Contractor must be responsible for ensuring that the noise and vibration from activities carried out on site are minimised as far as practical.

The Main Contractor is responsible for:

- Ensuring that any site noise and vibration plus any complaints, are monitored, investigated, managed and controlled in accordance with the recommendations provided in this plan.
- Ensuring procurement documents specify any particular requirements in relation to the management of noise and vibration.
- Ensuring all works are undertaken in accordance with the requirements of the contract documents and this plan.
- Ensuring all project personnel and sub-contractors employed are aware of their responsibilities in regard to the management of noise and vibration during construction and assume the responsibilities assigned to them within the plan.
- Monitoring and managing noise and vibration impacts on sensitive receivers, in accordance with the requirements of the relevant guidelines and standards.
- Consulting with the occupants of surrounding buildings to inform them of the nature of the construction works, to determine any specific noise and vibration sensitivity they may have and to negotiate respite times during noisier works.

2 DESCRIPTION OF THE PROPOSAL

2.1 SITE DETAILS

Schofields is a suburb of Sydney, in the Local Government Area of Blacktown, approximately at 45km north-west of Sydney CBD. The site is located along Farmland Drive, being Antonia Parade located to the east of the site. The site is legally described as Lot 1 and Lot 2 of DP1244925.

Stage 2 works involve the construction of:

- Learning building B3, 8 new homebases, over 2 levels;
- Learning building B4, 12 new homebases, over 2 levels;
- COLA spaces C and D;
- Associated student and staff amenities;
- Multipurpose courts to replace the existing temporary carpark;
- Completion of public domain works interface along the eastern boundary, connecting the school with the shared use carpark and sporting fields; and
- Completion of bus bay and associated landscaping works on Pelican Road.

A total of 20 new Home Bases will be delivered to the school as part of Stage 2, in accordance with approved SSD. All the other buildings of the Public School have already been built as part of Stage 1. Following figure shows the location of Stage 2 construction works and the buildings of Stage 1.

Figure 1: Stage 2 construction works location and Stage 1 buildings.

2.2 NOISE SENSITIVE RECEIVER DETAILS

The surrounding developments are detached houses, being the land uses as follows:

- *North*: Residential development along Farmland Drive.
- *East:* Park and sport fields buffering residential development in Antonia Parade.
- *South*: Undeveloped lot adjacent to Jerralong Drive.
- *West*: Future residential developments.

Figure 2 shows the site boundary and surrounding noise sensitive receivers for the Galungara Public School.

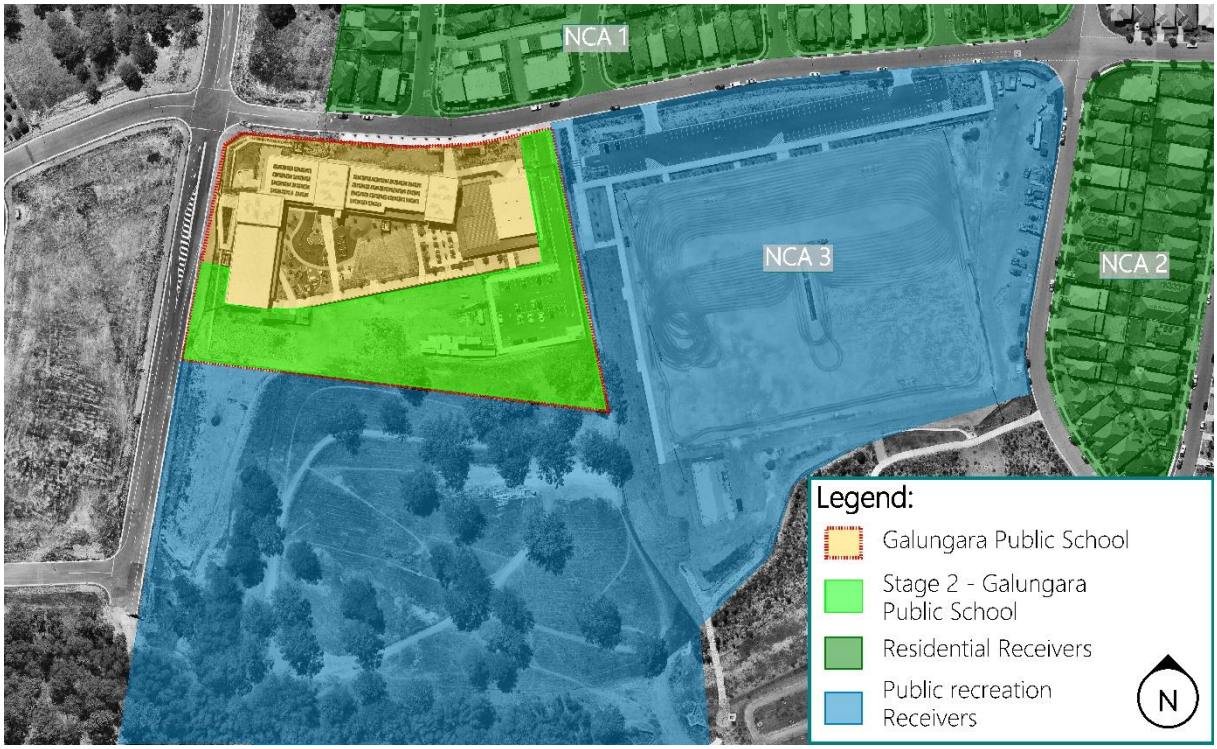

Figure 2: Galungara Public School site and surrounding noise sensitive receivers.

Refer to Table 1 for the details of the nearest noise sensitive receivers around the construction site, including the type of noise receiver, address, and approximate distances from the site boundary to the receivers' boundaries.

Sensitive Receiver	*Receiver Type*	*Address*	*Approx. closest distance, m*
NCA 1	Residential	72 Farmland Dr	75
NCA 2	Residential	27 Antonia Parade	250
NCA 3	Public recreation	Farmland Dr and Antonia Pde	< 10

Table 1: Receivers surrounding the site and the approximate distances from boundaries.

It is noted that if noise and vibration impacts associated with the proposed development are controlled at the nearest sensitive receivers, then compliance with the recommended criteria at all noise sensitive receivers should be achieved.

3 SITE MEASUREMENTS

Noise survey information has been retrieved from the Environmental Noise and Vibration Impact Assessment prepared by Acoustic Logic[1]. As per Acoustic Logic's report, long-term noise monitoring was carried out from Tuesday 21st May to Monday 3rd June 2019 at two monitoring locations. Details of the long-term noise monitoring results are detailed in Section 5 of the Environmental Noise and Vibration Impact Assessment Report. Table 2 below shows the RBLs measured for each time period for the noise logger located at Farmland Drive location.

Date	*Assessment Background Levels, dB(A)*		
	Day 0700-1800	*Evening 1800-2200*	*Night 2200-0700*
Tuesday, 21 May 2019	---	42	---
Wednesday, 22 May 2019	37	40	34
Thursday, 23 May 2019	37	37	31
Friday, 24 May 2019	38	41	30
Saturday, 25 May 2019	36	40	32
Sunday, 26 May 2019	38	39	32
Monday, 27 May 2019	---	---	31
Tuesday, 28 May 2019	39	40	31
Wednesday, 29 May 2019	---	---	---
Thursday, 30 May 2019	42	42	32
Friday, 31 May 2019	39	39	34
Saturday, 1 June 2019	---	40	34
Sunday, 2 June 2019	36	35	34
Monday, 3 June 2019	38	41	31
Rating Background Levels	**38**	**40**	**32**

Table 2: Results of long-term noise monitoring at Farmland Drive.

[1] Western Sydney Schools – Alex Avenue Public School Environmental Noise and Vibration Impact Assessment, by Acoustic Logic. Ref: 20190060.1/2301A/R3/VF, dated 23/01/2019.

4 NOISE AND VIBRATION CRITERIA

4.1 RELEVANT CODES AND STANDARDS

In preparing this CNVMP, the following documentation including legislation, codes, standards and guidelines have been considered:

- Regulatory Framework:
  - Environmental Planning and Assessment (EP&A) Act 1979.
  - Protection of the Environmental Operations (POEO) Act 1997.
- Construction Noise and Vibration
  - Development Conditions of Consent (SSD18-9368).
  - NSW Department of Environment and Climate Change (DECC) *'Interim Construction Noise Guideline'* (ICNG) 2009.
  - NSW DECC Assessing Vibration: A Technical Guideline 2006.
  - NSW Transport Roads & Maritime Services (RMS) *'Construction Noise and Vibration Guideline'* 2016.
  - Australian Standard AS 2436:2010 *'Acoustics – Guide to Noise Control on Construction, Maintenance & Demolition Sites'*.
  - British Standards Institution BS 6472:2008 *'Evaluation of human exposure to vibration in buildings (1 to 80 Hz)'*.
  - British Standards Institution BS 7385.2:1993 *'Evaluation and Measurement for Vibration in Buildings. Guide to Damage Levels from Ground-borne Vibration'*.

4.2 REGULATORY FRAMEWORK

4.2.1 ENVIRONMENTAL PLANNING AND ASSESSMENT (EP&A) ACT 1979

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides the regulatory framework for the protection of the environment in NSW. The EP&A Act is relevantly about planning matters and ensuring that "environmental impact" associated with the proposed development is properly considered and reasonable before granting development consent to develop.

The assessment of "environmental impact" relies upon the identification of acceptable noise criteria which may be defined in a Development Control Plan, or derived from principles using guidelines like NSW EPA Noise Policy for Industry (NPI 2017) or Noise Guide for Local Government (NGLG 2013).

4.2.2 PROTECTION OF THE ENVIRONMENTAL OPERATIONS (POEO) ACT 1997

The Protection of the Environment Operations (POEO) Act 1997 has the objective to protect, restore and enhance the quality of the NSW environment. Abatement of noise pollution is underpinned by the definition of "offensive noise" as follows:

"...

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

> *(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or*

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.

..."

Noise Guide for Local Government (NGLG) 2013, provides a consideration checklist to determine an "offensive noise".

4.3 DEVELOPMENT CONDITIONS OF CONSENT (SSD18-9368)

Clause B17 of the Development conditions of consent (SSD18-9368) state the following:

"... The Construction Noise and Vibration Management Sub-Plan must address, but not limited to, the following:

a. *Be prepared by a suitable qualified and experienced noise expert;*
b. *Describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);*
c. *Describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;*
d. *Include strategies that have been developed with the community for managing high noise generating works;*
e. *Describe the community consultation undertaken to develop the strategies in condition B17(d);*
f. *Include a complaints management system that would be implemented for the duration of the construction; and*
g. *Include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the implemented management measures. ..."*

The development consent also defines construction hours (Clause C3, C4, C5 and C6) and construction noise limits (Clause C12, C13, C14, C15, C16 and C17) for the project.

"... Construction Hours

C3. Construction, including the delivery of materials to and from the site, may only be carried out between the following hours:

(a) between 7am and 6pm, Mondays to Fridays inclusive; and

(b) between 8am and 1pm, Saturdays.

No work may be carried out on Sundays or public holidays.

C4. Construction activities may be undertaken outside of the hours in condition C3 if required:

(a) by the Police or a public authority for the delivery of vehicles, plant or materials; or

(b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or

(c) where the works are inaudible at the nearest sensitive receivers; or

(d) where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.

C5. Notification of such construction activities as referenced in condition C4 must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

C6. Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

(a) 9am to 12pm, Monday to Friday;

(b) 2pm to 5pm Monday to Friday; and

(c) 9am to 12pm, Saturday. …"

"… Construction Noise Limits

C12. 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 approved Construction Noise and Vibration Management Plan.

C13. The Applicant must ensure construction vehicles (including concrete agitator trucks) do not arrive at the site or surrounding residential or commercial precincts outside of the construction hours of work outlined under condition C3.

C14. The Applicant must implement, where practicable and without compromising the safety of construction staff or members of the public, the use of 'quackers' to ensure noise impacts on surrounding noise sensitive receivers are minimised.

Vibration Criteria

C15. Vibration caused by construction at any residence or structure outside the site must be limited to:

(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); and

(b) for human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: a technical guideline (DEC, 2006) (as may be updated or replaced from time to time).

C16. Vibratory compactors must not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in condition C15.

C17. The limits in conditions C15 and C16 apply unless otherwise outlined in a Construction Noise and Vibration Management Plan, approved as part of the CEMP required by condition B17 of this consent. …"

4.4 NSW INTERIM CONSTRUCTION NOISE GUIDELINE

The noise criteria in this section are for guidance only and do not form part of any legal obligation on the part of the project proponent. However, compliance with these criteria is considered best practice.

The ICNG suggest construction noise management levels that may minimise the likelihood of annoyance being caused to noise sensitive residential receivers depending on the duration of works. The Noise Management Levels (NMLs) for long-term duration works are as follows for residential receivers:

Time of Day	*NML $L_{Aeq,15min}$*	*How to Apply*
ICNG Criteria for Recommended Standard Hours: Mon-Fri 7am-6pm Sat 8am-1pm No work on Sundays or public holidays	Noise affected: RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. ▪ Where predicted or measured $L_{Aeq,15min}$ is greater that the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected: 75dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. ▪ Where noise is above this level, the relevant authority may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise. 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
ICNG Criteria for Outside Recommended Standard Hours *Refer to approved hours from the Consent Conditions*	Noise affected: RBL + 5dB	▪ A strong justification would typically be required for work outside the recommended standard hours. ▪ The proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community.

Table 3: ICNG construction airborne noise criteria for residential receivers surrounding the construction site.

In order to establish the airborne construction noise criteria, noise levels from the unattended noise monitoring have been used for the noise sensitive receivers – refer to Section 3. Table 4 below summarises the airborne construction noise criteria for most affected noise sensitive receivers surrounding the development site.

Sensitive Receiver		*Airborne Construction Noise Criteria, $L_{Aeq,15min}$ dB(A)*	
		Within Standard Hours	*Outside Standard Hours*
NCA 1 and NCA 2 (R2 Low Density and R3 Medium Density Residential)	Noise affected / External	48	43
	Highly noise affected / External	75	NA
NCA 3 (Active Recreation Area)	Noise affected / External	65	NA

Table 4: ICNG construction airborne noise criteria for noise sensitive receivers surrounding the site.

The ICNG recommends internal ground-borne noise maximum levels at residences affected by nearby construction activities. Ground-borne noise is noise generated by vibration transmitted through the ground into a structure and can be more noticeable than airborne noise for some sensitive receivers. The ground-borne noise levels presented below from the ICNG are for residential receivers during evening and night-time periods only, and assessed at the centre of the most affected habitable room. The objective of these criteria is to protect the amenity and sleep of people when they are at home.

- Evening: $L_{Aeq,15min}$ 40dB(A) (internal)
- Night: $L_{Aeq,15min}$ 35dB(A) (internal)

No assessments of ground borne noise are has been conducted as no out of hours work is proposed to occur during evening time and night time.

4.5 VIBRATION CRITERIA

There are two items that shall be considered in the assessment of vibration impacts from construction works. These include vibration impacts in terms of human comfort and building damage.

4.5.1 HUMAN COMFORT

The Department of Environment and Climate Change (DECC) developed the document *'Assessing Vibration: A Technical Guideline'* in February 2006 to assist in preventing people from exposure to excessive vibration levels within buildings. It is based on the guidelines contained in BS 6472.1:2008 *'Guide to evaluation of human exposure to vibration in buildings – Vibration sources other than blasting'*. The guideline does not however address vibration induced damage to structures or structure-borne noise effects.

Vibration and its associated effects are usually classified as follows:

- *Continuous vibration*. An uninterrupted vibration for a defined period. This type of vibration is assessed on the basis of weighted root-mean-squared (rms) acceleration values.
- *Impulsive vibration*. A vibration which has a rapid build up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on the frequency and damping).
- *Intermittent vibration*. An interrupted periodic vibration of continuous or repeated periods of impulsive vibration, or continuous vibration that varies significantly in amplitude. This type of vibration is assessed on the basis of Vibration Dose Values (VDV).

Vibration criteria for continuous and impulsive vibration are presented in Table 5, in terms of vibration velocity levels. The values are assessed for the most critical frequency range (higher than 8 Hz assuming sinusoidal motion). When assessing intermittent vibration comprising a number of events, it is recommended that the Vibration Dose Value (VDV) is used Table 6 shows the acceptable VDV values for intermittent vibration.

Receiver Type	Time	RMS velocity, mm/s [dB ref 10^{-6}mm/s]			
		Continuous Vibration		Impulsive Vibration	
		Preferred	Maximum	Preferred	Maximum
Residences	Day-time	0.20 [106 dB]	0.40 [112 dB]	6.00 [136 dB]	12.00 [142 dB]
	Night-time	0.14 [103 dB]	0.28 [109 dB]	2.00 [126 dB]	4.00 [132 dB]

Table 5: Continuous and impulsive vibration criteria applicable to the site. Note: Day-time is 07:00am to 10:00pm and night-time is 10:00pm to 07:00am.

Place	Time	Vibration Dose Values, $m/s^{1.75}$	
		Preferred	Maximum
Residences	Day-time	0.20	0.40
	Night-time	0.13	0.26

Table 6: Intermittent vibration criteria applicable to the site.

4.5.2 STRUCTURAL BUILDING DAMAGE

Ground vibration from construction activities can damage surrounding buildings or structures. For unoccupied buildings, or during periods where the buildings are unoccupied, the vibration criteria for building damage suggested by German Standard DIN 4150.3:2016 *'Structural Vibration – Effects of Vibration on Structures'* and British Standard BS 7385.2:1993 *'Evaluation and Measurement for Vibration in Buildings'* are to be adopted. Guideline values from DIN 4150.3:2016 and BS 7385.2:1993 are presented in Table 7 and Table 8 respectively.

Structural type	RMS velocity, mm/s			
	Foundation			Plane of floor uppermost full storey
	Less than 10Hz	10 to 50Hz	50 to 100Hz	Frequency mixture
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15

Table 7: DIN 4150.3:2016 Guideline values of vibration velocity for evaluating the effects of short-term vibration.

Structural type	Peak particle velocity, mm/s	
	4 to 15Hz	15Hz and above
Unreinforced or light framed structures Residential or light commercial type buildings	15mm/s @ 4Hz increasing to 20mm/s @ 15Hz	20mm/s @ 15Hz increasing to 50mm/s @ 40Hz and above

Table 8: BS 7385.2:1993 Guideline values of vibration velocity for evaluating cosmetic damage.

5 CONSTRUCTION ACTIVITIES

RCC has been engaged as the Main Contractor for the proposed works. A construction noise and vibration assessment has been carried out based on information supplied by the Main Contractor which includes construction phases and plant. The Main Contractor will be responsible for preparing a Works Plan and Schedule which include all relevant noise and vibration information.

5.1 DESCRIPTION OF WORKS

Refer to Table 9 for the stages of work as provided by the Contractor that have been assessed, and which construction activities will occur during those stages.

Stage of Works	*Construction Activities*
Excavation	Excavation and earth movement
Concrete Pouring	Concrete set-out
General Construction Works	Transportation, modular assembly and internal works
External Works	Landscaping

Table 9: Stages of work.

5.2 PROPOSED CONSTRUCTION WORKING HOURS

Section 4.3 of this report contains the constructions hours defined in the development conditions of consent.

5.3 TYPICAL EQUIPMENT AND NOISE LEVELS

In accordance with the information provided and to assess the potential noise and vibration impacts during works from a quantitative point of view, the construction noise sources for the works occurring during the project and the associated equipment noise levels are listed in Table 10.

Sound power levels are based on the databases published by Australian Standard 2436:2010 '*Guide to Noise Control on Construction, Maintenance & Demolition Sites*', Roads and Maritime Services '*Construction Noise and Vibration Guideline*' and the UK Department for Environmental, Food and Rural Affairs (DEFRA).

Stage of works	*Item*	*Typical Sound Power Level L_{WAeq} (dB ref 1pW)*	*Typical Sound Pressure Level L_{Aeq} at 10m (dB ref 20μPa)*
Excavation	Bobcat	107	79
	Trucks	107	79
Concrete Pouring	Concrete Pump	108	80
	Concrete Trowler	106	78
	Concrete Pencil Vibrator	103	75
General Construction Works	Crane (mobile)	106	78
	Trucks	107	79
	Hand tools	102	74
External Works	Bobcat	107	79
	Concrete Pump	108	80
	Concrete Pencil Vibrator	103	75
	Concrete Trowler	106	78
	Trucks	107	79

Table 10: Anticipated maximum airborne noise levels for equipment / plant used during the different stages of the works.

6 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

A construction noise and vibration assessment has been carried out based on the proposed plant and machinery throughout the works associated with the stages as per Section 5.

6.1 ASSESSMENT METHODOLOGY

An assessment of the likely noise and vibration impacts of the assumed stage of works on the most affected receiver catchments surrounding the site has been carried out. The assessment has considered the following:

- Construction activities considered in the noise impact are detailed in Section 5.1.
- Proposed construction hours as per Section 5.2.
- Typical noise source levels considered in the noise impact are detailed in Section 5.3.
- Project specific noise and vibration criteria at sensitive receivers as outlined in Section 4.
- A typical 2.4m high solid hoarding is installed as per Figure 3.
- The predictions consider continuous operation of the construction plant over the 15-minute assessment period plus a range of distances from the site boundaries.

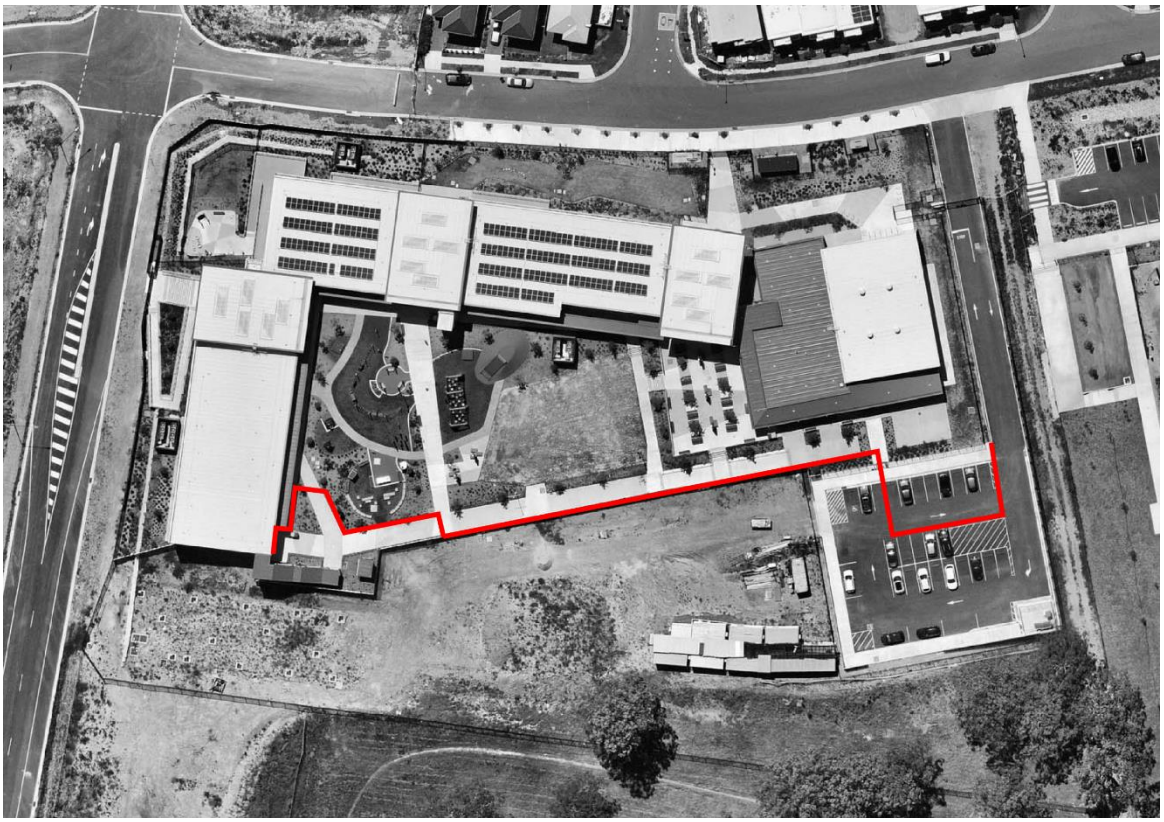

Figure 3: Hoarding (red outline) proposed on site.

It should be noted that the predicted noise levels generated during the construction works may vary depending on many factors including:

- Final selection of plant and equipment which could differ from the plant presented in Table 10.
- Exact location of equipment and plant on site – relative to the noise sensitive receivers.
- Shielding of noise provided by hoarding on site.

6.2 NOISE ASSESSMENT

The predicted noise levels for the stages of work detailed in Table 9 are presented in the following Sections. These predicted noise levels are typically representative of the worst case 15 minutes that it would be expected. The predicted noise levels at receiver locations are calculated to 1.5m above ground level, at the most affected point externally to each receiver that has been identified as the most affected.

The ICNG requires, and it is usual practice, to predict the reasonable worst-case noise level. For construction-type activities this will typically be when plant is operating close to an assessment location. However, it shall be considered that on larger construction sites (such as this one) where plant moves around, noise will not be at the reasonable worst-case noise level throughout the entire duration of the activity: it will be lower when the plant is further away. Therefore, it can be stated that noise levels will be lower at times throughout the construction activity.

6.2.1 EXCAVATION

Table 11 shows the predicted range of sound pressure levels at the boundary of the nearest noise sensitive receivers due to the construction plant for the proposed excavation works. Allowances have been made for distance attenuation, shielding and reflections.

Item	*Typical Noise Level L_{WA} dB*	*Predicted Noise Levels $L_{Aeq,15min}$, dB(A) (re. 20µPa)*		
		Receiver 1 – Residential	*Receiver 2 – Residential*	*Receiver 3 – Passive Recreational*
Bobcat	107	44 – 47	48 – 54	55 – 73
Trucks	107	44 – 47	48 – 54	55 – 73
Total	110	47 – 50	51 – 57	58 – 76

Table 11: Predicted airborne noise levels for the proposed excavation works at the nearest noise receivers.

Results show that predicted construction noise levels are expected to exceed the NMLs (orange font) for all receivers when works will be carried out in proximity of the boundaries close to the receivers.

The predicted exceedance of the NMLs in the surrounding receivers triggers the Contractor to apply all reasonable and feasible work practices to minimise the noise as much as possible, and community consultation, as per the requirements of the NSW ICNG. Refer to Section 7 for details.

6.2.2 CONCRETE POURING

Table 12 shows the predicted range of sound pressure levels at the boundary of the nearest noise sensitive receivers due to the construction plant for the proposed concrete pouring works. Allowances have been made for distance attenuation, shielding and reflections.

Item	Typical Noise Level L_{WA} dB	Predicted Noise Levels $L_{Aeq,15min}$, dB(A) (re. 20µPa)		
		Receiver 1 – Residential	Receiver 2 – Residential	Receiver 3 – Passive Recreational
Concrete Pump	108	45 - 48	49 - 52	56 - 74
Concrete Trowler	106	43 - 46	47 - 50	54 - 72
Concrete Pencil Vibrator	103	40 - 43	44 - 47	51 - 69
Total	111	48 - 51	52 - 55	59 - 77

Table 12: Predicted airborne noise levels for the proposed concrete pouring works at the nearest noise receivers.

Results show that predicted construction noise levels are expected to exceed the NMLs (orange font) for all receivers when works will be carried out in proximity of the boundaries close to the receivers.

The predicted exceedance of the NMLs in the surrounding receivers triggers the proponent to apply all reasonable and feasible work practices to minimise the noise as much as possible, and community consultation, as per the requirements of the NSW ICNG. Refer to Section 7 for details.

6.2.3 GENERAL CONSTRUCTION WORKS

Table 13 shows the predicted range of sound pressure levels at the boundary of the nearest noise sensitive receivers due to the construction plant for the general construction works. Allowances have been made for distance attenuation, shielding and reflections.

Item	Typical Noise Level L_{WA} dB	Predicted Noise Levels $L_{Aeq,15min}$, dB(A) (re. 20µPa)		
		Receiver 1 – Residential	Receiver 2 – Residential	Receiver 3 – Passive Recreational
Mobile Crane	106	43 – 46	47 – 50	54 – 72
Trucks	107	44 – 47	48 – 51	55 – 73
Hand Tools	102	29 – 32	18 – 21	25 – 43
Total	110	47 – 50	51 – 54	58 – 75

Table 13: Predicted airborne noise levels for the proposed general construction works at the nearest noise receivers.

Results show that predicted construction noise levels are expected to exceed the NMLs (orange font) for all receivers when works will be carried out in proximity of the boundaries close to the receivers for the mobile crane and the trucks.

The predicted exceedance of the NMLs in the surrounding receivers triggers the proponent to apply all reasonable and feasible work practices to minimise the noise as much as possible, and community consultation, as per the requirements of the NSW ICNG. Refer to Section 7 for details.

6.2.4 EXTERNAL WORKS

Table 14 shows the predicted range of sound pressure levels at the boundary of the nearest noise sensitive receivers due to the construction plant for the proposed external works. Allowances have been made for distance attenuation, shielding and reflections.

Item	*Typical Noise Level L_{WA} dB*	*Predicted Noise Levels $L_{Aeq,15min}$, dB(A) (re. 20µPa)*		
		Receiver 1 – Residential	*Receiver 2 – Residential*	*Receiver 3 – Passive Recreational*
Bobcat	107	44 – 47	48 – 51	55 – 73
Concrete Pump	108	45 – 48	49 – 52	56 – 74
Concrete Pencil Vibrator	103	40 – 43	44 – 47	51 – 69
Concrete Trowler	106	43 – 46	47 – 50	54 – 72
Trucks	107	44 – 47	48 – 51	55 – 73
Total	113	51 – 54	55 – 58	62 – 80

Table 14: Predicted airborne noise levels for the proposed external works at the nearest noise receivers.

Results show that predicted construction noise levels are expected to exceed the NMLs (orange font) for all receivers when works will be carried out in proximity of the boundaries close to the receivers.

The predicted exceedance of the NMLs in the surrounding receivers triggers the Contractor to apply all reasonable and feasible work practices to minimise the noise as much as possible, and community consultation, as per the requirements of the NSW ICNG. Refer to Section 7 for details.

6.3 VIBRATION ASSESSMENT

As per the nominated construction plant in the different stages – refer to Section 5.3, it is noted that vibration intensive plant will not be used during the construction works and it is anticipated that there will not be vibration impacts to adjacent sensitive receivers.

If the contractor has concerns for the disruptions at the nearest sensitive receivers due to construction plant use, it is recommended that prior to the commencement of the works, to undertake a preliminary vibration survey on each key vibration generating activity / equipment.

7 SITE SPECIFIC NOISE AND VIBRATION CONTROL RECOMMENDATIONS

This section of the Construction Noise and Vibration Planning provides site specific recommendations and provides applicable criteria together with best noise and vibration control practices to be observed during the proposed works.

Any noise from construction activities to be carried out on site must not result in *'offensive noise'* to any noise sensitive receiver. To this end, the Contractor employed to undertake the construction works is responsible for ensuring that any site noise and, in particular, any complaints shall be monitored, investigated, managed and controlled.

7.1 ACOUSTIC SCREENING

Acoustic screening is recommended during all phases of the construction work at the locations shown in Figure 3. The acoustic screening should be 2.4m high acoustic screen (Class A hoarding or equivalent) and constructed from minimum 19mm thick plywood plus minimise any air gaps.

7.2 RESPITE PERIODS

Respite periods are defined by the development conditions of consent C6 – refer to Section 4.3. They should generally be implemented into the work methodology in order to reduce the impact onto the surrounding NCA's, as detailed in Section 7.7. High noise generating activities such as 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; and
- 9:00am to 12:00pm, Saturday.

7.3 CONTROLS FOR NOISE AND VIBRATION

According to DECC's ICNG and AS2436:2010 *'Guide to Noise Control on Construction, Maintenance & Demolition Sites'*, the following techniques shall be applied to minimize the spread of noise and vibration to the nearest sensitive receivers.

7.3.1 NOISE

If a process that generates significant noise levels cannot be avoided, the amount of noise reaching the receiver should be minimised. Two ways of achieving this are to either increase the distance between the noise source and the receiver or to introduce noise reduction measures such as screens.

Physical methods to reduce the transmission of noise between the site works and residences, or other sensitive land uses, are generally suited to works where there is longer-term exposure to the noise. Practices that will reduce noise from the site include:

- Increasing the distance between noise sources and sensitive receivers.
- Reducing the line-of-sight noise transmission to residences or other sensitive land uses.
- Constructing barriers that are part of the project design early in the project to introduce the mitigation of site noise.
- Installing purpose built noise barriers and enclosures.

7.3.2 VIBRATION

Vibration can be more difficult to control than noise, and there are few generalizations that can be made about its control. It should be kept in mind that vibration may cause disturbance by causing structures to vibrate and radiate noise in addition to perceptible movement. Impulsive vibration can, in some cases, provide a trigger mechanism that could result in the failure of building components that had previously been in a stable state.

During the erection of the new structure, some vibrations (transmitted through the existing structures nearby the demolition sites) are expected, being more of a concern for the surrounding sensitive receivers.

It can also trigger annoyance being elevated into action by occupants of exposed buildings, and should therefore be included in the planning of communication with impacted communities. It should be remembered that failures, sometimes catastrophic, can occur as a result of conditions not directly connected with the transmission of vibrations, e.g. the removal of supports from retaining structures to facilitate site access.

Where site activities may affect existing structures, a thorough engineering appraisal should be made at the planning stage.

General principles of seeking minimal vibration at receiving structures should be followed in the first instance. Predictions of vibration levels likely to occur at sensitive receivers are recommended when they are relatively close, depending on the magnitude of the source of the vibration or the distance associated. Relatively simple prediction methods are available in texts, codes of practice or other standards, however it is preferable to measure and assess site transmission and propagation characteristics between source and receiver locations.

Guidance for measures available for the mitigation of vibration transmitted can be sought in more detailed standards, such as BS5228.2:2009 *'Code of practice for noise and vibration control on construction and open sites. Vibration'* or policy documents, such as the NSW DEC *'Assessing Vibration: A technical guideline'*.

Identifying the strategy best suited to the control of vibration follows a similar approach to that of noise avoidance, control at the source, control along the propagation path, control at the receiver, or a combination of these. It is noted that vibration sources can include stationary plants (pumps and compressors), portable plants (jackhammers and pavement vibrators), mobile plants, pile-drivers, tunneling machines and activities, and blasting, amongst others. Unusual ground conditions, such as a high water-table, can also cause a difference to expected or predicted results, especially when considering the noise propagated from piling.

7.4 UNIVERSAL WORK PRACTICES

To minimise construction noise complaints due to preventable activities at any time of the day, the following work practices shall be considered:

- Regularly train workers and contractors (such as a toolbox talks) to use equipment in ways to minimise noise.
- Ensure site managers periodically check the site and nearby residences and other sensitive land use for noise problems so that solutions can be quickly applied.
- Include in tenders, employment contracts, subcontractor agreements and work method statements clauses that require minimisation of noise and compliance with directions from management to minimise noise.
- Avoid the use of radios or stereos outdoors where neighbours can be affected.

- Avoid shouting, and minimise talking loudly and slamming vehicle doors.
- Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices.
- Develop a one-page summary of approval or consent conditions that relate to relevant work practices, and pin it to a noticeboard so that all site operators can quickly reference noise information.
- Workers may at times need to discuss or negotiate practices with their managers.

For work practices during night-time, the following shall be considered:

- Avoid the use of equipment which generates impulsive noise.
- Minimise the need for reversing or movement alarms.
- Avoid dropping materials from a height.
- Avoid metal-to-metal contact on equipment.
- Schedule truck movements to avoid residential streets if possible.
- Avoid mobile plant clustering near residences and other sensitive land uses.
- Ensure periods of respite are provided in the case of unavoidable maximum noise level events.

7.5 CONSULTATION AND NOTIFICATION

The community is more likely to be understanding and accepting of noise if the information provided is frank, does not attempt to understate the likely noise level, and if commitments are firmly adhered to. Community Consultation shall be as per EIS requirements and this has been addressed before the preparation of this CNVMP.

Recommended actions before and during construction are as per the endorsed Community Consultation Strategy Document – refer to Appendix B.

Appendix A contains the project update letterbox to the surrounding receivers, addressing the recommendations of the Community Consultation Strategy.

7.6 MANAGING NOISE LEVELS AND MAINTENANCE PROGRAM FOR PLANT AND EQUIPMENT

In terms of both cost and results, controlling noise at the source is one of the most effective methods of minimising the noise impacts from any construction activities. Recommendations for managing noise levels from plant and equipment are as follows:

- Use quieter methods:
  - Examine and implement, where feasible and reasonable, alternatives to rock-breaking work methods, such as hydraulic splitters for rock and concrete, hydraulic jaw crushers, chemical rock and concrete splitting, and controlled blasting such as penetrating cone fracture. The suitability of alternative methods should be considered on a case-by-case basis.
  - Use alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric controlled units where feasible and reasonable. Where there is no electricity supply, use an electrical generator located away from residences.
- Use quieter equipment

- Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine. For example, rubber wheeled tractors can be less noisy than steel tracked tractors.
- Noise labels are required by NSW legislation for pavement breakers, mobile compressors, chainsaws and mobile garbage compactors. These noise labels can be used to assist in selecting less noisy plant.
- Pneumatic equipment is traditionally a problem – select super silenced compressors, silenced jackhammers and damped bits where possible.
- When renting, select quieter items of plant and equipment where feasible and reasonable.
- When purchasing, select, where feasible and reasonable, the most effective mufflers, enclosures and low-noise tool bits and blades. Always seek the manufacturer's advice before making modifications to plant to reduce noise.

- Operate plant in a quiet and efficient manner
  - Reduce throttle setting and turn off equipment when not being used.
  - Examine and implement, where feasible and reasonable, the option of reducing noise from metal chutes and bins by placing damping material in the bin.

The Contractor shall prepare and implement a regular plant and equipment use and maintenance program. This is to ensure that 'noisy' equipment or tools are not used. This program should ensure that the contractor will:

- Regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.
- Equipment must not be operated until it is maintained or repaired, where maintenance or repair would address the annoying character of noise identified.
- For machines with enclosures, check that doors and door seals are in good working order and that the doors close properly against the seals.
- Return any hired equipment that is causing noise that is not typical for the equipment – the increased noise may indicate the need for repair.
- Ensure air lines on pneumatic equipment do not leak.

7.7 WORKS TIMING RESTRICTIONS AND SCHEDULING

Works should be carried out during periods specified by the approved Construction Hours. Scheduling noisy work during periods when people are least affected reduces noise impact on those. Recommendations for work scheduling are as follows:

- Provide respite periods.
- Schedule activities to minimise noise impacts.
  - Organise work to be undertaken during the recommended standard hours where possible.
  - When works outside the recommended standard hours are planned, avoid scheduling on Sundays or public holidays.
  - Schedule work when neighbours are not present (for example, commercial neighbours).

- Schedule noisy activities around times of high background noise (local road traffic or when other local noise sources are active) where possible to provide masking or to reduce the amount that the construction noise intrudes above the background.
- Consult with affected neighbours about scheduling activities to minimise noise impacts.

- Organise deliveries and access.
  - Nominate an off-site truck parking area, away from residences, for trucks arriving prior to gates opening.
  - Amalgamated loads can lead to less noise and congestion in nearby streets.
  - Optimise the number of vehicle trips to and from the site – movements can be organised to amalgamate loads rather than using a number of vehicles with smaller loads.
  - Inform, and consult where possible, the potentially noise-affected residences or other sensitive land uses of designated access routes to and from site, and make drivers aware of nominated vehicle routes.
  - Schedule deliveries to nominated hours only.

7.8 ADDITIONAL NOISE AND VIBRATION CONTROLS

There will likely be times or situations when construction works exceed the stated criteria at the nearest receivers, particularly when works occur in the areas closer to the receiver(s). Therefore, all feasible and reasonable noise control measures should be considered.

If, during construction, an item of equipment exceeds either the noise criteria at any location or the equipment noise level limits, the following noise control measures, together with construction best practices presented in this Section shall be considered to minimise the noise and vibration impacts of the project on the surrounding noise sensitive receivers:

- Schedule noisy activities to occur outside of the most sensitive times of the day for each nominated receiver. For example, the residential receivers are likely to be more sensitive to noise before 8am and after 6pm.
- Consider implementing equipment specific temporary screening for noisy equipment, or other noise control measures recommended in Appendix C of AS2436:2010. This will most likely apply to noisier hand-held items such as jack-hammers and circular saws.
- Locate specific activities such as carpentry areas (use of circular saws, etc.) to internal spaces or where shielding is provided by existing structures or temporary screening.
- Limit the number of trucks and heavy vehicles on site at any given time through scheduling deliveries at differing times.
- Traffic rules should be prepared to minimise the noise impact on the community.
- When loading and unloading trucks, adopt best practice noise management strategies to avoid materials being dropped from height.
- Avoid unnecessary idling of trucks and equipment. Vehicles and equipment to be turned off when not in use.
- Ensure that any miscellaneous equipment (extraction fans, hand tools, etc.) not specifically identified in this plan incorporates silencing/shielding equipment as required to meet the noise criteria.

If the measured construction vibration levels exceed the appropriate criteria during the works, one or more of the following measures should be taken:

- Modifications to construction equipment used.
- Modifications to methods of construction.
- Rescheduling of activities to less sensitive times.

If the measures given cannot be implemented or have no effect on noise or vibration levels or impact generated, a review of the criteria should be undertaken and the noise and vibration strategy amended.

7.9 MONITORING PROGRAM

Noise and vibration monitoring will be done on a complaint-only basis. Where a noise or vibration compliant is received, RCC will investigate the source of the complaint. If necessary, RCC will produce a noise / vibration monitoring report to close out the complaint. Noise and vibration monitoring should be performed inside the premises of the affected property and on site adjacent to the affected receivers.

Monitoring is to be undertaken by an experienced noise and vibration monitoring professional or an acoustic consultant. The results of any noise or vibration monitoring are to be provided to the relevant party or person in a timely manner allowing the builder to address the issue and respond to the complaints.

The following may be included in a noise monitoring report:

- The type of monitoring conducted (for example, at a particular project stage or following complaints) and a brief statement of the measurement method.
- The noise / vibration conditions on the consent / licence, or the relevant noise management objectives.
- Descriptions of the nearest affected residences and other sensitive land uses or, in the case of complaints, description of the complainant location and complaint.
- Plan or diagram showing the location of the monitoring and the noise generating works.
- Description of the instrumentation used.
- Name and relevant qualifications or professional memberships of monitoring personnel.
- The weather conditions during monitoring.
- The time(s) and duration(s) of monitoring, including dates – in the case of complaints.
- A clear description of the construction activities taking place during the monitoring.
- The results of monitoring at each monitoring location, including a comparison with the consent conditions or relevant noise management objectives.
- A clear statement outlining the project's compliance or non-compliance with the conditions or objectives.
- Where the monitored level is higher than the conditions or objectives, the reasons for non-compliance should be stated, strategies for minimising noise identified and stated, and the appropriate actions to implement the strategies.

7.10 WORKERS' TRAINING AND AWARENESS

The Contractor shall provide all project personnel and subcontractors with training on the environmental obligations through project inductions, toolbox talks, and through Safety Works Methods (SWMs).

All Project work personnel and subcontractors shall undergo a general project induction prior to commencing work. This should include a noise component to reinforce the importance of noise issues and the measures that will be implemented to protect the environment.

All inductions shall be carried out by the site manager, or his designate in the site office as appropriate. During the induction, each contractor / worker shall be taken around the site to ensure they are fully aware of the exclusion zones and site specific environment.

Site inductions and daily SWMs and toolbox talks will highlight the specific environmental requirements and activities being undertaken at each work area which will include relevant noise management matters.

7.11 OCCUPATIONAL HEALTH AND SAFETY

In addition to potential noise and vibration impacts on the community and structures, construction noise and vibration can also have an adverse impact upon the health of workers. It is important that Contractors adopt noise management strategies to prevent or minimise worker exposure to excessive noise and vibration. Such measures will also assist in reducing noise and vibration impacts on the surrounding community.

The National Occupational Health and Safety Commission (NOHSC) recommends a maximum acceptable workplace noise exposure level of 85dB(A) ($L_{Aeq,8h}$) for an eight hour time period.

Personnel involved in operations should be issued with ear plugs or ear muffs which must be used whenever noise levels interfere with normal speech when individuals are standing at a distance of 1m from each other, or when the $L_{Aeq,8hr}$ exceeds 85dB(A).

Signs should be erected and made visible at the entry to all areas where noise levels will exceed 85dB(A).

7.12 CONSTRUCTION TRAFFIC ROUTES

The contractor shall establish and implement traffic routes for deliveries to the site, which minimise the noise impact on surrounding noise sensitive receivers as best possible.

Deliveries will be scheduled and distributed to ensure avoidance of congestion to surrounding roads networks and within the precinct. Materials handling will be conducted within the construction site perimeter reducing any impacts on traffic flows within the area.

8 CONCLUSIONS

A construction noise and vibration assessment has been carried out for the proposed works for the Stage 2 of the Galungara Public School in Schofields. This report addresses the Condition of Consent B17 of the State Significant Development Application SSD18-9368.

In particular, this report identifies the Contractor's obligations and the requirements to manage noise and vibration during construction such that Contractor can make the necessary allowances within the construction costs, programmes and work methodologies.

The responsibilities of all stakeholders are identified and a framework for the management of noise and vibration during construction works is provided.

This report establishes relevant noise level criteria, details the acoustic assessment and provides comments and recommendations for the proposed development.

Potential construction noise and vibration impacts on the surroundings have been presented in this report and recommendations based on the relevant guidelines are provided. It is expected that the predicted exceedance of the NMLs in the surrounding receivers triggers the proponent to apply all reasonable and feasible work practices to minimise the noise as much as possible, and community consultation, as per the requirements of the NSW ICNG. Refer to Section 7 for details.

For each of the work stages and associated plant, assuming that they are exceeding the noise level criteria, the noise control measures presented in Section 7 shall be considered and implemented wherever reasonable and feasible in order to minimise any potential noise impact. Operation time restrictions shall be applied to 'noisy' construction plant to minimise noise impact to the nearest sensitive receivers.

The information presented in this report shall be reviewed if any modifications to selection of equipment / machinery, construction methodologies and modifications to the works construction program.

Based on the information presented in this report, relevant objectives will be satisfied and therefore approval is recommended to be granted.

APPENDIX A: PROJECT UPDATE LETTERBOX

Galungara Public School

Project update | February 2022

Investing in our schools

The NSW Government is investing $7.9 billion over the next four years, continuing its program to deliver 215 new and upgraded schools to support communities across NSW. This is the largest investment in public education infrastructure in the history of NSW.

The NSW Department of Education is committed to delivering new and upgraded schools for communities across NSW. The delivery of these important projects is essential to the future learning needs of our students and supports growth in the local economy.

Stage 2 for Galungara Public School

Construction on Stage 2 of the Galungara Public School will begin in March 2022. The school was planned and designed to be constructed in stages. Stage 2 is now progressing and will provide additional capacity to meet the need of the growing local community. Stage 2 will include:

- 20 new learning spaces
- Two additional covered outdoor learning areas
- Two new multipurpose games courts
- Landscaping works.

To review the State Significant Development application and support documentation, visit the NSW Government Planning Portal at: https://www.planningportal.nsw.gov.au/major-projects/project/10036

For more information contact:

School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
www.schoolinfrastructure.nsw.gov.au

NSW GOVERNMENT

Site establishment to commence late February 2022

The construction contract has been awarded to Richard Crookes Construction.

Site establishment prepares the construction area so that construction work can begin. As part of the site establishment, which is anticipated to commence from 28 February 2022, Richard Crookes Construction will:

- Install the site office and work sheds
- Deliver equipment

These works will take place between 7am and 5pm, Monday to Friday and 8am to 1pm on Saturdays.

Site signage is in place and hoarding put up to minimise noise and ensure the safety of the local community.

School Infrastructure NSW is working closely with the principal and staff to ensure that school operations continue with minimal disruption. To prevent disruption to school operations and activities, site deliveries are being scheduled outside of school drop off and pick up times, and traffic control personnel are on site to assist with contractor deliveries.

Managing construction impacts

Works are anticipated to start in March. As part of the consent to carry out the work, the contractor is required to develop a Construction Environmental Management Plan (CEMP) and a Construction Noise and Vibration Management Sub-Plan (CNVMP) to outline how it will manage construction impacts to nearby residents. These impacts include noise, vibration and vehicle movements.

You can view the consent conditions, including those required for managing construction impacts on the Planning Portal webpage at www.planningportal.nsw.gov.au/major-projects/project/10036

You can also take a look at the construction impacts consent conditions and proposed action below.

Consent conditions and proposed action

Below are some key consent conditions from DPIE for the Galungara Public School. Please let us know if you have any feedback or questions about these consent conditions and the associated management actions listed by contacting us via email at schoolinfrastructure@det.nsw.edu.au or phone 1300 482 651 by 3 March 2022.

Project Phase	Consent condition and proposed activities
General	**Proposed actions** ■ **Noise levels on site will not exceed the noise control guidelines that are outlined in the EPA Environmental Noise Control Manual for construction and demolition works.**

For more information contact:

School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
www.schoolinfrastructure.nsw.gov.au

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	■ We will provide advance notice of work to the local community, particularly when we anticipate high noise generating works. ■ Trucks will be well maintained and only use approved truck routes to and from the site.
Construction	Consent condition: procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009). Proposed actions: ■ Noise levels for general activities will only occur within approved standard work hours: a) Between 7:00am and 6:00pm Monday to Friday b) Between 8:00am and 1:00pm Saturday c) No work may be carried out on Sundays or public holidays unless approved by the Department of Industry, Planning and Environment. ■ Work will occur within approved standard work hours. ■ Workers and contractors are trained to use equipment in ways to minimise noise. ■ Avoid the use of radios or stereos outdoors where neighbours can be affected. ■ Avoid the overuse of public address systems. ■ Develop a one-page summary of the consent conditions for the site noticeboard for workers to quickly reference this information.
Construction	Consent condition: measures to be implemented to manage high noise generating works such as piling, in close proximity to the closest homes. Proposed actions: ■ If high noise generating works are planned, neighbours should be notified of this before work starts. ■ If rock breaking activities are required, effective equipment should be chosen, and respite periods for local residents should be put in place. Rock breaking hours will be strictly limited to approved hours of: a) 9:00am to 12:00pm, Monday to Friday b) 2:00pm to 5:00pm, Monday to Friday

For more information contact:

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	c) 9:00am to 12:00pm, Saturday. **■ For high noise generating works, if complaints are received, work will be managed to reduce the impact to local residents by implementing shorter time periods, or alternating with quieter work methods were practical.**

Frequently asked questions

When will main construction works start?

The construction is expected to start in mid March 2022, with preparatory works scheduled to start in late February 2022.

What steps will be taken to control noise and dust impacts?

The contractor will continue to implement dust and noise control measures. Dust and noise are minimised with hoarding, shade cloth and spraying water.

How will traffic be managed?

Traffic management will be in place where required for the safety of the local community and workers. Traffic controllers will be used to manage the entry and exit of vehicles to and from the construction site as necessary. Vehicles will give way to pedestrians at all times.

Will street parking be impacted during construction?

Street parking impacts will be minimised where possible. Contractors are encouraged to carpool and parking will be made available on site for construction vehicles. We will work with local communities to identify issues and put in place measures to mitigate the effects.

Will utility services be interrupted as part of the construction?

School Infrastructure NSW coordinates upgrades or new supplies of utility services with local providers to minimise disruption. In the event of a disruption to services in the local area, we will notify businesses and residents in advance.

Is there a COVID safety plan in place?

A comprehensive COVID-19 Safety Plan will be in place for the site and the contractor will enforce strict compliance with the Public Health Order. Our construction sites will follow all current health guidelines

For more information contact:

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www.schoolinfrastructure.nsw.gov.au

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We look forward to bringing you more information in the near future which will outline additional detail about the Stage 2 works.

Your feedback is important to us and we will ensure that the school and local community are provided regular updates, including on the School Infrastructure webpage at: https://www.schoolinfrastructure.nsw.gov.au/projects/g/galungara-public-school---stage-2.html

For more information contact:

School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
www.schoolinfrastructure.nsw.gov.au

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APPENDIX B: COMMUNITY COMMUNICATION STRATEGY

NSW GOVERNMENT Education

May 2020

School Infrastructure NSW

Community Communication Strategy

New primary school for the Alex Avenue community

Contents

Document Purpose

This Community Communication Strategy (CCS) has been developed to:

- Successfully consider and manage stakeholder and community expectations as integral to the successful delivery of the project.
- Outline interfaces with other disciplines, including safety, construction, design and environment, to ensure all activities are co-ordinated and drive best practice project outcomes.
- Inform affected stakeholders, such as the local community or road users about construction activities.
- Provide a delivery strategy which enables the open and proactive management of issues and communications.
- Highlight supporting procedures and tools to enable the team to deliver this plan effectively.
- Provide support for the broader communications objectives of School Infrastructure NSW (SINSW), including the promotion of the project and its benefits.

This Community Consultation Strategy (CCS) will be implemented through the design and construction phase of the project, and for 12 months following construction completion.

Plan review

The CCS will be revised regularly to address any changes in the project management process, comments and feedback by relevant stakeholders, and any changes identified as a result of continuous improvement undertakings. This will be done in close consultation with the SINSW Senior Project Director, appointed Project Management Company and/or Contractor and SINSW Community Engagement Manager.

Approval

The CCS is reviewed and approved by the SINSW Senior Project Director, in close consultation with Schools Operations and Performance, with final endorsement from the SINSW Community Engagement Senior Manager before being submitted to the Planning Secretary for approval.

Table 1: List of SSD requirements and where they are addressed

State Significant Developments B11**	The community communications strategy addresses this in section
Identify people to be consulted during the design and construction phase	Section 4 Section 5
Set out procedures and mechanisms for the regular distribution of accessible information about or relevant to the development	Section 6 Section 7 Section 8.4
Provide for the formation of community-based forums, if required, that focus on key environmental management issues for the development	Section 4
Set out procedures and mechanisms:	
• Through which the community can discuss or provide feedback to the Applicant	Section 4 Section 6 Section 8.5
• Through which the Applicant will respond to enquiries or feedback from the community; and	Section 8.5

State Significant Developments B11**	The community communications strategy addresses this in section
• To resolve any issues and mediate any disputes that may arise in relation to construction and operation of the development, including disputes regarding rectification or compensation	Section 8.5
Include any specific requirements around traffic, noise and vibration, visual amenity, flora and fauna, soil and water, contamination and heritage	Section 3

1. Context

The NSW Government is investing $6.7 billion over four years to deliver more than 190 new and upgraded schools to support communities across NSW. In addition, a record $1.3 billion is being spent on school maintenance over five years, along with a record $500 million for the sustainable Cooler Classrooms program to provide air conditioning to schools. This is the largest investment in public education infrastructure in the history of NSW.

A new primary school for the Alex Avenue community in Schofields, located on Farmland Drive is underway. The project will include:

- Flexible learning spaces
- A library, hall, canteen and covered outdoor learning area (COLA)
- Staff and administration facilities
- Special program rooms
- Multipurpose games court

The new Alex Avenue primary school is classified as a state significant development, and has been assessed by the Department of Planning, Industry and Environment (DPIE). Consent was provided on 21 May 2020.

DPIE's web page on the project is https://www.planningportal.nsw.gov.au/major-projects/project/10036.

2. Community Engagement Objectives

SINSW's mission is to provide school infrastructure solutions by working collaboratively with all our stakeholders to create learning environments across NSW that serve our future needs and make us all proud.

This CCS has been developed to achieve the following community engagement objectives:

- Promote the benefits of the project
- Build key school community stakeholder relationships and maintain goodwill with impacted communities
- Manage community expectations and build trust by delivering on our commitments
- Provide timely information to impacted stakeholders, schools and broader communities
- Address and correct misinformation in the public domain
- Reduce the risk of project delays caused by negative third party intervention
- Leave a positive legacy in each community.

3. Key Messages

Through each phase of the project, the key messages and means of engagement will be regularly reviewed, refined and updated. Information that is currently in the public domain is outlined below.

3.1. High level messaging

The NSW Government is investing $6.7 billion over four years to deliver 190 new and upgraded schools to support communities across NSW. In addition, a record $1.3 billion is being spent on school maintenance over five years. This is the largest investment in public education infrastructure in the history of NSW.

3.2. Project messaging

3.2.1. Project status

The State Significant Development Application has been assessed by the Department of Planning, Industry & Environment (DPIE) and consent has been granted.

3.2.2. Project benefits

A project is underway to provide a new public school for the Alex Avenue community in Schofields. The project will include:

- 19 flexible learning spaces
- a library, hall, canteen and covered outdoor learning area (COLA)
- administration and staff facilities.

The new school is designed to accommodate up to 500 students from years K-6 and to allow for future expansion of up to 1000 students.

3.2.3. High-quality learning environment

The project will provide flexible learning spaces that make use of the latest technology to enhance the learning experience for the next generation of students. Furthermore, the contemporary and sustainable facilities provide an outstanding working environment for school staff.

Flexible learning spaces are adaptable to accommodate small or large groups and facilitate students use of modern technology, while working independently and collaboratively.

3.2.4. Environmental benefits

The new school will be built in accordance with current sustainability principles. School Infrastructure NSW is committed to environmentally conscious construction and maintenance practices.

3.3. Construction phase

3.3.1. Traffic management

The construction contractor has developed a Traffic Management Plan to ensure that vehicle movements are managed with minimal disruption to the community. All construction vehicles (excluding worker vehicles) are to be contained wholly within the site, except if located in an approved on-street work zone, and vehicles must enter the site before stopping.

3.3.2. Safety

School Infrastructure NSW is committed to ensuring that work is completed safely and efficiently and with minimal impact to the local community. Prior to construction starting, any hazardous material is required to be removed from the site. This work will be carried out in accordance with regulatory requirements including the provisions of SafeWork NSW.

3.3.3. Noise, vibration and dust

Any activity that could exceed approved construction noise management levels will be managed in strict accordance with the Protection of the Environment Operations Act 1997. All works will be conducted in accordance with the Contractor's approved Construction Noise Management Plan. Vibration from works will be minimal and kept within acceptable levels of the Assessing Vibration: a technical guideline vibration criteria for day time periods.

Mitigation measures will be in place to manage noise and dust levels, including hoarding to minimise the effects of noise and dust and hosing down as required to ensure the safety of the school and local community.

Construction works, including the delivery of materials to and from the site, will take place between 7am and 6pm Monday to Friday and 8am and 1pm on Saturdays. No night work is scheduled for this project. In line with the NWs

Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2020, School Infrastructure NSW construction sites will now operate on weekend and public holidays during the COVID-19 pandemic.

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

(a) 9am to 12pm, Monday to Friday;

(b) 2pm to 5pm Monday to Friday; and

(c) 9am to 12pm, Saturday.

Activities may be undertaken outside of these hours if required:

(a) by the Police or a public authority for the delivery of vehicles, plant or materials; or

(b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or

(c) where the works are inaudible at the nearest sensitive receivers; or

(d) where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.

Notification of such construction activities as referenced in Condition C5 must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

3.3.4. Disruptive works

Construction work for the new primary school Alex Avenue is underway. The following activities are planned for the upcoming weeks (*works will be outlined*). You can contact us directly using the details below to discuss any aspect of this work.

3.3.5. Get involved

We are committed to working together with our school communities and other stakeholders to deliver the best possible learning facilities for students. Your feedback is important to us. For more information contact us via the details below.

- Email: schoolinfrastructure@det.nsw.edu.au
- Website: schoolinfrastructure.nsw.gov.au
- Phone: 1300 482 651

3.3.6. Fauna and vegetation

School Infrastructure NSW is committed to ensuring construction work has a minimal impact upon fauna and vegetation.

School Infrastructure NSW will comply with all Development Consent Conditions relating to the protection of fauna and vegetation, and will comply with all relevant mitigation measures listed in the Environmental Impact Statement (EIS).

Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared to govern the completion of all construction works. The CEMP will detail measures to be taken for the protection and management of fauna and vegetation, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of DPIE.

3.3.7. Soil and water

School Infrastructure NSW is committed to the appropriate management of soil and water on the construction site.

School Infrastructure NSW will comply with all Development Consent Conditions relating to soil and water management, and will comply with all relevant mitigation measures listed in the EIS.

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The CEMP will detail measures for the management of soil and water, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the DPIE.

A suitably qualified and experienced consultant will prepare a Construction Soil and Water Management Sub-Plan (CSWMSP), which will form part of the CEMP. The CSWMSP will:

- describe erosion and sediment control measures to be implemented during construction
- provide a plan of how construction works will be managed in wet-weather events

- detail flows from the site to surrounding area
- describe the measures to be taken to manage stormwater and flood flows for small and large sized events
- include an Acid Sulfate Soils Management Plan (if required).

Erosion and sediment controls will be installed and maintained in accordance with the “Blue Book” – *Managing Urban Stormwater: Soils and Construction (4th edition)*. These controls will be implemented prior to the commencement of any other site disturbance works.

A rainwater harvesting system will be installed onsite and used on-site during construction. Approval will be obtained prior to the discharge of onsite stormwater to Council’s stormwater drainage system or street gutter.

Only approved soil and fill types will be used onsite. Accurate records will be kept on the volume and type of fill used onsite.

3.3.8. Visual amenity

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The plan will detail measures to maintain visual amenity, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the DPIE.

The CEMP will include provisions for the management of outdoor lighting. The installation and operation of outdoor lighting will comply with both AS 4282-2019 – Control of the Obtrusive Effects of Outdoor Lighting and AS 1158.3.1-2005 – Lighting for Roads and Public Spaces – Part 3.1: Pedestrian Area (Category P) Lighting.

Visual amenity impacts will be limited during construction via the installation of appropriate site fencing and adherence to site housekeeping procedures.

3.3.9. Contamination

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The CEMP will detail contamination management measures, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the DPIE.

The project site has been tested for contamination and is considered to be safe and suitable.

The CEMP will include protocols for the management of unexpected contamination discovered during the course of construction works.

3.3.10. Heritage

Prior to construction, a CEMP will be prepared to govern the completion of all construction works. The plan will detail measures to protect heritage matters, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the DPIE.

The CEMP will include unexpected finds protocols for objects of Aboriginal or Historic heritage.

In the event that relics of Aboriginal heritage are discovered, all works in the immediate area will cease immediately, and consultation will occur with a suitably qualified archaeologist, registered Aboriginal representatives and DPIE to determine an appropriate management strategy.

In the event that relics of historic heritage are discovered, all works in the immediate area will cease immediately, and consultation will occur with DPIE to determine an appropriate management strategy.

3.4. Handover phase

3.4.1. Traffic and access

Construction work on the new primary school Alex Avenue has been completed. We are now in a position to confirm access provisions for the new school, including pick-up and drop-off arrangements.

3.5. Official school opening

A new primary school, Alex Avenue in Schofields was completed today, and delivered brand new facilities including:

- 19 flexible learning spaces
- a library, hall, canteen and covered outdoor learning area (COLA)
- administration and staff facilities.

Thank you for your patience during construction and we are thrilled to deliver this project for the school community.

4. Project Governance

4.1. Project Reference Group

The Department's engagement process strives to engage with key stakeholders from the school community. As part of this process, a Project Reference Group (PRG) is established early in the project with nominated representatives from the school community to ensure input from, and consultation with, impacted stakeholders.

The PRG provides key information from an operational, educational, change and logistics perspective into the planning, through the design and construction phases of the project.

The PRG will receive project briefings and key progress updates on project progress to support its responsibilities in assisting to communicate updates to school staff, parents and stakeholders in the wider local community.

The Project Reference Group will be conducted as two separate groups during the development and delivery of all projects:

(a) Project Reference Group – Planning

A nominated group (limited to 10) will participate in workshops to develop the Educational Principles and Education Rationale which will inform the Functional Design Brief. These workshops are chaired by the SINSW Senior Project Director (or delegate) and may be facilitated by an Education Consultant. This activity will inform the development of the building design.

(b) Project Reference Group – Delivery

The purpose of the group is to seek input and inform design processes and provide operational requirements and information to help minimise the impact of the project on school operations. These workshops are chaired by the Senior Project Director (or delegate) and may be facilitated by the appointed architectural consultant, as required. The PRG will provide key information from an operational and logistics perspective to assist project delivery.

Specifically to communications and engagement related matters, the PRG will also:

- Provide a forum for discussion and exchange of information relating to the planning and delivery of the project
- Identify local issues and concerns to assist the project team with the development of mitigation strategies – to manage and minimise construction and environmental impacts to the school community and local residents
- Provide feedback to the communications and community engagement team on key messages and communications and engagement strategies
- Provide advice on school engagement activities
- Assist to disseminate communications to the school community and other stakeholders.

As per all department led delivery projects, the PRG acts as a consultative forum and not a decision-making forum for the planning and delivery of this school infrastructure.

Figure 1: Project Reference Group (PRG)

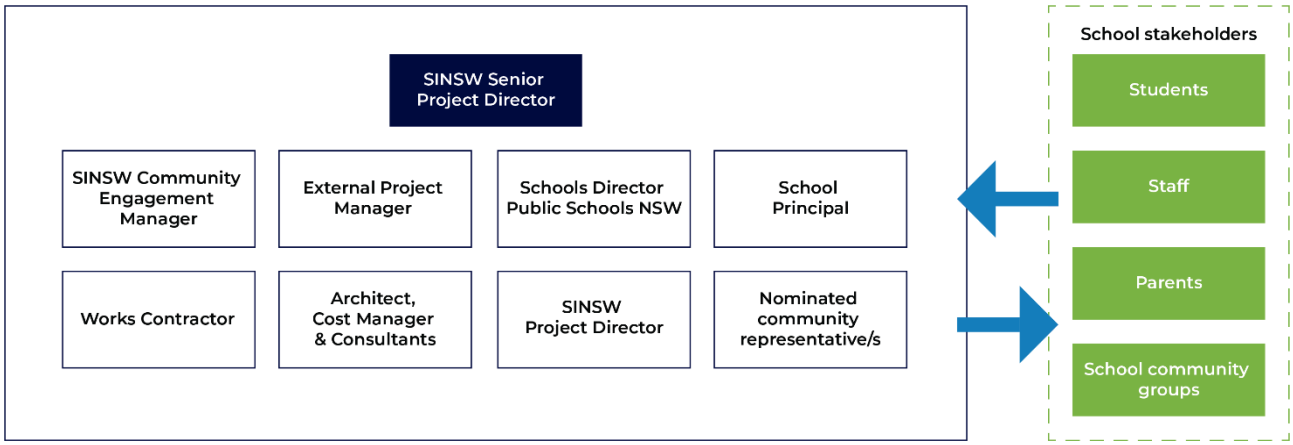
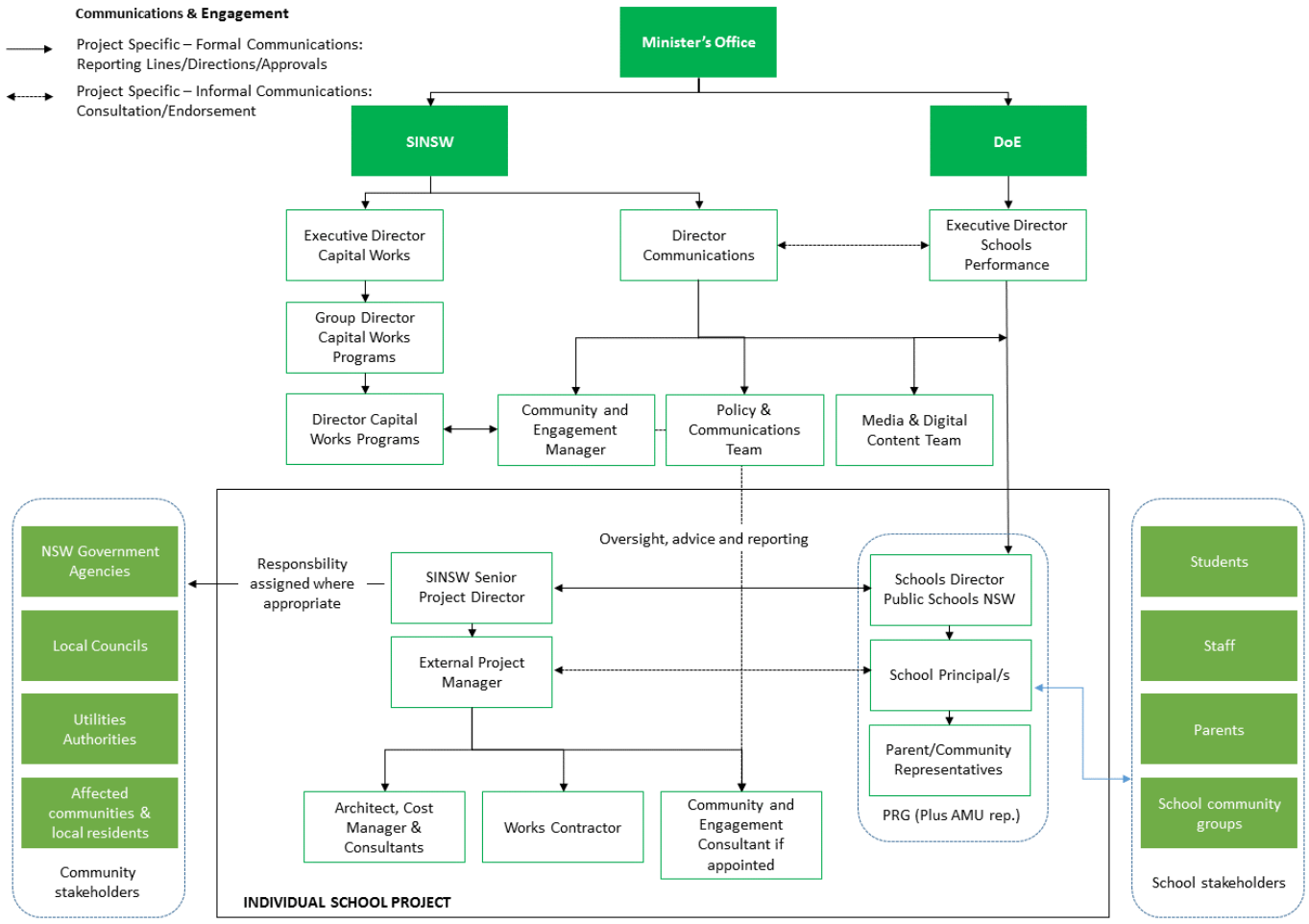


Figure 2 below maps how the department and SINSW will communicate both internally and externally.

Figure 2: SINSW Project Governance



5. Stakeholders

The stakeholder list below summarises who will be consulted during the design and construction phase via ongoing face to face meetings, communications collateral and digital engagement methods.

Table 2: Stakeholders

Stakeholders	Interest and involvement
Local Members of Parliament: ▪ State Government Member for Riverstone – *Kevin Conolly* ▪ Federal Government Member for Greenway – *Michelle Rowland*	▪ Meeting the economic, social and environmental objectives of state and federal governments ▪ Deliver increased public education capacity on time ▪ Delivering infrastructure which meets expectations ▪ Addressing local issues such as traffic, congestion and public transport solutions
Government agencies and peak bodies: ▪ Transport for NSW ▪ Roads and Maritime Services NSW ▪ Fire and Rescue NSW ▪ NSW Department of Education ▪ NSW Department of Planning, Industry and Environment ▪ NSW Environmental Protection Authority ▪ NSW Rural Fire Service ▪ Sydney Water ▪ NSW Heritage Council ▪ NSW Office of Environment, Energy and Science ▪ NSW Department of Premier and Cabinet	▪ Traffic and congestion on the local road system ▪ Adequate public transport options and access ▪ Ensuring new infrastructure meets standard requirements for safety and fire evacuation ▪ Ensuring the development is compliant ▪ Ensuring the development does not impact heritage items ▪ Easing overcrowding in local schools
Cultural and heritage interest ▪ Local Aboriginal Land Council ▪ Local heritage groups	▪ Discovery of cultural and heritage artefacts during construction
Local Council – Blacktown City Council ▪ Mayor ▪ General Manager ▪ Councillors ▪ Bureaucrats	▪ Schedule for construction and opening of school ▪ Impacts to the local community including noise, congestion and traffic ▪ Shared use of community spaces ▪ Providing infrastructure to meet the increase in population density
School community ▪ Principal (once appointed) ▪ Teachers (once appointed) ▪ Staff (once appointed) ▪ Prospective parents and carers ▪ Prospective students	▪ Safe pedestrian and traffic access to the school during construction ▪ Construction impacts and mitigations ▪ Quality of infrastructure and resources upon project completion ▪ How to access the new school once completed

Stakeholders	Interest and involvement
Local community • All residents and businesses to the south of Schofields Road, up to Burdekin Road (bounded to the east by First Ponds Creek and Railway Terrace in the west)	▪ Noise and truck movements during construction ▪ Increased traffic and congestion on nearby streets ▪ Local traffic and pedestrian safety ▪ Changed traffic conditions for pick-up and drop-off ▪ Shared use of school facilities and amenities ▪ Visual amenity
Nearby public schools • Schofields Public School • Hambledon Public School • Riverbank Public School	▪ Impact on school resources ▪ Impact on current students ▪ Implications for teaching staff ▪ Possible impacts on enrolments and boundary changes ▪ Opportunities to view the new facilities
Adjoining affected landowners and businesses • All landowners on Farmland Drive • All landowners on Belford Street • All landowners on Glacier Street • All landowners on Hyde Street • All landowners on Heathland Avenue • Landowner - Blacktown City Council • Landowner – Catalina Developments • Landowner – Toplace Developments • Woolworths and BWS Schofields • HCafe • Dipeksha Hair and Beauty • Thirty 7 Candles • FJ Electrical • Rogue Cosmetique	▪ Noise and truck movements during construction ▪ Increased traffic and congestion on nearby streets ▪ Local traffic and pedestrian safety ▪ Changed traffic conditions for pick-up and drop-off ▪ Shared use of school facilities and amenities ▪ Environmental impacts during construction ▪ Visual amenity

6. Engagement Approach*

*** From 30 March 2020, the way we communicate has temporarily changed, please refer to Appendix A for a detailed up to date list of changed communication methods and tools. This particularly refers to face to face communication channels such as door knocks, information booths/sessions, face to face meetings and briefings.**

The key consideration in delivering successful outcomes for this project is to make it as easy as possible for anyone with an interest to find out what is going on. In practice, the communications approach across all levels of engagement will involve:

- Using uncomplicated language
- Taking an energetic approach to engagement
- Encouraging and educating whenever necessary
- Engaging broadly including with individuals and groups that fall into harder to reach categories
- Providing a range of opportunities and methods for engagement
- Being transparent
- Explaining the objectives and outcomes of planning and engagement processes.

In addition to engagement with Government Departments and Agencies and Council, two distinct streams of engagement will continue for the project as follows:

- School community for existing schools being upgraded, or surrounding schools for new schools, and
- Broader local community.

This allows:

- School-centric involvement from school communities (including students, parents/caregivers, teachers, admin staff) unencumbered by broader community issues, and
- Broad community involvement unencumbered by school community wants and needs. Broad community stakeholders include local residents, neighbours and local action groups.

6.1. General community input

Members of the general public impacted by the construction phase are able to enquire and complain about environmental impacts via the following channels:

- Information booths and information sessions held at the school or local community meeting place, and advertised at least 7 days before in local newspapers, on our website and via letterbox drops
- 1300 number that is published on all communications material, including project site signage
- School Infrastructure NSW email address that is published on all communications material, including project site signage

Refer to Section 8.5 of this document for detail on our enquiries and complaints process.

A number of tools and techniques will be used to keep stakeholders and the local community involved as summarised in table 3 below.

For reference, project high level milestones during the delivery phase include:

- Site establishment/early works
- Commencement of main works construction
- Term prior to project completion
- Project completion
- First day of school following project completion
- Official opening

Table 3: School Infrastructure NSW Communications Tools

Communications Tool	Description of Activity	Frequency
1300 community information line	The free call 1300 482 651 number is published on all communication materials and is manned by SINSW. All enquiries that are received are referred to the appointed C&E Manager and/or Senior Project Director as required and logged in our CRM. Once resolved, a summary of the conversation is updated in the CRM.	Throughout the life of the project and accessible for 12 months post completion
Advertising (print)	Advertising in local newspapers is undertaken with at least 7 days' notice of significant construction activities, major disruptions and opportunities to meet the project team or find out more at a face to face event.	At project milestones or periods of disruption
Call centre scripts	High level, project overview information provided to external organisations who may receive telephone calls enquiring about the project, most namely stakeholder councils.	Throughout the project when specific events occur or issues are raised by stakeholders
Community contact cards	These are business card size with all the SINSW contact information. The project team/ contractors are instructed to hand out contact cards to stakeholders and community members enquiring about the project. Cards are offered to school administration offices as appropriate. Directs all enquiries, comments and complaints through to our 1300 number and School Infrastructure NSW email address.	Throughout the life of the project and available 12 months post completion
CRM database	All projects are created in SINSW's Customer Relationship Management system – Darzin - at project inception. Interactions, decisions and feedback from stakeholders are captured, and monthly reports generated. Any enquiries and complaints are to be raised in the CRM and immediately notified to the Senior Project Director, Project Director and Community Engagement Manager.	Throughout the life of the project and updated for 12 months post completion
Display boards	A0 size full colour information boards to use at info sessions or to be permanently displayed in appropriate places (school admin office for example).	As required
Door knocks*	Provide timely notification to nearby residents of upcoming construction works, changes to pedestrian movements, temporary bus stops, expected impacts and proposed mitigation. Provide written information of construction activity and contact details.	As required prior to periods of construction impacts
Face-to-face meetings/briefings*	Activities include meeting, briefings and "walking the site" to engage directly with key stakeholders, directly impacted residents and business owners and the wider community.	As required

Communications Tool	Description of Activity	Frequency
FAQs	Set of internally approved answers provided in response to frequently asked questions. Used as part of relevant stakeholder and community communication tools. These are updated as required, and included on the website if appropriate.	Throughout the life of the project
Information booths*	Information booths are held locally and staffed by a project team member to answer any questions, concerns or complaints on the project. Info booths are scheduled from the early stages of project delivery through to project completion. Information booths are to be held both at the school/ neighbouring school, as well for the broad community: ▪ School information booths are held at school locations at times that suit parents and caregivers, with frequency to be aligned with project milestones and as required. ▪ Community information booths are usually held at local shopping centres, community centres and places that are easily accessed by the community. They are held at convenient times, such as out of work hours on weekdays and Saturday's. Collateral to be provided include community contact cards, latest project notification or update, with internal FAQs prepared. All liaison to be summarised and loaded in the CRM. Notice of at least 7 days to be provided.	At project milestones and as required
Information sessions (drop in)*	Information sessions are a bigger event than an info booth, held at a key milestone or contentious period. We have more information on the project available on display boards/ screens and an information pack handout – including project scope, planning approvals, any impacts on the school community or residents, project timeline, FAQs. Members from the project and communications team will be available to answer questions about the project. These events occur after school hours on a week day (from 3pm – 7pm to cover working parents). All liaison summarised and loaded on the CRM.	As required
Information pack	A 4 page A4 colour, fold out flyer that can include: ▪ Project scope ▪ Project update ▪ FAQs ▪ Contact information ▪ Project timeline To be distributed at info sessions or at other bigger events/ milestones in hard copy and also made available electronically.	As required

Communications Tool	Description of Activity	Frequency
Media releases/events	Media releases are distributed upon media milestones. They promote major project milestones and activities and generate broader community awareness.	Media milestones: ▪ Project announcement ▪ Concept design completed ▪ Planning approval lodged ▪ Planning approval granted ▪ Construction contract tendered ▪ Construction contract awarded ▪ SOD turning opportunity ▪ Handover ▪ Official opening
Notifications	A4, single or double sided, printed in colour that can include FAQs if required Notifications are distributed under varying templates with different headings to suit different purposes: ▪ **Works notification** are used to communicate specific information/ impacts about a project to a more targeted section of the community. This template doesn't have an image so it can be more appropriately targeted for matters like hazardous material. ▪ **Project update** is used when communicating milestones and higher level information to the wider community i.e. project announcement, concept design/DA lodgement, construction award, completion. Always includes the project summary, information booths/ sessions if scheduled, progress summary and contact info.	As required according to the construction program. Distributed via letterbox drop to local residents and via the school community at least 5-7 days prior to construction activities or other milestones throughout the life of the project. Specific timings indicated in table 5 – Section 8.
Photography, time-lapse photography and videography	Captures progress of construction works and chronicles particular construction activities. Images to be used in notifications, newsletters and report, on the website and Social Media channels, at information sessions and in presentations. Once the project is complete, SINSW will organise photography of external and internal spaces to be used for a range of communications purposes.	Project completion (actual photography and video of completed project) Prior to project completion - artist impressions, flythrough, site plans and construction progress images are used
Presentations	Details project information for presentations to stakeholder and community groups.	As required

Communications Tool	Description of Activity	Frequency
Priority correspondence	Ministerial (and other) correspondence that is subject to strict response timeframes. Includes correspondence to the Premier, Minister, SINSW and other key stakeholders. SINSW is responsible for drafting responses as requested within the required timeframes.	As required
Project Reference Group	SINSW facilitated Project Reference Group sessions providing information on the design solution, construction activities, project timeframes, key issues and communication and engagement strategies.	Meets every month or as required More information on the PRG is detailed in Section 4
Project signage	A0 sized, durable aluminium signage has been installed at the new primary school Alex Avenue, in Schofields. Provides high level information including project scope, project image and SINSW contact information. Fixed to external fencing/ entrances etc. that are visible and is updated if any damage occurs.	Throughout the life of the project and installed for 12 months post completion
Site visits	Demonstrate project works and progress and facilitate a maintained level of interest in the project. Includes media visits to promote the reporting of construction progress.	As required
School Infrastructure NSW email address	Provide stakeholders and the community an email address linking direct to the Community Engagement team. Email address (schoolinfrastructure@det.nsw.edu.au) is published on all communications materials.	Throughout the life of the project
School Infrastructure NSW website	A dedicated project page for the new primary school Alex Avenue in Schofields is located on the SINSW website - https://www.schoolinfrastructure.nsw.gov.au/projects/a/alex-avenue-new-primary-school.html	Updated at least monthly and is live for at least 12 months post completion of the project
Welcome pack/ thank you pack	At project completion the following flyers are utilised: ▪ **Welcome pack** – project completion for school community - A 2 to 4 page A4 flyer which is provided to the school community on the first day/week they are returning to school when new facilities are opening, or attending a new school. Includes project overview, map outlining access to the school and key locations, FAQs, contact information. ▪ **Thank you pack** – A 2 to 4 page A4 flyer tailored to the local residents to thank them for their patience and support of the project.	Project completion only

7. Engagement Delivery Timeline*

*** From 30 March 2020, the way we communicate has temporarily changed, please refer to Appendix A for more details on changed methods and tools. The table below outlines both traditional and alternative methods to be used in line with the changes.**

The following engagement delivery timeline maps tailored communications tools and activities by key milestone.

Table 4: Engagement timeline

Project Phase / milestone	Target Audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
Prior to first delivery of components (modular buildings)	Near neighbours Local community	**Planned** • Works notification online and distributed to surrounding community • No doorknock – letterbox drop with 'door knock' letter template to adjacent landowners • Website update • SINSW email address and hotline • FAQs	June/July 2020
Main Construction works, including but not limited to: ▪ Works commenced ▪ Key impact periods – noise, dust, traffic, vibration ▪ Construction milestones	Local community Adjacent landowners Local Council State agencies Local teachers Prospective parents and students	**Planned** • Project update: letterbox drop and online • Works notifications • Door knocking to discuss works • Information booth • Information packs • Information boards • Website update • SINSW email address and hotline • Media release • Contact cards • FAQs • Project signage **Alternative methods where applicable:** • No doorknock – letterbox drop with 'door knock' letter template • Digital information booth (if required) with information boards and pack online	June 2020 to completion (at key construction events as required, as per our notification process in Table 5)
Term prior to project completion	School community Local community Adjacent landowners	**Planned** • Project update: letterbox drop and online • Information booth and	Term 4, 2020

Project Phase / milestone	Target Audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
	Local Council Prospective parents and students	presentation • Information pack • Information boards • Website update • SINSW email address and hotline • Media release • Site visits **Alternative methods where applicable:** • Digital information booth (if required) with information boards and pack online	
Handover and welcome to new school	School community Local community	**Planned** • Media release • Website update • SINSW email address and hotline • Site visits • Thank you pack • Welcome pack	Day 1 Term 1, 2021
Opening	All	**Planned** • Media release • Official opening ceremony	TBC
Post-opening	All	**Planned** • Website remains live • Project signage remains installed • 1300 phone and email still active, and CRM still maintained for complaints and enquiries.	2021-2022 (12 months post construction completion)

8. Protocols

8.1. Media engagement

SINSW manages all media relations activities, and is responsible for:

- Responding to all media enquiries and instigating all proactive media contact.
- Media interviews and delegation to SINSW media spokespeople who are authorised to speak to the media on behalf of the project
- Informing the Minister's Office and SINSW project team members and communications representatives of all media relations activities in advance and providing the opportunity to participate in events where possible.

8.2. Site visits

SINSW in partnership with Schools Operations and Performance organises and hosts guided project site tours and media briefings as required by the Minister's Office. The Project Team will ensure the required visitor site inductions are undertaken and that all required Personal Protective Equipment (PPE) is worn.

For media site visits and events, SINSW creates, or contributes to, the production of an event pack. This will include an event brief, media release, speaking notes and Q&As.

8.3. Social, online and digital media

SINSW initiates and maintains all social and online media channels. These channels can include Facebook, Twitter, LinkedIn and the website. The SINSW Online Content Team upload to the SINSW website.

8.4. Notification process

Notifications (titled works notifications or project updates as per Table 3) are SINSW's prescribed notification requirement and are the primary mechanism to inform the community and key stakeholders about the impact of school construction on the local area. Notifications provide advance warning of activities and planned disruptions, as per the notice periods in Table 5 below, allowing stakeholders and community members to plan for the impacts and make alternative arrangements where required. Notifications are distributed in person via door knocks, via letterbox drop, via the school and electronically via email.

The C&E Manager advises the project team of the relevant notification requirements and timeframes to be met. The team obtains the information necessary to meet these timeframes by:

- Having oversight of the project delivery program
- Visiting site as required
- Attending and participating in construction meetings, planning meetings, and Risk and Opportunity workshops.

Table 5: Notifications periods

Works activity	Minimum community notification period
Notification to communities following major incident	Same day
Emergency works/unforeseen events	Same day
Contamination management and notification	Within 48 hours
Upcoming works notification (minimum disruption)	5- 7 days
Invitation/notification of community event (e.g. info booth)	5 – 7 days
Notifications regarding traffic changes, parking impacts, road closures, major detours	10 – 14 days
Pedestrian route changes and other impacts	10 – 14 days

Works activity	Minimum community notification period
Notifications regarding operational changes for the school community (school drop-off points, entry and exit points)	10 - 14 days
Major construction impacts (out of hours/ significant noise/ demolition)	10 – 14 days
Major impacts to school community e.g. relocation to temporary school	6 months

8.5. Enquiries and complaints management

SINSW manages enquiries (*called interactions in our CRM, Darzin*), and complaints in a timely and responsive manner.

Prior to project delivery, a complaint could be related to lack of community consultation, design of the project, lack of project progress, etc.

During project delivery, a complaint is defined as in regards to construction impacts – *such as* – safety, dust, noise, traffic, congestion, loss of parking, contamination, loss of amenity, hours of work, property damage, property access, service disruption, conduct or behaviour of construction workers, other environmental impacts, unplanned or uncommunicated disruption to the school.

If a phone call, email or face- to- face complaint is received during construction, they must be logged in our CRM, actively managed, closed out and resolved by SINSW within 24-48 hours.

As per our planning approval conditions, a complaints register is updated monthly and is publicly available on the project's website page on the SINSW website.

If the complainant is not satisfied with SINSW response, and they approach SINSW for rectification, the process will involve a secondary review of their complaint as per the outlined process.

Complaints will be escalated when:

- An activity generates three complaints within a 24-hour period (separate complainants).
- Any construction site receives three different complaints within a 24-hour period.
- A single complainant reports three or more complaints within a three day period.
- A complainant threatens to escalate their issue to the media or government representative.
- The complaint was avoidable
- The complaint relates to a compliance matter.

Complaints will be first escalated to the Senior Manager, Community and Engagement or Director of Communications for SINSW as the designated complaints handling management representatives for our projects. Further escalation will be made to the Executive Director, Office of the Chief Executive to mediate if required.

If a complaint still cannot be resolved by SINSW to the satisfaction of the complainant, we will advise them to contact the NSW Ombudsman - https://www.ombo.nsw.gov.au/complaints.

The below table summarises timeframes for responding to enquiries and complaints, through each correspondence method:

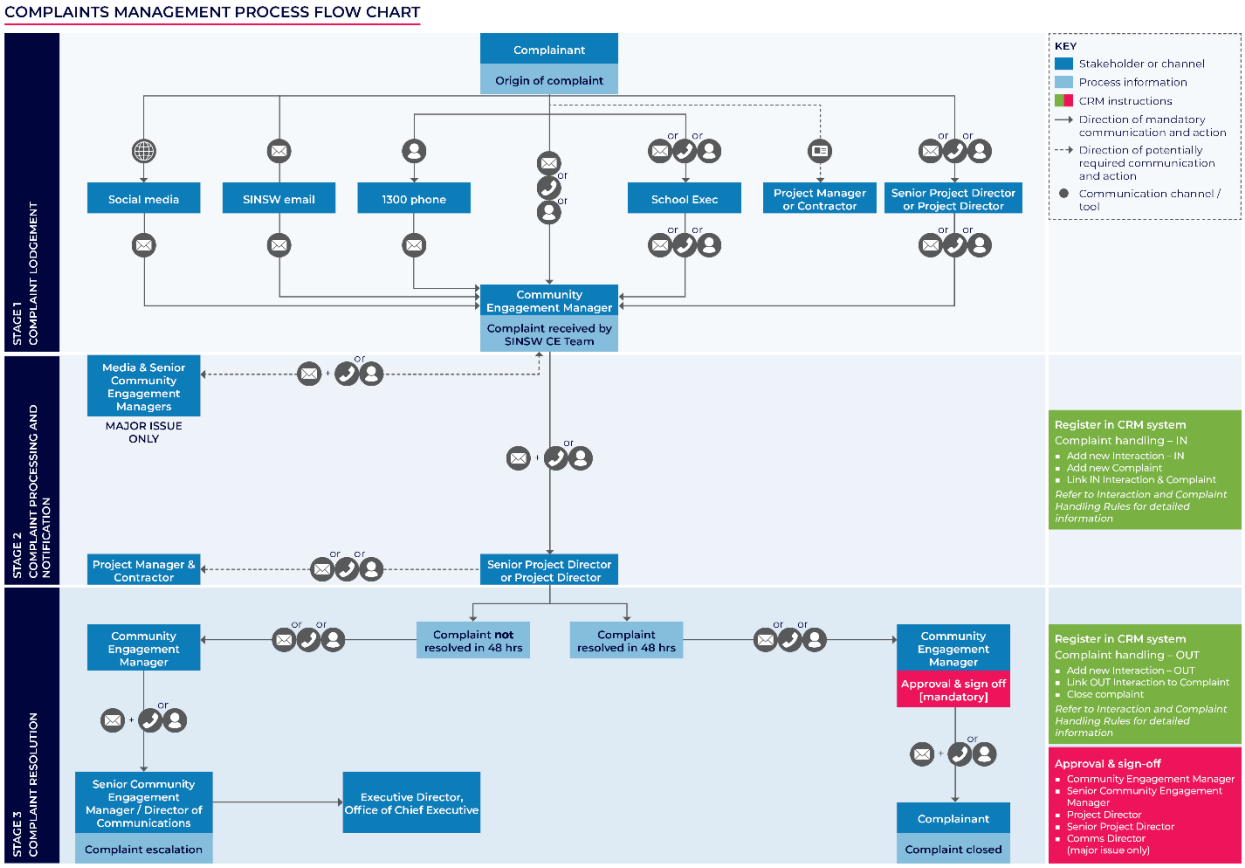
Table 6: Complaint and enquiry response time

Complaint	Acknowledgement times	Response times
Phone call during business hours	At time of call – and agree with caller estimated timeframe for resolution.	Complaint to be closed out within 48 hours. If not possible, continue contact, escalate as required and resolve within 7 business days.

Complaint	Acknowledgement times	Response times
Phone call after hours*	Within two (2) hours of receiving message upon returning to office.	Following acknowledgement, complaint to be closed out within 48 hours. If not possible, continue contact, escalate as required and resolve within 7 business days.
Email during business hours	At time of email (automatic response)	Complaint to be closed out within 48 hours. If not possible, continue contact, escalate internally as required and resolve within 7 business days.
Email outside of business hours	At time of email (automatic response)	Complaint to be closed out within 48 hours (once return to business hours). If not possible, continue contact, escalate internally as required and resolve within 7 business days.
Interaction/ Enquiry		
Phone call during business hours	At time of call – and agree with caller estimated timeframe for response.	Interaction to be logged and closed out within 7 business days.
Phone call after hours	Within two (2) hours of receiving message upon returning to office.	Interaction to be logged and closed out within 7 business days.
Email during business hours	At time of email (automatic response)	Interaction to be logged and closed out within 7 business days.
Email outside of business hours	At time of email (automatic response)	Interaction to be logged and closed out within 7 business days.
Letter	N/A	Interaction to be logged and closed out within 10 business days following receipt.

The below diagram outlines our internal process for managing complaints.

Figure 3 - Internal Complaints Process



8.5.1. Disputes involving compensation and rectification

School Infrastructure NSW is committed to working with the school and broader community to address concerns as they arise. Where disputes arise that involve compensation or rectification, the process for resolving community enquiries and complaints will be followed to investigate the dispute. Depending upon the results of the investigation, School Infrastructure NSW may seek legal advice before proceeding.

8.6. Incident management

An incident is an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. Material harm is harm that:

(a) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; *or*

(b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).

8.6.1. Roles and responsibilities following an incident

In the event of an incident, once emergency services are contacted, the incident must be immediately reported to the SINSW Senior Project Director who will inform:

- SINSW Executive Director
- SINSW C&E Manager
- SINSW Senior Manager, C&E
- SINSW Communications Director

SINSW Communications Director will:

- Lead and manage all communications with the Minister's office in the event of an incident, with assistance as required

- Direct all communications with media to the SINSW Media Manager in the first instance for management
- Notify all other key project stakeholders of an incident.

The school and local community will be notified within 24 hours in the event of an incident, as per our notification timelines in Table 5.

The SINSW Senior Project Director will issue a written incident notification to Department of Planning, Industry & Environment (DPIE) (compliance@planning.nsw.gov.au) and Local Council immediately following the incident to set out the location and nature of the incident.

This must be followed within seven days following the incident of a written notification to the Department of Planning, Industry and Environment (compliance@planning.nsw.gov.au) that:

(a) identifies the development and application number;

(b) provides details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);

(c) identifies how the incident was detected;

(d) identifies when SINSW became aware of the incident;

(e) identify any actual or potential non-compliance with conditions of consent;

(f) describes what immediate steps were taken in relation to the incident;

(g) identifies further action(s) that will be taken in relation to the incident; and

(h) provides the contact information for further communication regarding the incident (the Senior Project Director).

Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, SINSW will provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below:

(a) a summary of the incident;

(b) outcomes of an incident investigation, including identification of the cause of the incident;

(c) details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and

(d) details of any communication with other stakeholders regarding the incident.

8.7. Reporting process

Throughout the project, data will be recorded on participation levels both face to face and online, a record of engagement tools and activities carried out in addition to queries received and feedback against emerging themes.

Stakeholder and community sentiment will be evaluated throughout to ensure effectiveness of the engagement strategy and to inform future activities.

Reporting will include but not be limited to:

- Stakeholder engagement reporting – numbers of forums, participation levels and a summary of the outcomes Community sentiment reporting – outputs of all community engagement activities, including numbers in attendance at events, participation levels and feedback received against broad themes
- Online activity – through the project website and via social media
- Media monitoring – as part of the proactive media campaign
- Engagement risk register - to be updated regularly.

Appendix A – Changing the way we communicate – community engagement alternative methods

Below are proposed alternatives to our standard mandatory requirements for community engagement effective as of 30 March 2020. These alternatives are proposed to ensure we continue to comply with SSD and DA conditions and that our communities can remain informed about our projects while adhering to social distancing requirements and NSW Health advice.

Our engagement principles for this period should continue to ensure our communications are:

- Simple
- Streamlined
- Accessible.

Mandatory requirements and alternatives at a glance:

SSD CONDITION	ALTERNATIVE
1300 community information line	No change
Advertising (print)	Promote online info session / generic single advert?
Call centre scripts	No change
Community contact cards	Contractors to hand out as required
CRM database	No change
Display boards	Digital version
Door knocks	No door knocks, use letterbox drop*
Face-to-face meetings/briefings	Phone call or teleconferencing
FAQs	No change
Information booths	No info booths: issue project update instead
Information sessions (drop in)	Digital version
Information pack	Digital version
Media releases/events	No change to media releases, no events to be held
Notifications	Distributed to school community via email from Principal Distributed to near neighbours via letterbox drop*
Photography, time-lapse photography and videography	Source photography if health advice permits

SSD CONDITION	ALTERNATIVE
	Use images and time-lapse from similar projects if unable to photograph site
Presentations	Digital version for PRGs/stakeholder meetings
Priority correspondence (RML)	No change
Project Reference Group	Skype meetings / teleconferencing
Project signage	No change if production and installation still possible; A4 print out delivered
Site visits	Site visits via phone/video/photography
School Infrastructure NSW email	No change
School Infrastructure NSW website	No change (may publish updates more frequently)
Welcome pack/ thank you pack	Welcome pack: Do not issue until school resumes Thank you pack: Issued when project is entirely complete

*alternative may change depending on distributor operations

Post Approval – Consultation

Consultation needs to be meaningful, done with courtesy and respect and be well documented. These are people/ organisations that we need to be building meaningful relationships with.

Conditions of all consent can require consultation with a range of stakeholders. Consultation in the post approval world needs to be well documented to satisfy the condition requirements.

Examples include Council, service providers (eg. Electricity gas etc.), consult with local bus provider and TfNSW.

Read each condition carefully, any reference to consult triggers consultation.

Typically on State Significant Development, there will be a specific consultation condition as to how this piece can be appropriately addressed.

Consultation is not:

- A token gesture
- Done at the end of the piece of work,
- An email to the relevant stakeholder with no response;
- A meeting with the stakeholder with no meeting minutes.

Consultation is:

- Meaningful
- Done prior to the requirement,
- Captures an outcome,
- Identifies matters resolved,
- Identifies matters unresolved,
- Any disagreements are disclosed; and
- How we are going to address unresolved matters?

How to capture all the relevant details on consultation requirements? Any consultation requirement in a condition is required to be accompanied with the following table:

Education
School Infrastructure

Post Approval Consultation Record

B15 – Traffic and Pedestrian Management Sub-Plan

Identified Party to Consult:	Schofields and surrounding community
Consultation type:	Public, Online
When is consultation required?	Prior to commencement
Why	B17 – Construction Noise and Vibration Management Sub-Plan, prepared in consultation with Council
When was consultation held	February 2022, via SINSW website
Identify persons and positions who were involved	**SINSW** **Schofields and surrounding communities** **RCC**
Provide the details of the consultation	SINSW facilitated an online consultation with the Schofields community regarding the CNVMP developed for Galungara Stage 2. The consultation material was provided in February 2022 and is available here: Galungara Stage 2 CNVMP consultation. The purpose of the consultation was to keep the community informed about the project and allow community stakeholders to provide their input to the development.
What specific matters were discussed?	Nil matters were raised with RCC
What matters were resolved?	NA
What matters are unresolved?	NA
Any remaining points of disagreement?	No
How will SINSW address matters not resolved?	NA

George Denny-Smith

From: Jaron Hoffenberg <Jaron.Hoffenberg@tsamgt.com>
Sent: Friday, 4 March 2022 10:29 AM
To: Tom Hemmett; George Denny-Smith
Cc: Peter Hambessis
Subject: FW: Galungara Stage 2 [TSA-P.NSW.C1335]
Attachments: 2022-02-21 Galungara PS Project Update FINAL.pdf; Galun - distribution area - highlighted.jpg

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Tom,

Please append the below and attached to your CNVMP.

Regards,

Jaron Hoffenberg
Project Manager

TSA
Best for Project

Level 15, 207 Kent Street, Sydney, NSW, 2000
+61 405 535 475
+61 2 9276 1400
Jaron.Hoffenberg@tsamgt.com
www.tsamgt.com

From: Stuart Bicknell <Stuart.Bicknell@det.nsw.edu.au>
Sent: Friday, 4 March 2022 9:11 AM
To: Jaron Hoffenberg <Jaron.Hoffenberg@tsamgt.com>; Jim Lewis <jim.lewis3@det.nsw.edu.au>; Robin Roy <robin.roy@det.nsw.edu.au>
Cc: Peter Hambessis <peter.hambessis@tsamgt.com>; Danny Cvetkovski <Danny.Cvetkovski@det.nsw.edu.au>
Subject: RE: Galungara Stage 2 [TSA-P.NSW.C1335]

Hello Jaron, please pass on to Tom.

See attached Project Update.

- On SINSW Project Update on project webpage 21 Feb 22: see link: https://www.schoolinfrastructure.nsw.gov.au/projects/g/galungara-public-school---stage-2.html#library-tab
- Letterboxed Tuesday, 22 Feb (see attached)
- Galungara PS Facebook Page on 23 Feb 2: See link. https://www.facebook.com/GalungaraPS

Thanks,
Stuart

From: Jaron Hoffenberg <Jaron.Hoffenberg@tsamgt.com>
Sent: Friday, 4 March 2022 8:59 AM
To: Stuart Bicknell <Stuart.Bicknell@det.nsw.edu.au>; Jim Lewis <jim.lewis3@det.nsw.edu.au>; Robin Roy <Robin.Roy@det.nsw.edu.au>; Tom Hemmett <hemmettt@richardcrookes.com.au>; George Denny-Smith <dennysmithg@richardcrookes.com.au>
Cc: Peter Hambessis <peter.hambessis@tsamgt.com>
Subject: RE: Galungara Stage 2 [TSA-P.NSW.C1335]

Stuart,

Please provide Tom with all the media that was used to consult the community for the noise and vibration requirements. We need it this morning please.

Regards,

Jaron Hoffenberg
Project Manager

Level 15, 207 Kent Street, Sydney, NSW, 2000
+61 405 535 475
+61 2 9276 1400
Jaron.Hoffenberg@tsamgt.com
www.tsamgt.com

From: Stuart Bicknell <Stuart.Bicknell@det.nsw.edu.au>
Sent: Monday, 21 February 2022 3:08 PM
To: Jim Lewis <jim.lewis3@det.nsw.edu.au>; Robin Roy <robin.roy@det.nsw.edu.au>; Jaron Hoffenberg <Jaron.Hoffenberg@tsamgt.com>
Subject: Galungara Stage 2

Hello everyone,

See attached the final version project update for Galungara Stage 2 to be distributed. Please note:

- Going on SINSW webpage today
- Will reach out to Tracy and provide her a link so she can share on the school's Facebook page
- Expect letterboxing tomorrow of houses near school on Farmland Drive (approx. 20)

Also note, the sod turn is likely for 16 March. We are working with our media team, however, I expect a sod turn to take place on this day. Will also let Tracy know when I send the link.

Also anticipate final draft of CCS in next 24-48 hours.

Thanks,
Stuart

Stuart Bicknell
Community Engagement Manager | School Infrastructure NSW
0419 462 142 **|** stuart.bicknell@det.nsw.edu.au **|** education.nsw.gov.au

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NSW GOVERNMENT | Education

I acknowledge the homelands of all Aboriginal people and pay my respect to Country.


Schofields Rd
Schofields Rd
Schofields Rd
Schofields Rd
Junction Rd
Junction Rd
Frederick Jones Cr
Raspberry Cr
Lillian Cr
Alex Ave
Heathland Ave
Heathland Ave
Wimbledon Way
Hyde St
Glacier St
Belford St
Arcadia St
Prairie St
Farmland Dr
Farmland Dr
Galungara Public
Galungara Public School
Antonia Parade
Fortunato St
Wildflower St
Alex Ave
Antonia Parade
Jerralong Dr
Jerralong Dr

6.10 CONSTRUCTION WASTE MANAGEMENT SUB-PLAN

The Construction Waste Management sub-Plan has been prepared by EcCell Consulting for the Project.

It is not embedded in this document; it is supplied as an attached appendix so that it can be displayed/updated/revised in isolation if required.

GALUNGARA PUBLIC SCHOOL
STAGE 2 CONSTRUCTION
WASTE MANAGEMENT PLAN

VERSION NUMBER:

VERSION 6

REPORT DATE:

10/02/2022

SUBMITTED TO:

RICHARD CROOKES
CONSTRUCTIONS

PRESENTED BY:

JO DRUMMOND

ECCELL ENVIRONMENTAL MANAGEMENT PTYLTD
35 WAVERLY CRST, BONDI JUNCTION NSW 2022

TABLE OF CONTENTS

1. INTRODUCTION

Overview

This Construction Waste Management Plan (CWMP) has been prepared by EcCell Environmental on behalf of Richard Crookes Constructions for the new Alex Avenue Public School at the corner of Farmland Drive and future realignment of Pelican Road in Schofields (the site). The site is legally described as proposed Lots 1 and 2, being part of existing Lot 4 in DP1208329 and Lot 121 in DP1203646.

The new school will cater for approximately 1,200 primary school students and 70 full-time staff upon completion. The plan is for:

- Construction of two 2-storey classroom buildings (Block B) containing 20 homebases comprising:
  - Collaborative learning spaces;
  - Learning studios;
  - Covered outdoor learning spaces;
  - Practical activity areas; and
  - Amenities.
- Associated site landscaping and open space including associated fences throughout and games courts;
- Pedestrian access points along both Farmland Drive and the future Pelican Road;
- Substation on the north-east corner of the site; and
- School signage to the front entrance.

All proposed school buildings will be connected by a covered walkway providing integrated covered outdoor learning areas (COLAs). School staff will use the Council car park for the adjacent sports fields pursuant to a Joint Use agreement. The proposed School pick up and drop off zone will also be contained within the future shared car park and will be accessed via Farmland Drive.

Purpose

The purpose of this CWMP is to meet the requirements of the State Significant Development Application (SSDA) conditions of consent, particularly Condition B17 and will:

a) Identify, quantity and classify waste streams to be generated during construction.
b) Describe measures to be implemented to manage, reuse, and recycle and safely dispose of the waste.
c) Identify servicing arrangements including but not limited to waste management loading zones.
d) Prepare a site drawing for Construction Waste Management Loading Zones.

Condition of Approval (CoA) B12and B17

CoA Reference	CoA Detail
B13	(d) a program to monitor and report on the: (i) impacts and environmental performance of the development; (ii) effectiveness of the management measures (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; and (h) a protocol for periodic review of the plan.
B18	**Construction Waste Management Plan** (a) detail the quantities of each waste type generated during construction and the proposed reuse, recycling and disposal locations; (b) removal of hazardous materials, particularly the method of containment and control of emission of fibers to the air, and disposal at an approved waste disposal facility in accordance with the requirements of the relevant legislation, codes, standards and guidelines, prior to the commencement of any building works.

2. OBJECTIVES & TARGETS

The project construction waste objectives include:

- Meeting all waste management standards while ensuring the health and safety of the workers on the project.
- Maximising the quantities of materials diverted from landfill by reusing, recycling and reprocessing off-site.
- Disposal of no more than 20% of residual waste materials to a licensed landfill in accordance with both regulatory and legal requirements.
- The diversion from landfill of 80% of construction waste by weight, to meet the criteria of the NSW State Government's waste legislation, waste policy settings and regulatory regime.

3. LEGISLATIVE REQUIREMENTS AND GUIDELINES

Relevant key legislation and guidelines applicable to the project include

- Protection of the Environment Operations Act 1997
- Protection of the Environment (General) Operations Act 1998
- Waste Avoidance and Resource Recovery Act 2001
- Protection of the Environment Operations (Waste) Regulation 2014
- NSW Department of Planning and Environment, Secretary's Environmental Assessment Requirements (SEARs).
- SSDA Conditions of Consent

4. SERVICING ARRANGMENTS

The current legislation determines that the generator of waste is the owner of the waste until the waste crosses a weighbridge into a licensed facility. Waste contractors including construction contractors are the primary transporters of waste off-site, accordingly contractors will be required to provide monthly reports on waste reused, reprocessed or recycled, thus diverted from landfill or waste sent to landfill. These reports have a direct bearing on the generator's regulations.

The CWMP will be implemented on site throughout excavation and construction. A waste data file will be maintained on site.

All entries in the Waste Data File will include:

- Classification of the waste;
- Time and Date of material removed
- Description and size of waste
- Waste facility used
- Vehicle registration and Waste Contractors Company name

The Waste Data File will be available for inspection to any authorized Council Officer at any time during site works. At the conclusion of site works, the designated person will retain all waste documentation and make this validating documentation available for inspection.

Arrangement's will be made with the Waste Contractor to increase bin supply if there is an unexpected increase in waste generation.

5. WASTE MANAGEMENT STRATEGIES

The waste management strategy for the project will operate over the design, procurement, and construction including fit out of the project.

Management Strategies	Responsibilities
Design:	
Use of modular components in design	Architect & Engineer
Use of prefabricated components in design	Architect, Builder, Subcontractors.
Design for materials to standard sizes	Architect, Subcontractors
Design for operational waste minimisation	Architect & Builder
Procurement:	
Select recycled and reprocesses materials	Architect, Engineer, Builder & Sub Contractors
Components that can be reused after deconstruction	Architect, Engineer & Builder
Pre-construction	
Waste management plan to be reviewed & approved prior to construction	Builder
Construction on-site:	
Use the avoid, reuse, reduce, recycle principles	Builder & Waste Contractor
Minimisation of recurring packaging materials	Sub-contractors
Returning packaging to the supplier	Builder & Sub-contractor
Separation of recycling of materials off site	Waste Contractor
Audit & monitor the correct usage of bins	Builder & Waste Contractor
Audit and monitor the Waste Contractor	Builder

6. MONITORING & REPORTING

Regular observations will be made by the Construction Site Manager and measures put into place to monitor the waste bins on site. The Site Manager will review any

- Incident, non-conformance and corrective action required;
- Monthly waste management reporting; including ensuring all waste quantities generated are recorded, including tracking of receipts for waste, recycling or disposal via the appointed waste contractor;
- Record waste classification and testing results;
- Update the CWMP in light of any changes to construction activities or further information, which may alter waste management practices;
- Auditing of waste management generation and practices across the site as a component of broader environmental site audits;
- Visual inspections daily to ensure waste management controls are implemented and maintained across site;
- Final review of the CWMP upon project completion to ensure information accurately reflects site activities, and to assist future waste management planning; and
- Ensure compliance with Approval, Permit and License sections that are relevant to current operations

7. CORRECTIVE ACTION

Where formal auditing, daily visual inspections or incident reporting identify incorrect storage or disposal procedures, or maintenance or waste management issues, observations will be promptly reported to the Construction Site Manager and recorded. The Construction Site Manager will determine appropriate measures to rectify the issues in a timely manner in consultation with the Environmental Management Representative and Health and Safety Manager where required.

8. COMPLAINTS HANDELING

Members of the general public impacted by the construction phase are able to enquire and complain about environmental impacts via the following channels:

- Information booths and information sessions held at the school or local community meeting place, advertised at least 7 days before in local newspapers, on our website and via letterbox drops;
- 1300 number that is published on all communications material, including project site signage;
- School Infrastructure NSW email address that is published on all communications material, including project site signage.

9. CONSTRUCTION WASTE MANAGEMENT PLANNING REVIEW

Richard Crooks have in place an external environmental auditing programme this will include a prestart and an annual review of site waste documentation including:

- Compliance with Approval, Permit and Licence sections that are relevant to current operations
- Compliance with the CWMP
- Compliance with waste disposal records

10.WASTE MANAGEMENT PLAN APPLICATION

PROJECT:
Alex Avenue Public School
ADDRESS:
CNR Farmland Drive and future realignment of Pelican Road in Schofields
Details of Application:
RICHARD CROOKES CONSTRUCTIONS
Description of buildings and other structures currently on the site:
No buildings and other structures on the site and no demolition is required.
Brief description of proposal:
Construction of: • A 2-storey library, administration and staff building (Block A); • Four 2-storey classroom buildings (Block B) containing 40 homebases; • A single storey assembly hall (Block C) with a performance stage and integrated covered outdoor learning area (COLA). The assembly hall will have OOSH facilities, storeroom areas and amenities; • Associated site landscaping and open space including associated fences throughout and games courts.
If materials / waste is reused on site or off site, how will it be re-used:
Reuse of soil and excavation material on site, reuse of drums, pallets and rio materials.

	Name	Signed	Contact Number	Date
Prepared by :	Jo Drummond	Jo Drummond	0412214233	20/11/2019

PHASE: DEMOLITION

There is no demolition as this is a greenfield site.

PHASE 1: EXCAVATION

Material Type on Site	Estimated Volume (m^3) or Weight (t) (Most Favourable → Least)			ON-SITE TREATMENT	OFF-SITE TREATMENT	
	Reuse	Recycling	Disposal	Proposed reuse and/or recycling collection methods	Disposal / Transport Contractor	Waste Depot, Recycling Outlet or Landfill site
Excavated VENM Greenfield site			1,000 m^3	NA	Grasshopper Environmental	Transferred to licenced receiving facility
Sub Total	**1,000 m^3**					
TOTAL	**1,000 m^3 taken off site**					

Narrative: There is minimal excavation of virgin excavated natural material (VENM). Material, which will be used back on the site for landscaping. This material will be covered to reduce soil displacement and prevent air pollution.

The Detailed Site Investigation (Greencap report reference C122140:J160656_Detailed Site Investigation Proposed Alex Avenue Public School) did not identify any unacceptable human health or ecological risk associated with the surface soil quality. The investigation tested for potential pollutants common to this type of site including Hydrocarbons, Heavy Metals, Pesticides and Asbestos fibres. No results were reported above the adopted assessment criteria in any of the tested samples. Given this, it is unlikely that contaminated soils or asbestos material with the potential to become airborne would be encountered during the excavation and construction phase of the development.

This excludes general considerations that are relevant to unexpected finds.

PHASE 2: CONSTRUCTION

Material Type on Site	Estimated Volume (m^3) or Weight (t) (Most Favourable → Least)			ON-SITE TREATMENT	OFF-SITE TREATMENT	
	Reuse	Recycling	Disposal	Proposed reuse and/or recycling collection methods	Disposal Location / Contractor	Waste Depot, Recycling Outlet or Landfill site
Concrete Brick Block-work & Tile		82m^3		Co-mingled Bins	Grasshopper Environmental Pty Ltd	Crushed for road base
Metals		54m^3		Co-mingled Bins		Scrap Metal Dealer for smelting
Timber off-cuts		96m^3		Co-mingled Bins		Recycled for chips and mulch
Cardboard		60m^3		Co-mingled Bins		Recycled into cardboard
Plasterboard		85m^3		Co-mingled Bins		Recycled as soil conditioner
Plastics, plastic packaging, paint drums*, containers		60m^3	8 m^{3-}	Co-mingled Bins		- Styrene and plastic to landfill * Paint drums nested and recycled
Pallets and Reels	63 units			Separated onsite		Returned to the supplier
Liquid Waste			9 m^3	Separated onsite		Transferred to licenced landfill
General Waste			95 m^3	Co-mingled Bins		Transferred to licenced landfill
Sub Total	**NB:63 units**	**437**	**112 m^3**			
TOTAL	**549**			**NB: Plus, an additional 63 pallets (single units returned to suppliers for reuse)**		

Narrative:
All waste will be co-mingled and taken for off-site separation and reuse or recycling except Pallets and Reels.
It is not anticipated that any hazardous wastes will be generated during construction however during any disposal and material recovery activities, one should beware of potentially hazardous materials such as fluorescent tubes, laboratory chemicals, batteries, asbestos, pesticides and herbicides. If these types of wastes are identified, ensure that the waste is transported to a place that can lawfully accept it under Section 143 of the Protection of the Environment Operations Act 1997.

APPENDIX A – WASTE MANAGEMENT LOADING ZONE

APPENDIX B – CONTINGENCY PLAN

No	Activity	Aspect Impact	Inherent Risk	Actions / Control Measure	Residual risk Score	Action By	Contingency Plan
Waste Management							
1.1	All waste would be assessed, classified, managed and disposed of legally	Soil Contamination	13	All waste will be assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (DECC, 2008).	6	Environmental Manager	No waste to leave the site without a waste classification.
.2	All waste materials removed from the site will only be directed to a waste management facility lawfully permitted to accept the materials	Illegal dumping of waste	13	Waste Tracking System Provide monthly waste reports with tipping dockets indicating that waste has been taken to a licensed waste facility.	6	Waste Contractor	Withhold payment unless dockets provided and correlated.
1.3	Waste tracking reporting and auditing of waste volumes and disposal destinations	Illegal dumping of material	13	Waste Tracking System	6	Waste Contractor	Audit waste contractor to ensure they comply with current legislation.
1.4	All waste materials removed from the site shall only be directed to a waste management facility or premises lawfully permitted to accept the materials	Illegal dumping of waste material. Waste taken to an unlicensed facility.	13	Waste Tracking System provided by Waste Contractor docketing documenting waste leaving the site and crossing a weighbridge to a licenses waste facility.	6	Waste Contractor	Withhold payment unless dockets provided. Waste contractor to advise Richard Crooks if waste has been taken to un unlicensed facility
1.5	All liquid waste generated on the site shall all be assessed and classified in accordance with Waste Classification Guidelines	Incorrect classification	13	Waste Tracking System documenting liquid waste leaving the site and crossing a weighbridge to a licenses liquid waste facility.	18	Waste Contractor	Request disposal dockets for all liquid waste leaving the site.

6.11 CONSTRUCTION SOIL & WATER MANAGEMENT SUB-PLAN

The Construction Soil & Water Management sub-Plan has been prepared by Northrop Consulting Engineers for the Project.

It is not embedded in this document; it is supplied as an attached appendix so that it can be displayed/updated/revised in isolation if required.

NORTHROP

CIVIL ENGINEERING REPORT: SOIL & WATER MANAGEMENT PLAN

Galungara Primary School – Stage 2

Lot 4 DP1208329 & Lot 121 DP1203646

PREPARED FOR
Richard Crookes Constructions
Level 3, 4 Broadcast Way

Artarmon NSW 2064
Tel: (02) 9902 4700

Ref: S182535-01-CR03
Rev: 4
Date: 22.02.22

Civil Engineering Report: Soil & Water Management Plan

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
28.05.19	1	For Review	J. Grinsell	J. Gilligan
11.11.19	2	For Review	J. Grinsell	J. Gilligan
24.07.20	3	For Review	J. Gilligan	J. Gilligan
22.02.22	4	Stage 2	J. Grinsell	J. Gilligan

Northrop Consulting Engineers Pty Ltd

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Galungara Public School (SSD 9368): Submission of Construction Soil and Water Management Plan in accordance with Condition B13 and B19

Condition	Condition requirements	Document reference
B19	The Applicant must prepare a Construction Soil and Water Management Plan (CSWMSP) and the plan must address, but not be limited to the following: (a) be prepared by a suitably qualified expert, in consultation with Council;	Appendix I, CEMP rev2 – 03/0620: SSD 9368 - B19 - CSWMP - Northrop - 3 – 200516 Appendix E, CV, p16 Appendix D, Council Consultation, p15
	(b) describe all erosion and sediment controls to be implemented during construction;	Section 2.2, Sediment and Erosion Control Measures, p7 – to be read in conjunction with civil engineering plans
	(c) provide a plan of how all construction works will be managed in a wet-weather events (i.e. storage of equipment, stabilisation of the Site);	Appendix C, Wet Weather Management Plan
	(d) detail all off-Site flows from the Site; and	Appendix A: Soil and Water Management Plans, p12
	(e) describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events,	Northrop Commentary, p10

	including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI.	
B13	(a) detailed baseline data;	Northrop Commentary, p8 Richard Crookes Construction, CEMP, Section 9
	(b) details of: (i) the relevant statutory requirements (including any relevant approval, license or lease conditions);	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 4
	(ii) any relevant limits or performance measures and criteria; and	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 9 and Section 10
	(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 9 and Section 10
	(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 9 and Section 10
	(d) a program to monitor and report on the: (i) impacts and environmental performance of the development;	Northrop Commentary, p9 Richard Crookes Construction CEMP, Table 7 and Section 10, Table 8

	(ii) effectiveness of the management measures set out pursuant to paragraph (c) above;	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 9, Table 7 and Section 10, Table 8
	(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Appendix C, RCC Wet Weather Management Plan, p19
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Northrop Commentary (e), p8
	(g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 20.1
	(ii) complaint;	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 17.2
	(iii) failure to comply with statutory requirements; and	Northrop Commentary, p9 Richard Crookes Construction CEMP, Section 20.1
	(h) a protocol for periodic review of the plan.	Northrop Commentary, p10

NSW Department of Education
259 George Street Sydney NSW 2000 GPO Box 33 Sydney NSW 2001 T 02 9273 9200 www.schoolinfrastructure.nsw.gov.au

1. General

1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Richard Crookes Constructions to prepare the Civil Engineering design and documentation in support of a Construction Certificate for Stage 2 of Galungara Primary School development at Proposed Lots 1 & 2 Being part of Lot 4 DP1208329 & Lot 121 DP1203646, Farmland Drive, Schofields.

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Erosion and Sediment control.

1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

1. Detailed Design Phase Civil Documentation prepared by Northrop:
   - C02.01 [N] Sediment and Soil Erosion Control Plan
2. NSW Department of Housing Manual, “Managing Urban Stormwater Soil & Construction” 2004 (Blue Book)
3. Blacktown Development Control Plan 2006 Part R Soil Erosion and Sediment Control Guidelines

1.3 The Development

1.3.1 Precinct and Surrounds

The site is located within the suburb of Schofields in the Blacktown City Council (Council) Local Government Area (LGA). The site is approximately two (2) hectares, bound by Farmland Drive to the north, the proposed Pelican Road extension to the west and existing developments to the south and east.

The existing site accommodates Stage 1 of Galungara Primary School including a number of Teaching Facilities (Buildings), footpaths, landscaping and carparking areas.

1.3.2 Proposed Development

This development is on Proposed Lots 1 & 2 Being Part of Lot 4 DP1208329 & Lot 121 DP1203646, Schofields NSW, which consists of Stage 2 of Galungara Primary School. The development includes in the construction two (2) teaching blocks, landscaping works and pedestrian access connectivity within the site.

The proposed site grading generally falls to a proposed bio-retention basin at the south-west corner of the site to minimise earthworks where possible. All pavement and landscaping fall away from the buildings to ensure nuisance stormwater runoff is avoided. There are no upstream catchments that are directed through the site.

2. Erosion and Sediment Control

The objectives of the erosion and sediment control for the development site are to ensure:

- Adequate erosion and sediment control measures are applied prior to the commencement of construction and are maintained throughout construction; and
- Construction site runoff is appropriately treated in accordance with Blacktown City Council requirements.

As part of the works, the erosion and sedimentation control will be constructed in accordance with Council requirements and the NSW Department of Housing Manual, “Managing Urban Stormwater Soil & Construction” 2004 (Blue Book) prior to any earthworks commencing on site. The Concept Sediment and erosion control measures are documented in Northrop’s detailed design drawing C02.01 [N] Sediment and Soil Erosion Control Plan

2.1 Sediment Basin

Whilst the works cover an area larger than 2500m^2 (which prompts the requirement for a sediment basin), due to the constraints of the site in placing a basin, the Contractor has proposed to limit disturbed areas less than the prescribed amount as part of the Stage 2 works. As such disturbed areas are to be less than 2,500m^2 at all times.

Should the disturbed area ever become equal to or greater than 2,500m^2 a sediment basin will need to be provided with overflows discharging to the existing pit and pipe network within the site.

2.2 Sediment and Erosion Control Measures

Prior to any earthworks commencing on site, sediment and erosion control measure shall be implemented generally in accordance with the Construction Certificate drawings and the “Blue Book”. The measures shown on the drawings are intended to be a minimum treatment only as the contractor will be required to modify and stage the erosion and sedimentation control measures to suit the construction program, sequencing, and techniques. These measures will include:

- A temporary site security/safety fence is to be constructed around the site, the site office area.
- Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles.
- Dust control measures including regular watering of stockpiles and exposed surfaces to suppress dust, installing fence hessian, and watering exposed areas.
- Placement of hay bales or mesh and gravel inlet filters around and along proposed catch drains and around stormwater inlets pits; and
- Stabilised site access at the construction vehicle entry/exits.

Any stockpiled material, including topsoil, shall be located as far away as possible from any associated natural watercourses or temporary overland flow paths. Sediment fences shall be installed to the downstream side of stockpiles and any embankment formation. All stockpiles and embankment formations shall be stabilised by hydroseeding or hydro mulching on formation.

3. Further Commentary

3.1 SSD Conditions

The Minister for Planning and Open Spaces has provided Conditions of Consent (Application Number: SSD 9354) for the proposed development at Proposed Lots 1 & 2 Being part of Lot 4 DP1208329 & Lot 121 DP1203646, Farmland Drive, Schofields. Conditions associated with the Construction Soil and Water Management Plan have been provided below with further commentary for consideration by School Infrastructure NSW and the Certifying Authority.

B12. Environmental Management Plan Requirements

Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:

- **(a) Detailed baseline data.**
- **(b) Details of:**
  - **(i) The relevant statutory requirements (including any relevant approval, license, or lease conditions).**
  - **(ii) Any relevant limits or performance measures and criteria; and**
  - **(iii) The specific performance indicators that are proposed to be used to judge the performance of, or guide implementation of, the development or any management measures**
- **(c) A description of the measures to be implemented to comply with the relevant statutory requirements, limits or performance measures and criteria.**
- **(d) A program to monitor and report on the:**
  - **(i) Impacts and environmental performance of the development.**
  - **(ii) Effectiveness of the management measure set out pursuant to paragraph (c) above.**
- **(e) A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible.**
- **(f) A program to investigate and implement ways to improve the environmental performance of the development over time.**
- **(g) A protocol for managing and reporting any:**
  - **(i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);**
  - **(ii) complaint.**
  - **(iii) failure to comply with statutory requirements; and**
- **(h) a protocol for periodic review of the plan**

Northrop Commentary

The Construction Environmental Management Plan prepared by Richard Crookes Construction has addressed a number of these items as referenced in the table below.

(a) detailed baseline data;	Richard Crookes Construction, CEMP, Section 9
(b) details of: (i) the relevant statutory requirements (including any relevant approval, license or lease conditions);	Richard Crookes Construction CEMP, Section 4
(ii) any relevant limits or performance measures and criteria; and	Richard Crookes Construction CEMP, Section 9 and Section 10
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Richard Crookes Construction CEMP, Section 9 and Section 10
(c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Richard Crookes Construction CEMP, Section 9 and Section 10
(d) a program to monitor and report on the: (i) impacts and environmental performance of the development;	Richard Crookes Construction CEMP, Table 7 and Section 10, Table 8
(ii) effectiveness of the management measures set out pursuant to paragraph (c) above;	Richard Crookes Construction CEMP, Section 9, Table 7 and Section 10, Table 8
(e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Refer to Appendix C – RCC Wet Weather Management Plan.
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Northrop Commentary (e), p8
(g) a protocol for managing and reporting any: (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria);	Richard Crookes Construction CEMP, Section 20.1
(ii) complaint;	Richard Crookes Construction CEMP, Section 17.2
(iii) failure to comply with statutory requirements; and	Richard Crookes Construction CEMP, Section 20.1

(h) a protocol for periodic review of the plan.	This plan is to be reviewed bi-monthly to ensure it is reflective of the construction staging of the development until such time that all exposed soil surfaces have been covered. In addition, the plan shall also be reviewed after significant rainfall events to coincide with the inspection of Sediment and Soil Erosion Control devices as instructed by Richard Crookes Constructions.

Construction Environmental Management Plan

B18. The Applicant must prepare a Construction Soil and Water Management Plan (CSWMSP) and the plan must address, but not be limited to the following:

- **a) Be prepared by a suitably qualified expert, in consultation with Council.**
- **b) Describe all erosion and sediment controls to be implemented during construction.**
- **c) Provide a plan of how all construction works will be managed in a wet weather events (i.e., storage of equipment, stabilization of the Site);**
- **d) Detail all off-Site flows from the site; and**
- **e) 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).**

Northrop Commentary

(a) This Construction Soil and Management Plan has been prepared under the guidance of an experienced Chartered Senior Civil Engineer. Relevant CV's have been provided in the appendices.

(b) Erosion and Sediment Controls to be implemented during construction are briefly described in Section 2.2 of this report and documented on the civil engineering plans

(c) The management of construction works during wet weather is identified on the attached Wet Weather Management Plan prepared by Richard Crookes Constructions (Appendix C) which address procedures during such events. This is further noted in the Construction Environmental Management Plan prepared by Richard Crookes Constructions in Appendix D Sections 9 & 10. It is understood that general construction equipment is stored in containers during wet weather. Machinery / Plant is positioned away from flow paths to ensure that surface flows to the basin are not impeded. Typically, after a wet weather event, a 20-50mm layer of the subgrade is stripped and stockpiled to dry and be recompacted.

(d) The soil and water management plan prepared by Northrop Consulting Engineers has been updated to indicate direction of flows on site during rain events.

(e) Surface flows generated during storm events up to the 1 in 10-year storm event are directed over land or within the constructed pit and pipe network to the legal point of discharge.

C24. Disposal of Seepage and Stormwater

Adequate provisions must be made to collect and discharge stormwater drainage during construction of the building to the satisfaction of the principal certifying authority. The prior written approval of Council must be obtained to connect or discharge site stormwater to Council's stormwater drainage system or street gutter.

Northrop Commentary

The project design team have approached Blacktown City Council to initiate discussions regarding the proposed measures to control soil erosion and sedimentation during construction including proposed methods of discharging stormwater from the site. The Post Approval Consultation Record has been provided in Appendix C.

Appendix A – Soil & Water Management Plans

NOTE
WORKS TO BE STAGED TO KEEP EXPOSED SOIL TO UNDER 2500m2 AT ALL TIMES. IF EXPOSED SOIL EXCEEDS 2500m2 AT ANY TIME A SEDIMENT BASIN IS REQUIRED.

LEGEND

- BOUNDARY LINE
- EASEMENT LINE
- EXISTING KERB
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY (OVERHEAD)
- EXISTING ELECTRICITY (UNDERGROUND)
- EXISTING GAS
- EXISTING WATER
- EXISTING STORMWATER
- EXISTING CONTOURS
- SEDIMENT FENCE
- SECURITY FENCE
- PROPOSED BUILDING FOOTPRINT
- WIRE MESH AND GRAVEL SEDIMENT FILTER
- GEOTEXTILE INLET FILTER TRAPS
- DRAINAGE SWALE / BUND / DIVERSION MOUND
- DRAINAGE SWALE
- STABILISED SITE ACCESS WITH SHAKER GRID
- STOCKPILE
- EXISTING TREE TO BE RETAINED

GENERAL NOTES:

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

DRAWN: V. CHON DESIGNED: J. GRINSELL JOB MANAGER: J. GILLIGAN VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
H	ISSUED FOR APPROVAL	VC		JRG	26.02.20
J	ISSUED FOR CLIENT REVIEW	VC		JRG	26.05.20
K	ISSUED FOR INFORMATION	VC		JRG	15.06.20
L	ISSUED FOR CONSTRUCTION	VC	JG	JRG	26.06.20
M	RE-ISSUED FOR CONSTRUCTION	JO	JG	JRG	24.07.20
N	ISSUED FOR STAGE 2 CC1	JRG		JRG	22.02.22

CLIENT
RICHARD CROOKES CONSTRUCTIONS
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

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SCALE 1:500@A1 0 5 10 15 20 25m

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PROJECT
GALUNGARA PRIMARY SCHOOL
PELICAN ROAD, SCHOFIELDS

DRAWING TITLE
CIVIL DOCUMENTATION CONSTRUCTION CERTIFICATE
SEDIMENT AND SOIL EROSION CONTROL PLAN

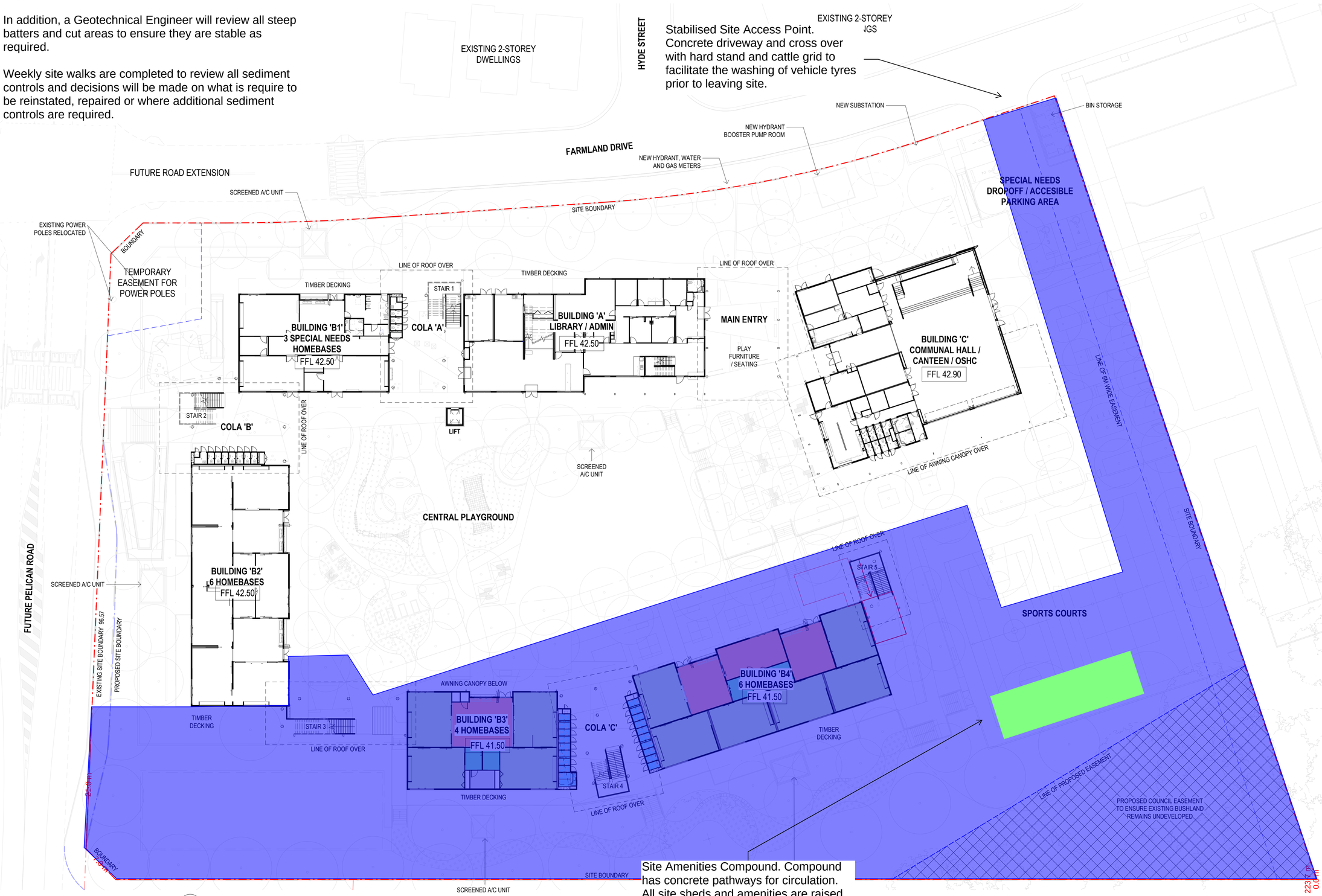
JOB NUMBER 182535
DRAWING NUMBER C02.01
REVISION N
DRAWING SHEET SIZE = A1

Appendix B – RCC Wet Weather Management Plan

During wet weather events the Site Manager & WHS Advisor will complete a site walk to review how construction works will be completed and if changes are required.

In addition, a Geotechnical Engineer will review all steep batters and cut areas to ensure they are stable as required.

Weekly site walks are completed to review all sediment controls and decisions will be made on what is require to be reinstated, repaired or where additional sediment controls are required.



1 BUILDING COMPLEX GROUND FLOOR PLAN
1 : 300

Site Amenities Compound. Compound has concrete pathways for circulation. All site sheds and amenities are raised to prevent any water access. In addition there are silt fences surrounding the site boundaries to catch any sediment run off.

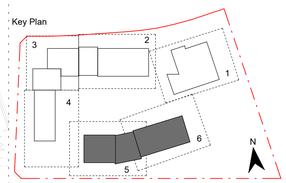
Drawing Notes:
1. Refer to **COM-AR-9010** for legend of all symbols and codes.
2. Refer to **COM-AR-9011/9012** for all drawing notes.
3. Refer to **COM-AR-9700** for Technical Schedule

Issue	Description	Date
1	ISSUED FOR REVIEW	06.08.2021
A	CONCEPT DESIGN REPORT ISSUE	09.08.2021

NOTES - SITE PLANS

1. Refer Landscape Achitect's documentation for planting, fencing, and outdoor furniture equipment details.
2. Refer Civil Engineer's documentation for details of site and ground works, including pavements and retaining walls.
3. Refer Bushfire Report for requirements and details for Defendable Space.

Key Plan



Contractor

Client

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architecture interior design urban design landscape
nom architect M. Sheldon 3990

Project Title

GALUNGARA PUBLIC SCHOOL

Drawing Title

BUILDING COMPLEX GROUND FLOOR PLAN

Scale @ A1	As indicated
Drawing Created (date)	30/05/2019
Drawing Created (by)	DN
Plotted and checked by	DN
Verified	JS
Approved	JS

Project No	Drawing No	Issue
180645	AA-AR-1110	A

9/08/2021 10:15:49 PM

Appendix C – Council Consultation

Post Approval – Consultation

Consultation needs to be meaningful, done with courtesy and respect and be well documented. These are people/ organisations that we need to be building meaningful relationships with.

Conditions of all consent can require consultation with a range of stakeholders. Consultation in the post approval world needs to be well documented to satisfy the condition requirements.

Examples include Council, service providers (eg. Electricity gas etc.), consult with local bus provider and TfNSW.

Read each condition carefully, any reference to consult triggers consultation.

Typically on State Significant Development, there will be a specific consultation condition as to how this piece can be appropriately addressed.

Consultation is not:

- A token gesture
- Done at the end of the piece of work,
- An email to the relevant stakeholder with no response;
- A meeting with the stakeholder with no meeting minutes.

Consultation is:

- Meaningful
- Done prior to the requirement,
- Captures an outcome,
- Identifies matters resolved,
- Identifies matters unresolved,
- Any disagreements are disclosed; and
- How we are going to address unresolved matters?

How to capture all the relevant details on consultation requirements? Any consultation requirement in a condition is required to be accompanied with the following table:

Post Approval Consultation Record

B19 Construction Soil and Water Management Sub-Plan

Identified Party to Consult:	Blacktown City Council (BCC)
Consultation type:	Email correspondence & Phone calls
When is consultation required?	Prior to commencement
Why	B19 – Construction Soil & Water Management Sub-Plan (CSWMSP), prepared in consultation with BCC.
When was consultation held	David Yee and Danny Zabakly confirmed as contacts from Stage 1 approved CSWMP CSWMSP issued to David Yee and Danny Zabakly for review – 25/02/22 Follow up call to David Yee – 10/03/22
Identify persons and positions who were involved	**Danny Zabakly** Team Leader, Blacktown City Council **David Yee** Engineering Coordinator, Blacktown City Council **Tom Hemmett** Project Manager, Richard Crookes Constructions **George Denny-Smith** Site Engineer, Richard Crookes Constructions
Provide the details of the consultation	Consultation with Blacktown City Council has been attempted through emails and phone calls. During a phone conversation with David Yee, he affirmed receipt of the CSWMSP. He noted that BCC's policy is to rely on a suitably qualified expert to prepare the CSWMP so there is no risk to Council infrastructure or local ecosystems. If any other comments and or updates are required for the CSWMSP these will be updated accordingly.
What specific matters were discussed?	During a phone conversation with David Yee, he affirmed receipt of the CSWMSP. He noted that BCC's policy is to rely on a suitably qualified expert to prepare the CSWMP so there is no risk to Council infrastructure or local ecosystems.
What matters were resolved?	NA
What matters are unresolved?	NA
Any remaining points of disagreement?	No
How will SINSW address matters not resolved?	NA

Appendix D – CV

James Gilligan

Associate | Senior Civil Engineer

BE (Civil) MIEAust CPEng NER

James is an Associate at Northrop and a Senior Civil Engineer with over 14 years' experience managing and delivering buildings and complex civil infrastructure projects requiring design from the concept phase through to construction and post construction stages.

James has particular experience in project management and contract administration. James' technical background includes civil design of utilities, earthworks, stormwater and roads for subdivision and buildings projects across all types of development including Health, Education, Residential, Commercial & Industrial.

Project Experience

Urban Redevelopment

- University of Wollongong Health and Wellbeing Precinct
- St Leonards South Precinct
- Frasers Central Park, Broadway
- Tailors Walk, Pemberton Street, Botany
- 150 Epping Road, Lane Cove
- Glebe Affordable Housing Project, Glebe

Public Domain and Open Spaces

- Blacktown International Centre for Training Excellence
- Croom Regional Sporting Complex, Croom
- Twin Creeks Golf Club, Luddenham
- Elara Neighbourhood Centre, Elara
- Hurstville Bus Interchange, Hurstville
- Windsor Station Bus Interchange, Windsor

Infrastructure / Utilities Coordination

- Northwest Rail Link
- Sydney International Airport – Stage 2B
- Southern Sydney Freight Line

Health

- Nepean Private Hospital
- The George Centre, Gledswood Hills
- Westmead Mental Health Facility
- Cumberland West Mental Health Facility
- Manly Adolescent and Young Adult Hospice
- B22 Mental Health, Blacktown
- Blacktown Forensic Mental Health Unit
- Tumut Hospital Peer Review

Commercial / Industrial

- Goodman Interchange Park, Eastern Creek
- Goodman Oakdale Peer Reviews
- Sydney Business Park Warehouses, Marsden Park
- ESR Horsley Logistics Park Peer Reviews
- Erskine Park Industrial Estate Warehouses
- Kingsford Smith Distribution Centre, Mascot
- Blum Australia Warehouse, Hoxton Park

Education

- Edmondson Park Public School
- Galungara Public School
- Jordan Springs Public School
- Catherine Field Public School
- East Leppington Public School
- Estella Public School
- Westmead Catholic College, Westmead
- St Joseph's College, Hunters Hill
- Barker College Junior School and Early Learning Centre - Waitara
- Meadowbank TAFE - Multi-Trades and Digital Technology Hub
- Kingswood TAFE – Institute of Applied Technology for Construction
- Western Sydney University Subdivision, Westmead

Aged Care

- Zhiva Living, Dural
- Uniting, Marion Street Leichhardt
- Uniting, Norton Street Leichhardt
- Bupa, Sutherland

6.12 EXTERNAL LIGHTING

The design certificates attached as Appendix 6.12 detail compliance with this SSD Consent Condition for the proposed works.

6. Engagement Approach

From 30 March 2020, the way we communicate has temporarily changed, please refer to Appendix A for a detailed up to date list of changed communication methods and tools. This particularly refers to face to face communication channels such as door knocks, information booths/sessions, face to face meetings and briefings**.**

The key consideration in delivering successful outcomes for this project is to make it as easy as possible for anyone with an interest to find out what is going on. In practice, the communications approach across all levels of engagement will involve:

- Using uncomplicated language
- Taking an energetic approach to engagement
- Encouraging and educating whenever necessary
- Engaging broadly including with individuals and groups that fall into harder to reach categories
- Providing a range of opportunities and methods for engagement
- Being transparent
- Explaining the objectives and outcomes of planning and engagement processes.

In addition to engagement with Government Departments and Agencies and Council, two distinct streams of engagement will continue for the project as follows:

- School community for existing schools being upgraded, or surrounding schools for new schools, and
- Broader local community.

This allows:

- School-centric involvement from school communities (including students, parents/caregivers, teachers, admin staff) unencumbered by broader community issues, and
- Broad community involvement unencumbered by school community wants and needs. Broad community stakeholders include local residents, neighbours and local action groups.

6.1. General community input

Members of the general public impacted by the construction phase are able to enquire and complain about environmental impacts via the following channels:

- Information booths and information sessions held at the school or local community meeting place, and advertised at least 7 days before in local newspapers, on our website and via letterbox drops
- 1300 number that is published on all communications material, including project site signage
- School Infrastructure NSW email address that is published on all communications material, including project site signage

Refer to Section 8.5 of this document for detail on our enquiries and complaints process.

A number of tools and techniques will be used to keep stakeholders and the local community involved as summarised in table 3 below.

For reference, project high level milestones during the delivery phase include:

- Site establishment/early works
- Commencement of main works construction
- Term prior to project completion
- Project completion
- First day of school following project completion
- Official opening

Table 3: School Infrastructure NSW Communications Tools that may be utilised

Communications Tool	Description of Activity	Frequency
1300 community information line	The free call 1300 482 651 number is published on all communication materials and is manned by SINSW. All enquiries that are received are referred to the appointed C&E Manager and/or Senior Project Director as required and logged in our CRM. Once resolved, a summary of the conversation is updated in the CRM.	Throughout the life of the project and accessible for 12 months post completion
Advertising (print)	Advertising in local newspapers is undertaken with at least 7 days' notice of significant construction activities, major disruptions and opportunities to meet the project team or find out more at a face to face event.	At project milestones or periods of disruption
Call centre scripts	High level, project overview information provided to external organisations who may receive telephone calls enquiring about the project, most namely stakeholder councils.	Throughout the project when specific events occur or issues are raised by stakeholders
Community contact cards	These are business card size with all the SINSW contact information. The project team/ contractors are instructed to hand out contact cards to stakeholders and community members enquiring about the project. Cards are offered to school administration offices as appropriate. Directs all enquiries, comments and complaints through to our 1300 number and School Infrastructure NSW email address.	Throughout the life of the project and available 12 months post completion
CRM database	All projects are created in SINSW's Customer Relationship Management system – Darzin - at project inception. Interactions, decisions and feedback from stakeholders are captured, and monthly reports generated. Any enquiries and complaints are to be raised in the CRM and immediately notified to the Senior Project Director, Project Director and Community Engagement Manager.	Throughout the life of the project and updated for 12 months post completion
Display boards	A0 size full colour information boards to use at info sessions or to be permanently displayed in appropriate places (school admin office for example).	As required
Door knocks	Provide timely notification to nearby residents of upcoming construction works, changes to pedestrian movements, temporary bus stops, expected impacts and proposed mitigation. Provide written information of construction activity and contact details.	As required prior to periods of construction impacts
Face-to-face meetings/briefings	Activities include meeting, briefings and "walking the site" to engage directly with key stakeholders, directly impacted residents and business owners and the wider community.	As required

Communications Tool	Description of Activity	Frequency
FAQs	Set of internally approved answers provided in response to frequently asked questions. Used as part of relevant stakeholder and community communication tools. These are updated as required, and included on the website if appropriate.	Throughout the life of the project
Information booths	Information booths are held locally and staffed by a project team member to answer any questions, concerns or complaints on the project. Info booths are scheduled from the early stages of project delivery through to project completion. Information booths are to be held both at the school/ neighbouring school, as well for the broad community: ▪ School information booths are held at school locations at times that suit parents and caregivers, with frequency to be aligned with project milestones and as required. ▪ Community information booths are usually held at local shopping centres, community centres and places that are easily accessed by the community. They are held at convenient times, such as out of work hours on weekdays and Saturday's. Collateral to be provided include community contact cards, latest project notification or update, with internal FAQs prepared. All liaison to be summarised and loaded in the CRM. Notice of at least 7 days to be provided.	At project milestones and as required
Information sessions (drop in)	Information sessions are a bigger event than an info booth, held at a key milestone or contentious period. We have more information on the project available on display boards/ screens and an information pack handout – including project scope, planning approvals, any impacts on the school community or residents, project timeline, FAQs. Members from the project and communications team will be available to answer questions about the project. These events occur after school hours on a week day (from 3pm – 7pm to cover working parents). All liaison summarised and loaded on the CRM.	As required
Information pack	A 4 page A4 colour, fold out flyer that can include: ▪ Project scope ▪ Project update ▪ FAQs ▪ Contact information ▪ Project timeline To be distributed at info sessions or at other bigger events/ milestones in hard copy and also made available electronically.	As required

Communications Tool	Description of Activity	Frequency
Media releases/events	Media releases are distributed upon media milestones. They promote major project milestones and activities and generate broader community awareness.	Media milestones: ▪ Project announcement ▪ Concept design completed ▪ Planning approval lodged ▪ Planning approval granted ▪ Construction contract tendered ▪ Construction contract awarded ▪ SOD turning opportunity ▪ Handover ▪ Official opening
Notifications	A4, single or double sided, printed in colour that can include FAQs if required Notifications are distributed under varying templates with different headings to suit different purposes: ▪ **Works notification** are used to communicate specific information/ impacts about a project to a more targeted section of the community. This template doesn't have an image so it can be more appropriately targeted for matters like hazardous material. ▪ **Project update** is used when communicating milestones and higher level information to the wider community i.e. project announcement, concept design/DA lodgement, construction award, completion. Always includes the project summary, information booths/ sessions if scheduled, progress summary and contact info.	As required according to the construction program. Distributed via letterbox drop to local residents and via the school community at least 7 days prior to construction activities or other milestones throughout the life of the project. Specific timings indicated in table 5 – Section 8.
Photography, time-lapse photography and videography	Captures progress of construction works and chronicles particular construction activities. Images to be used in notifications, newsletters and report, on the website and Social Media channels, at information sessions and in presentations. Once the project is complete, SINSW will organise photography of external and internal spaces to be used for a range of communications purposes.	Project completion (actual photography and video of completed project) Prior to project completion - artist impressions, flythrough, site plans and construction progress images are used
Presentations	Details project information for presentations to stakeholder and community groups.	As required

Communications Tool	Description of Activity	Frequency
Priority correspondence	Ministerial (and other) correspondence that is subject to strict response timeframes. Includes correspondence to the Premier, Minister, SINSW and other key stakeholders. SINSW is responsible for drafting responses as requested within the required timeframes.	As required
Project Reference Group	SINSW facilitated Project Reference Group sessions providing information on the design solution, construction activities, project timeframes, key issues and communication and engagement strategies.	Meets every month or as required More information on the PRG is detailed in Section 4
Project signage	A0 sized, durable aluminium signage has been installed at the Galungara Public School, in Alex Avenue, at Schofields. Provides high level information including project scope, project image and SINSW contact information. Fixed to external fencing/ entrances etc. that are visible and is updated if any damage occurs.	Throughout the life of the project and installed for 12 months post completion
Site visits	Demonstrate project works and progress and facilitate a maintained level of interest in the project. Includes media visits to promote the reporting of construction progress.	As required
School Infrastructure NSW email address	Provide stakeholders and the community an email address linking direct to the Community Engagement team. Email address (schoolinfrastructure@det.nsw.edu.au) is published on all communications materials.	Throughout the life of the project
School Infrastructure NSW website	A dedicated project page for Stage 2 of the Galunagra Public School is located on the SINSW website - https://www.schoolinfrastructure.nsw.gov.au/projects/g/galungara-public-school---stage-2.html	Updated at least monthly and is live for at least 12 months post completion of the project
Welcome pack/ thank you pack	At project completion the following flyers are utilised: ▪ **Welcome pack** – project completion for school community - A 2 to 4 page A4 flyer which is provided to the school community on the first day/week they are returning to school when new facilities are opening, or attending a new school. Includes project overview, map outlining access to the school and key locations, FAQs, contact information. ▪ **Thank you pack** – A 2 to 4 page A4 flyer tailored to the local residents to thank them for their patience and support of the project.	Project completion only

6.2 Construction works notification distribution methodology

Construction works notifications will be distributed to targeted properties in the vicinity of the project. These properties have been identified as part of the technical studies and plans submitted as part of the planning and assessment approval pathway and post approval requirements. Specifically, the notification distribution map at Figure 1 below has been prepared through an analysis of the impacts and requirements identified in:

- the Acoustic Assessment Report submitted with the Environmental Impact Assessment
- the Transport and Accessibility Impact Assessment submitted with the Environmental Impact Statement
- the Construction Worker and Staff Transportation Strategy
- the Construction Environmental Management Plan
- the Construction Noise and Vibration Sub Plan
- the Construction Traffic and Pedestrian Management Sub Plan.

This methodology has been used to identify the anticipated construction impacts identified for this project. It does not include an arbitrary distribution area due to the robust impact analysis that has been carried out during planning and assessment phase of the project.

The distribution area may be altered:

- to address specific construction activities where the impact/s affect fewer or greater properties, depending on the nature of the work
- where ongoing monitoring shows more widespread impacts to that predicted in the EIS
- if complaints are received outside of the distribution area
- if there is an approved project modification in the future that results in more widespread impacts
- at the discretion of School Infrastructure NSW.

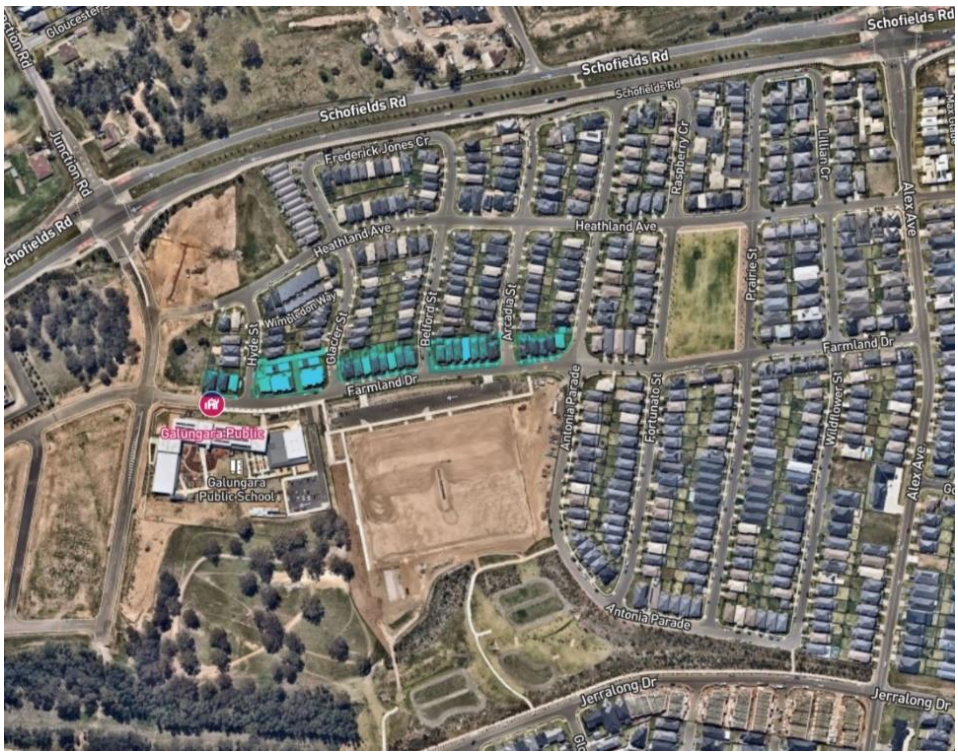
Additional project updates and notifications will also be distributed when communicating milestones and higher-level information to the wider community such as construction contract award and project completion. Such updates and notifications may not detail construction impacts and may be distributed to a greater number of addresses to widely publicise the project's achievements.

Project updates and notifications will also be provided to addresses along local roads, and to the greater school community, to advise of peak times of vehicle movement. This includes for large concrete pours which are anticipated to have higher than usual vehicle activity and are expected during the early stages of construction (up to 30 June 2022).

Approproiate signage will also be in Farmland Road. See Figure 2 below for local access and egress routes.

Select households, OOSH operators and other community groups and stakeholders will be identified and consulted if they are likely to be impacted by work at later stages of the project

Properties for notification distribution



Reference: Eagle Eye. Accessed 28.1.22

Figure 2: Map of vehicle access and egress notification and distribution area

Reference: Construction Transport and Management plan. p.6

7. Engagement Delivery Timeline

The way SINSW communicates has temporarily changed during the COVID-19 pandemic due to social distancing requirements. Please refer to Appendix A for more details on changed methods and tools. The table below outlines both traditional and alternative methods to be used in line with the changes.

The following engagement delivery timeline maps tailored communications tools and activities by key milestone.

Table 4: Engagement timeline

Project Phase / milestone	Target Audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
Main Construction works, including but not limited to: ▪ Works commenced ▪ Key impact periods – noise, dust, traffic, vibration ▪ Construction milestones	Local community Adjacent landowners Local Council State agencies Local teachers Prospective parents and students	**Planned** • Project update: letterbox drop and online • Works notifications • Door knocking to discuss works • Information booth • Information packs • Information boards • Website update • SINSW email address and hotline • Media release • Contact cards • FAQs • Project signage **Alternative methods where applicable:** • No doorknock – letterbox drop with 'door knock' letter template • Digital information booth (if required) with information boards and pack online	March 2022 until 2023 completion (at key construction events as required, as per our notification process in Table 5)
Term prior to project completion	School community Local community Adjacent landowners Local Council Prospective parents and students	**Planned** • Project update: letterbox drop and online • Information booth and presentation • Information pack • Information boards • Website update • SINSW email address and hotline • Media release • Site visits **Alternative methods where applicable:** • Digital information booth (if required) with	Term 4, 2022

Project Phase / milestone	Target Audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
		information boards and pack online	
Handover and welcome to new school	School community Local community	**Planned** • Media release • Website update • SINSW email address and hotline • Site visits • Thank you pack • Welcome pack	2023
Opening	All	**Planned** • Media release • Official opening ceremony	2023
Post-opening	All	**Planned** • Website remains live • Project signage remains installed • 1300 phone and email still active, and CRM still maintained for complaints and enquiries.	2023-202412 months post construction completion)

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