RICHARD CROOKES
CONSTRUCTIONS

ARMIDALE SECONDARY COLLEGE
NO:1155

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

&

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

30/5/2019


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Written By: Sam Lyons Site Engineer	
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1 Introduction

1.1 Project Overview

The Project consists of the design and construction of a Secondary College for approximately 1580 students of which RCC is the principal contractor

The project is located at Armidale Secondary College, Butler Street, Armidale NSW 2350. Access to site is off Butler Street, the Site Manager is Mitch McManus who can be contacted on 0428 219 608.

The Armidale Secondary College is to be constructed from steel and masonry. The steel structure is a portal frame which is clad with metal wall, roof and ceiling linings. Below the metal wall cladding is masonry construction.

The works are to be carried out within the operating hours of 7am – 6pm Monday to Friday, 8am – 1pm Saturdays & no work on Sundays or public holidays without permission.

The works are planned to be complete within a one hundred (100) week period consisting of an eighteen (18) week design period and an eighty-two (82) week construction period.

Milestones No 1 – Relocation of Armidale High School to Duval High School and associated early works.

Milestones No 2 – Completion of Armidale Secondary College main building works.

1.2 EMP & CEMP Objectives

This document is considered to be an operational EMP & CEMP which provides the framework necessary to implement the required management measures associated with the proposed excavation and construction works. Once implemented the objective of the management measures will be to ensure that the excavation of materials present at the site can be carried out without significant adverse impact on the environment or the health of the site workers and neighbouring residence. The management and monitoring aspects and Principal Contractor responsibilities covered in this EMP & CEMP include air quality, sediments, surface water, waste, noise, vibration, traffic, site security and emergencies.

RCC notes that this EMP & CEMP will focus on mitigating and managing environmental and human health issues associated with the excavation works proposed at the site. The appointed Civil Works Contractor will provide task specific (i.e. operational hours, noise mitigation, traffic control, environmental management, erosion sediment control plan) measures for the proposed construction works.

The primary objective of the EMP & CEMP is to provide a management framework to mitigate potential environmental and human health risks associated with excavation and construction works. The objectives can be summarised as follows:

- Prevent, reduce and effectively manage potential impacts to the environment resulting from excavation works, material handling and associated spoil disposal;
- Ensure that environmental management is undertaken in accordance with relevant legislative and policy requirements;
- To ensure the site is suitable for the proposed landuse, in reference to contamination; and
- Promote environmental awareness amongst employees and contractors.

1.3 Reports Relied Upon in Preparing this EMP

The EMP & CEMP framework provided in this document has relied upon information provided in the following reports;

- Soil Contamination Assessment (WSP)
- Geotechnical Investigation (GeoEnviro Consultancy) : RefJG17064A
- Pre-demolition Hazardous Building Materials Survey (WSP)
- Tree Assessment Report (McArdle and Sons Pro Tree Services): SSD 9095
- Aboriginal Archaeological Assessment (Apex Archaeology)
- Construction Noise & Vibration Management Plan (Day Design)
- Environmental Noise Assessment (Day Design): 6495-1.1 Rev A
- Architectural Drawings of the proposed development prepared by NBRS Architecture
- Remediation Action Plan (WSP)
- Environmental Impact Statement and Development
- SSD conditions B31, B32, C15, C22,C32 & C36

2 Roles and Responsibilities

The following sections set out the organisational structure for the project:

2.1 Project Organisational Structure

All personnel including the Consultants, Contractors, Subcontractors and all other personnel associated with undertaking excavation and construction works at Butler Street Armidale, ultimately report to the Principal Contractor.

The Principal Contractor will be responsible for implementing this EMP & CEMP. This will specifically involve monitoring the environmental performance of the works and ongoing compliance with legislative requirements, this EMP & CEMP, and all other associated environmental management documentation, development of a construction environmental management plan (CEMP).

2.2 Parties and Responsibilities

The parties involved with, and their responsibilities during, the environmental management of the works are provided in Table 1.

Table 1: Project Parties and Responsibilities

Party	Responsibilities	Reports to
The Principal Contractor Richard Crookes Constructions	- Ensure all works are implemented in accordance with the CEMP. - Promote awareness of appropriate environmental management and occupation health and safety (OHS) practices to the Project Manager. - Ensure the Project Manager is aware of the CEMP and site specific issues. - Review risks and identify potential opportunities and issues with the project. - Monitor and inspect activities for compliance with relevant environmental requirements, including ensuring suitable management plans have been submitted and approved prior to undertaking works. - Ensure environmental incidents and non-compliances are reported promptly and investigated. - Undertake environmental audits on the project at a frequency deemed appropriate to the length of the project. - Periodically review the performance of the Project Manager in meeting the objectives of their EMP & CEMP via regular audits. The audits will review the Project Manager's activities to ensure that environmental hazards have the appropriate mitigation controls in place. Improvement requests and non-compliances will be monitored and corrective action undertaken, this review is to be completed every 1 month across all areas and appendices of the EMP & CEMP - Maintain an environmental audit register to record close out of any actions issued.	***The Superintendent*** GHD Stuart Collett

Party	Responsibilities	Reports to
The Superintendent	- The Superintendent is appointed by the Client SINSW as a primary contact overseeing the day to day operations at the Site. - Primary contact for all personnel in relation to site works and environmental management. - Review risks and identify potential opportunities and issues with the project. - Monitor and inspect activities for compliance with relevant environmental requirements, including ensuring suitable management plans have been submitted and approved prior to undertaking works. - Ensure environmental incidents and non-compliances are reported promptly and investigated.	***The Client*** SINSW Terry O'Sullivan
Environmental Specialist / Engineer Environmental Strategies	- Comply with this EMP & CEMP. - Provide advice where required to the Principal Contractor in relation to environmental issues associated with the works, if requested. - Responsible for implementing this EMP & CEMP and all required environmental controls. - Undertake onsite and offsite air monitoring. - Conduct environmental incident investigations, if requested by the Project Manager. - Demonstrate an understanding and management of the potential environmental impacts associated with the project. - Review risks and identify potential opportunities and issues with the project. - Ensure all Subcontractors under their control are appropriately informed of the relevant components of environmental management documentation. - Report all environmental incidents, hazards, non-compliances and near misses to the Project Manager immediately. - Implement corrective action responses to environmental incidents and non-compliances in consultation with the Project Manager.	***The Principal Contractor***
Sub-Contractors	- Implement and comply with relevant components of this EMP & CEMP. - Report all environmental incidents, hazards, non-compliances and near misses to the Principal Contractor immediately. - Implement corrective action responses to environmental incidents and non-compliances as required by the Contractor.	***The Principal Contractor***

3 Implementation of EMP & CEMP

3.1 Site Inductions and Training

All personnel, including the Principal Contractors staff and subcontractors, who will be working on the project or will require regular access to the sites will be required to undertake training and site inductions including environmental requirements as required by the Principal Contractor. All personnel should demonstrate an understanding of potential environmental issues and the measures that will be implemented to protect the environment and local community, as detailed in this document.

3.2 EMP & CEMP Induction

The EMP & CEMP awareness induction will cover:

1. Outlining the objective and purpose of the works; and
2. Contents of the EMP & CEMP and their (the workers) responsibility.

- SSD Condition B20 content location:
- (i) hours of work; - *SECTION 1.1*
- (ii) 24-hour contact details of site manager; *SECTION 1.1*
- (iii) management of dust and odour to protect the amenity of the neighbourhood; *SECTION 7*
- (iv) stormwater control and discharge; *SECTION 9 & APPENDIX I*
- (v) measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site; *SECTION 7,9,10 & APPENDIX I*
- (vi) groundwater management plan including measures to prevent groundwater contamination; *SECTION 10 &11*
- (vii) external lighting in compliance with AS 4282-1997 Control of the obtrusive effects of outdoor lighting; *APPENDIX D*
- (viii) community consultation and complaints handling; *APPENDIX E*
- (b) Construction Traffic and Pedestrian Management Sub-Plan (see condition B21); *APPENDIX F*
- (c) Construction Noise and Vibration Management Sub-Plan (see condition B23); *APPENDIX G*
- (d) Construction Waste Management Sub-Plan (see condition B24); *APPENDIX H*
- (e) Construction Soil and Water Management Sub-Plan (see condition B25); *APPENDIX I*
- (f) an unexpected finds protocol for contamination and associated communications procedure; *APPENDIX J*
- (g) an unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure; and *APPENDIX K*
- (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. *APPENDIX L*

- SSD Condition B15 content location:
- (a) detailed baseline data; *SECTION 1.3*
- (b) details of: *SECTION 4,7-15*
- (i) the relevant statutory requirements (including any relevant approval, licence 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 the 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; *SECTION 7-15*
- (d) a program to monitor and report on the: *SECTION 17*
- (i) impacts and environmental performance of the development;
- (ii) effectiveness of the management measures 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; *SECTION 7-15 & 16*
- (f) a program to investigate and implement ways to improve the environmental performance of the development over time; *SECTION 20*
- (g) a protocol for managing and reporting any: *SECTION 20*
- (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. *SECTION 2*

All site workers will sign the EMP & CEMP induction register acknowledging receipt and understanding of this EMP & CEMP. All induction sessions will be recorded in the induction register.

In addition to this, the civil contractor's plan is required to be consistent with the contents of this plan managing the works will provide their own Construction Management Plan (CMP), which will be adhered to for the duration of the works.

3.3 Daily Toolbox Meetings

The Principal Contractor will also conduct daily toolbox meetings with all personnel to review management procedures and identify / discuss daily site conditions and potential hazards. Site inductions and toolbox talks will highlight specific environmental requirements and activities being undertaken at the worksite each day.

A record of issues covered in daily toolbox meetings should be maintained for future audit.

3.4 Personal Protective Equipment

All site personnel will be provided with, utilise, and be appropriately trained in the requirements of personal protective equipment (PPE). PPE requirements will depend on the activity or situation, but may include the following:

- High visibilityclothing;
- Protectiveclothingandfootwear;
- Eye protection;
- Respirable(half-face)masksasrequired;
- Hard hat as required (i.e. in the vicinity of the working excavator or other overhead plant);and
- Sun protection as required (long sleeves, sunscreen, hat or hard hat fitted with wide brimmed sunprotection).

Personnel will be trained in the requirements and use of PPE to an appropriate level according to responsibilities.

PPE requirements should be detailed in the Safe Work Method Statements (or similar) which will be provided to the Principal Contractor for review and endorsement. Additional PPE will be required to carry out some aspects of the construction process and the PPE outline above should only be considered as the basic requirements. Additional PPE will be required if works are to be conducted in asbestos work environs.

3.5 Responsibility and Reporting

The Principal Contractor is responsible for ensuring that all personnel under their jurisdiction have been provided with adequate training in the areas outlined in this document.

The principal contractor will complete weekly safety and environmental walks, with the critical information included in the monthly report.

The Principal Contractor will maintain records of all personnel who have undergone training in relation to the CEMP and general environmental responsibilities. Records of trained personnel will be maintained in a log to be kept on site. A record of issues covered in daily toolbox meetings should be maintained.

The Principal Contractor will ensure that anyone who appears to lack an understanding in the above areas undergoes adequate retraining.

4 Legislation

The following is a summary of statutory requirements to be satisfied by RCC. Table 2 includes the required permits, licenses and consents under the relevant acts, regulation or policy.

Table 2: Summary of Acts, Regulations and Guidelines Applicable to Project

Act/ Regulation / Planning Policy	Key Project Requirements	Jurisdiction
Protection of the Environment Operations Act 1997 (POEO Act) and Regulations	Undertake all activities so as to minimise harm to the environment (in particular pollution of air and water and noise emissions) and not cause an offence under the Act. Discharge to stormwater may require a license under the Act. Some transporters of waste are required to be licensed under the Act. Some waste disposal/processing facilities are required to be licensed under the Act.	State
Protection of the Environment Operations (Waste) Regulation 2014	Requirements in relation to transportation, collection, storage or disposal of waste including asbestos waste.	State
Protection of the Environment Operations (Clean Air) Regulation 2010	Requirements in relation to emission from vehicles and general obligations that the occupiers of non-residential premises do not cause air pollution by failing to operate or maintain plant, carry out work or deal with materials in a proper and efficient manner.	State
Work Health and Safety Act 2011	Requirements in relation to ensure work safety that are enforceable by law.	Commonwealth
Roads and Rail Transport (Dangerous Goods) Act 1997	Transport of waste classified as Dangerous Goods in accordance with Regulations	State

Act/ Regulation / Planning Policy	Key Project Requirements	Jurisdiction
NSW EPA Asbestos and Waste Tyres Guidelines (2015).	Outlines the legal requirements that consignors, transporters, and occupiers of premises must meet in addition to their obligations under the Waste Regulation.	State
The Waste Avoidance and Resource Recovery Act 2001	Minimise the amount of waste for disposal, where possible recycle	State
Environmental Planning and Assessment Act 1979	Compliance with Development Consent Conditions issued by Consent Authority (Armidale Council) to manage effects on the environment.	State
NSW ASMAC Acid Sulfate Soil Manual (August 1998)	Outline a stepwise process for site assessment and management of proposals in areas containing acid sulfate soils	State
NSW EPA (2014) Waste Classification Guidelines	Requirements in relation to permits required-soil/water that may need to be transported to landfill and appropriate waste classification will be required.	State
NSW Heritage Act 1977.	Requirements in relation to Protection of heritage listed items	State
Environmentally Hazardous Chemicals Act 1985	Requirements in relation to a legal framework capable of regulating priority/high-risk chemicals throughout their entire life cycles	
NSW Roads Act 1993	Consent under Section 138 of the NSW Roads Act 1993 is required for any works or activities in a public reserve, public road way or footpath (nature strip).	State

All work shall be conducted, as appropriate, in accordance with (but not limited to) the following environmental codes of practice:

- Australian Standard (AS) 2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- AS 2601 - 2001: Demolition of Structures;
- AS 2436- 1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- AS 2986.1-2003 Workplace air quality - Sampling and analysis of volatile organic compounds by solvent desorption;
- AS 2986.2-2003 Workplace air quality – Part 2: Diffusive sampling method;
- AS NZS ISO 19011-2003 Guidelines for quality and or environmental management systems auditing;

- AS/NZS 3012-2003: Electrical Installations- Construction and Demolition sites;
- BS6472 -1992: Evaluation and Human Exposure to Vibration in Buildings (1 to 80Hz);
- BS7385 Part 2-1993: Evaluation and measurement of Vibration in Buildings Part 2;
- DEC (now EPA), NSW (2005): Approved Methods for the Modelling and Assessment of Air Pollutants in NSW;
- DEC (now EPA), NSW (2007): Approved methods for the Sampling and Analysis of Air Pollutants in NSW;
- Department of Conservation and Land Management, CALM (1992): Urban Erosion Control and Sediment Control;
- National Environmental Protection Measure (NEPM) on Ambient Air Quality;
- National Environment Protection Council (1998): National Environment Protection NSW DEC (2007): Noise Guide for Local Government;
- NEPM (1999) *Assessment of Site Contamination,* as amended 2013;
- National Occupational Health and Safety Commission, 2nd Edition [NOHSC: 2002 (2005)]: Code of Practice for the Safe Removal of Asbestos;
- NSW Department of Housing (1998): Managing Urban Stormwater- Soils and Construction;
- SafeWork, NSW (1993). Code of Practice: Safe Work on Roofs, Part 1, Commercial and Industrial Buildings;
- SafeWork, NSW (1997). Code of Practice: Amenities for Construction Work;
- SafeWork, NSW (1997). Code of Practice: Cutting and Drilling of Concrete and Other Masonry Products;
- SafeWork, NSW (1992). Code of Practice: Electrical Practices for Construction Work;
- SafeWork NSW (July 2014): Code of Practice: Excavation Work;
- WorkCover NSW (March 2014): Managing asbestos in or on soil; and
- Other NSW EPA endorsed relevant guidelines.
- EPA's Interim Construction Noise Guidelines (DECC, 2009)
- AS 4373-2007 – Pruning of Amenity Tree Pruning
- AS 4970-2009 – Protection of Trees on Development Sites (in relation to protective fencing)
- AS 1158.3.1:2005 Lighting of roads and public spaces – Pedestrian area (Category P) lighting – Performance and design requirements
- AS 4282-1997 Control of the obtrusive effects of outdoor lighting

5 Occupational Health and Safety

The following Health and Safety plan contains procedures and requirements that are to be implemented as a minimum during the site works.

The objectives of the health and safety plan are:

- To apply standard procedures that reduces risks resulting from the above works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards and mandatory safety practices and procedures; and
- Provision for contingencies that may arise while operations are being conducted at the site.

This health and safety plan does not provide safety information specific to construction and other demolition or excavation activities carried out by contractors, such as the safe operation, maintenance and inspection of plant, etc. Contractors will be required to prepare their own Safe Work Method Statements for their work activities. All parties working on the site shall comply with all applicable Work Health and Safety legislation, regulations, codes and guidelines.

5.1 Responsibilities

Principal Contractor

RCC is responsible for ensuring that the work is carried out in accordance with the health and safety plan. This will include:

- Ensuring a copy of the health and safety plan and EMP & CEMP is available at the site during the excavation/construction activities;
- Confirming individuals are competent in performing assigned tasks;
- Liaison with the contractor representatives, as appropriate, regarding safety matters; and
- Investigation and reporting of incidents and accidents.

Every individual worker is responsible for conducting their allocated tasks in a safe manner and in accordance with their training and experience. They must give due consideration to the safety of all others in their proximity and cooperate in matters of health and safety. All workers must leave their work areas in such a condition that the location will not be hazardous to others at any time.

5.2 Hazards

The known or potential hazards associated with the work activities described are listed below:

- Potential chemical hazards;
- Physical hazards, including;
- Work in or near excavations;
- Operating machinery;
- Heat stress and UV exposure;
- Underground or overhead services;

- Manual handling; and
- Noise.

In the event of the discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, or of any new hazard that could potentially cause serious harm to personnel or the environment, work will be suspended until the Project Manager has been notified and appropriate instructions have been provided to field personnel.

5.3 Potential Chemical Hazards

The main potential chemical hazards associated with the excavation/construction works is petroleum hydrocarbons, PAHs, heavy metals, asbestos and soil gasses.

When working with identified contaminated materials in general, care needs to be taken to ensure that the contamination is not introduced to the worker via ingestion, inhalation or dermal contact. The personal protective equipment (PPE) and decontamination requirements outlined in Section 3.4 shall be followed to control the risks posed by chemical hazards at the site.

Potential hazards associated with working with asbestos or asbestos containing material (ACM) are addressed in detail in the Asbestos Management Plan (AMP) and should be read in conjunction to this document (refer to ***Appendix B***).

5.4 Physical Hazards

Operating Machinery

Heavy plant and equipment operating in the vicinity of field personnel presents a risk of physical injury. Personnel should always be cognisant of their position in relation to operating machinery .

Never walk behind or to the side of any operating equipment without the operator's knowledge. Do not assume that the operator knows your position. Personnel should stay at least 2 m from the operational area of heavy equipment and should not stand directly below any load or piece of equipment (eg. excavators).

Working in or Near Excavations

All excavations shall be shored, sloped or otherwise constructed, so as to comply with SafeWork Authority safety regulation to minimise the potential for collapse.

Geotechnical advice, given to the slopes and treatment of batters, should be adhered to at all times. All batters to be 1H:2V for temporary and permanent.

Cuts and Abrasions

The manual work associated with the site works gives rise to the risk of cuts and abrasions to personnel working in the area. As well as the direct consequences of any cut or abrasion, such injuries can lead to the possibility of exposure to contaminants through the wound as well as diseases such as tetanus. To minimise the risk of direct or indirect injury, personnel will wear the personal protective equipment described.

Heat Stress and UV Exposure

Site personnel may experience heat stress due to a combination of elevated ambient temperatures and the concurrent use of personal protection equipment; this depends in part on the type of work and the time of year.

There are four main types of heat stress related problems:

- Heat Rash - caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Decreased ability to tolerate heat, as well as being a nuisance.
- Heat Cramps - caused by profuse perspiration with inadequate fluid intake and chemical replacement. Signs: muscle spasms and pain in the extremities and abdomen.
- Heat Exhaustion – is caused by increased stress on various organs as they meet the increasing demand to cool the body. Signs: shallow breathing; pale, cool, moist skin; profuse sweating; dizziness, and lassitude
- Heat Stroke - result of overworked cooling system. Heat Stroke is the most severe form of heat stress. Body must be cooled immediately to prevent severe injury and/or death. Signs: red, hot, dry skin; no perspiration, nausea; dizziness and confusion; strong, rapid pulse and coma. Medical help must be obtained immediately.

In addition to the above, overexposure to UV radiation in sunlight can result in sunburn to exposed skin. The use of a high protection sunscreen (SPF15 or greater) on all exposed skin is recommended. Hats (including hard hats in specified areas) will also provide additional sun protection during the peak (i.e. 10:00 am to 3:00 PM) sun period. Sunglasses should be worn (where appropriate) to protect eyes from effects of UV exposure.

5.5 Underground Services

There is the potential for underground services (electricity, natural gas lines inside the site compound running from the gas tanks, water, telephone, sewer, and stormwater) to be present beneath the work area. The remediation contractor shall ensure that appropriate procedures will be taken to minimise the risk associated with excavation near services. This should include but not be limited to dial before you dig plan review, service provider notification and work clearance, service location by an approved contractor, manual test pitting, adherence to safe excavation distances (for overhead and below ground services), spotting during excavation, assessment of structural considerations etc.

5.6 Aboveground Electrical Hazards

All electrical plant and equipment must comply with the requirements of Australian Standard AS 3000. Hand held portable tools shall comply with AS/NZS 3160 "hand-held portable electric tools" and shall be double insulated. A Residual Current Device (RCD) shall protect plug-in portable equipment, which is connected to a supply above Extra Low Voltage - 12-24 Volts (including equipment supplied from a generator or welding set). RCD protection shall be provided during the maintenance of portable electrical equipment. RCD protection shall be provided at all times, while the equipment is connected to a power supply above Extra Low Voltage, irrespective of whether power is switched ON or OFF. RCD's shall comply with AS 3190 and shall be type II units, rated to trip at or below 30 milliamps within 40 milliseconds.

No excavator may work within 2 m of overhead distribution power lines.

5.7 Manual Handling

When lifting or handling heavy objects, use correct lifting techniques, bending the knees not the back. If the item to be lifted is too heavy or awkward for one person to lift, seek assistance from other employees or use mechanical help.

5.8 Noise

Long-term exposure to high levels of noise is unlikely. However, operating machinery may cause significant noise exposures for short periods. Earplugs, earmuffs or a combination of both shall be worn in any situation where noise levels make normal conversation difficult.

6 Environmental Management

The remaining sections of this document set out the environmental management activities and management measures, which will be implemented during the Excavation works. The Principal Contractor will ensure that personnel responsible for undertaking the works are aware of their roles and responsibilities detailed in this CEMP.

6.1 Potential Environmental Issues

The potential environmental issues associated with the proposed construction works include:

- Air emissions from contaminated soils and groundwater;
- Impact of noise and air emissions from plant, equipment and vehicles used in the project and associated transport of infrastructure;
- Potential impacts to terrestrial and aquatic ecology within close proximity to the work area and the surrounding areas;
- Disturbance to, and release of potentially contaminated soil and groundwater to the local environment; and
- Disruption to amenity of any residents and other land users in the vicinity of the site.

6.2 General Structure of Environmental Management

Individual management measures have been prepared to address the issues listed in Environmental Elements 1 to 9. The numbering order should not be considered as a ranking of priority of each element as each element will have some over laps in procedures and monitoring requirements. Each plan is comprised of a number of elements, each with an overall associated management policy, mechanisms of policy implementation, proposed monitoring programs and potential corrective actions as described in Table 3.

6.3 Tree Protection

All tree protection is to be implemented in line with Tree Impact Assessment report prepared by Tarranne Pty Ltd, which outline the minimum requirements of tree protection required for Armidale Secondary College. The information within the report outlines the tree protection zones and structural root zones to ensure trees are not affected during construction.

Table 3: Structure of CEMPs

EMP Element	Description of Content
Element	The environmental aspect of construction or operation requiring management consideration.
Potential Impacts	The potential impacts in relation to the environment.
Management Actions	The procedures to be undertaken to avoid or minimise potential impacts
Performance Objectives	The target or strategy to be achieved through the specific management actions.
Performance Indicator	The criteria against which the implementation of the actions and the level of achievement of the performance objectives will be measured, as well as the success of the implementation of the policy.
Monitoring	The intended monitoring program and the process of measuring actual performance.
Responsibility	The entity assigned responsibility for carrying out each action.
Reporting	The process of documenting actual performance, or how well the policy has been achieved, including the format, timing and responsibility for reporting and auditing of the monitoring results.
Corrective Action	The action to be implemented and by whom in the case where a performance requirement is not met.

7 Environmental Management Measure Element 1: Air Quality

7.1 Summary of Potential Impacts

Potential impacts to air quality resulting from the works include emissions from exposed soils, asbestos dust, groundwater, plant and equipment and dust generated during earthworks and land clearance and demolition work. Air monitoring has been implemented around site to ensure the air quality is not impacted upon.

Potential odour / vapour impacts may also occur as a result of the release of odours from impacted soils / groundwater / gases and exposure from unexpected finds, hydrocarbon hotspots and soil gas pathways within any uncontrolled fill.

Ambient Air Levels will likely vary as earth works proceed. Earth works will also be conducted up to the site boundaries in some areas and odour / soil gas will be subject to changes in wind direction and weather conditions. The application and effectiveness of odour suppressant mitigation will need to be well managed under the discretion of the Principal Contractor and the environmental consultant.

7.2 Procedures

A summary of the minimum plan requirements is provided in Table 4.

Table 4: Summary of Air Quality Management Procedures

Element	Air Quality
Performance Objectives	The objective of this management measure is not to generate any odours or gasses and to adopt the necessary management strategy and PPE if presented with the occurrence to minimise the impacts of odours and/or vapours if encountered. Avoid or minimise the potential for odour and/or vapour emissions during the handling of exposed soils. Maintain plant and equipment such that exhaust emissions are minimised. Avoid or minimise disruption to amenity of residents and other land users in the vicinity of site works.
Management Actions	Use of surfactant spray (onsite in close proximity of the earth works and at the site boundary/fences) is required for odour suppressant during works (this is up to the discretion of the Project Manager and the environmental consultant). Heavy equipment and vehicles will be appropriately maintained to minimise exhaust emissions. Appropriate methods of dust suppression will be implemented, such as ensuring earthworks materials remain moist to ensure dust is minimised during works. Evaluate weather conditions prior to works commencing and during any change in wind direction. Cease works if dust or odour generation is excessive. In addition water trucks will be used to control dust on site and wheel wash bays and cattle grid will will be where trucks exit site from to control tracking of sediment. In order to minimise dust the following actions will be implemented where required, exposed surfaces and stockpiles will be watered, trucks entering and leaving site are to have loads covered, trucks associated with the development do not track dirt onto the public roads, public roads used by trucks are kept clean and land stabilisation works are carried out progressively on site to minimise exposed surfaces

Element	Air Quality
	or if weather forecasts predict strong winds; with plastic or Hessian material. All dust/odour control measures will be kept in good operating condition and be functional at all times, with regular maintenance. All loads are to be covered and appropriately fitted with tarpaulins to contain dust and/or odour during transport. A complaints register will be established and maintained to receive and address complaints from the community regarding the detection of nuisance odour during the works. Residents in the vicinity of the proposed works will be informed of potential dust/odour impacts prior to the commencement of works.
Performance Indicator	No complaints from location residents, surrounding businesses or site personnel. Goal of nil complaints relating to dust quality issues. Vapour emissions (Chlorinated VOCs) are likely to occur however the number of complaints should be kept to a minimum. All complaints will be responded to within 24 hours No onsite observation of dust generation during excavation works by Project team. No visual evidence of exhaust smoke during idle of equipment. No visual evidence of tracked material on public roads. A reduction in the number of complaints received in relation to air quality each month.
Monitoring	Implementation of visual monitoring of dust, material tracking, truck tarping, water spray use, exhaust plumes and stockpile covering. If unexpected fines protocol detects contaminants a review of air born testing is to be undertaken.

Element	Air Quality
Responsibility	The Principal Contractor is responsible for ensuring that if a monitoring program is required to be implemented by appropriately trained/qualified staff. This program may be sub-contracted out to a specialist sub-consultant as required. The Principal Contractor is to ensure responsible personnel are suitably qualified.
Reporting	Maintenance of records on site of visual, PID and Asbestos monitoring undertaken if required.
Corrective Action (as required)	If required replace or repair emission control devices. Provide equipment to enable wetting of exposed soils if required. Should excessive dust be generated during works will also cease, until weather conditions improve and/or additional dust suppression measures have been implemented. The use of PPE with appropriate filters, inside the works zone will be mandatory, in the event that PID readings exceed the limits set by the environmental consultant for the Site/area. The level set by the environmental consultant is exceeded the following action shall be undertaken: ▪ Backfill any excavation or cover with plastic sheeting; ▪ Temporarily cease works until levels drop; and ▪ Increase the use of suppressant near the excavation. In the event that boundary monitoring exceeds the daily works shall be stopped immediately. The earthworks shall be quickly backfilled and the situation reassessed if odour / gasses are identified and deemed excessive by the environmental consultant, the application of odour suppressants should be used / increased and then works can recommence once suitably qualified environmental consultant has assessed ambient air quality to be satisfactory.

8 Environmental Management Measure Element 2: Asbestos Dust

8.1 Summary of Potential Impacts

Possible asbestos dust-generating activities include the mechanical removal of building materials, demolition and earth disturbance works along with vehicle movement over asbestos impacted soils. The generation of asbestos dust should be minimised and meet relevant air quality standards as specified in the NOHSC:1003 (1995) *Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment*. Additional information is outlined in detail in the Asbestos Management Plan attached in **Appendix B**.

Air monitoring when disturbing contaminated soils across the site should be implemented. Any air monitoring of asbestos should be performed in accordance with the NOHSC:3003 (2005) *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*.

8.2 Procedures

A summary of the minimum Asbestos Air Monitoring plan requirements is provided in Table 5 with addition measures for asbestos removal air monitoring covered in Section 7.1.2 in the Asbestos Management Plan in **Appendix B.** As the demolition and removal of known asbestos is to occur prior to site possession a clearance certification needs to be undertaken to ensure the soil classification and contamination has not changed since the reviewed investigations. The below will be required if the classifications change.

Table 5: Summary of Asbestos Dust Management Procedures

Element	Air Quality
Performance Objectives	The objective of this management measure is not to generate any asbestos dust and to adopt the necessary PPE if presented with the occurrence of asbestos dust and to minimise the impacts of dust levels encountered. Avoid or minimise the potential for dust emissions during the handling of exposed soils and asbestos containing material (predominantly located within the existing buildings as identified in the hazardous building materials survey). Maintain plant and equipment such that decontamination procedures are followed and cross contamination outside the impacted work areas are minimised. Avoid or minimise disruption to amenity of residents and other land users in the vicinity of site works.

Management Actions	Use of water spray (onsite in close proximity of the earthworks and at the site boundary/fences) is required for dust suppressant during earthworks. Water sprays might be used during demolition works on the removal of ACM within the current buildings on the site (this is up to the discretion of the Project Manager and the environmental consultant). Once the earthworks of each area is finished, this area of the site should be covered with plastic sheeting or the use of water spray to minimise dust generation (this to the discretion of the Project Manager and the environmental consultant). Use of enclosed and over-pressurized cabins on excavation equipment and trucks entering the site or work area (if staged). This should prevent ambient air (potentially contaminated with asbestos dust) and dust to intrude into the cabin. Appropriate methods of dust suppression will be implemented, such as ensuring earthwork and material removal. Soils and materials are to remain moist to ensure dust is minimised during works. Evaluate weather conditions prior to works commencing and during any change in wind direction. Cease works if dust generation is excessive. Covering of any stockpiles that are to remain for greater than two days (Waste reclassification stockpiles), or if weather forecasts predict strong winds; with plastic or Hessian material. All dust control measures will be kept in good operating condition and functional at all times, with regular maintenance. All loads are to be covered and appropriately fitted with tarpaulins to contain dust during transport. Were asbestos soils and materials are to be removed offsite, loads are to be encapsulated in black plastic, prior to tarpaulins covering being fitted. A complaints register will be established and maintained to receive and address complaints from the community regarding the detection of nuisance dust during the works. Residents in the vicinity of the proposed works will be informed of potential dust impacts prior to the commencement of works. In addition water trucks will be used to control dust on site and wheel wash bays and cattle grid will will be where trucks exit site from to control tracking of sediment. In order to minimise dust the following actions will be implemented where required, exposed surfaces and stockpiles will be watered, trucks entering and leaving site are to have loads covered, trucks associated with the development do not track dirt onto the public roads, public roads used by trucks are kept clean and land stabilisation works are carried out progressively on site to minimise exposed surfaces
Performance Indicator	No complaints from location residents, surrounding businesses or site personnel. Goal of nil complaints relating to dust quality issues. All complaints will be responded to within 24 hours. No onsite observation of dust generation during excavation works by Project team. No visual evidence of tracked material on public roads. A reduction in the number of complaints received in relation to air quality each month.

Monitoring	The air quality will be evaluated by the Project Manager and assessed by a suitably qualified environmental consultant. Continuous exclusion zone boundary monitoring during excavation works using asbestos air monitoring equipment is required. The air pumps should be calibrated to the required flow rate in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]. ▪ Fence line sampling for Asbestos. Four (1) samples/day, airborne fibres testing in accordance with the NOHSC: 3003 (2005) method. Action level is 0.1 fibres/mL (with air monitoring filters to be situated within 10m of the location of asbestos removal work) Implementation of visual monitoring of dust, material tracking, truck tarping, water spray use, exhaust plumes and stockpile covering.
Responsibility	The Principal Contractor is responsible for ensuring that the monitoring program is implemented by appropriately trained/qualified staff.

	required. The Principal Contractor is to ensure responsible personnel are suitably qualified.
Reporting	Maintenance of records on site of visual dust and Asbestos monitoring must be undertaken by a suitably qualified environmental consultant. Daily asbestos air monitoring results should be made available 24hr after collection and notification of the results made available at the site lunch shed.
Corrective Action (as required)	Replace or repair dust control devices. Provide equipment to enable wetting of exposed soils and materials if required. Should excessive dust be generated works will also cease, until weather conditions improve and/or additional dust suppression measures have been implemented. The use of PPE with appropriate filters, inside the works zone will be mandatory, in accordance with the requirements outlined in the AMP. The level presented in the CEMP prevails. When the 0.1 f/mL (Fibres per millilitre of air) level with the work area is exceeded the following action shall be undertaken: ▪ Backfill any excavation or cover ground surface with plastic sheeting; ▪ Temporarily cease works until levels drop; and ▪ Increase the use of suppressant near the excavation. In the event that boundary monitoring exceeds the 0.1 f/mL (Fibres per millilitre of air) works shall be stopped immediately. The earth works shall quickly backfill any excavation and the area cover with black plastic and the situation reassessed if by the Principal Contractor, the application of dust suppressants should be used/increased and then works can recommence once suitably qualified environmental consultant has assessed ambient air quality to be satisfactory.

9 Environmental Management Measure Element 3: Sediments

9.1 Summary of Potential Impacts

Potential impacts from sediments resulting from the works include dust emissions (Refer to Element 1: Air Quality) and storm water (Refer to Element 4: Surface Water) generated during earthworks/land clearance and construction.

The following potential impacts from sediments may occur as part of the works program:

- Complaints from local residents;
- Breaches in Regulatory requirements;
- Increased turbidity and sediment concentrations due to accidental release;
- Increased sediment load on storm water drains and infrastructure;
- Damage to local ecological receptors.

Any impacts would be expected to be temporary only in nature and generally localised to the area of adjoining active works and transport routes, but may have longer term impacts to local ecological communities.

9.2 Procedures

A summary of the minimum plan requirements is provided in Table 6. Also refer to appendix 9 for additional controls

Table 6: Summary of Sediment Management Procedures

Element	Sediments
Performance Objectives	The objective will be to avoid an impact on water quality in surface water and drains which eventually discharge offsite by implementing prevention measures to control any sediment that is generated. Avoid or minimise soil migration and loss to surface waters and drains. Avoid or minimise pollution of creeks and waterways. Avoid or minimise increased sediment load on storm water drains and infrastructure.
Management Actions	Prior to the start of the works a stormwater and sediment control plan should be prepared by the Principal Contractor. This Plan should be in accordance with Councils consent. Site contractors will be required to observe any increases in sediment load in storm water drains when excavations are close to surface drains or waterways. Sediment control structures (i.e. silt fencing and/or hay bales) should be implemented in accordance with the Stormwater and Sediment Control Plan prior to the commencement of works. Evaluate weather conditions prior to works commencing and during any change in wind direction. Cease works if dust generation is excessive (by visual assessment). Covering of any stockpiles that are to remain for greater than two days, or if weather forecasts predict strong winds; with plastic or Hessian material. All sediment control measures will be kept in good operating condition and functional at all times, with regular maintenance.

	Strategic placement of such structures down-gradient of stockpiles and slopes to minimise sediment entrainment. These measures should also be placed on the up-slope side of any storm water collection channels. If a significant rain event occurs, fieldwork will cease. There will be sediment control measures available for placement down gradient of the work area; and Works will also be conducted in a manner to minimise the potential for sediment and soil migration, whereby excavated material will be hauled offsite as soon as practicable and/or reinstated and compacted. In addition water trucks will be used to control dust on site and wheel wash bays and cattle grid will will be where trucks exit site from to control tracking of sediment. In order to minimise dust the following actions will be implemented where required, exposed surfaces and stockpiles will be watered, trucks entering and leaving site are to have loads covered, trucks associated with the development do not track dirt onto the public roads, public roads used by trucks are kept clean and land stabilisation works are carried out progressively on site to minimise exposed surfaces. All erosion and sediment controls must be effectively implemented and maintained at or above design capacity for the duration of the construction works until ground disturbed is stabilised
Performance Indicator	The prevention of sediment runoff is the best approach. Site contractors will be required to observe any increases in sediment load in storm water drains when excavating close to surface drains and site boundaries. No complaints from location residents, surrounding businesses or site personnel. Goal of nil complaints relating to sediment issues. No onsite observation of dust generation during excavation works by Project team. No visual evidence of tracked material on public roads.
Monitoring	Regular observations will be made by the Site Manager and mitigation measures put into place if sediment loaded runoff is likely to occur or a rainfall event is predicted. Records of all corrective actions and known sediment releases will be kept. Implementation of visual monitoring of dust, material tracking, truck tarping, water spray use, exhaust plumes and stockpile covering.
Responsibility	The Project Manager is responsible for ensuring that the monitoring program is implemented by appropriately trained/qualified staff.
Reporting	Maintenance of records on site of visual monitoring undertaken
Corrective Action (as required)	Clean-up of sediment. Installation of sediment and erosion controls. Additional storm water control measures. Altered excavation works. Cease works if a major storm event is likely to occur. Replace or repair sediment and erosion control devices. Should excessive dust be generated excavation works will also cease, until weather conditions improve and/or additional dust suppression measures have been implemented.

10 Environmental Management Measure Element 4: Surface Water

Works must comply with requirements for storm water management in accordance with Managing Urban Storm water – Soils and Construction (Landcom, 2004) to minimise direct or indirect un-authorised release of surface water during site works to minimise impacts to surface water quality of surrounding environs.

In the event groundwater is intercepted during excavation works, a temporary water collection pit shall be excavated in the bottom of the excavation pit or graded surface. Water samples should be collected and tested for chemical of concern prior to discharge/disposal. The expected permanent groundwater table is at a significant depth, which is more than 3m from ground surface. Excavation pump out water (if any) shall be pumped from the excavation by a licensed contractor and disposed of off-site as "liquid waste" in accordance with NSW EPA (2014). The Principal Contractor will need to obtain the relevant approvals should be obtained prior to the commencement of dewatering. In line with Geotechncal Invesigation Report, 8.1.4 trial piles are to be carried out and witness by a geotechnical engineer to see if there is a risk that the groundwater may be disturbed, these are adequate control measures given that the report states that ground water had not been located with any of the test bore holes.

10.1 Summary of Potential Impacts

The following potential impacts from surface water may occur as part of the works program:

- Complaints from local residents;
- Breaches in Regulatory requirements;
- Increased turbidity and sediment concentrations due to accidental release;
- Increased sediment load on storm water drains and infrastructure;
- Ruts and gullies in soil surfaces;
- Unsuitable conditions for construction works;
- Safety and Health related issues; and
- Damage to local ecological receptors.

Any impacts would be expected to be temporary only in nature and generally localised to the area of adjoining active works, but may have longer term impacts to local ecological communities.

10.2 Procedures

A summary of the minimum plan requirements is provided in Table 7.

Table 7: Summary of Water Quality Management Procedures

Element	Water Quality
Performance Objectives	Avoid or minimise the disturbance to, and release of potentially contaminated soil or sediment laden water to the surrounding environs. Prevent increased water flows causing erosion damage to drainage infrastructure and water ways. Prevent safety related incidents associated with wet or slippery work conditions.
Management Actions	Assessment of weather during excavation operations and consideration of temporarily halting works until more favourable conditions are encountered. Install sediment control structures (i.e. silt fencing and/or hay bales) should be implemented in accordance with Managing Urban Storm water

	– Soils and Construction (Landcom, 2004) prior to the commencement of works. This would include strategic placement of such structures down-gradient of temporary stockpiles and slopes to minimise sediment entrainment. These measures should also be placed on the up-slope side of any storm water collection channels. Control of drainage on the site by interception and redirection of clean storm water in a controlled manner. Collection of storm water on-site in trenches and sumps for appropriate management. Provide inlet protection to be provided for any potentially impacted locations. Site contractors will be required to observe any sediment control and/or storm water control measures to ensure that they are working at a satisfactory level. Provision of a Spill cleanup kit on all sites where bulk fuel is stored or is being transferred. Maintain a hardstand or lined and bunded area for the refueling and storage of equipment. Cease works if excessive surface water makes conditions unsuitable for construction works. Cease works if excessive surface water makes creates safety concerns. adequate provisions must be made to collect and discharge stormwater drainage during construction of the building. Approval is required from the Council to connected or discharge site stormwater.
Performance Indicator	The prevention of increased storm water runoff is the best approach. Site contractors will be required to observe any increases in sediment loads and volumes in storm water drains when working close to surface drains and report any discharges beyond the site boundaries. Site contractors will be required to observe any sediment control and/or storm water control measures to ensure that they are working at a satisfactory level.
Monitoring	Regular observations will be made by the Site Contractors and the Project Manager and mitigation measures put into place if sediment loaded runoff is likely to occur or a rainfall event is predicted. Monitoring requirements from a pump-out-permit or other required license shall be adhered to at all times.
Responsibility	The Project Manager is responsible for ensuring that each of the monitoring programs is implemented by appropriately trained/qualified staff. These programs may be sub-contracted out to a specialist sub-consultant as required.
Reporting	Records of all corrective actions and known sediment releases will be kept. Records of Near Miss and Injuries will be kept. The Project Manager will immediately report to the Contract Administrator any incidents of water discharging off site.

11 Environmental Management Measure Element 5: Waste Management

Excess soils requiring offsite disposal will require additional assessment and should be stockpiled onsite prior to sampling and any additional assessment by a suitably qualified environmental consultant.

All excavated material removed from site will need to have appropriate Waste Tracking Certificates and no material is permitted to leave site prior to receiving a waste classification letter. Each truckload should be completely filled before leaving the site. A transportation form (Appendix C) shall accompany each truckload and should be handed back to the Environmental Specialist upon return to the site. The waste docket should be attached to this transportation form.

Storm water and/or groundwater collected on-site in trenches and sumps will be subject to waste management if offsite disposal is to take place. Disposal via the storm water system may be undertaken subject to relevant authorities discharge license conditions.

Should excavations require dewatering, water samples will be collected by the Environmental Specialist and analysed prior to pump-out and offsite disposal. Waste liquid disposal dockets should be maintained onsite for inspection.

If during any site earthworks or excavation, asbestos, evidence of gross contamination or unknown type of material not previously detected is observed (Unexpected Finds), site works are to cease until the Project Manager has been notified and appropriate instructions have been provided to field personnel. Further works in such a location should be conducted under the supervision of a suitably qualified environmental consultant after a formal notification to the Site Auditor. All additional work would be documented and detailed in a validation report prepared by the Environmental Specialist and reviewed by the Site Auditor.

Other waste, excluding soils and groundwater, generated during the redevelopment works may include:

1 Domestic waste generated by site workers;
2 Asbestos contaminated waste to follow recommendations of UFP;
3 Concrete Slab;
4 Liquid waste; and
5 Inert building materials

Asbestos waste and decontamination disposal waste should be conducted as per consultants advice and site auditors requirements.

Each outbound truck should be logged as clean prior to dispatch along with information pertaining to the amounts of loads and number of trucks leaving the site in addition to copies of all waste classifications certificates, waste tracking certificates, weigh bridge dockets, and any council approvals should be maintained onsite for inspection.

The above measures are to implemented in line with the SSD conditions, Remediation Action Plan (Appendix L) and the Construction Waste Management Plan (Appendix H)

11.1 Summary of Potential Impacts

The following potential impacts from waste management may occur as part of the works program:

- Complaints from local residents;
- Breaches in Legislative/Regulatory requirements; and
- Damage to local ecological receptors.

Any impacts would be expected to be temporary only in nature and generally localised to the area of adjoining active works, but may have longer term impacts to local ecological communities.

11.2 Procedures

A summary of the minimum plan requirements is provided in Table 8.

Table 8: Summary of Waste Management and Minimisation Procedures

Element	Waste Management and Minimisation Quality
Performance Objectives	The objective will be to minimise and control any wastes and waste categories that are generated, and ensure that they will be appropriately disposed of. Avoid or minimise environmental impacts related to waste management and handling of potentially contaminated soils. Avoid or minimise impacts due to unexpected finds. Avoid or minimise health risks associated with potentially contaminated soil exposure and dust generation.
Management Actions	Provision of a Spill cleanup kit on all sites where bulk fuel is stored or is being transferred. Maintain a hardstand or lined and bunded area for the refueling and storage of equipment. Visual assessment of excavated material by the Environmental Specialist. The Environmental Specialist shall direct the Excavator Operator if the soil has to re-assessed onsite or disposed off-based on the in-situ waste classification. Trucks to be used for transport of soil are to be fitted with cover tarpaulins to contain the load. Each truck prior to exiting site, shall be inspected prior to dispatch and either logged out as clean (wheels and chassis), or hosed down within a wheel wash down bay. Provide waste receptacles for all waste types and ensure that personnel use these correctly. All trucks leaving the site should be accompanied with a waste transportation form (Appendix B). Cease site works until the Project Manager has been notified of any unexpected finds and appropriate instructions have been provided to field personnel to address the issue. Project Manager to inform the Contract Administrator of any unexpected finds.

Monitoring	Regular observations will be made by the Project Manager and measures put into place if sediment loaded runoff is likely to occur or a rainfall event is predicted. Records of all corrective actions and known sediment releases will be kept. An up to date record of waste tracking shall be kept by the Environmental Specialist.
Responsibility	The Principal Contractor is responsible for ensuring that the monitoring program is implemented by appropriately trained/qualified staff. This program may be sub-contracted out to a specialist sub-consultant (the Environmental Specialist) as required. The Principal Contractor is to ensure responsible personnel are suitably qualified.
Reporting	Maintenance of records on site of equipment inspections undertaken and landfill disposal/waste tracking and weigh bridge dockets, and any council approvals should be maintained onsite for inspection.
Corrective Action (as required	Revision of the works strategy including relocation and alteration to the operating procedure if waste is shown to be entering the surrounding environment.

12 Environmental Management Measure Element 6: Noise Management

The Principal Contractor may wish to undertake a noise management study by a suitably qualified consultant prior to undertaking a detailed Noise Management Plan. The findings and recommendations in the Noise Management Plan will supersede the minimum requirements outlined below.

Site works will be conducted from 7:00 a.m. to 6:00 p.m. Monday to Friday, with work on Saturdays between 8:00 a.m. and 1:00 pm if required. Work outside these hours will be permitted if it meets the requirements of SSD condition C6 & C15-C22.

12.1 Summary of Potential Impacts

The following potential impacts from Noise may occur as part of the works program:

- Complaints from local residents;
- Breaches in Regulatory requirements; and
- Safety and Health related issues.

Any impacts would be expected to be temporary only in nature and generally localised to the area of adjoining active works and transport routes, but may have longer term impacts to Safety and Health related issues.

12.2 Procedures

A summary of the minimum plan requirements is provided in Table 9.

Table 9: Summary of Environmental Noise Management Procedures

Element	Noise Management
Performance Objectives	Avoid or minimise the impact of noise emissions from plant, equipment and vehicles used in the works.
Management Actions	Plant and equipment will not be permitted to 'warm-up' before the nominated working hours. Where possible, plant and equipment will be located / orientated to direct noise away from the closest sensitive receivers. Undertake regular maintenance of plant and equipment to minimise noise emissions. All machinery will be kept in good working order and will comply with noise attenuation standards. Other noise control measures, including acoustic barriers, will be examined and put in place should the need arise. Maximum operating noise of equipment is to be 85 db(A). Selection of the quietest suitable machinery reasonably available for each work activity. All plant and equipment to have efficient low noise muffler design and be well-maintained. Offset distance between noisy items of plant/machinery and nearby sensitive receivers to be maximized were possible. Where practicable, ensure that noisy plant/machinery are not working simultaneously in close proximity to sensitive receivers. These actions are to be implemented in line with SSD conditions C5,C8, C15 & C19

	Queuing of trucks is not to occur adjacent to any residential receiver. Where queuing is required engines are to be switched off. Trucks to be fitted with efficient low noise mufflers and be well maintained. Trucks will follow the designated haulage route between locations. Trucks will adhere to the designated speed limits. Trucks will refrain from using compression breaking where possible. Any pumps or generators used will be encapsulated or appropriately encased to ensure noise generation is minimised and emissions are muffled.
Performance Indicator	No complaints from surrounding residents.
Monitoring	Noise generation is considered to be minimal if no complaints are received from the neighbours and areas of excavator use are in isolated areas away from any onsite facilities or neighbours.
Responsibility	The Principal Contractor is responsible for ensuring that the monitoring program is implemented by appropriately trained/qualified staff. This program may be sub-contracted out to a specialist sub-consultant as required. The Principal Contractor is to ensure responsible personnel are suitably qualified.
Reporting	Maintenance of records on site of equipment inspections undertaken, and results of noise surveys.
Corrective Action (as required)	Revision of the works plan including revision to working hours as necessary or staggering use of noisy equipment to minimise impacts.

Noise Complaints

In line with the Construction Noise & Vibration Management Plan a Community Liaison Officer (Project Manager or Site Manager) to handle notification to the residents, noise complaints an any other noise relevant areas. The SSD conditions C6 & C8 are also to be considered and address with any noise relating activities.

13 Environmental Management Measure Element 7: Vibration

Due to no structures within close proximity to the site boundaries the Principal Contractor will not be undertaking a structural integrity assessment by a suitably qualified engineer or specialised consultant of the buildings and structures. As such the below minimum requirements outlined in Table 10 will be followed.

13.1 Summary of Potential Impacts

The following potential impacts from Vibration may occur as part of the works program:

- Complaints from local residents;
- Breaches in Regulatory requirements;
- Safety and Health related issues; and
- Damage to local infrastructure.

Any impacts would be expected to be temporary only in nature and generally localised to the area of adjoining active works and transport routes, but may have longer term impacts to local infrastructure and Heritage listed buildings.

13.2 Procedures

A summary of the minimum plan requirements is provided in Table 10 and in line with SSD condition C15-C22.

Element	Vibration Management
Performance Objectives	Minimise the effects of the project has on adjacent public utilities, structures and buildings from vibration.
Management Actions	Prior to activities that may pose a risk to adjacent public utilities, structures and buildings a visual inspection will be undertaken to access potential damage associated with vibration impacts including cracks and other indications of settlement. Select appropriately sized machinery and equipment and design procedures for use in order to comply with vibration limits and to reduce vibration generation. Establish communication with relevant authorities and local residents. Ensure machinery used is appropriately sized to prevent over-loading and over-revving. The above actions are to be implemented in line SSD conditions C20 & C22
Performance Indicator	Goal of nil complaints relating to vibration issues during the project. Zero damage to adjacent public utilities, structures and residential buildings from vibration. Zero detrimental health problems to personnel in the vicinity of the vibration source.
Monitoring	Vibration monitoring to be adopted upon receiving a complaint or under direction from a government agency.
Responsibility	The Principal Contractor is responsible for ensuring that vibration control is implemented. The Principal Contractor is to ensure

	responsible personnel are suitably qualified to inspect buildings and infrastructure for structural integrity.
Reporting	Inspection, monitoring and surveillance by the project manager and contractors. Maintenance of records relating to any complaints received, including subsequent non-compliance forms and corrective actions.
Corrective Action (as required	Where vibration results in damage to structures, temporary protection/ rectification works will be completed prior to recommencement of site works. Work practices will be reviewed and modified as appropriate to ensure ongoing damage is minimised.

14 Environmental Management Measure Element 8: Traffic Management

The Principal Contractor may wish to undertake a traffic management study by a suitably qualified consultant prior to completing a detailed Traffic Management Plan. The findings and recommendations in the Traffic Management Plan will supersede the minimum requirements outlined below. A summary of the minimum plan requirements is provided in Table 11. These requirements are a minimum and are in addition to the TMP.

14.1 Summary of Potential Impacts

The following potential impacts from Traffic may occur as part of the works program:

- Complaints from local residents;
- Breaches in Regulatory requirements;
- Safety and Health related issues; and
- Damage to local infrastructure.

Any impacts would be expected to be temporary only in nature and generally localised to the area of adjoining active works and transport routes, but may have longer term impacts to Safety and Health related issues.

14.2 Procedures

A summary of the minimum plan requirements is provided in Table 11.

Table 11: Summary of Traffic Management Procedures

Element	Traffic Management
Performance Objectives	Minimise the effect project related traffic movements (including parking availability and pedestrian movement) has on the local area and chosen haulage routes.
Management Actions	Truck loading to be be on-site. Truck movements to and from the site to be restricted to designated truck routes through the area. The management of the site works will be the responsibility of the site contractor. Pedestrian warning signs to be utilised in the vicinity of the site access points. Pedestrian arrangements, construction activity and erection of safety fencing will be provided in accordance with Safework requirements. The above actions are to be implemented in line with SSD conditions B26, B35, C10 & C11
Performance Indicator	Goal of nil complaints relating to traffic issues during the project
Monitoring	Low potential for impacts, however a log of all truck and other heavy equipment (cranes etc.) movement to be retained by the Principal Contractor.
Responsibility	The Principal Contractor is responsible for ensuring that the traffic management plan is implemented by appropriately trained/qualified staff. The Principal Contractor is to ensure responsible personnel are suitably qualified.

Reporting	Maintenance of records relating to any complaints received, including subsequent non-compliance forms and corrective actions. A log of all truck and heavy equipment movements to be retained by the Principal Contractor.
Corrective Action (as required	Revision of the traffic plan including revision to working hours as necessary, staggering truck access or adopting alternate haulage routes.

15 Environmental Management Measure Element 9: Unexpected & Heritage Finds

Ground conditions between sampling points can vary, and further hazards may arise from unexpected sources once remediation commences. To manage the potential for unexpected occurrences of contamination, an unexpected finds protocol has been prepared.

The nature of any undiscovered hazards which may be present at the site are generally expected to be detectable through visual or olfactory means, for example:

- Additional hydrocarbon contaminated soils (staining / discolouration visible);
- Additional excessive VOC contaminated soils (odorous (sweet/chemical);
- Fragments of asbestos-containing materials (visible) or potential friable material;
- Significant ash and/or slag contaminated soils / fill materials (visible); and
- Additional USTs or uncovering of an existing UST that have not been previously identified or location approximated precisely.

As a precautionary measure to ensure the protection of the workforce and surrounding environment, should any unexpected potentially hazardous substance be encountered the works should cease immediately before being assessed by a suitably qualified environmental consultant. In addition, Armidale Council and other relevant regulator (i.e. SafeWork) should also be informed of any potential immediate risk to either human health or the environment (except for issues relating to UPSS or groundwater impacts where the NSW EPA should be informed).

The Site Auditor should be notified in relation to any unexpected finds to discuss the assessment, remediation and validation procedures required.

The sampling strategy for each 'unexpected find event' and remediation works shall be designed by a suitably qualified environmental consultant. The strategy will, however, be aimed at determining the nature of the substance, that is, is it hazardous and, if so, does it exist at concentrations which pose an unacceptable risk to human health or the environment. The sampling frequency of the identified substance / materials meeting the minimum requirements the listed in the NEPM ASC 2013, Australian Standard AS4482.1-2005, AS4482.2-1999 and NSW EPA Sampling Design Guidelines (1995).

Refer to Appendix J for the Hygienist procedure implemented for on site unexpected finds, which is in line with SSD condition B7 & B20.

Heritage Finds

The Principal Contractor will ensure that in the event that an unexpected find is of cultural or historical nature, a nominated archaeologist would be available to attend the site, to ensure that there are no extended delays to the program. Should an unexpected relic, archaeological feature or deposit is exposed during works, where an archaeologist is not already on site, work should cease in that area and a suitably qualified archaeologist should be contacted for advice. Depending on the level of integrity and/or significance of the relic, the relic/feature would be assessed and recorded and, if relevant, excavated manually to ensure that important information is not lost, and monitor adjacent works. If the relic/ feature is assessed as having state significance the archaeologist would consult with the Heritage Council to develop an appropriate strategy to manage the relic.

Refer to Appendix K for the Watching Brief prepared by specialised consultant for the detailed procedure to be followed, which is in line with SSD condition C30 & C31 . This contains critical information in regards to the unexpected finds of historical, aboriginal and skeletal archaeology finds and how these situations are to be handled.

15.1 Procedures

A summary of the minimum requirements is provided in Table 12.

Table 12: Summary of Unexpected Finds Management

Element	Unexpected finds Management
Performance Objectives	Avoid or minimise impacts related to management and handling of potentially contaminated soils. Avoid or minimise impacts due to unexpected cultural finds. Avoid or minimise health risks associated with potentially contaminated soil exposure.
Management Actions	Once a potential unexpected contamination find is identified, tested and returns a positive reading for contamination the material disposed off-site based on the classification. In the event that an unexpected find is of cultural or historical nature, a nominated archaeologist would be available to attend the site. Cease site works until the Project Manager has been notified of any unexpected finds and appropriate instructions have been provided to field personnel to address the issue. Project Manager to inform the Contract Administrator of any unexpected finds.
Performance Indicator	All unexpected finds are to be disclosed to the Site Auditor for advisement on the suitability of the management and any sampling regime prior to remediation / validation works proceeding. All unexpected finds are to be handled and stored in a safe and appropriate manner Unexpected finds for off-site disposal is classified and transported to an appropriate landfill facility. A completed transportation form and waste dockets shall be returned to the Environmental Specialist who shall maintained a record No environmental impact on, and disturbance to, the surrounding area from waste, no leaks or spills of oil or fuel. No waste is to be disposed of in the surrounding environment.
Monitoring	Regular observations of the earth work surface and excavations will be made by the Project Manager and Excavator Operator or spotter. Records of all unexpected finds will be kept (any asbestos burial pits uncovered during earth works should be surveyed and a geotextile warning layer placed on it). An up to date record of waste tracking and / or PASS/ASS treatment rates (if treated onsite) shall be kept by the Environmental Specialist.
Responsibility	The Principal Contractor is responsible for ensuring that appropriately trained/qualified staff. This program may be sub-contracted out to a specialist sub-consultant (the Environmental Specialist and archaeologist) as required. The Principal Contractor is to ensure responsible personnel are suitably qualified.

Reporting	All unexpected Finds are to be documented, and included into the validation report. Maintenance of records on site of equipment inspections undertaken and landfill disposal/waste tracking and weigh bridge dockets, and any council approvals should be maintained onsite for inspection. A survey of any asbestos burial pits discovered on site should be recorded.
Corrective Action (as required	Revision of the works strategy including relocation and alteration to the operating procedure if waste/leachate is shown to be entering the surrounding environment from the disturbance of the unexpected find.

16 Unexpected Asbestos Contamination Procedure

16.1 Unexpected Asbestos Finds Procedure

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.

WORKCOVER – NOTIFICATION

For Bonded ACM, in quantities greater than 10m², requiring a licensed contractor (AS-B) to complete the removal works, a WorkCover 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. WorkCover will review the application and return the first two pages, stamped with an official WorkCover approval. No works are to proceed prior to the receipt of the Notification.
RCC will require a copy of the WorkCover stamped 'Notification' prior to issuing an RCC Asbestos removal permit.

WORKCOVER – PERMIT

For all Friable removal works, regardless of quantity, a suitably licensed contractor (AS-A) must apply to WorkCover 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. WorkCover will review the application and return the first two pages stamped with an official WorkCover 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 WorkCover 'Permit' and the application form prior to issuing an RCC Asbestos removal permit.

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.

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.

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 in to 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.

17 Monitoring Requirements

17.1 Auditing and Records

The Project Manager will conduct regular audits of the Principal Contractors implementation of the CEMP (including the Asbestos Management Plan). Audits will involve a review of all environmental documents, records and reports to ensure compliance with the requirements of the CEMP. If non- compliance is detected, the Principal Contractor will initiate to the satisfaction of the Project Manager the appropriate corrective action.

Key environmental and procedural issues to be covered by the audit will include, but may not be limited to:

- Environmental management measures presented in Environmental Elements 1 to 9;
- Environmental management measures presented in the AMP;
- Adherence to reporting procedures;
- Complaint and incident management; and
- Legislative requirements.

Records of auditing and reporting will be maintained to demonstrate compliance with environmental requirements.

Environmental and construction records will include, but may not be limited to:

- Complaint records;
- Incident, non-conformance and corrective action reporting;
- Communications with stakeholders;
- Monthly waste management reporting;
- Air monitoring if required;
- Daily asbestos monitoring if required; and
- CEMP audit documentation.

The above actions are to be completed in line with SSD condition C38, C48, Appendix A, Appendix I and Appendix L

18 Emergency Preparedness and Response

Specific and immediate responses to emergencies and environmental incidents will be determined by the Principal Contractor.

Table 13: Emergency Contacts

Organisation	Contact Number
Police, Fire, Ambulance	000
Emergency call service - International standard[1]	112
Armidale Hospital	226 Rusden Street, Armidale NSW 2350 (02) 6771 4000 Mon-Fri = 7am – 5pm
Armidale Medical Centre	145 Faulkner Street, Armidale NSW 2350 (02) 6772 2355 Mon-Fri = 8am - 5:30pm Sat = 8:30am - 12pm
Armidale Regional Council + (Water Supply)	135 Rusden St, Armidale NSW 2350 1300 136 833 Mon-Fri = 8:30am-5:00pm
State Emergency Service (SES)	24Hrs 132-500
NSW EPA Pollution Hotline	(24 hours) Phone: 131 555
Essential Energy (Electricity Supply)	13 20 80
Elgas (Gas Supply)	(02) 6771 4070
WIRES (Wildlife Information and Rescue Service) Regional	(02) 6778 4994
Telstra	132 203

19 Security and Public Safety

19.1 Restriction to Access

Perimeter fencing and/ barricades that restrict access to the proposed work zone and stockpile area will be installed. Only authorised persons wearing the appropriated PPE will be able to enter the excavation/construction and stockpile/staging areas during works.

Whilst excavations remain open, the site is unattended and works are not active, high visibility fencing will be placed around the boundary of the excavation to alert any people on site to the presence of the excavation.

19.2 Pedestrian and Traffic Control

Relevant signage will be in place during the excavation works to warn and protect pedestrians and other traffic of the potential exposures in the vicinity of the work area.

Signage shall also be erected to inform the public whom to contact in case of any complaints

20 Reporting

Environmental Elements 1 to 9 of the Project include Performance Objectives to be applied to specific aspects of the works and Corrective Actions that may be adopted should non- conformances or environmental incidents occur.

a. Non-compliance

A non-conformance is defined as a failure to fulfill a requirement of this CEMP or other associated environmental document. All non-compliances must immediately be reported to the Contract Administrator, and the appropriate details of the non-compliance should be submitted (in writing via email) within 24 hours of the occurrence of the non-compliance.

The Project Manager or Subcontractors may identify and report a non-conformance.

b. Environmental Incident & incident

An environmental incident is defined as an unplanned event that occurs that impacts, or has the potential to impact, on the environment (including natural or built). In the event of an environmental incident, the Contract Administrator should be notified immediately. The details of the environmental incident will be supplied to the Project Manager on reporting of any 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.

c. Incident Notification, Reporting and Response

When reporting a non-compliance or environmental incident, all immediate corrective actions which have been taken to rectify the situation will be documented. Further corrective action should be recommended if required at the time of reporting. Relevant agencies which require notification should also be identified.

The Principal Contractor will maintain a register of all non-compliances and environmental incidents, along with the corrective and preventative actions which have been implemented to mitigate and/or prevent further recurrences. The Principal Contractor must ensure and verify that corrective actions to control environmental impacts, and avoid future non-compliances have been undertaken by the appropriate personnel.

The above is all to be completed in line with SSD conditions C44 & C48.

Table 14 details the general procedures to be undertaken when non-compliances and environmental incidents occur.

Table 14: Corrective and Preventative Action Procedures

Element	Management
Objective	To implement a system to identify, document, analyse and implement corrective and preventative actions for environmental non-conformance issues
Management Actions	When a non-conformance or environmental incident occurs the Principal Contractor is to ensure corrective and preventive actions are implemented by: ▪ Assigning personnel to undertake investigation as per 'Environmental Incident Investigation Report' Form or 'Non-Compliance Report' Form and designate lead investigator. ▪ Maintain documentation of Investigation Report Forms and their corrective/preventive actions on site; ▪ Report environmental non-conformances identified that cause or have the potential to cause a significant environmental impact immediately to the Contract Administrator.

	▪ Provide a summary of environmental non-conformances with outstanding corrective actions to the Contract Administrator as requested. ▪ Utilise corrective/preventative actions to revise and update CEMP and/or CEMP objectives, operational controls, and other aspects as required. ▪ Review outstanding corrective action status.
Responsibility	All Staff and Subcontractors are: ▪ Responsible for informing their immediate manager of environmental non-conformances. ▪ Responsible for undertaking corrective/preventative actions and effectiveness determinations as assigned.
Reporting	Maintenance of records of '*Environmental Incident Investigation Report*' Forms and '*Non-Compliance Report*' Forms completed for the duration of the project.

Appendix A

Figure 1 – Site Location

158 – 182 Butler Street Armidale NSW 2350

Figure 2 – Asbestos Detection – Findings

i. Hazardous Materials Risk Assessment (Greencap)

Asbestos Register

(Hazardous Materials and Risk Assessment)

School :	Armidale High School (8102)
Region :	New England
State Electorate :	Northern Tablelands
Local Government Area :	Armidale Dumaresq
Initial Survey :	Noel Arnold & Associates : 16 - Dec - 2009
Reviewed By :	Greencap-NAA : 01 - Apr - 2015

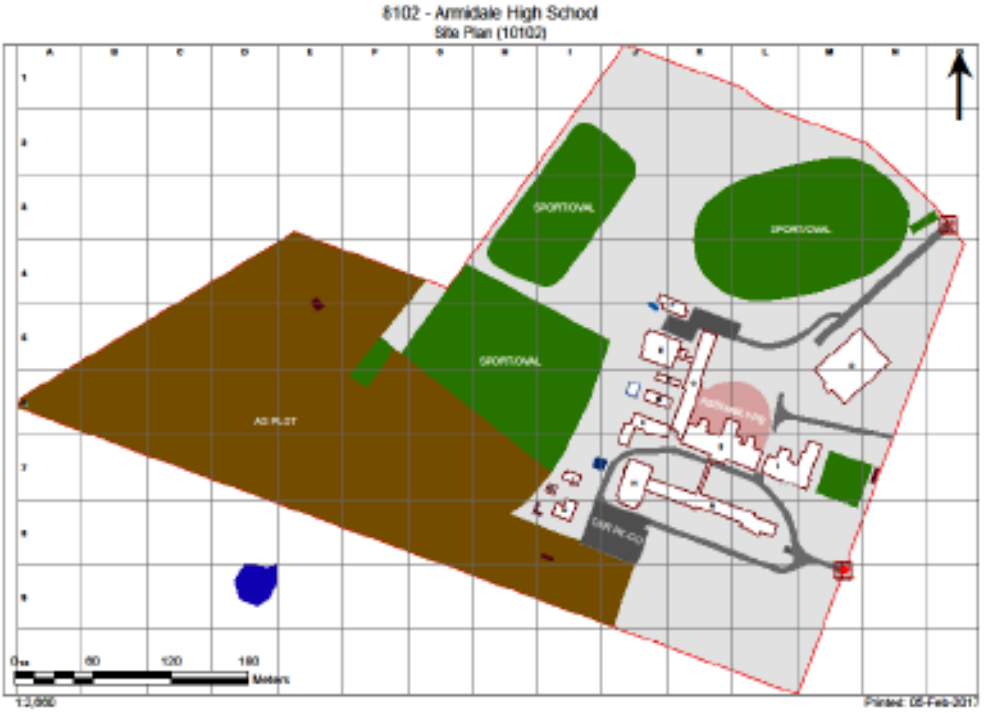


Figure 3 - Site Demolition Plan

Figure 4 – Soil Sampling Locations – Findings

Soil Contamination Investigation

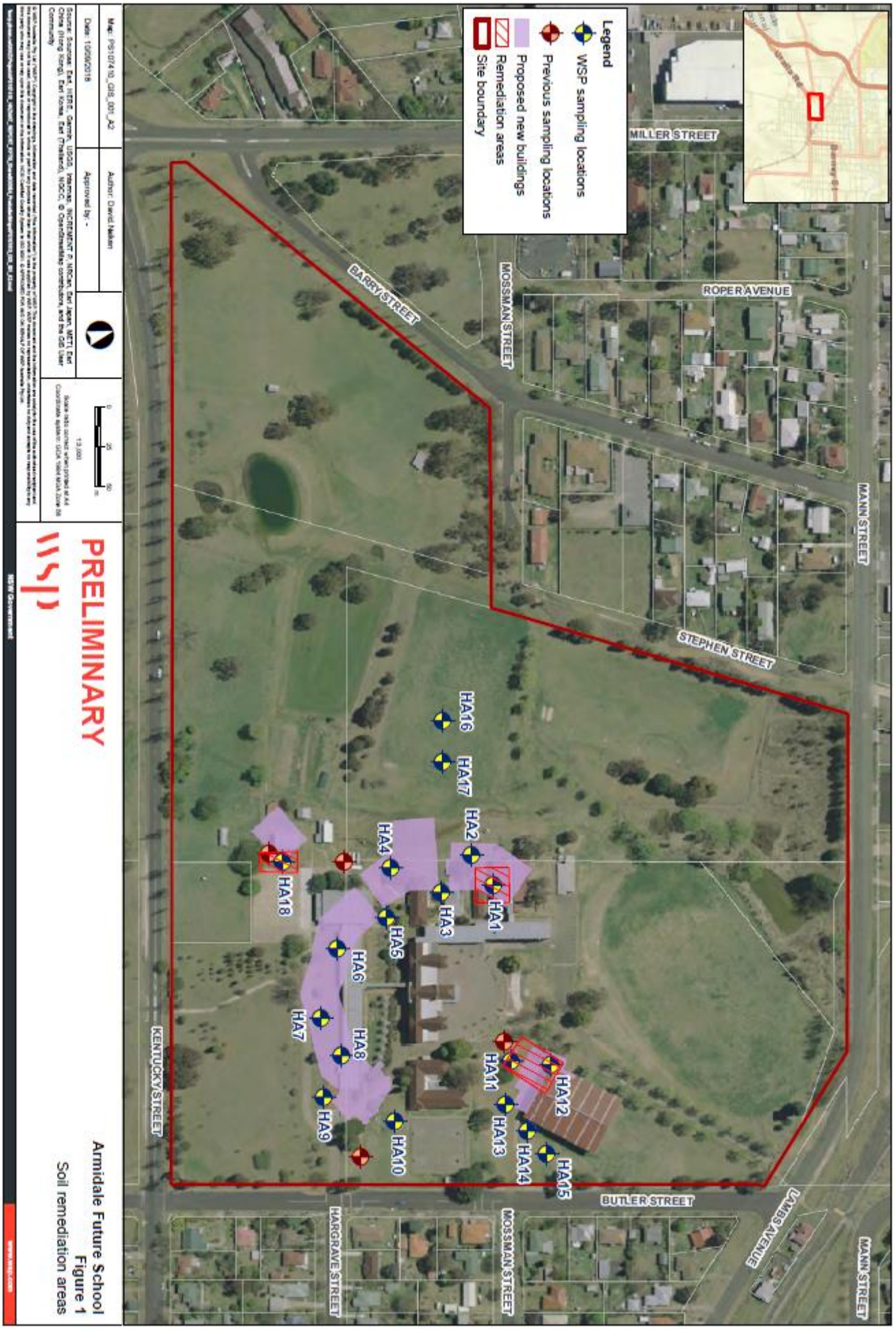
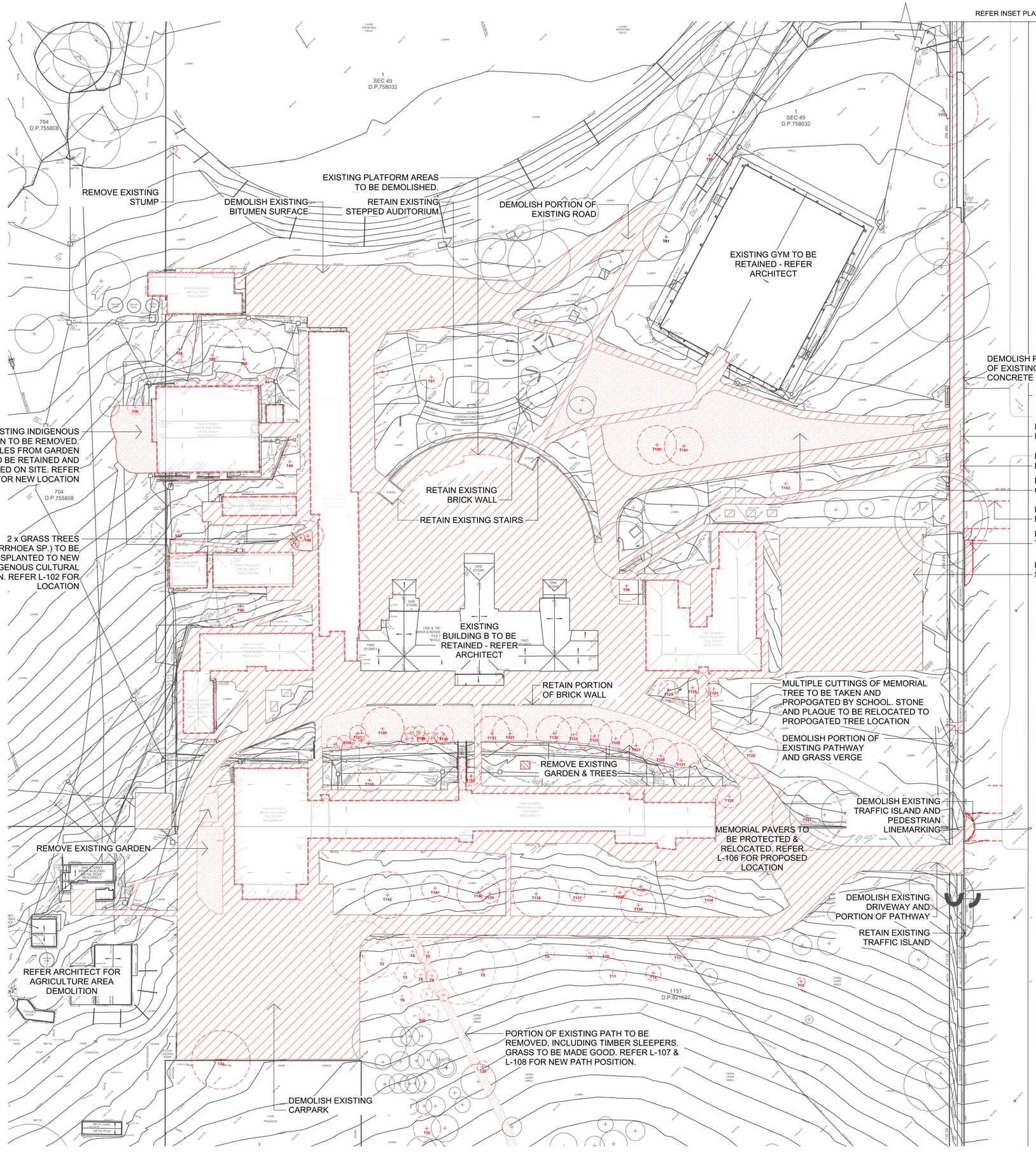


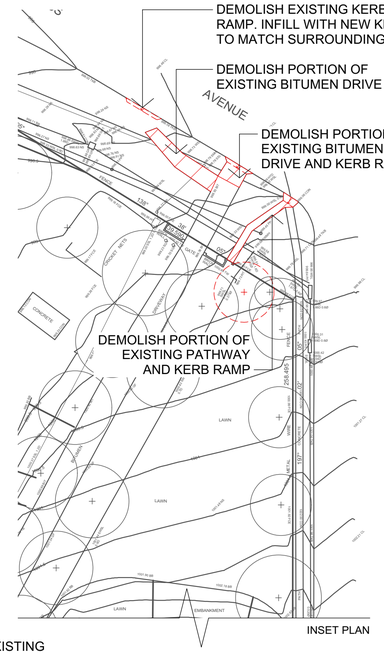
Figure 5 – Proposed Development Plan

Site plan NBRS-AR-DWG-012

Figure 6 – Tree Protection Plan

Refer to next page





NBRSARCHITECTURE. LANDSCAPE

LEGEND

- SITE BOUNDARY
- TREES TO BE REMOVED
- TREES TO BE RETAINED AND PROTECTED AS PER AS4970-2009
- STRUCTURE TO BE DEMOLISHED
- HARDSCAPE SURFACE TO BE DEMOLISHED
- SOFTSCAPE SURFACE TO BE DEMOLISHED

NOTE:
1. REFER TO ARCHITECT FOR BUILDING DEMOLITION
2. REFER TO L-004 FOR FENCING PLAN & FENCES TO BE DEMOLISHED

TREE REMOVAL SCHEDULE

NO.	BOTANICAL NAME	RETENTION VALUE	REMARKS
T1	FRAXINUS EXCELSIOR	HIGH	COMPENSATORY FRAXINUS SP. PROPOSED
T2	CEDRUS DEADARA	HIGH	
T3	CEDRUS DEADARA	HIGH	
T4	EUCALYPTUS CRENULATA	MEDIUM	
T5	FRAXINUS EXCELSIOR	MEDIUM	COMPENSATORY FRAXINUS SP. PROPOSED
T6(x3)	EUCALYPTUS SPP.	MEDIUM	
T7	QUERCUS ROBUR	HIGH	COMPENSATORY QUERCUS ROBUR PROPOSED
T8	QUERCUS ROBUR	HIGH	COMPENSATORY QUERCUS ROBUR PROPOSED
T9(x2)	PISTACIA CHINENSIS	LOW	COMPENSATORY PISTACIA CHINENSIS PROPOSED
T10	EUCALYPTUS DALRYMPLEANA	MEDIUM	
T11	PISTACIA CHINENSIS	MEDIUM	COMPENSATORY PISTACIA CHINENSIS PROPOSED
T12	QUERCUS ROBUR	MEDIUM	COMPENSATORY QUERCUS ROBUR PROPOSED
T13	PISTACIA CHINENSIS	MEDIUM	COMPENSATORY PISTACIA CHINENSIS PROPOSED
T23(x4)	CASUARINA	MEDIUM	
T26	CASUARINA	LOW	
T39	EUCALYPTUS SPP.	LOW	
T42	FRAXINUS EXCELSIOR	HIGH	COMPENSATORY FRAXINUS SP. PROPOSED
T46	CUPRESSUS SPP SPP.	LOW	
T47	EUCALYPTUS CINEREA	MEDIUM	
T48(x2)	ALLOCASUARINA TORTULOSA	LOW	
T49	CUPRESSUS SPP SPP.	LOW	
T54	EUCALYPTUS DALRYMPLEANA	LOW	ENVIRONMENTALLY SIGNIFICANT TREES (POTENTIAL KOALA HABITAT) AS PER FLORA & FAUNA REPORT (2018) - COMPENSATORY 3 x EUCALYPTUS DALRYMPLEANA PROPOSED
T55	EUCALYPTUS DALRYMPLEANA	MEDIUM	
T56	EUCALYPTUS DALRYMPLEANA	LOW	
T80	ULMUS PROCERA	LOW	COMPENSATORY ULMUS PROCERA PROPOSED
T87	FRAXINUS CLARET ASH	LOW	COMPENSATORY FRAXINUS SP. PROPOSED
T96	CUPRESSUS SPP.	MEDIUM	
T121	PINUS RADIATA	HIGH	
T122	FRAXINUS EXCELSIOR	HIGH	MEMORIAL TREE - CUTTINGS TO BE TAKEN & PROPOGATED FOR FUTURE TREE PLANTING
T123	CUPRESSUS SEMPERVIRENS	MEDIUM	
T124	CUPRESSUS SPP.	MEDIUM	
T125	CUPRESSUS SPP.	MEDIUM	
T127	BETULA PENDULA	MEDIUM	
T126(x11)	PHOTINIA	HIGH	
T128	ACER NEGUNDA	LOW	COMPENSATORY ACER SP. PROPOSED
T129	ARBUTUS UNEDO	MEDIUM	
T130	PISTACIA CHINENSIS	MEDIUM	COMPENSATORY PISTACIA CHINENSIS PROPOSED
T131(x9)	PYRUS SPP.	HIGH	GROUP PLANTING IN FORMATION - COMPENSATORY PYRUS SPP. PROPOSED
T132	PYRUS SPP.	MEDIUM	COMPENSATORY PYRUS SPP. PROPOSED
T133	PISTACIA CHINENSIS	MEDIUM	COMPENSATORY PISTACIA CHINENSIS PROPOSED
T134	QUERCUS ROBUR	MEDIUM	COMPENSATORY QUERCUS ROBUR PROPOSED
T135	EUCALYPTUS CRENULATA	LOW	
T136	EUCALYPTUS CRENULATA	LOW	
T137(x2)	PISTACIA CHINENSIS	MEDIUM	COMPENSATORY PISTACIA CHINENSIS PROPOSED
T138	QUERCUS ROBUR	HIGH	COMPENSATORY QUERCUS ROBUR PROPOSED
T139	QUERCUS ROBUR	MEDIUM	COMPENSATORY QUERCUS ROBUR PROPOSED
T140	CUPRESSUS	MEDIUM	
T141	QUERCUS PALUSTRIS	MEDIUM	
T142	EUCALYPTUS MELLIODORA	MEDIUM	

REFER ARBORIST REPORT FOR FURTHER DETAIL

Issue

No.	Date	Description	Chkd
A	25/07/2018	TENDER ISSUE	AS
B	28/08/2018	TENDER ADDENDUM	AS

Disclaimer

These plans are for tender use only. Not intended for construction purpose unless specifically noted. The contractor intending to use these documents shall check and verify all works on site and report any discrepency to the Landscape Architect prior to commencement. Failure to do so shall not be the responsibility of the Client or Landscape Architect.

Landscape Architect

NBRSARCHITECTURE. LANDSCAPE

Level 3, 4 Glen Street, Milsons Point. NSW 2061 Australia
T: 61 2 9922 2344 F: 61 2 9922 1308
E: architects@nbrsarchitecture.com W: nbrsarchitecture.com

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ABN 16 002 247 565

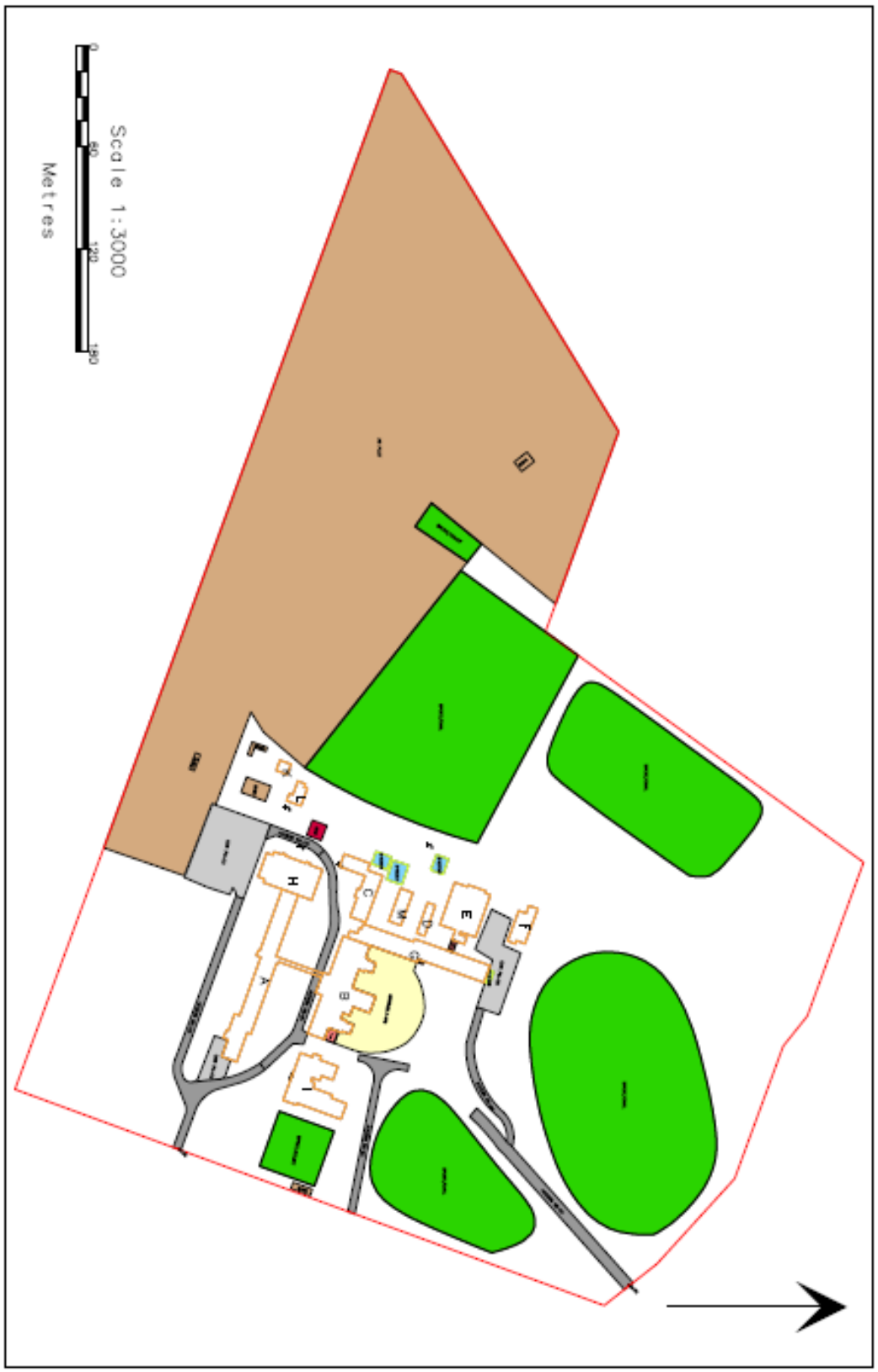
Project
ARMIDALE SECONDARY COLLEGE
at
BUTLER STREET, ARMIDALE, NSW, 2350
for
NSW Department of Education

Drawing Title
Landscape Demolition Plan

Date 28/08/2018
Scale 1:500 @ A1 1:1000 @ A3
0 5 10 15 20 25 30m

Drawing Reference 17352-NBRS-L-002
Rev B

Appendix B – Asbestos Management Plan



Appendix C – Waste Transportation Register

C&D Waste

Date	Ticket No.	Vehicle	Product	Weight
23-Feb-2019 8:44 AM	10294732	142XLG	C&D Waste	11.66
26-Feb-2019 8:33 AM	10294900	142XLG	C&D Waste	13.28
27-Feb-2019 9:02 AM	10295035	228VRB	C&D Waste	17.04
28-Feb-2019 7:37 AM	10295153	142XLG	C&D Waste	16.00
01-Mar-2019 7:40 AM	10295294	142XLG	C&D Waste	15.88
02-Mar-2019 8:51 AM	10295469	142XLG	C&D Waste	16.84
02-Mar-2019 8:53 AM	10295470	260XZD	C&D Waste	15.38
05-Mar-2019 6:03 AM	10295636	142XLG	C&D Waste	13.22
06-Mar-2019 6:53 AM	10295801	142XLG	C&D Waste	20.88
06-Mar-2019 6:54 AM	10295802	260XZD	C&D Waste	15.34
07-Mar-2019 7:55 AM	10295978	142XLG	C&D Waste	20.24
07-Mar-2019 8:14 AM	10295981	584XFG	C&D Waste	17.96
07-Mar-2019 5:37 PM	10296103	MBHT900	C&D Waste	37.29
08-Mar-2019 7:17 AM	10296115	142XLG	C&D Waste	21.30
08-Mar-2019 8:30 AM	10296129	584XFG	C&D Waste	20.80
08-Mar-2019 9:08 AM	10296141	KW950	C&D Waste	26.06
08-Mar-2019 4:33 PM	10296219	MBHT900	C&D Waste	38.89
08-Mar-2019 5:29 PM	10296223	654YAX	C&D Waste	16.26
09-Mar-2019 8:06 AM	10296237	584XFG	C&D Waste	15.26
11-Mar-2019 1:48 PM	24685	654YAX	C&D Waste	23.06
11-Mar-2019 6:05 AM	10296287	142XLG	C&D Waste	19.04
12-Mar-2019 7:44 AM	10296390	142XLG	C&D Waste	21.76
12-Mar-2019 7:45 AM	10296391	260XZD	C&D Waste	17.60
12-Mar-2019 2:50 PM	10296469	654YAX	C&D Waste	26.68
12-Mar-2019 5:01 PM	10296479	MBHT900	C&D Waste	36.48
13-Mar-2019 7:16 AM	10296490	142XLG	C&D Waste	20.44
13-Mar-2019 7:19 AM	10296491	260XZD	C&D Waste	19.06

Asbestos

Date	Time	Ticket No.	Vehicle	Product	Net	EPA Docket	Contract/Variation
26-02-2019	2:36PM	1-349807	189VYO	Asbestos	5.5	FB2DFT2L4P4L	Contract
28-02-2019	7:38AM	1-349975	189VYO	Asbestos	2.46	HBXLHR3B3BCR	Contract
1-03-2019	9:09AM	1-350123	189VYO	Asbestos	3.5	B7TFR6ABER4L	Contract
4-03-2019	9:21AM	1-350400	841QZV	Asbestos	17.92	DPRBFFJ7J6MY	Variation #03
5-03-2019	8:02AM	1-350504	584XFG	Asbestos	15.82	V9W2JLWZJMY7	Variation #03
5-03-2019	8:46AM	1-350518	539QVW	Asbestos	13.44	YBXLRTTETK69	Variation #03
5-03-2019	9:50AM	1-350532	841QZV	Asbestos	15.76	Y7AMCV3KZLZP	Variation #03
5-03-2019	12:13PM	1-350575	841QZV	Asbestos	20.26	3JWYDURKA6CV	Variation #03
5-03-2019	1:10PM	1-350593	539QVW	Asbestos	23.32	XM6VE67RYUDE	Variation #03
5-03-2019	1:57PM	1-350609	841QZV	Asbestos	27.60	77RHUNM93J3T	Variation #03
5-03-2019	3:33PM	1-350624	539QVW	Asbestos	25.02	ZB9PVTRMZLZA	Variation #03
6-03-2019	8:02AM	1-350639	841QZV	Asbestos	21.74	WCR4CJXNET72	Variation #03
6-03-2019	8:50AM	1-350650	539QVW	Asbestos	19.16	VBXA4VTR7UEL	Variation #03
6-03-2019	9:42AM	1-350665	841QZV	Asbestos	24.52	WCKH4LAWXZS3	Variation #03
6-03-2019	12:10PM	1-350703	189VYO	Asbestos	5.78	CBWDKRK2YBT2	Contract
6-03-2019	1:14PM	1-350718	841QZV	Asbestos	24.70	FCEPW7AMW2PJ	Variation #03
6-03-2019	12:11PM	1-350704	539QVW	Asbestos	27.58	YCDFHSCW9WL2	Variation #03
6-03-2019	2.19PM	1-350731	539QVW	Asbestos	28.14	9B6VZ43FP6DK	Variation #03
12-03-2019	7:51AM	1-351222	186VYO	Asbestos	6.68	E4XETAV9KXV9	Variation #10
12-03-2019	12.09PM	1-351282	189VYO	Asbestos	0.68	3CPKMTSWLFWH	Variation #8
12-03-2019	11:19AM	1-351265	189VYO	Asbestos	2.90	ECVTBCTJK2NU	Variation #5
12-03-2019	1:19PM	1-351299	189vVYO	Asbestos	1.86	YCMWXND7ATU7	Variation #4
15-03.2019	7.34AM	1-351582	189VYO	Asbestos	5.50	9BSWBSJL4JND	Variation #9
14-03-2019	8.11AM	1-351471	841QZB	Asbestos	4.98	ZCKWZKMWWB2F	Contract
14-03-2019	10:09AM	1-351499	841QZB	Asbestos	3.34	6NYMH3YZAZZ4	Contract
19-03-2019	1:58PM	1-352025	189VYO	Asbestos	0.18	TBA	Variation #8
15-04-2019	08:02AM	1-354946	189VYO	Asbestos	5.40	UUML2FWPSLD9	Variation #18 & 19
30-04-2019	12:39PM	1-356535	189VYO	Asbestos	3.54	UUML2FWPSLD9	Variation #11
1-05-2019	3:30PM	1-356686	189VYO	Asbestos	3.90	UV999CKKLDY6	Variation #11

Appendix D - External Lighting Compliance

13 May 2019

Ref No: MN10030

NBRS Architecture
Level 3, 4 Glen Street
MILSONS POINT NSW 2061

Attention: Macella Salzmann

RE: Armidale High School – External Lighting
CERTIFICATE OF DESIGN – ELECTRICAL SERVICES

SUBJECT PREMISES: Butler Street
Armidale NSW 2350

Pursuant to the provisions of **Clause A2.2 of the Building Code of Australia,** I hereby certify that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, Part 7 of the Environmental Planning and Assessment Regulations, relevant Australian Standards and relevant conditions of Development Consent. In particular the design is in accordance with the following:

Outdoor Lighting	**AS 1158.3.1:2005 Lighting for roads and public spaces – Pedestrian area (Category P) lighting – Performance and design requirements and AS 4282-1997 Control of the obtrusive effects of outdoor lighting**

I am an appropriately qualified and competent person in this area and as such can certify that the design and performance of the design systems comply with the above and which are detailed on the following drawings.

Dwg No.	Title
E203	PART SITE – EXTERNAL LIGHTING
E401.4	ZONE 1 – CARPARK LEVEL – LIGHTING LAYOUT

Marline Newcastle possesses Indemnity Insurance to the satisfaction of the building owner.

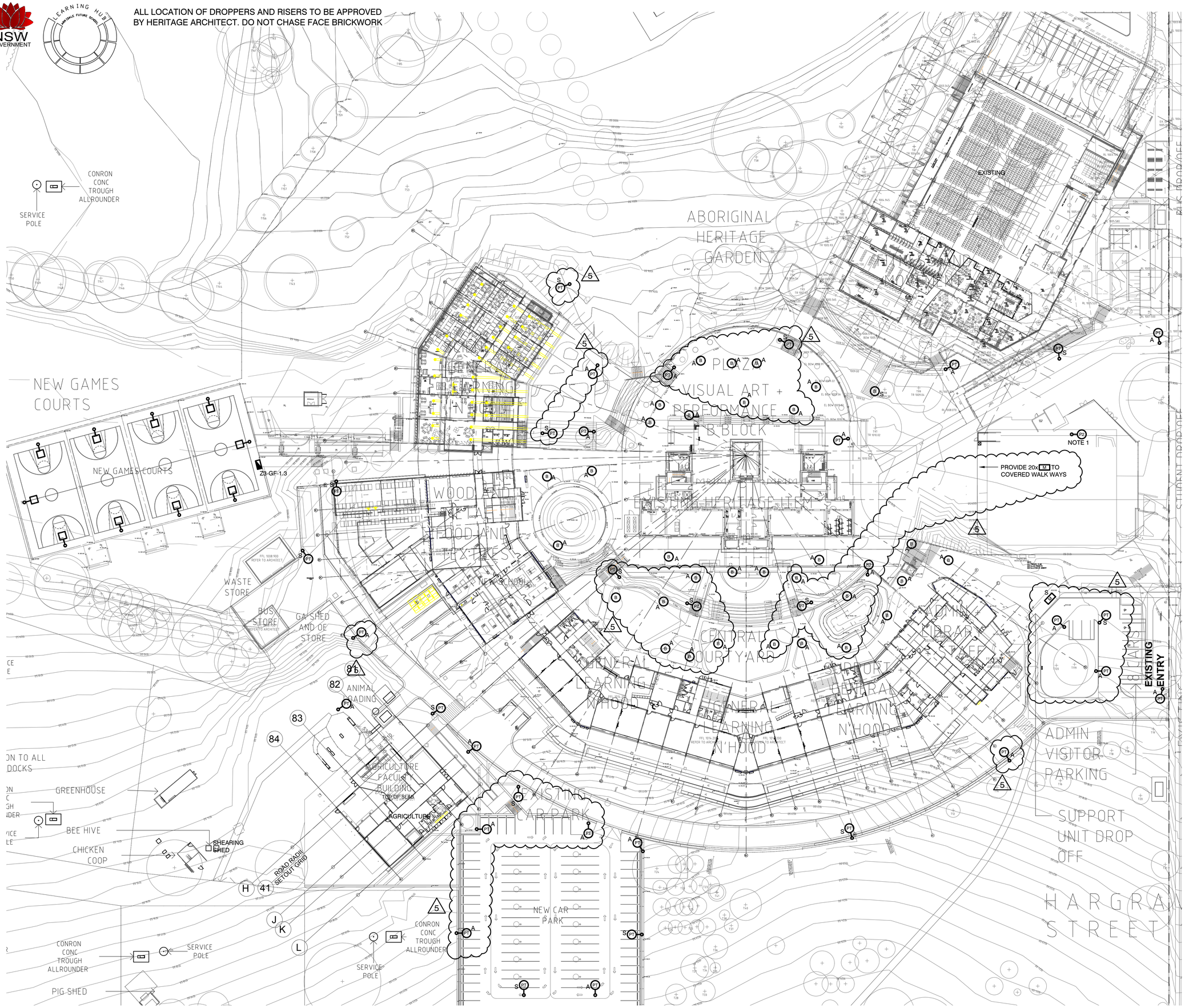
Full Name of Designer: Keld Hoyer
Qualifications: Mech. Eng. Cert., Elect. Eng. Cert.
Address of Designer: 239 King Street Newcastle NSW 2300
Business Telephone No: 02 4925 9300 **Fax No:** 02 4926 3811
Name of Employer: Marline Newcastle Pty Ltd
Signature:

Marline Newcastle Pty Ltd
ABN 49 612 456 381
ACN 612 456 381
www.marline.com.au

Managing Director Brian Hunt, BE, MBA MIEAust
Director Daniel White, BE (Hons), B.BUS, MIEAust
Director Brendan Maher

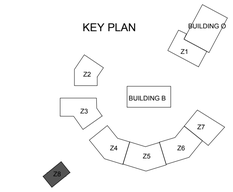
Unit F 56 Clyde Street
Hamilton North NSW 2292
P 02 4925 9300
mail@marline.com.au

ALL LOCATION OF DROPPERS AND RISERS TO BE APPROVED BY HERITAGE ARCHITECT. DO NOT CHASE FACE BRICKWORK



NBRSARCHITECTURE.

KEY PLAN



LEGEND

A = LIGHT FITTING CONNECTED TO "ACCESS" CIRCUIT
S = LIGHT FITTING CONNECTED TO "SECURITY" CIRCUIT

NOTE:
1. PROVIDE 10 OFF P2 TO BE LOCATED WHERE DIRECTED.

REFER TO LANDSCAPE ARCHITECT'S DRAWINGS FOR FINAL LOCATION OF EXTERNAL LIGHTING

No.	Date	Description	Chkd
6	21.5.19	CROWN CERTIFICATE ISSUE	
5	28.2.19	FOR APPROVAL	
4	31.8.18	ADDENDUM TENDER ISSUE	
3	24.7.18	FINAL TENDER ISSUE	
2	12.7.18	FINAL TENDER REVIEW	
1	22.6.18	SCHEMATIC DESIGN FOR REVIEW	

PROJECT MANAGER
GHD Newcastle
Level 2 and 3, GHD Tower, 24 Honeysuckle Drive,
Newcastle, NSW 2300
+61 2 4979 9999

STRUCTURAL /CIVIL ENGINEER
Birzulis Associates
583 Darling Street, Rozelle NSW 2039
+61 2 9555 7230

MECHANICAL / HYDRAULIC / FIRE / ELECTRICAL / COMMUNICATIONS ENGINEERING
Marline
Unit 4 239 King Street Newcastle NSW 2300
+61 2 4925 9300

MN10030

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MECHANICAL . ELECTRICAL . HYDRAULIC . FIRE . ENERGY

P (02) 4925 9300 **MARLINE NEWCASTLE PTY LTD**
mail@marline.com.au Unit F 56 Clyde Street
www.marline.com.au Hamilton North NSW 2292
ABN 49 612 456 381 ACN 612 456 381

SECURITY
DEPARTMENT OF EDUCATION NSW

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com

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Project
ARMIDALE SECONDARY COLLEGE

at
BUTLER STREET, ARMIDALE, NSW, 2350

for
NSW Department of Education

Drawing Title
ELECTRICAL SERVICES
PART SITE
EXTERNAL LIGHTING

Date FEB 2018
Scale 1:500
K.HOYER S.RYAN
Drawing Reference MARL-EL-DWG-E-203
Revision 6

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IN CENTIMETER INCREMENTS WHEN DRAWING PRINTED FULL SIZE (A1)

NSW GOVERNMENT

LEARNING HUB
SUSTAINABLE FUTURE SCHOOLS

NOTE 1

MSR

CARPARK

OUTLINE OF BUILDING ABOVE

1:40

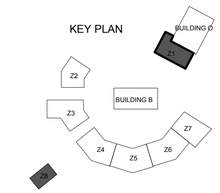
F13 F12 F10 F9

O8 O7 O6 O5 O4 O3 O2 O1

FITNESS AND MOVEMENT - BUILDING O

NBRSARCHITECTURE.

KEY PLAN



NOTES:
1. PROVIDE LIGHTING TO UNDERCROFT AREA AS REQUIRED.
ALLOW D 6 OFF.

No.	Date	Description	Chkd
3	21.5.19	CROWN CERTIFICATE ISSUE	
2	30.4.19	REVISED FOR INFORMATION	
1	12.4.19	FOR INFORMATION	

PROJECT MANAGER
GHD Newcastle
Level 2 and 3, GHD Tower, 24 Honeysuckle Drive,
Newcastle, NSW 2300
+61 2 4979 9999

STRUCTURAL /CIVIL ENGINEER
Birzulis Associates
583 Darling Street, Rozelle NSW 2039
+61 2 9555 7230

MECHANICAL / HYDRAULIC / FIRE / ELECTRICAL / COMMUNICATIONS ENGINEERING
Marline
Unit 4 239 King Street Newcastle NSW 2300
+61 2 4925 9300

MN10030

marline BUILDING SERVICES ENGINEERS
MECHANICAL . ELECTRICAL . HYDRAULIC . FIRE . ENERGY

P (02) 4925 9300
mail@marline.com.au
www.marline.com.au
ABN 49 612 456 381

MARLINE NEWCASTLE PTY LTD
Unit F 56 Clyde Street
Hamilton North NSW 2292
ACN 612 456 381

SECURITY
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Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com

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Project
ARMIDALE SECONDARY COLLEGE

at
BUTLER STREET, ARMIDALE, NSW, 2350

for
NSW Department of Education

Drawing Title
ELECTRICAL SERVICES
ZONE 1 - CARPARK LEVEL
LIGHTING LAYOUT

Date FEB 2018
Scale 1:100
JC K.HOYER S.RYAN
Drawing Reference MARL-EL-DWG-E-401.4
Revision 3

0 1 2 3 4 5 6 7 8 9 10
IN CENTIMETER INCREMENTS WHEN DRAWING PRINTED FULL SIZE (A1)

Appendix E - Community Consultation & Complaints Handling

5/2/2019

ARMIDALE SECONDARY COLLEGE 1155

COMMUNITY CONSULTATION AND ENGAGEMENT PLAN

RICHARD CROOKES
CONSTRUCTIONS

Delivering Certainty

Contents

Revision

Rev Date	Revision Description	PM's Initials (acceptance of changes)
5/2/2019	Original Issues	

1 Introduction

This Community Consultation and Engagement Plan forms part to the Project Management Plan.

1.1 Purpose of the Plan

Richard Crookes Constructions (RCC) recognises the importance of trust in relationship building with stakeholders involved with the project. Consequently, being accountable is paramount and we seek to be transparent with our communications and documentation.

Further, in line with our company commitment to continual improvement, we constantly aim for a greater level of engagement and interaction with stakeholders, particularly when our project activities may impact on the communities in which we operate.

The purpose of this plan is to outline processes for:

- Achieving our Objectives and Targets;
- Consultation Strategies;
- Identification of Stakeholders;
- Responsibilities for Implementing the Plan; and
- Stakeholder Grievances and Concerns.

2 RCC Objectives and Targets

RCC's overall objective is to promote an open communications environment that will minimise disruptions and issues for both the project team and the community.

To support this, and in line with commitments made in RCC's Environmental Policy, project level objectives and targets include:

- Community complaints are to be actioned within 24hours;
- No repeat complaints for the same issue.

3 Description of the Project

3.1 General

The NSW Department of Education is consolidating Duval High School and Armidale High into Armidale Secondary College. The project includes:

Relocation of Armidale High School operations to the Duval High School site by Day 1 Term 1 2019.

Design and construction of a new High School for approximately 1580 students, including demolition of the existing Armidale High School with the exception of:

- retention and adaptive re-use of a heritage building (Block B)
- retention and refurbishment of the existing indoor gymnasium (Building O)

Relocation of school operations into the new Armidale Secondary College by Day 1 Term 1 2021.

3.2 Hours of Operation

The Development Consent hours of operation for the construction project are:

7am to 6pm Monday to Friday

8am to 1pm Saturday

No work on Sundays and public holidays without approval.

3.3 Proposed Timeframes

The table below provides an overview of the construction activities and the timeframe for the works.

Construction Activities –		
Demolition & Earthworks	Heavy machinery, approx. 10 – 20 truck movements per day.	Jan 2019 – July 19
Structure & Building Envelope	Crane movements, reinforcement and concrete truck deliveries	Aug 2019 – Feb 2020
Internal Finishes & Completion	Materials deliveries (roof sheets, plasterboard, duct work etc), increased vehicle traffic due increased workforce	Nov 2019 – Sep2020

4 Site Management Contact Details

Key contact details are provided below:

Position	Name	Phone (W)	Phone (M)
Construction Manager	Luke Gerathy	02 9902 4700	0409 296 967
Project Director	Simon Karkkainen	02 9902 4700	0414 304 256
Senior Contract Administrator	Jeremiah Bain	02 9902 4700	0419 211 963
Senior Project Engineer	Joel Davie	02 9902 4700	0401 296 073
Site Manager	Mitch McManus	02 9902 4700	0428 219 608
Foreman	Ryan Sharp	02 9902 4700	0457 706 301
WHS Management Rep.	Ellisa Battersby	02 9902 4700	0432 514 046
	Location	Phone	Facsimile
Site Management Project Office	Armidale High School adjacent to Butler St.	02 9902 4700	0428 219 608

5 Balancing Community Expectation and RCC Obligations

Balanced community engagement involves both a commitment from RCC and an expectation from the community, as summarised below.

	Inform	Consult	Involve	Collaborate
Community Expectation	To get balanced and objective information about aspects of the project that impact on us	To be asked our opinions and allow us to provide feedback to the company on the matters that concern us	To be involved in the decision making process and the exploration of alternatives regarding those issues that are of concern to us	To create a partnership with us whereby we have faith that our concerns and ideas are integrated into the decision making process
RCC Obligation	We will keep the community well informed	We will listen and acknowledge community concerns and provide	We will work with the community to make sure concerns and issues are	We will look to the community for advice and innovation in solving issues and concerns and

	Inform	Consult	Involve	Collaborate
		evidence that concerns are considered in decision making	reflected in any alternatives developed. Provide feedback to the community on how their inputs has influenced outcomes	incorporate their advice into the decision making process to the maximum extent possible.

6 Consultation and Strategy/Our Approach to Dialogue

6.1 General

Community consultation can be involving, meaningful, useful and effective if the following principles are used as a starting point for making consultation work:

- Making it timely: participation should not be so late in the process of an issue that it is tokenistic or merely confirms decisions already made. Give people enough time to express their views.
- Making it inclusive: Participation should be selected in a way that is not open to manipulation, and should include a cross section of the participation.
- Making it community focused: Ask participants not what they personally want but what is appropriate in their role as a citizen.
- Making it interactive: avoid reducing questions to a simplistic response. Allow consideration of the big picture so people can readily become engaged.
- Making it effective: Although decision making can strive for consensus, complete agreement may not be the outcome. Be clear on how the decisions will be made so participants understand the impact of their involvement. Allow enough time for participants to become familiar with the project issues.
- Making it Matter: it is important that a strong likelihood that any recommendations that emerge from the consultative process will be accepted. If they are not, it is important that a public explanation is provided.

6.2 Ways to Consult

Different community stakeholder groups need different consultation methods at different stages of the project. Some of the processes that may be used are listed below.

Consultation Method	Inform	Consult	Involve	Collaborate
Tools	Fact Sheet / flyers Website Project Open days Briefings 24 hrs. contact points Media Direct personal visits Project inductions	Public submissions Focus groups Public meetings Surveys	Community liaison groups Workshops Submissions Community projects / sponsorship Local suppliers preference policy	Advisory groups Decision making Consensus building

Appendix 1 identities how these methods will be employed specifically to this project.

6.3 Letter Box Drops and Public Notices

Letter box drops or public notices will include at least the following:

- Why the works are required;
- When they will occur;
- What mitigation measures are in place to minimise any community or environmental impacts;
- Who will be doing the work and a contact phone number for further information; and
- Emergency Contact number / community complaints line.

6.4 Communication Protocols

The protocols for establishing and continuing community consultation for this project include:

- Communicating clearly;
- Including 3 or 4 main messages, and repeat them in different ways;
- Ensuring information is structured around the same messages i.e. Consistency;
- Ensuring project staff are clear about main messages, so stakeholders receive consistent messages;

- Providing information promptly;
- Establishing timelines and lines of communication: for this project a 24 hour response time to deal with community concerns has been determined;
- Making the information accessible to all interested parties; and
- Being open to changes that may result from listening and incorporating innovations or concerns from the community into the project activities and methodologies.

7 Identification of Stakeholders for this Project

7.1 General

Key stakeholders are generally identified as people who are adversely or positively impacted by our operations, those who have an interest in / influence on what we do.

Our project sites are required to identify their key stakeholders and consider their expectations and concerns during design (where achievable) and operational activities.

These projects key stakeholders are many and varied and may include:

- RCC's Employees Client and end users, subcontractors, and suppliers;
- Local and Indigenous communities;
- Customers;
- Surrounding property occupiers or owners;
- Community organisations that represent local and indigenous communities near our projects, particularly in regional NSW;
- Unions who are concerned about upholding workers' rights and interests; and
- Governments – local & state;
- The media; and
- Industry associations.

Within these groups, there are stakeholders that may be interested in specific issues or affected by a range of issues.

7.2 Community Consultation Planning

Appendix 1 summarises the Community and Stakeholders Mapping Guide and overall consultation strategy planned for this project.

7.3 Stakeholders Identified for this Project & Consultation Strategies

For this project, business, residential and other stakeholders that may be specifically impacted by project works and the corresponding consultation strategy have been listed in the table below:

Stakeholders and Consultation Strategies		
Precinct	Impacts	Consultation Strategy
Businesses	During Construction: extra traffic (concrete trucks)	A construction update advising of progress of current works and advice of commencement of soft ground works will be issue in advance of works commencing Personal consultation – a visit will be made to update progress on works and inform businesses of upcoming works Ongoing communication with the Client, Property managers and business tenants via regular email flyers and project updates. The agreed complaint handling procedures will be implemented

Stakeholders and Consultation Strategies		
Precinct	Impacts	Consultation Strategy
Residents	During Construction: Noise, Traffic, Dust	Prior to works starting, notification and consultation will be undertaken with the identified key sensitive receivers. A presentation was made to the July meeting of the Chatswood North CLG. Personal consultation will be undertaken with identified sensitive receivers to make them aware of works, and the potential issues such as concrete trucks utilising site on a 10 hour basis Monday to Friday, and Saturday for 5 hours. Personal consultation will be undertaken with the residents potentially impacted by regenerated noise and vibration The agreed complaint handling procedures will be implemented in line with section 6.2 & 6.3 of the CNVMP.
Employees & Subcontractors	WHS concerns Career progression & learning opportunities For those who live in regional communities where our projects are based – interactions out of work hours, business creation during the life of the project, supporting social infrastructure	Project sites, employees and contractors are expected to participate in company improvements, via: Safety committees Performance appraisals Direct communications between employees & management Newsletters & alerts Intranet Monthly reporting & corporate reports IT helpdesk

Stakeholders and Consultation Strategies		
Precinct	Impacts	Consultation Strategy
Local & Indigenous Communities	Disengagement of local & indigenous communities with the project Non – fulfilment of GC21 Contract obligations contained in Aboriginal Participation Plans Miss-alignment of RCC's policies and the NSW Government's commitment to creating outcomes (training, employment, enterprise development) for Aboriginal people, as referred to in the Making It Our Business Strategy and procurement in construction policy. Potential to affirm and respect indigenous and other heritage & cultural values	Development of Aboriginal Participation Plans to involve the indigenous community Community consultation groups Newsletters and other targeted communications Monthly reporting & corporate reports Community perception surveys
Suppliers	Suppliers and subcontractors not aware of RCCs expectations Impacts of RCC's payment terms and conditions on suppliers and subcontractors	Technology exchanges Identification of risks associated with their activities and implementation of controls Seek to utilise local suppliers and support these suppliers
Community Organisations	Assurance that potential impacts (social, environmental, safety etc.) have been considered during RCC's projects and mitigated RCC's community interactions and support are mutually beneficial and sustainable	Community consultation and engagement groups Support local sporting and other groups Corporate programs
Unions	Freedom of our employees to choose to join labour unions	Communicate with unions on specific issues, RCC's CBA etc.

Stakeholders and Consultation Strategies		
Precinct	Impacts	Consultation Strategy
Regulators	Government has mechanisms of regulation that cover a range of aspects within RCC including industrial, safety, environment	RCC's activities required to work within legislative frameworks and local and state levels Meetings with Council, BCA consultant with respect to planning and design issues Onsite meetings with Local Council, DECC, WorkCover, ABCC to ensure RCC works complying with legislation, minimising impacts to stakeholders, minimising industrial relations conflicts etc.

7.4 Indigenous Stakeholders

RCC recognises and respects the importance of Indigenous peoples' culture, heritage and traditional rights and supports the identification, recording, management and protection of indigenous cultural heritage sites.

Indigenous cultural heritage is broadly defined to include matters that are significant to either Indigenous peoples or under legislation, such as dreaming, ceremonial, sacred and burial sites; archaeological sites where evidence of the past occupation and use by Indigenous peoples can be found; more contemporary historic sites; and traditional knowledge.

We recognise that Indigenous peoples have a vital role to play in identifying and properly managing cultural heritage, especially where it could be affected by our activities.

Where identified by the planning process, projects will undertake early consultations and assessments with Indigenous peoples to ascertain whether our proposed activities are likely to impact cultural heritage values and, in conjunction with Indigenous peoples and relevant authorities, determine how best to plan and undertake those activities to avoid or minimise such impacts.

RCC also actively seeks to utilise traditional knowledge in the development of site-based practices such as environmental management plans (refer Section 4 and Appendix 1 of the Project Management Plan).

7.5 Aboriginal Participation Plan

Aboriginal Participation Plans will be developed for a project in accordance with the Contract requirements or where there is a significant

potential to benefit the local community in line with the NSW Government's policies (see Appendix 1 of the Project Management Plan).

8 Responsibility for Implementing the Plan

The Project Manager is responsible for developing and implementing the Community Consultation and Engagement Plan for this project. Where required, specialist consultants will be engaged.

9 Stakeholder Grievances and Concerns

Project sites are required to maintain a register of concerns, complaints and relevant external communications.

Concerns and complaints are to be investigated as incidents, using RCC's standard investigation processes (Form 01.1), and outcomes and actions are reported back to relevant stakeholders.

10 Is the Plan Effective?

Monitoring public opinion and complaints will identify how successful the project Community Consultation and Engagement Plan is:

- If issues can be resolved by consultation and collaboration, then the program is successful.
- If issues are escalating and resolution is improbable, the program is to working.

A regular review process during the project is also a central requirement of stakeholder identification, to ensure that all appropriate groups and individuals are effectively identified and suitably engaged.

11 Resources

http://www.vlgaconsultation.org.au/

http://www.communitysolutions.com.au/index.html

Landcom Booklet Stakeholder Consultation Workbook (available on internet)

Appendix 1 – Stakeholder Table

Community Stakeholder Mapping Guide								
Stakeholder	Issue / Impact	Does the stakeholder have / require?			Implementation Requirements			Affected / Level of Impact
		Information Needs	Expertise / Knowledge	Regulation	Planning Approval	Construction Management Plans e.g. Noise & Vibration	Contract Requirement	
Residents	Dust, noise	1	2	2	3	1	2	2
Business	Traffic	2	2	2	2	2	2	2
Community Group	Traffic	2	2	2	2	2	2	2
Indigenous Group	Heritage	1	1	1	2	1	1	1
Client	Operations	1	1	1	1	2	1	1
EPA	Environment	1	1	1	1	1	1	1
WorkSafe	Safety	2	2	2	2	2	2	2
Local Council	Building	2	1	1	1	1	1	1
Union	IR	2	1	2	3	2	1	1

Importance	
High	1
Medium	2
Low	3

Stakeholder	Level of Impact	Consultation Strategy			
		Inform	Consult	Involve	Collaborate
Residents	3	✓	✓	✓	
Business	3	✓	✓	✓	
Community Groups	1	✓			
Indigenous Group					
Client					
EPA		✓			✓
WorkSafe		✓	✓		
Local Council		✓	✓		
Union		✓			

Step 1:

Rank why a particular group is a stakeholder for this project i.e. is their interest low, medium, high?

1 = low

2 = medium

3 = high

Step 2:

✓ Indicate Consultation Strategy employed

Details provided in Section 7.0.

SYDNEY

214 WILLOUGHBY RD,
NAREMBURN NSW 2065

PO BOX 1024
CROWS NEST NSW 1585

PHONE: +61 2 9902 4700
FAX: +61 2 9439 1114

NEWCASTLE

LEVEL 1, 118 BELFORD ST,
BROADMEADOW NSW 2292

PO BOX 835,
HAMILTON NSW 2303

PHONE: +61 2 9902 4700
FAX: +61 2 9439 1114

TAMWORTH

82 KABLE AVE,
TAMWORTH NSW 2340

PO BOX 576,
TAMWORTH NSW 2340

PHONE: +61 2 6766 5225
FAX: +61 2 6766 3022

ACT

UNIT 1, 155 NEWCASTLE ST,
FYSHWICK ACT 2609

PO BOX 771,
FYSHWICK ACT 2609

PHONE: +61 2 6143 2900
FAX: +61 2 6280 8774

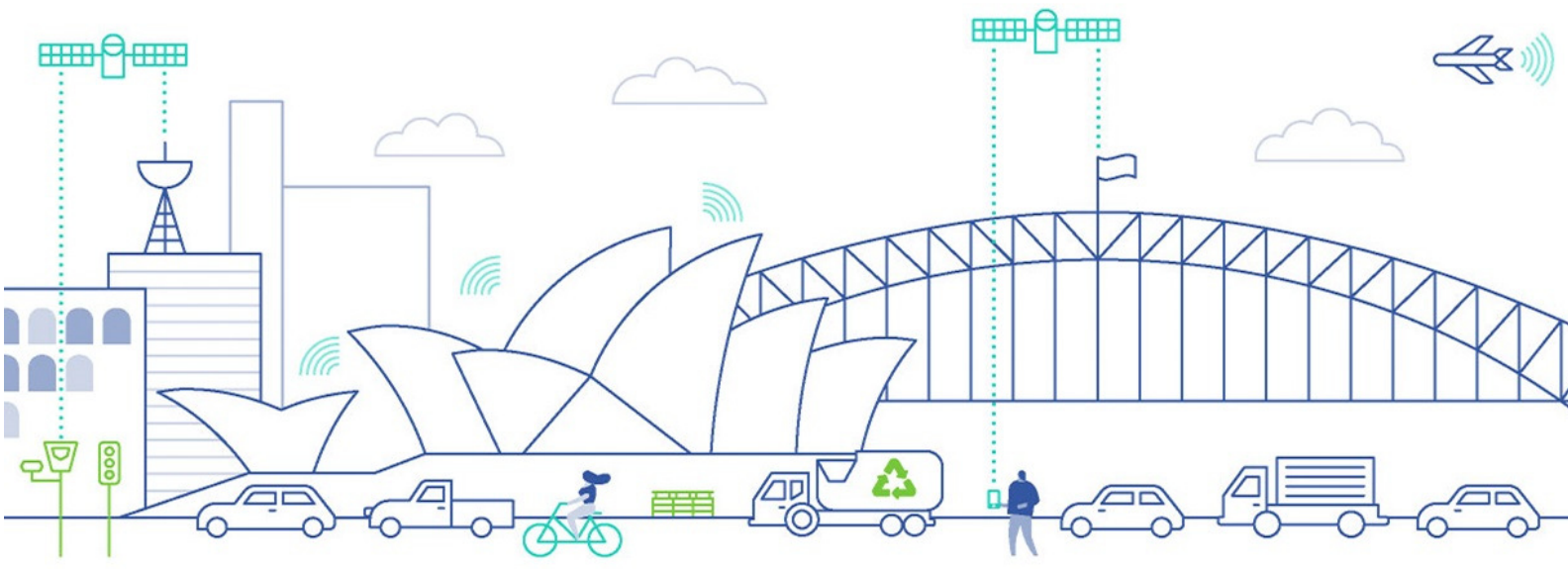
richardcrookes.com.au

Appendix F - Construction Traffic & Pedestrian Management Plan

Construction Traffic & Pedestrian Management Sub-Plan

Armidale Secondary College

NBRS Architecture



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T: (02) 9418 3033
E: ttmnsw@ttmgroup.com.au

Revision Record

No.	Author	Reviewed		Description	Date
1.	Paul Cai	Calum Hutcheson		Rev 00	19.06.2018
2.	Baqir Husain	Calum Hutcheson		Rev 01	04.07.2018
3.	Baqir Husain	Calum Hutcheson		Rev 02	21.08.2018
4.	Baqir Husain	Ilona Blackburn		Rev 03	30.05.2019
5.	Baqir Husain	Ilona Blackburn		Rev 04	31.05.2019
6.	Baqir Husain	Ilona Blackburn		Rev 05	03.06.2019
7.	Baqir Husain	Ilona Blackburn		Rev 06	17.07.2019

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Level 5, Suite 501, 174 Pacific Highway, Greenwich. PO Box 5238 Greenwich NSW 2065

Contents

Table Index

Figure Index

1 Introduction

1.1 Background

TTM Consulting was engaged by NBRS Architecture to prepare a Construction Traffic & Pedestrian Management Sub-Plan (CTPMSP) for works at Armidale Secondary College. The recommendations from this plan will be implemented during the construction phases at the existing Armidale High School.

1.2 Scope

This CTPMSP will be used as a guide for co-ordination of all road users during the construction works, including maintaining public vehicle access around the site. Traffic control and safety measures outlined in this report are intended to assist in maintaining a safe environment for both site workers and members of the public.

The scope of this CTPMSP includes the following;

- Location and description of Works;
- Timing and delivery of project;
- Impacts on the road (and pedestrian where applicable) networks, and;
- Location of traffic control devices, works vehicles and traffic controllers (where required).

It is noted that this document sets the overarching framework for the management of construction traffic during the works, however, it is recognised that the plan may need to be reviewed and revised as the project progresses.

1.3 Objective of this plan

This objective of this plan is to provide an overarching strategy for traffic and pedestrian management. It aims to ensure safe and efficient movement of vehicles and pedestrians around the site.

The overarching aim being to ensure a coordinated approach to traffic management and the successful delivery of the program of works, with minimal disruption to road users and the surrounding community.

1.4 Guidelines and Design Standards

The CTPMSP have been developed in accordance with the requirements of the RTA (RMS) Traffic Control at Work Sites Manual (Version 5, issued July 2018).

1.5 Limitations of this plan

The CTPMSP developed by TTM only considers the impact of works on traffic and pedestrians. Impacts on other aspects in the local environment, such as noise, are not considered here and need to be assessed separately and incorporated as necessary.

The CTPMSP is based on advice supplied by Richard Crookes Constructions regarding the expected characteristics and requirements of the construction program.

2 Existing Network Details

2.1 Road network

The subject site has frontage to Butler Street. The roads surrounding the site are maintained and controlled by Armidale Regional Council except for Kentucky Street which is RMS controlled.

The road characteristics are shown in Table 2-1.

Table 2-1: Road characteristics

Road	Speed Limit	Lanes	Road Authority
Kentucky Street	50kph	2 (undivided)	RMS
Butler Street	50kph	2 (undivided)	Council
Lambs Avenue-Mann Street	50kph	2 (undivided)	Council
Barry Street	50kph	2 (undivided)	Council
Miller Street	50kph	2 (undivided)	Council

School zones are present along Kentucky Street, Butler Street, Hargrave Street, Mossman Street and Lambs Avenue-Mann Street with a maximum speed of 40kph. School zones near the school site are shown in Figure 2-1 and Figure 2-2.

A "Bus Zone" (8:00 am – 9:30 am and 2:30 pm – 4 pm, School Days) is present on Butler Street. Bus zone along Butler Street is shown in Figure 2-3.

"No Parking" (8:00 am – 9:30 am and 2:30 pm – 4 pm, School Days) areas are present along the school side of Butler Street allowing car drop-off and pick-ups. No Parking areas along Butler Street are shown in Figure 2-4.

Figure 2-1: School zone along Hargrave Street

Figure 2-2: School zone along Kentucky Street

Figure 2-3: Bus zone along Butler Street

Figure 2-4: No Parking area along Butler Street

2.2 Walking infrastructure

Walking infrastructure includes pedestrian footpaths, children's crossings and pedestrian crossings in the vicinity of the Armidale High School (see Figure 2-5).

There are two children's crossings present across Butler Street. There is a children's crossing near Butler Street – Mossman Street intersection and another one near Butler Street – Hargrave Street intersection. The crossings are shown in Figure 2-6.

The children's crossings will not be operational during constructions stages as the school will be closed to students. Duval High School will be operating as a combined school during this stage and accommodating Armidale High School students.

There will be some changes to the walking infrastructure with the redeveloped Armidale Secondary College. There will be new concrete pathways, kerb ramps, relocation of pedestrian crossings and kerb extensions.

A pedestrian crossing is present on Lambs Avenue which connects the school with the railway crossing. Another pedestrian crossing is present on Kentucky Street providing access to school from the southern boundary. Pedestrian crossings are shown in Figure 2-7 and Figure 2-8.

Figure 2-5: Pedestrian footpath along Butler Street

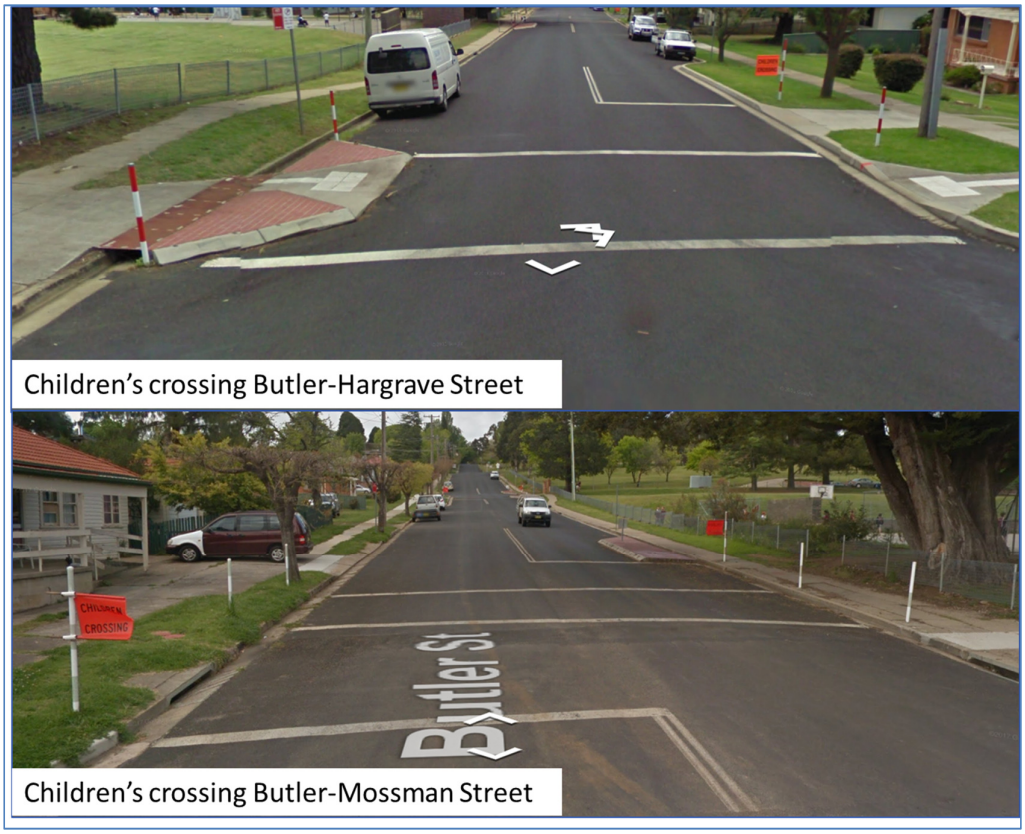


Figure 2-6: Children's crossing across Butler Street

Figure 2-7: Pedestrian crossing on Lambs Avenue

Figure 2-8: Pedestrian crossing on Kentucky Street

3 Project Description

3.1 Project Overview

The Project includes the demolition of the existing college and construction of a new Secondary College for approximately 1,580 students and 110 staff.

TTM note that all existing students and staff have been temporarily relocated to Duval High School – as such there will be no public activity within the site throughout the entirety of the works.

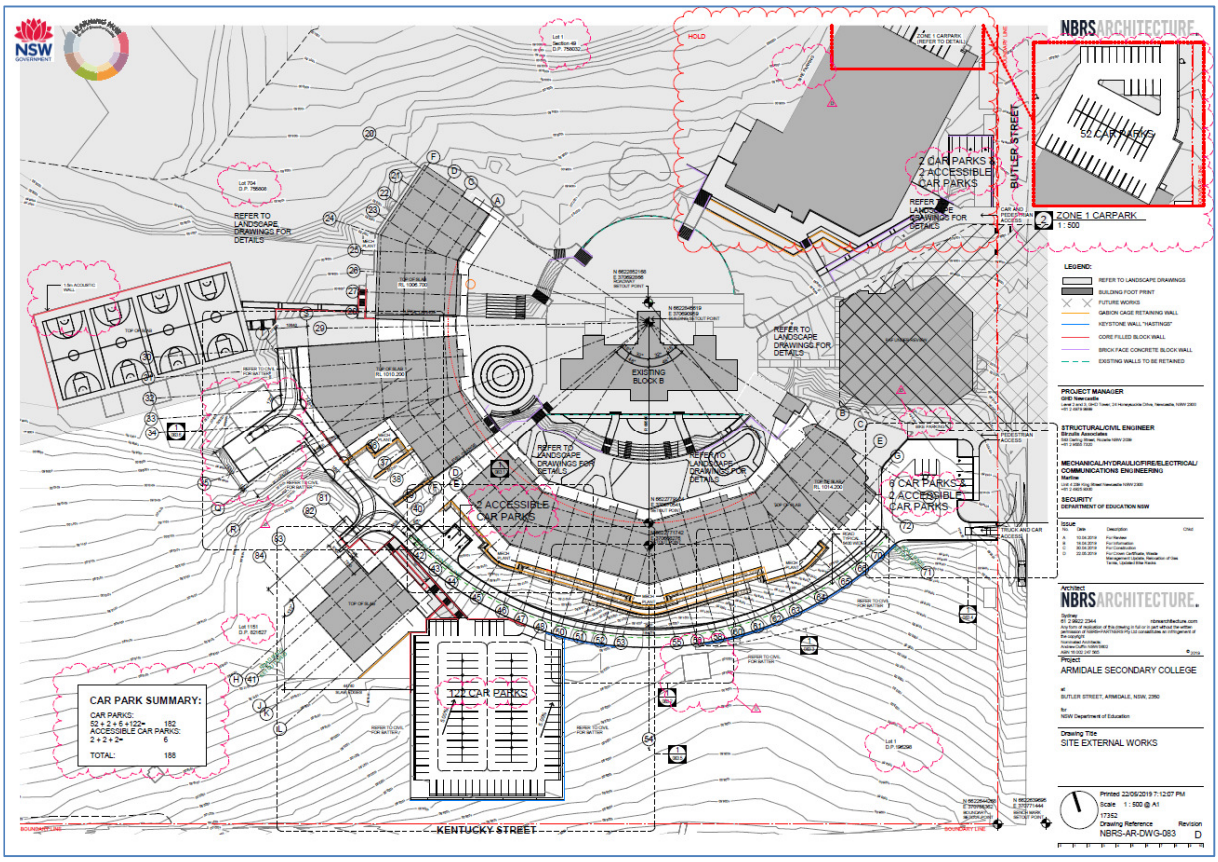


Figure 3-1: Development layout

3.2 Site location

The subject site, Armidale High School, is located at Butler Street, Armidale NSW (see Figure 3-2). The site has vehicle access from Butler Street.

The site is predominantly surrounded by residential land uses with commercial activities taking place along Mann Street and other streets to the west of the site.

Figure 3-2: Aerial image of the site

3.3 Key Personnel and Contact Details

The following are key CTPMSP personnel with contact details:

Principal Contractor	Joel Davie
	Richard Crookes Constructions
	(02) 9902 4700 / 0401 296 073
	DavieJ@richardcrookes.com.au
Traffic Engineer	Ilona Blackburn
	TTM Consulting Pty Ltd:
	Traffic Consultant (Roads and Maritime Services Prepare Workzone Traffic Management Plan certified) Card No.: 0051857257
	(07) 5514 8000
	iblackburn@ttmgroup.com.au

4 Construction Impacts

4.1 Programme

The estimated project duration is shown in Table 4-1.

Table 4-1: Estimated construction duration

Activities	Duration
Demolition	12 weeks
Excavation	16 weeks
Construction	18 months

Demolition and excavation activities have already commenced and practical completion of construction is expected be in early 2021.

4.2 Hours of Operation

The proposed working hours for the project will be as follows:

- Construction Works (including deliveries of materials and equipment) between:
  - 7:00 am to 6:00 pm: Monday to Friday.
  - 8:00 am to 1:00 pm: Saturdays.
  - No work on Sundays or Public Holidays without permission.

4.3 Haulage Routes

During the demolition, excavation and construction stages, vehicle movements for the project will be required to:

- Comply with relevant environment approvals.
- Comply with traffic control plans
- Minimise the number of vehicle movements by optimising materials loads where possible.
- Enter and exit the site in a forward direction.
- Promote safe driving principles.
- Evaluate the need for temporary traffic control.
- Plan on-site vehicle movements.

- Avoid or minimise truck reversing and three point turns on site.

However, the proposed construction vehicle routes as shown in Figure 4-1 will be able to accommodate the construction vehicles. It is expected that all heavy goods such as girders or machinery plant are likely to be delivered outside of peak traffic hours.

The proposed vehicle movement routes are shown in Figure 4-1.

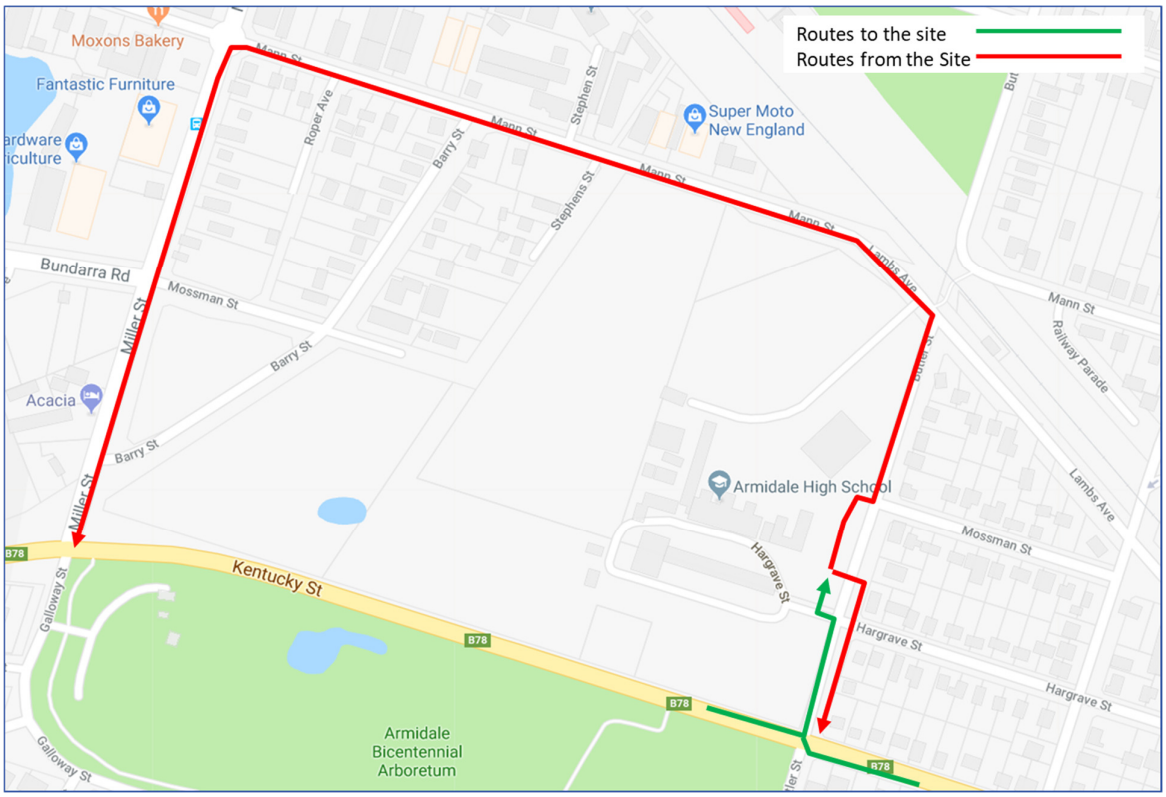


Figure 4-1: Construction vehicle routes

It is proposed that construction vehicles will:

- Arrive at the site traveling from Kentucky Street onto Butler Street. Enter the site via a left turn through the existing entry at the Butler Street/Hargrave St intersection.
- Unload and load within the site boundary.
- Depart from the site via the existing exit at the Butler Street/Mossman Street intersection.
  - Two routes will be used on departure to limit two way interaction of vehicles on Butler Street.
    - Turn left out to travel along Butler Street and Lambs Avenue, then turn left onto Miler Street and exit on Kentucky Street.
    - Turn right out to travel south on Butler Street to Kentucky Street.

The proposed construction access routes satisfy the requirements for anticipated access movements with due consideration to the travelling public.

4.4 Construction Vehicle Impacts

Various types of trucks will access the site. The maximum sized design vehicle will be a truck and dog during demolition and excavation and semi-trailer for material delivery during construction. The typical length of these vehicles is 19 metres.

Construction vehicle activities of the development are is over three stages. Average heavy vehicle demand information relating to the works has been provided by RCC. The absolute peak number of trucks expected during a day is 9 vehicles (equivalent to 18 vehicle trips) – with most days averaging much less.

The construction vehicles will enter and exit the subject site in a forward direction.

A breakdown of the various construction vehicles and machinery is shown in Table 4-2.

Table 4-2: Construction vehicles and machinery used on-site[1]

Stage	Construction Vehicles
Demolition	• truck and dog, medium rigid vehicles and small rigid vehicle • 20t excavator with bucket • hammer, ripper, bogie for rubbish removal • Other equipment includes 12m^3 bins, sweeper and water carts
Excavation	• Truck and Dog, medium rigid vehicles and small rigid vehicle • 20t and 40t excavators • Piling rig allowing 80t for pilling • Small concrete pump and concrete trucks • Dozer, scraper and grater
Construction	• Tower crane, forklift, material hoist, bobcat • 23m^3 and 10m^3 bins for rubbish removal • 5t Machines, concrete pumps and concrete trucks • Mobile cranes 50-130t • Concrete trucks • Semi-trailers for material delivery

4.5 Materials Handling and Cranes

Loading and unloading is to occur on-site. There will be various plant and equipment used on site as identified in Table 2-2. A tower crane will also be required on site and the working arm extents will be contained wholly within the site boundary. It is proposed to have concrete pouring within the property boundary.

4.6 Site Parking

Parking is provided for staff on site. This is in accordance as per condition B26 which states 'Prior to the

commencement of construction, the Applicant must provide sufficient parking facilities on-site, including for heavy vehicles and for site personnel, to ensure that construction traffic associated with the development does not utilise public and residential streets or public parking facilities'. The details of this provision has been addressed in a separate letter (Refer to Appendix C).

4.7 Site Fencing

The construction site will be enclosed by fencing/hoarding to prevent access to the property and to protect the public / roadway from construction activities.

4.8 Pedestrian & Cyclists

Pedestrian and cyclist movements around the site will be maintained during the construction works at all times. Boundary fence will be used to limit pedestrian access to the site. Pedestrians and cyclists on the footpath will have the right of way at site access crossings at all times.

If the works methodology changes, in a manner that requires the closure of an existing route, a suitable alternative is to be provided prior to any closure, and relevant authority approvals shall be applied.

Site staff will assist in the management of heavy vehicles are entering or exiting the site to ensure the safety of pedestrians and cyclists in the vicinity.

4.9 Network Impact

The existing and future traffic assessment of Armidale Secondary College has been conducted in a separate Traffic Transport and Accessibility Impact Assessment Report. The results showed that the current intersections configuration is adequate for the existing and future traffic demands for the proposed development. Based on the traffic assessment results, the addition of construction vehicles will not adversely affect the road intersections in terms of capacity and delay – particularly given that the trips associated with an active education site are not being accommodated for as all students and staff have been relocated to Duval High School.

Additionally, there are no major construction activities anticipated for any developments surrounding the site. There will not be any cumulative construction vehicle traffic impacts for the proposed development.

4.10 Construction permits

4.10.1 Works zone

All works activities will be undertaken within the site boundary. A works zone is therefore not required on the frontage of the site.

4.10.2 Road Occupancy License

All works activities will be undertaken within the site boundary with no expected impact on traffic flow.

Should any construction activities be considered to have impact on the operational efficiency of the road

networks. An ROL will be applied for prior to such activities taking place.

5 Mitigation of Construction Impacts

5.1 Emergency Vehicles

Access to the site and neighbouring properties by emergency vehicles will not be affected by the works as all roads and paths at the site frontage will remain open and accessible at all times.

The main point of access for emergency vehicles will be directly via the access at the Butler Street/Hargrave Street intersection. This provides the most effective point to access the site. Alternatively, emergency vehicles will also have access to any of the site gates during and outside work hours if required.

Emergency Services will be advised when any changes are made to the existing traffic management within the area.

Ambulance and emergency vehicles with flashing lights and sirens activated in the vicinity of the site must be given priority passage at all times.

5.2 Unplanned Incidents

The types of emergencies/unplanned incidents that may occur include, but are not limited to:

- motor vehicle crashes/breakdowns.
- terrorist attacks and bomb threats.
- structural/catastrophic failures.
- inclement weather conditions, including flooding.
- anti-social behaviour.

The occurrence of unplanned incidents on the local road network can temporarily restrict Project activities and network operations. The management and response to unplanned incidents on the local road network is not the responsibility of the Project, but where possible and particularly if Project activities are involved, RCC will:

- Apply and maintain communication protocols, particularly between Project sites and emergency services.
- Inform the authorities and emergency services of any incident and provide assistance, if appropriate and possible, for the duration of the incident.
- If resources are available, provide initial response to unplanned incidents with the aim to make incident scene safe, and prevent further harm to persons or property.
- Provide support to emergency services, including traffic control in the vicinity of the incident.

- During major incidents provide a senior representative on-site to liaise with the authorities and emergency service agencies.
- Reschedule planned works that will interfere with the incident or create additional delays to those road users already affected by the incident.
- Disseminate road condition information for distribution to road users.

5.3 Pedestrians and Cyclist Access Management

Haulage vehicles will not impact the movement of pedestrians and cyclists in the vicinity of the site.

Pedestrian and cyclist movements around the site will be maintained during the construction works at all times.

A boundary fence will be used to prevent pedestrian access to the site. Pedestrians and cyclists on the footpath will have the right of way at site access crossings at all times.

Footpaths widths as per existing conditions shall be maintained at all times.

Suitable signage within the site boundary (visible to exiting vehicles) will advise drivers to “watch for pedestrians”.

Cyclists will be governed by the same controls as pedestrians (when travelling on the footpath) and as vehicles (when travelling on the road).

Whilst not proposed during the main construction works, in the event that any construction activities (loading and unloading etc.) do occur on the footpath – relevant Council approval will be sought prior to commencing such activities.

Landscaping and footpath connections from the site to the public network will take place towards the end of the main construction works program. An application will be submitted to Council for construction activities undertaken on the footpath.

5.4 Bus Services

The closest public bus stop is located on Miller Street approximately 900m from the school. It is serviced by Edwards bus route number 483. Bus route 483 is a loop service both starting and ending at Armidale Courthouse on Faulkner Street. The bus route has a frequency of 2 hours starting from 8 am up to 5 pm.

Operation of public transport services and access to facilities will not be impacted by the works.

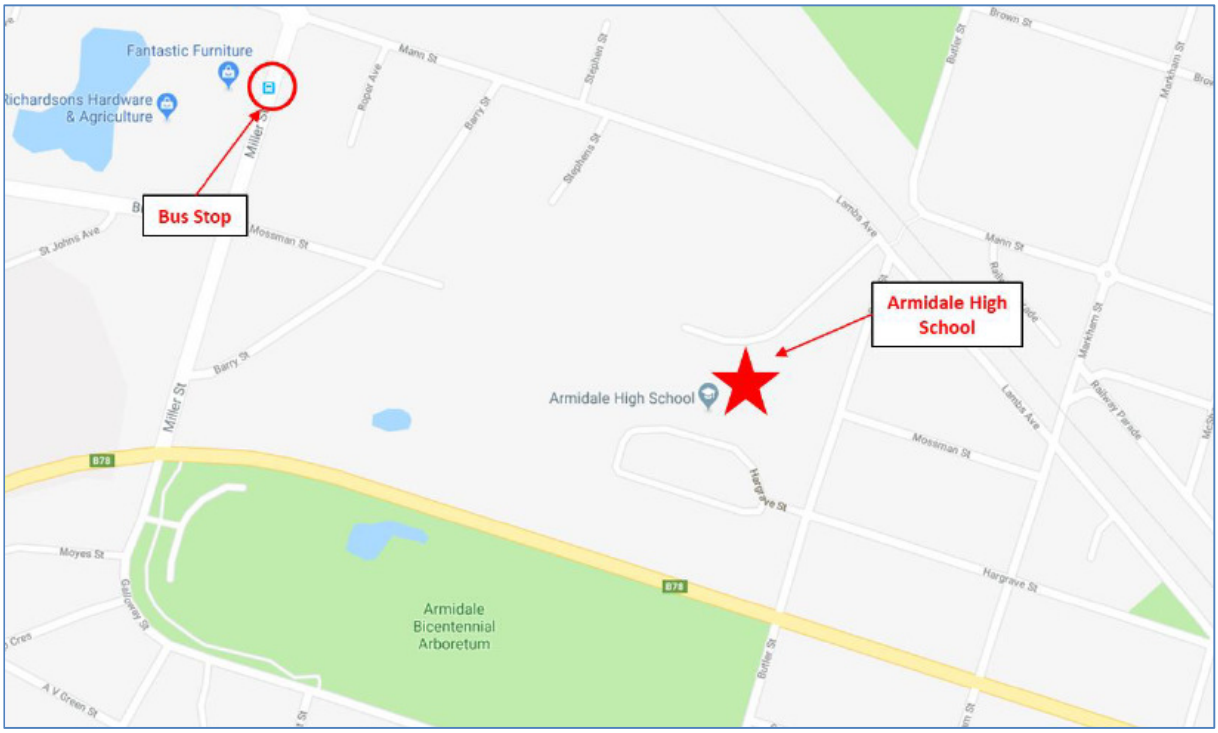


Figure 5-1: Bus stop near the subject site

5.5 Adjacent Properties

Access to adjacent properties will be maintained at all times for all transport modes as per existing conditions.

5.6 Road Network

As shown, the expected traffic generation of the site is up to 9 heavy vehicles per day. This is equivalent to 1 vehicle per hour at each access/egress gate.

Staff accessing the site by private vehicle will be significantly less than that which the school has been assessed to generate as part of the development approval for the site.

There no other major developments in the area undergoing construction that would result in an unacceptable cumulative impact on the network.

5.7 Traffic Control Plans

Traffic Control Plans (TCPs) for access points to the site on Butler Street have been provided by Richard Crookes Constructions for the construction activities. The TCP's indicate the arrangements in place to ensure safe passage of all road users.

The TCP's that are in place have been reviewed and approved by Council. Evidence of Council consultation

and approval is provided in Appendix A with the TCP's.

During the course of the works, vehicles will enter and exit to and from Butler Street. To ensure safe passage of all road users the following management measures are to be in place:

- No queuing or parking/staging of works vehicles permitted on Butler Street or at the frontage of residential properties.
- Qualified traffic controllers to be located as indicated on TCP's.
- When a truck is entering or exiting the site pedestrians will stopped to limit the potential for conflict.
- Pedestrians are to only be held for short periods to allow vehicles to pass.
- Truck arrivals and departures to and from the site will be staged to limit queuing and the combined noise and visual impact of trucks idling and/or passing near the site.
- Advanced warning signs will be provided on all approaches to the site gates to warn approaching road users of works vehicles operating in the area.

TTM have reviewed the traffic control plans and confirm they are consistent with the provisions of this report.

5.8 Additional Measures for Road User Safety

Additional measures for pedestrian, cyclist and motorist safety in the vicinity of the site are to be implemented. These measures include:

- All personnel working on the site are required to have a site specific induction as per RCC standard work health and safety procedures. The principal contractor will keep a record of all inducted personnel and maintain records for the duration of the works.
- Safety devices (audible and visual) on all works vehicles and plant/machinery being operated within the site.

5.9 Driver Code of Conduct

Management of vehicular access to and from the site is essential to maintain the safety of the general public as well as the labour force.

As part of site induction and standard WHS policy all workers and contractors who drive to and from the site will be required to drive in a safe manner when in charge of a vehicle, with additional attention to any instance of public transport use, heavy vehicle use and pedestrian and cyclist activity. Vehicles may also be fitted with GPS monitoring systems.

Site inductions will also inform workers of other strategies including their implementation, monitoring and reporting as to discourage use of local roads that do not form part of the access route to the Project identified within this CTPMSP.

The following code is to be implemented as a measure to maintain safety within the site:

- Utilisation of only the designated transport routes.
- Drivers to maintain a sufficient distance from the temporary barriers that will be implemented around trees that form part of the endangered plant community.
- Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.
- Ensure drivers of construction vehicles to follow approved routes and ensure appropriate road works signage is implemented to minimize conflicts with other road users. Impact on other road users are detailed in sections 4.8, 5.3, 5.4, 4.9 and 5.6.
- Heavy vehicles to limit the use of compression braking within built up areas to minimise noise impact.
- Ensure that vehicle is not left idling (Engine on) when not in use
- Ensuring that construction vehicles are well maintained and in good working order and not causing unnecessary noise, such as damaged mufflers
- All access hatches to engines to be kept closed

It is intended that any occurrence of traffic incidents or complaints will be recorded within site the safety and environmental management systems and reported to the Site Managers for corrective action.

In the potential event of a complaint, incident or the failure to comply with a requirement set out in the CPTMSP implementation strategy, relevant corrective action will be undertaken which could include the following:

- Traffic patterns will be investigated and traffic will be rescheduled or rerouted if possible;
- Review of the monitoring frequency;
- Repeatedly offending personnel will be identified and educated in the desired mode of operation for the vehicle;
- Appropriate approvals will be sought from relevant authorities where this was not done previously; and
- All issues of non-compliance will be rectified by on-site Management.

RCC shall incorporate procedures that involve a formal management review as part a continuous improvement programme, to ensure its continuing suitability, adequacy and effectiveness.

5.10 Program Monitoring

In accordance with Condition B22f and in order to ensure the CTPMP is working effectively RCC will complete monthly site walks reviewing both the on-site conditions and the actions to be implemented as per this

report. This will ensure that all controls measures are being implement on and around site as per the report and will enable RCC to see where maintenance or additional action may be required.

5.11 Notifications to Residents and Community

During construction, the project team will inform the community of all major impacts including changed traffic conditions or disruption to services. The community and key stakeholders will be informed of changes via a number of means including but not limited to the principal contractor website, directions signage, works notices and letter drops.

Nearby residents were informed of various works during construction through a works notification. This works notification was delivered through letters in the neighbouring resident's mailboxes. The flyers and the locations of the handouts are shown in Appendix B.

5.12 Construction Traffic

RCC will ensure that all construction vehicles (excluding worker vehicles) will be contained wholly within the site, except if located in an approved on-street work zone, and vehicles will enter the site before stopping.

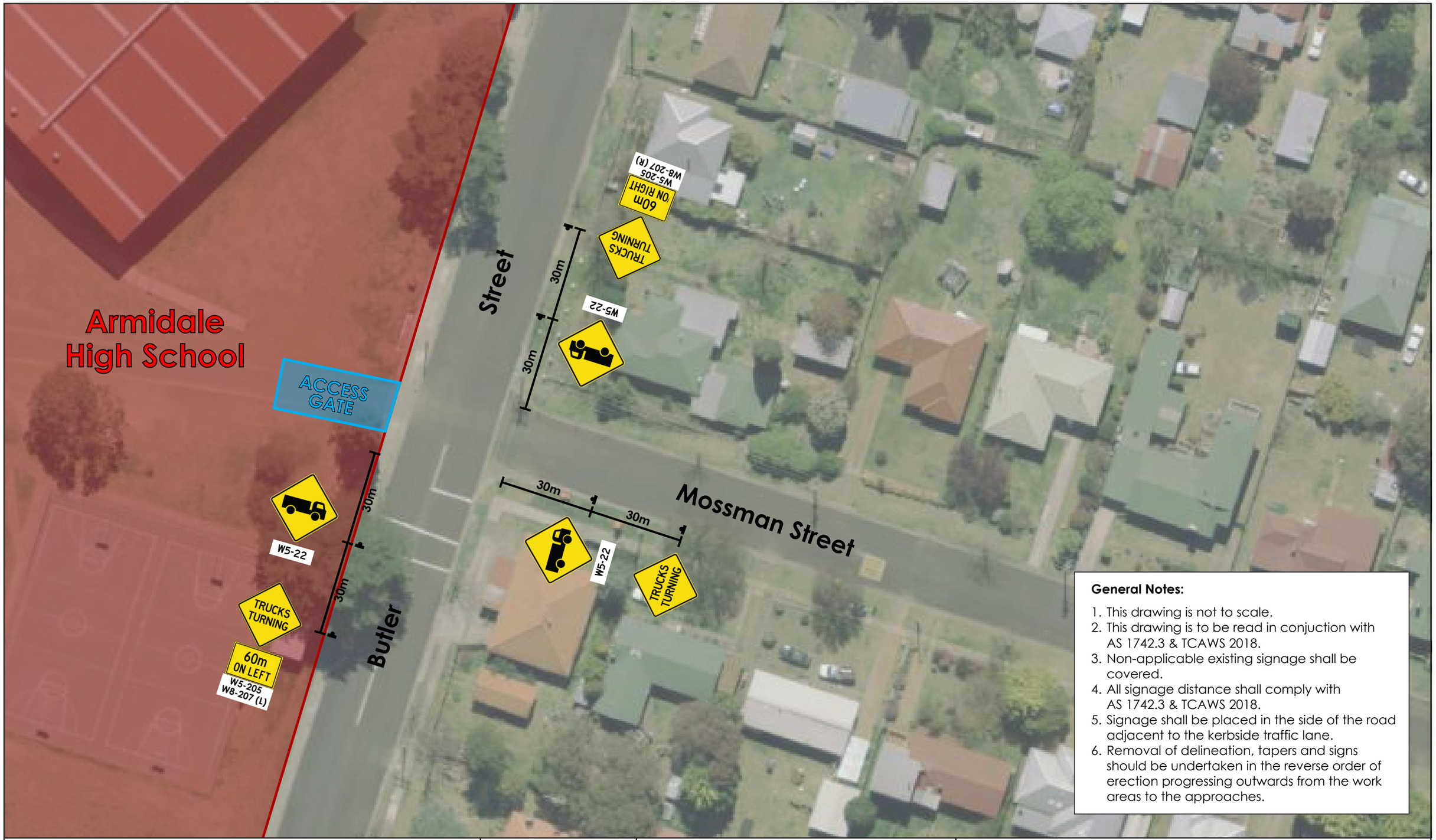
5.13 No Obstruction of Public Way

The public way (outside of any approved construction works zone) will not be obstructed by any materials, vehicles, refuse, skips or the like, under any circumstances. Non-compliance with this requirement will result in the issue of a notice by the relevant Authority to stop all works on site.

5.14 Air Quality Discharges

RCC will install and operate equipment in line with best practice to ensure that the development complies with all load limits, air quality criteria/air emission limits and air quality monitoring requirements as specified in the EPL applicable to the site.

Appendix A Traffic Control Plans



General Notes:

1. This drawing is not to scale.
2. This drawing is to be read in conjuction with AS 1742.3 & TCAWS 2018.
3. Non-applicable existing signage shall be covered.
4. All signage distance shall comply with AS 1742.3 & TCAWS 2018.
5. Signage shall be placed in the side of the road adjacent to the kerbside traffic lane.
6. Removal of delineation, tapers and signs should be undertaken in the reverse order of erection progressing outwards from the work areas to the approaches.

TCP 1		Date:	01.05.2019
Project:	Armidale High School	**Prepared By:**	Geoff Higgins
Project Number:	19.207	**Approved By:**	Geoff Higgins (0031298737)
Client:	Richard Crookes	**Signature:**	

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Suite 2.08
50 Holt Street
Surry Hills NSW 2010

(02) 8324 8700
info@traffix.com.au

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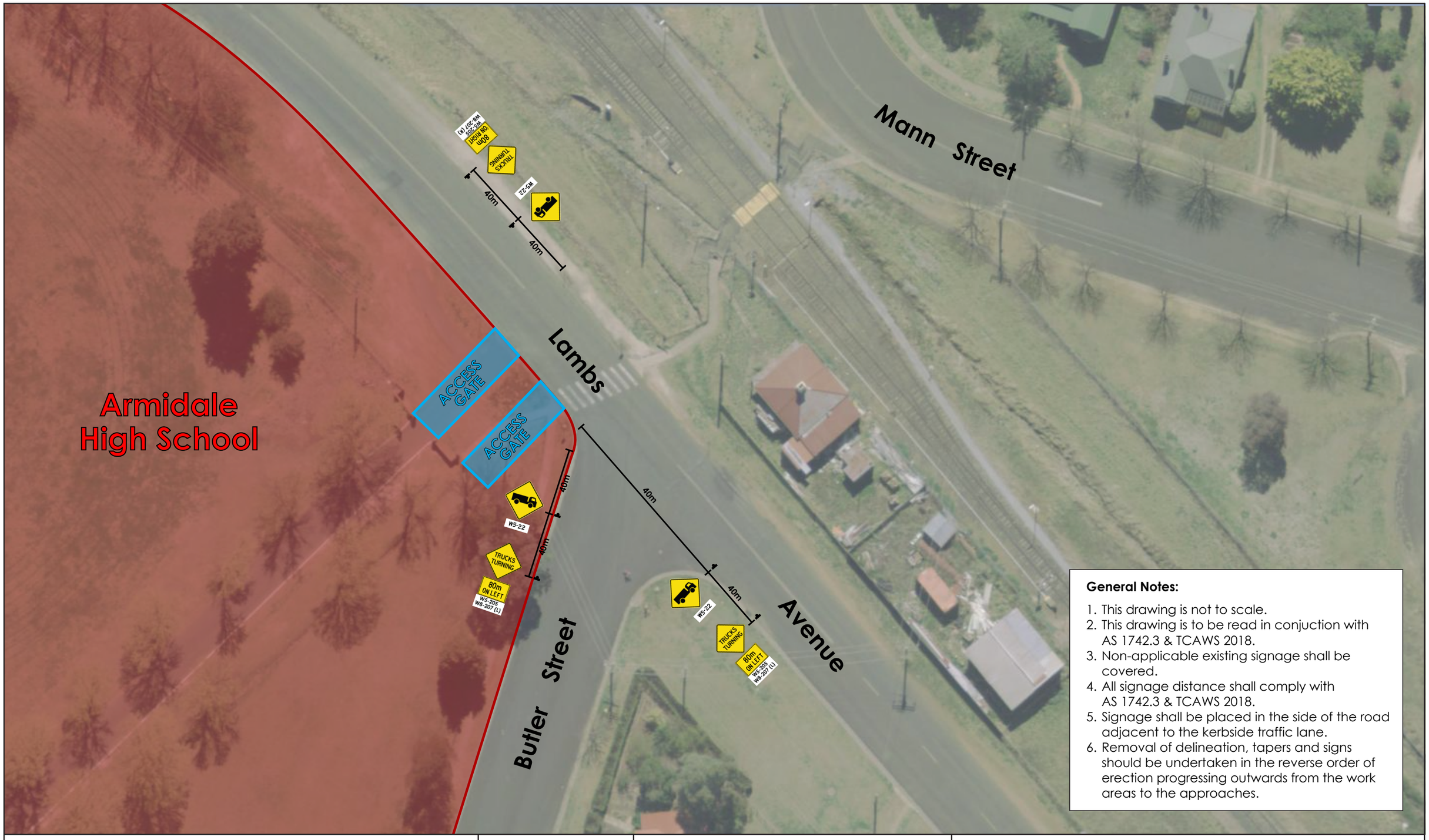

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3. Non-applicable existing signage shall be covered.
4. All signage distance shall comply with AS 1742.3 & TCAWS 2018.
5. Signage shall be placed in the side of the road adjacent to the kerbside traffic lane.
6. Removal of delineation, tapers and signs should be undertaken in the reverse order of erection progressing outwards from the work areas to the approaches.

TCP 2		Date:	01.05.2019
Project:	Armidale High School	**Prepared By:**	Geoff Higgins
Project Number:	19.207	**Approved By:**	Geoff Higgins (0031298737)
Client:	Richard Crookes	**Signature:**	

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Suite 2.08
50 Holt Street
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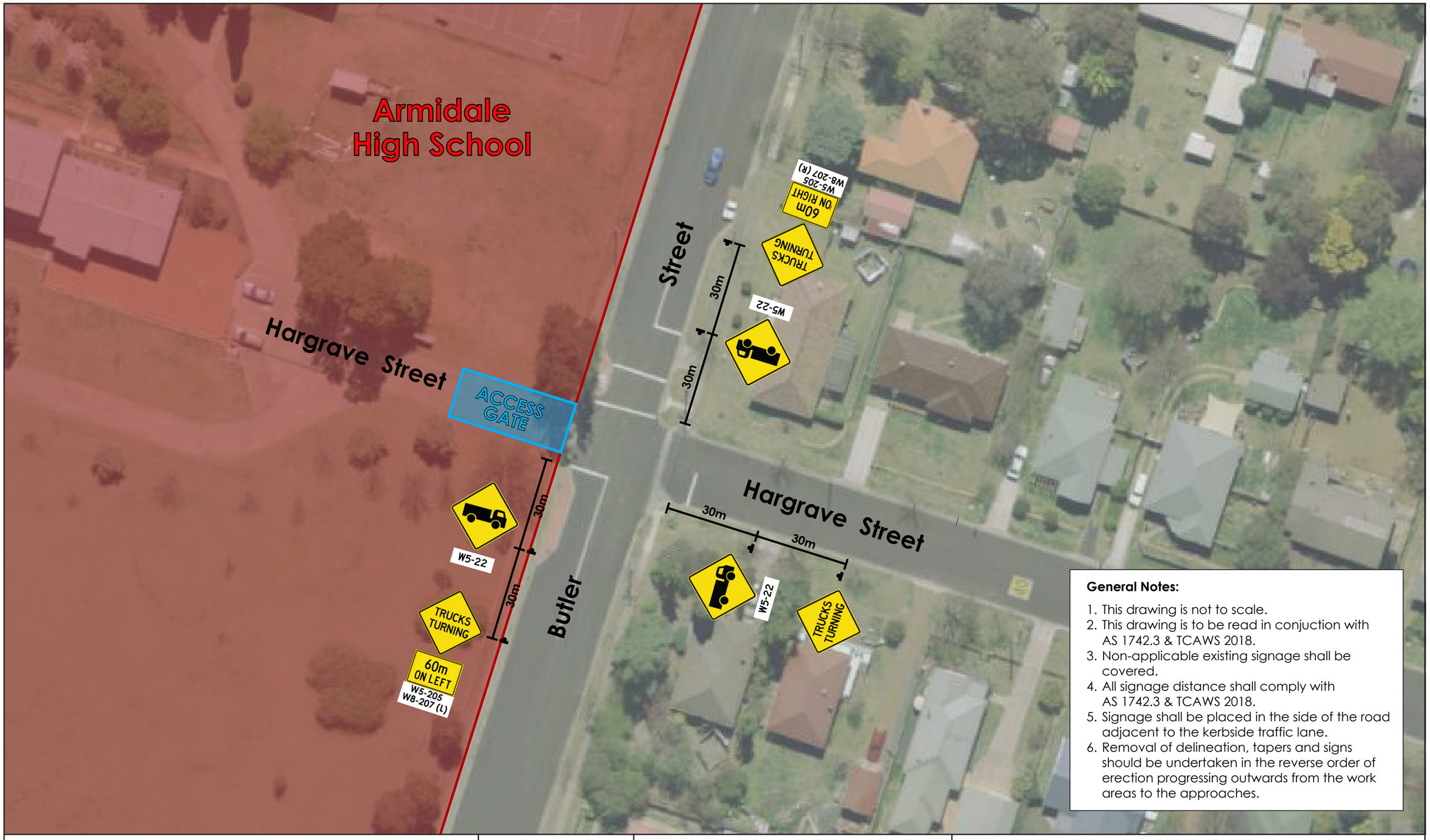

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3. Non-applicable existing signage shall be covered.
4. All signage distance shall comply with AS 1742.3 & TCAWS 2018.
5. Signage shall be placed in the side of the road adjacent to the kerbside traffic lane.
6. Removal of delineation, tapers and signs should be undertaken in the reverse order of erection progressing outwards from the work areas to the approaches.

TCP 3		Date:	01.05.2019
Project:	Armidale High School	**Prepared By:**	Geoff Higgins
Project Number:	19.207	**Approved By:**	Geoff Higgins (0031298737)
Client:	Richard Crookes	**Signature:**	

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Suite 2.08
50 Holt Street
Surry Hills NSW 2010

(02) 8324 8700
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Council Consultation

Sam Lyons

From: Bayden Blanchette
Sent: Monday, 13 May 2019 4:45 PM
To: Sam Lyons
Cc: Tahlia Rakete; Ellisa Battersby; Mitch McManus
Subject: FW: TRIM: FW: Armidale Secondary College - acknowledgment

Sam,

TCP is approved to install cast in signage, can we please order these signs ASAP, we may need some poles etc also.

Regards,

Bayden Blanchette, WHS&E Advisor

RICHARD CROOKES CONSTRUCTIONS

Direct 02 9902 4700 | Fax 02 6766 3022 | Mobile 0427 480 062
Suite 1, 493 Peel Street, Tamworth NSW 2340
www.richardcrookes.com.au

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From: Mark Wilson
Sent: Monday, 13 May 2019 4:40 PM
To: Bayden Blanchette
Subject: RE: TRIM: FW: Armidale Secondary College - acknowledgment

Dear Bayden

The proposed traffic control plans are deemed acceptable and endorsed for implementation. I would not two issues.

1. The Lambs Ave / Butler intersection is likely to be of highest risk. Please monitor performance and adjust your TCP if there are any safety concerns.

2. I noted the other day that trucks were queuing in Lambs Avenue. This is generally not an issue but there were two trucks on one side of the road and one on the other. Please ensure that any trucks that queue are restricted to the “correct” side of the road, being mindful of property access etc.

Regards

Mark Wilson

Program Leader Investigations & Design

P 02 6770 3877 **M** 0427 896 568 **F** 02 6772 9275
E mwilson@armidale.nsw.gov.au **W** armidaleregional.nsw.gov.au
135 Rusden Street | PO Box 75A Armidale NSW 2350

ARMIDALE Regional Council | INVESTARMIDALE.COM.AU

From: Bayden Blanchette [mailto:BlanchetteB2@richardcrookes.com.au]
Sent: Monday, 13 May 2019 3:49 PM
To: Mark Wilson
Cc: Tahlia Rakete
Subject: TRIM: FW: Armidale Secondary College

Hi Mark,

As discussed, please find attached TCP for you to review and provide comment.

Regards,

Bayden Blanchette, WHS&E Advisor

RICHARD CROOKES CONSTRUCTIONS

Direct 02 9902 4700 | Fax 02 6766 3022 | Mobile 0427 480 062
Suite 1, 493 Peel Street, Tamworth NSW 2340
www.richardcrookes.com.au

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Date Issued	22/03/2018						
Project	DoE, Armidale High School Redevelopment Project			From	David Logan		
Subject	Traffic Working Group Meeting #02			Tel	0459 805 315		
Venue	Teleconference			Job No	2219148		
Date / Time	Wednesday 22/03/2018 – 2:00 pm – 3:00 pm						
A - Absent	David Logan	DL	GHD	**A**	Michael Flynn	MF	ARC
	Phillip Pitt	PP	RMS		Rob Shaw	RS	ARC
	Liz Smith	LS	RMS		Mark Wilson	MW	ARC
	Calum Hutcheson	CH	TTM		Graham Earl	GE	ARC
	Paul Cai	PC	TTM		Libby Ure	LU	NBRS
	Baqir Husain	BH	TTM		Andrew Duffin	AD	NBRS
	Roger Lee	RL	GHD				
Distributed to	All attendees and; James Frost (GHD) / John Perkins (RMS) / Matthew Metlege & Wayne Cooper (DoE)						
Attachments	Nil						

Item	Action / Item	By Who	By when
1.0	**General**		
1.1	The purpose of the meeting was to continue dialogue between relevant stakeholders with relating to traffic issues associated with the Armidale High School Redevelopment Project. This includes impacts due to the Armidale High School (AHS) redevelopment and the temporary accommodation at Duval High School (DHS).	Note	
1.2	Minutes from meeting #01 were accepted read.	Note	
2.0	**Armidale HS Redevelopment**		
2.1	The SEARs response from Department of Planning and Environment (DPE) has now been received. A full Traffic Impact Assessment (TIA) is required.	Note	
2.2	DL is presently awaiting clarification from TfNSW regarding the SEARs requirement for considering the at-level railway crossing on Lamb St.	DL	Ongoing
2.3	DoE is presently procuring a traffic consultant in accordance with their procurement protocols. It is anticipated that the TIA works will commence Monday 9/04/2018.	Note	
2.4	Local Traffic Advisory Committee (LAC) were noted as a stakeholder under ARC. The LAC review any changes to regulatory devices on ARC-owned roads (install or removal) and would make a recommendation to ARC. Furthermore, noted that review any changes to regulatory devices on RMS-owned roads (install or removal) would be by RMS.	Note	
2.5	Council data to assist project would be helpful and a request will be provided for this by the project delivery team (Gipper request). *22/03 – NBRS to follow this up with planner for project.*	NBRS	**ASAP**
2.6	A Questionnaire will be prepared for the AHS TIA to obtain indication about proposed mode of transport to AHS once completed. DL to coordinate survey.	DL	16/04/18
2.7	Noted that any works to RMS roads would be under a Works Authority Deed (WAD)	Note	
3.0	**Duval HS temporary works**		
3.1	It was noted that the approvals process for Duval is via a CDC. A RMS certificate will be required as part of this process under the *Environmental Planning and Assessment Regulations 2000.* RMS is happy for certificate to be issued based upon submission of a suitable Traffic management Plan which address: – Construction issues – Operational issues for the temporary school	Note	

Item	Action / Item	By Who	By when
3.2	DL to issue current Traffic Assessment for DHS by TTM to RMS and Council for comment. RMS to provide update on additional information needed to obtain certificate.	DL PP	**ASAP**
3.3	TTM to prepare fee proposal to update traffic assessment in accordance with 3.2.	CH	**ASAP**
3.4	TTM to prepare and issue student transport questionnaire to DL. Questionnaire to include: – Current mode of transport to Duval HS / Armidale HS – Proposed mode of transport to Duval HS next year DL to coordinate survey to be undertaken prior to Term 1 holidays. (2 weeks away)	CH DL	**ASAP** 12/04/18
3.5	LS to email list of RMS' concerns for Duval HS to GHD / Council / NBRS / TTM. These were noted to include: – Safety issues relating to separation between drop-off / bus zone / pick-up and street frontage to manage these items – Behavioural control measures – Monitoring controls etc.	LS	26/03/18
3.6	The Duval HS traffic assessment is critical and needs to be closed out within the next 3 weeks to avoid delay to the program.	Note	
3.7	Council data regarding the Harper St subdivision would be helpful. A Gipper request will be made by the project team planner. *22/03 – NBRS to follow this up with planner for project.*	NBRS	**ASAP**
4.0	**Other Business**		
3.1	Meeting ended at approximately 3:00 pm.	Note	
3.2	Next meeting will be scheduled for 11/04/2018. DL to issue invite.	DL	22/03/18

Date Issued	03/07/2018				
Project	DoE, Armidale High School Redevelopment Project			From	David Logan
Subject	Traffic Working Group Meeting #01			Tel	0459 805 315
Venue	Teleconference			Job No	2219148
Date / Time	Wednesday 28/02/2018 – 9:00 am – 10:00 am				

A - Absent							
	David Logan	DL	GHD		Michael Flynn	MF	ARC
A	Phillip Pitt	PP	RMS		Rob Shaw	RS	ARC
A	John Perkins	JP	RMS		Leah Cook	LC	ARC
	Calum Hutcheson	CH	TTM		Graham Earl	GE	ARC
	Paul Cai	PC	TTM	A	Libby Ure	LU	NBRS
	Baqir Husain	BH	TTM				

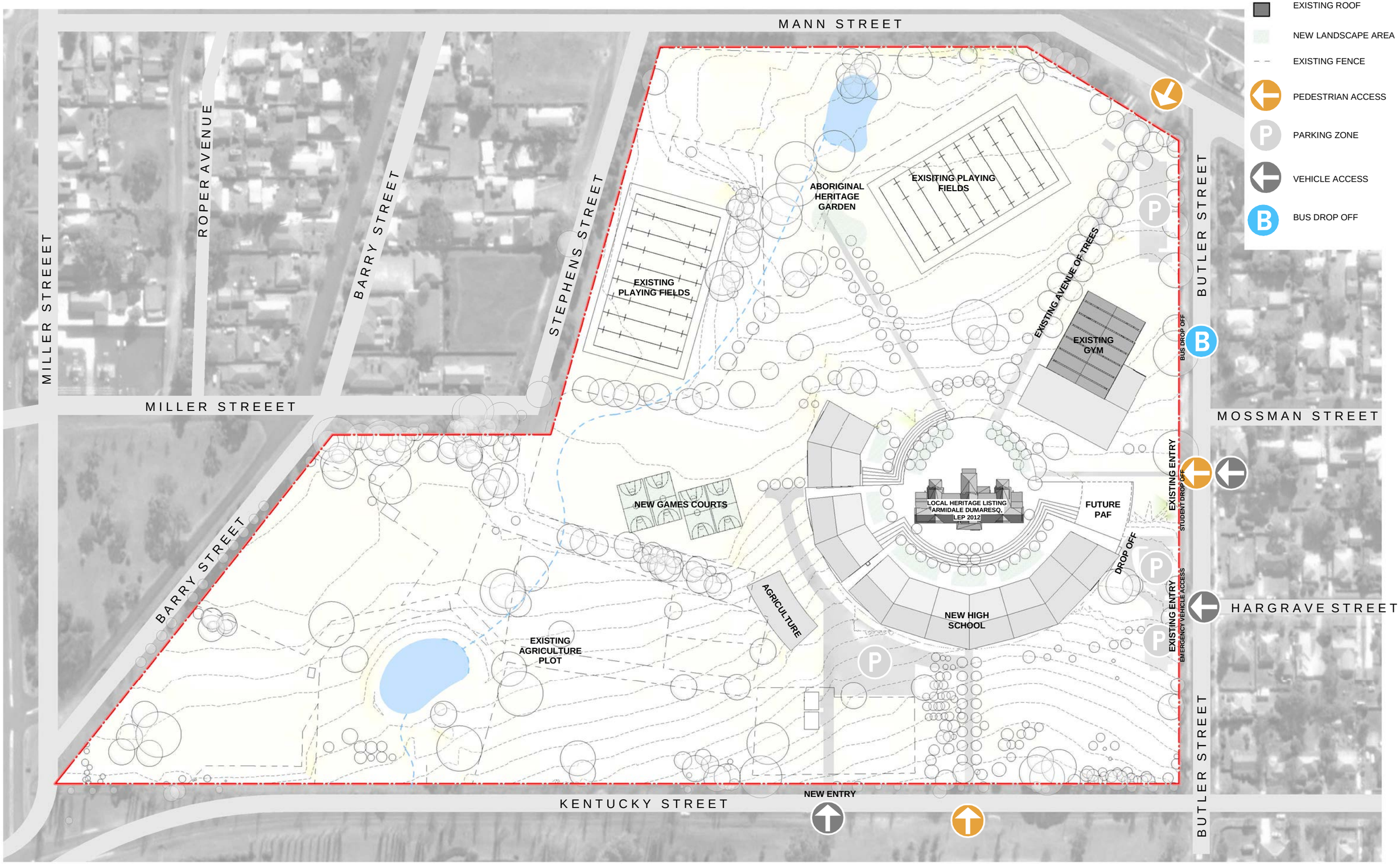
Distributed to	All attendees and; Roger Lee & James Frost (GHD) / Phillip Pitt & John Perkins (RMS) / Andrew Duffin (NBRS) / Matthew Metlege & Wayne Cooper (DoE)
Attachments	NBRS drawing (Armidale HS & Duval HS)

Item	Action / Item	By Who	By when
1.0	**General**		
1.1	The purpose of the meeting was to commence dialogue between relevant stakeholders with relating to traffic issues associated with the Armidale High School Redevelopment Project. This includes impacts due to the Armidale High School (AHS) redevelopment and the temporary accommodation at Ducal High School (DHS).	Note	
1.2	General project update meetings are held between the project team (DoE / GHD / NBRS) and ARC regularly at ARC's offices. Meeting #03 was held last week on 28/02/2018. Traffic is raised as a general ongoing item as part of these regular meetings.	Note	
1.3	A RMS representative was not able to be present today. DL to coordinate correspondence with RMS to obtain key concerns with regards to AHS and DHS	DL	Ongoing
2.0	**Armidale HS Redevelopment**		
2.1	The SEARS response from Department of Planning and Environment (DPE) has not yet been received.	Note	
2.2	ARC's key traffic concerns as raised in the SEARS response include: – Proposal for buses to be offloaded on Butler St. – ARC objection. ARC would prefer to have buses offloading off-street. – Capacity of proposed car parking is an issue – ARC objection that there may not be sufficient off-street car parking nominated. This will need to be demonstrated. – Proposal for new direct entrance from Kentucky Street. There are potential sight issues as this location is at the crest of a hill – ARC recommendation that this is allowable for east travelling traffic, pending RMS approval for new access point. – ARC noted geotechnical issues in the area of Kentucky St, including stream and pavement movement. Council has ongoing pavement repair issues in this vicinity. – Setting down and picking up issues – preference for kiss and drop area off-road.	Note	
2.3	It was noted that TTM is presently not engaged for AHS review at this stage.	Note	
2.4	The SEARS response provides details as to what will be required in the Traffic Impact Assessment for the development.	Note	

Item	Action / Item	By Who	By when
2.5	Edward Buses will be consulted as part of the traffic review.	Note	
2.6	Local Traffic Advisory Committee were noted as a stakeholder	Note	
2.7	ARC noted that there will be interest in adequate facilities for special needs pick-up and drop-off.	Note	
2.8	LC advised that there has been a fatality incident previously on Butler St. Pedestrian and traffic control is important. ARC anticipated that there may be questions from community on this issue.	Note	
2.9	Council data to assist project would be helpful and a request will be provided for this by the project delivery team (Gipper request).	Note	
3.0	**Duval HS temporary works**		
3.1	It was noted that the approvals process for Duval is CDC. An RMS certificate will be required as part of this process under the *Environmental Planning and Assessment Regulations 2000.* Requirements to fulfil this certificate to be confirmed by RMS.	Note	
3.2	ARC's key traffic concerns at the Duval temporary school included: – Bus drop-off and queuing – Off-street parking capacity – Intersection conditions	Note	
3.3	ARC advised the following additional areas for car parking may be made available to DoE subject to investigations (drainage and surface): – Monro St subject to investigation – Harden St subject to improvements by DoE	Note	
3.4	It was noted that it may be prudent to meet on site at a future stage to discuss issue. The date for this wold be 27/03/2018 if this eventuates.	Note	
3.5	A Traffic Assessment Report is presently being finalised by TTM. ARC requested a Traffic and Parking Impact Assessment to AustRoads standards. This is pending outcome of item 3.1 above.	Note	
3.6	Council data regarding the Harper St subdivision would be helpful. A Gipper request will be made by the project team planner. DL to coordinate.	DL	ASAP
4.0	**Other Business**		
3.1	Meeting ended at approximately 4.15 pm.	Note	
3.2	Next meeting will be scheduled potentially next week 15/03/2018. DL to issue invite.	DL	08/03/2018

ARMIDALE FUTURE SECONDARY SCHOOL

NBRSARCHITECTURE.



Scale: 1000@A1 or 2000@A3

0 10m 20m 30m 40m 50m 60m

PROPOSED SITE PLAN

NUMBER:	CODE	ASSET NUMBER
01	OS612	
02	OS621	
03	OS523	
04	EX. (ART)	
05	OS710	
06	OS780	
07	OS842	
08	OS841	
09	OS837	
10	OS606	
11	OS606	
12	OS606	
13	OS750	
14	OS616	
15	OS616	
16	OS750	
17	OS523	
18	OS616	
19	OS616	
20	OS616	
21	OS616	
22	OS616	
23	OS616	
24	OS606	
25	OS616	
26	OS616	
27	OS616	

NBRSARCHITECTURE.

REFER TO PAGES 004 - 007
FOR DETAILING OF STAGES
1A & 2A INTERFACE

HARDEN STREET

CREST ROAD

MONRO STREET (DIRT ROAD)

STAGE 2a
NEW PARKING ZONE

5M BOUNDARY SET BACK LINE

EXISTING CARPARK

STAGE 1B -
RELOCATION OF EXISTING
ART DEMOUNTABLE

STAGE 2d

EXISTING GARAGE

STAGE 1a

STAGE 1 SITE FENCE

STAGE 1b

EXISTING PLAYING FIELD

STAGE 1 SITE FENCE

5M BOUNDARY SET BACK LINE

STAGE 4 SITE FENCE

BINS

EXISTING BUILDING C

EXISTING BUILDING D

STAGE 2 SITE FENCE

STAGE 2a

AGRICULTURAL PLOT

EXISTING PLAYING COURTS

EXISTING PLAYING FIELD

STAGE 3 SITE FENCE

STAGE 2b

EXISTING COLA

EXISTING BUILDING B

STEEP SITE FALL

EXISTING BUILDING A

EXISTING BUILDING E

APPROXIMATE SITE AREA
67,061m2

INDIGENOUS HERITAGE ZONE

AGRICULTURAL PLOT

STAGE 3 SITE FENCE

5M BOUNDARY SET BACK LINE

STAGE 2c

NOTES:

- All dimensions in mm unless otherwise stated. Verify all dimensions and levels on site. Report any discrepancies prior to the commencement of any work.
- All dimensions indicate the Architectural intent only. Provide shop drawings with dimensions to verify and obtain approval prior to construction.
- Use figured dimensions only. Do not scale from drawings.
- All drawings are to be read in conjunction with all consultants documents.
- Refer to specifications for codes description.
- Refer to specifications for fences types.
- Refer to finishing schedule for finishes materials and colours.
- The completion of the issue details checked and authorised section is confirmation of the status of the drawings. The drawings shall not be used for construction unless endorsed "For Construction" and authorised for issue.
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- All new paths to have 1:50 cross fall away from building entries
- Maximum path gradient 1:20 with adjacent path surface level with
- Check access requirements are met on all new paths and ramps
- Services to be reticulated to suit demoutable locations
- All demolition works to landscaping, paths, retaining walls to be made good.
- Contractors to ensure demountable buildings do not intrude on setbacks.
- Ensure all setbacks are acheived.
- Maximum path gradient 1:20 with adjacent path surface level waith path for 300mm adjacent path edge.

Issue

No.	Date	Description	Chkd
3	12/11/2017	DRAFT DUVAL DEMOUNTABLE DOCUMENTS	NBRS
4	14/12/2017	DRAFT SUBMISSION TO CONSULTANTS	NBRS
5	23/01/2018	DRAFT STAGE ONE SUBMISSION	NBRS
6	25/01/2018	STAGE ONE PRELIMINARY SUBMISSION	NBRS
7	02/02/2018	STAGE 2 PRELIMINARY SUBMISSION	

DEMOLITION
SITE BOUNDARY
SETBACK LINE
APPROXIMATE LOCATION OF TEMPORARY SITE FENCE
EXISTING WATER
EXISTING SEWER
EXISTING STORM WATER
EXISTING ELECTRICAL
EXISTING GAS
FIRE SEPERATION SETBACK (6M)
EXISTING TREES
TREES TO BE DEMOLISHED
STAGE 1
STAGE 2

DRAFT - NOT FOR CONSTRUCTION
02.02.2018

Drawing Title
PROPOSED SITE / STAGING PLAN

Project
DUVAL DEMOUNTABLE DEMAND

at
Crest Rd, Armidale NSW 2350

for
NSW DEPARTMENT OF EDUCATION

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com
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Nominated Architects: Geoffery Deane 3766; Andrew Duffin 5602; Garry Hoddinett 5286
ABN 16 002 247 565
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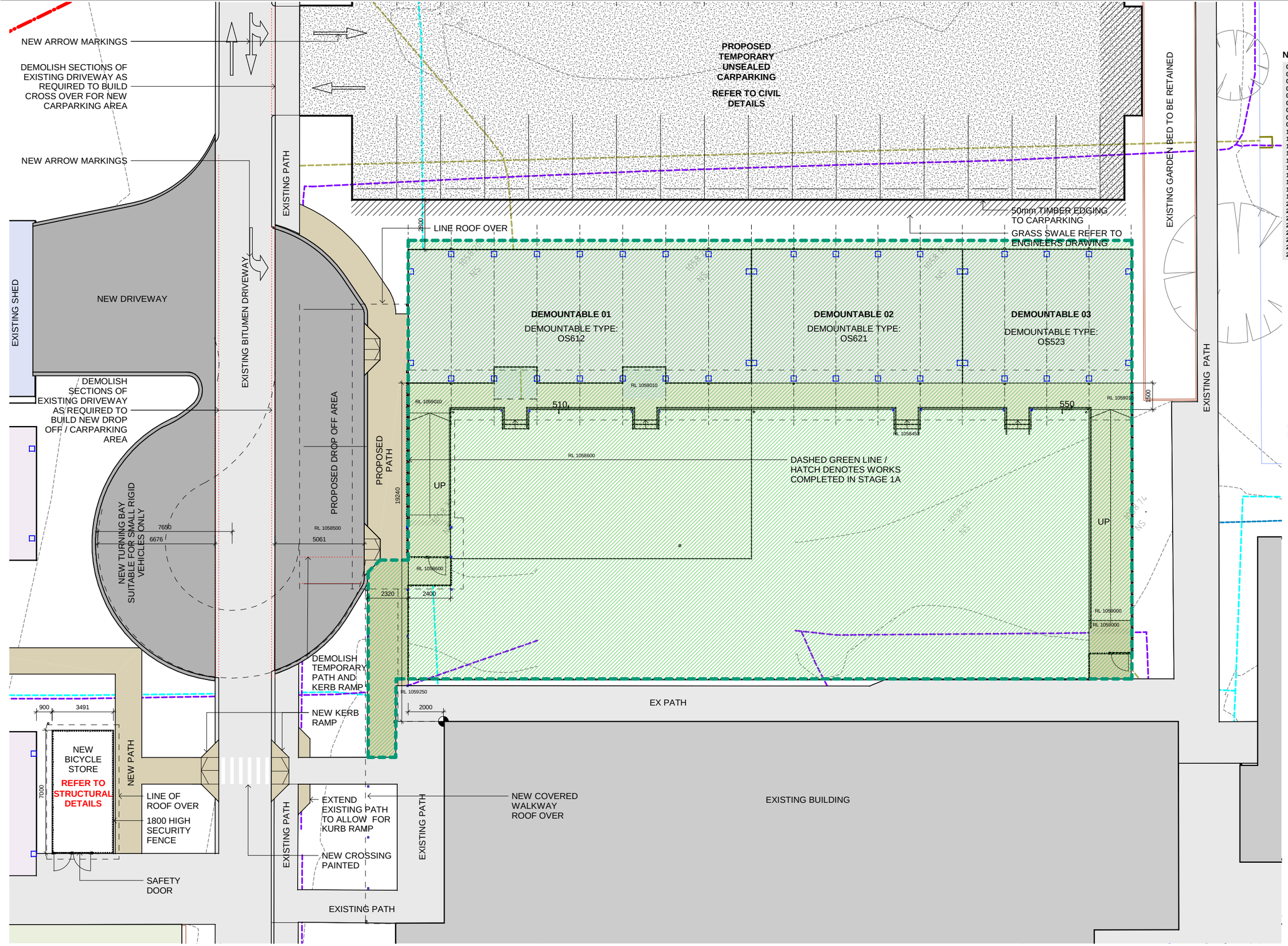
Date 2/02/2018 4:29:08 PM
Scale 100@A1 or 200@A3

Drawing Reference 17352-ID-003
Revision 7



NBRSARCHITECTURE.

NUMBER:	CODE	ASSET NUMBER
01	OS612	
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03	OS523	
04	EX. (ART)	
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07	OS842	
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14	OS616	
15	OS616	
16	OS750	
17	OS523	
18	OS616	
19	OS616	
20	OS616	
21	OS616	
22	OS616	
23	OS616	
24	OS606	
25	OS616	
26	OS616	
27	OS616	

- DEMOLITION
- SITE BOUNDARY
- SETBACK LINE
- APPROXIMATE LOCATION OF TEMPORARY SITE FENCE
- EXISTING WATER
- EXISTING SEWER
- EXISTING STORMWATER
- EXISTING ELECTRICAL
- EXISTING GAS
- FIRE SEPERATION SETBACK (6M)
- STAGE 1 WORKS
- EXISTING TREES
- TREES TO BE DEMOLISHED
- PROPOSED SOFT FALL
- PROPOSED TIMBER WALKWAY/RAMP AS PER D&C CONTRACT DETAILS
- PROPOSED CONCRETE PATH AS PER D&C CONTRACT DETAILS
- PROPOSED BITUMEN
- EXISTING PATHWAY / BITUMEN
- PROPOSED GRAVEL PARKING
- PROPOSED DEMOUNTABLES
- EXISTING BUILDING
- PIERS OVER 1200mm (REFER TO D&C CONTRACT)
- PIERS UNDER 1200mm (REFER TO D&C CONTRACT)
- SETOUT POINT

NOTES:

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Issue

No.	Date	Description	Chkd
2	01/12/2017	PRELIMINARY DOCUMENTS FOR CONSULTANTS	NBRS
3	12/11/2017	DRAFT DUVAL DEMOUNTABLE DOCUMENTS	NBRS
4	14/12/2017	DRAFT SUBMISSION TO CONSULTANTS	NBRS
5	23/01/2018	DRAFT STAGE ONE SUBMISSION	NBRS
6	29/01/2018	STAGE 2 - FOR INFORMATION	
7	02/02/2018	STAGE 2 PRELIMINARY SUBMISSION	

Drawing Title
STAGE 2a - SPECIAL NEEDS AND CARPARK

Project
DUVAL DEMOUNTABLE DEMAND

at
Crest Rd, Armidale NSW 2350

for
NSW DEPARTMENT OF EDUCATION

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com
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ABN 16 002 247 565
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Drawing Reference 17352-ID-007
Revision 7

0 1 2 3 4 5 6 7 8 9 10

Date Issued	03/05/2018						
Project	DoE, Armidale High School Redevelopment Project			From	David Logan		
Subject	Traffic Working Group Meeting #03			Tel	0459 805 315		
Venue	Teleconference			Job No	2219148		
Date / Time	Thursday 03 May 2018 – 10:30 am – 11:30 am						

A - Absent							
	David Logan	DL	GHD	**A**	Michael Flynn	MF	ARC
A	Phillip Pitt	PP	RMS		Rob Shaw	RS	ARC
A	Liz Smith	LS	RMS		Mark Wilson	MW	ARC
	John Perkins	Jp	RMS		Graham Earl	GE	ARC
	Calum Hutcheson	CH	TTM		Libby Ure	LU	NBRS
	Paul Cai	PC	TTM	**A**	Andrew Duffin	AD	NBRS
	Baqir Husain	BH	TTM				
	Roger Lee	RL	GHD				

Distributed to	All attendees and; James Frost (GHD) / Matthew Metlege & Wayne Cooper & John Marfleet (DoE)
Attachments	Nil

Item	Action / Item	By Who	By when
1.0	**General**		
1.1	The purpose of the meeting was to continue dialogue between relevant stakeholders relating to traffic issues associated with the Armidale High School Redevelopment Project. This includes impacts due to the Armidale High School (AHS) redevelopment and the temporary accommodation at Duval High School (DHS).	Note	
1.2	Minutes from meeting #02 were accepted read.	Note	
2.0	**Armidale HS Redevelopment**		
2.1	**Actions closed**		
	Nil actions closed out this meeting.		
2.2	**Ongoing items**		
	<u>Lamb St Railway crossing.</u> Mtg 02: DL is presently awaiting clarification from TfNSW regarding the SEARs requirement for considering the at-level railway crossing on Lamb St. *Mtg 03 update – Confirmed that this has been raised by ARC. Impact from pedestrian will be assessed with site survey. Further discussion to be held once this is known. Clear scope to meet SEARs requirements will be part of this discussion.*	DL	Ongoing
	<u>Gripper request</u> Mtg 01: Council data to assist project would be helpful and a request will be provided for this by the project delivery team (Gipper request). *Mtg 03 Update – TTM to obtain when up on site next week.*	TTM	11/05/18
	<u>Transport Questionnaire:</u> Mtg 02:A Questionnaire will be prepared for the AHS TIA to obtain indication about proposed mode of transport to AHS once completed. DL to coordinate survey. *Mtg 03 Update – TTM has issued draft surveys to GHD. GHD is obtaining feedback from school Principals. Survey will be undertaken next week.*	DL	11/05/18
2.3	**New items**		
	<u>TIA</u> TTM has been engaged to undertake AHS TIA. Proposed program as follows: – 'Red Flag' report highlighting proposed site survey works to be prepared by TTM and issued today for RMS / ARC comment and additional input. This is to ensure site works capture all necessary information first time. CH to prepare and issue. – Cameras are being deployed to site this week.	CH	03/05/18

Item	Action / Item	By Who	By when
	– Site survey works undertaken next week. – Draft report issued to GHD by 18/05/18.	CH	18/05/18
	RMS to provide crash data relevant to the AHS site. JP to issue to GHD and copy in TTM / NBRS.	JP	10/05/18
	RMS advised that the TTM TIA is to include impacts from temporary relocation works to and from the site.	TTM	18/05/18
	DL to forward contact for Edwards Coaches.	DL	03/05/18
3.0	**Duval HS temporary works**		
3.1	**Actions closed**		
	TTM to prepare fee proposal to update traffic assessment in accordance with 3.2.	CH	Completed
	LS to email list of RMS' concerns for Duval HS to GHD / Council / NBRS / TTM. These were noted to include: – Safety issues relating to separation between drop-off / bus zone / pick-up and street frontage to manage these items – Behavioural control measures Monitoring controls etc.	LS	Completed
3.2	**Ongoing items**		
	<u>Current TIA by TTM</u> Mtg 02: DL to issue current Traffic Assessment for DHS by TTM to RMS and Council for comment. *Mtg 03 Update – Action outstanding. DL to forward report. Note that original comments provided by NBRS and GHD have not been incorporated yet.*	DL	**ASAP**
	<u>Transport Questionnaire:</u> Mtg02: TTM to prepare and issue student transport questionnaire to DL. Questionnaire to include: – Current mode of transport to Duval HS / Armidale HS – Proposed mode of transport to Duval HS next year DL to coordinate survey to be undertaken prior to Term 1 holidays. (2 weeks away) *Mtg 03 Update – TTM has issued draft surveys to GHD. GHD is obtaining feedback from school Principals. Survey wil be undertaken next week.*	DL	11/05/18
	<u>Gipper Request</u> Mtg01: Council data regarding the Harper St subdivision would be helpful. A Gipper request will be made by the project team planner. *Mtg 03 Update – TTM to obtain when up on site next week. ARC advised that stage 1 of the subdivision works are complete and plans for these works are available.*	TTM / MW	11/05/18
3.3	**New items**		
	DL to forward email list of RMS' concerns for DHS as received to TTM.	DL	03/05/18
	<u>Revised TTM TMP required for RMS Certificate (as part of CDC)</u> Proposed program as follows: – Cameras dispatched to site today – Red Flag' report highlighting proposed site survey works to be prepared by TTM and issued today for RMS / ARC comment and additional input – Site survey works undertaken next week – Draft report issued to GHD by 18/05/18 or earlier. **Noted that this report is more critical that the AHS report.**	Note	
	ARC advised that they will complete survey count for Erskine St / crest Rd intersection and make this information available to TTM.	MW	11/05/18
	MW to issue information regarding stormwater infiltration to DL to pass onto design team. Historic survey data will also be provided.	MW	10/05/18

Item	Action / Item	By Who	By when
	TMP for DHS is to include assessment of decommissioning phase works also	TTM	18/05/18
	JP to confirm with RMS legal counsel that RMS that letter will be sufficient as RMS Certificate.	JP	18/05/18
4.0	**Other Business**		
4.1	Meeting ended at approximately 11:30 am.	Note	
4.2	Next meeting will be scheduled for 23/05/2018 following issue of draft report. DL to issue invite.	DL	04/05/18

Date Issued	29/05/2018		
Project	DoE, Armidale High School Redevelopment Project	From	David Logan
Subject	Traffic Working Group Meeting #04	Tel	0459 805 315
Venue	Teleconference	Job No	2219148
Date / Time	Wednesday 23 May 2018 – 1:00 pm – 2:00 pm		

A - Absent							
	John Marfleet	JM	DOE		Michael Flynn	MF	ARC
	David Logan	DL	GHD		Rob Shaw	RS	ARC
	Phillip Pitt	PP	RMS		Mark Wilson	MW	ARC
A	Liz Smith	LS	RMS		Graham Earl	GE	ARC
	John Perkins	Jp	RMS		Libby Ure	LU	NBRS
	Calum Hutcheson	CH	TTM	**A**	Andrew Duffin	AD	NBRS
	Paul Cai	PC	TTM		Stephanie Yue	SY	TfNSW
	Baqir Husain	BH	TTM		Lee Farrell	LF	TfNSW
	Roger Lee	RL	GHD				

Distributed to	All attendees and; James Frost (GHD) / Matthew Metlege (DoE)
Attachments	Nil

Item	Action / Item	By Who	By when
1.0	**General**		
1.1	The purpose of the meeting was to continue dialogue between relevant stakeholders relating to traffic issues associated with the Armidale High School Redevelopment Project. This includes impacts due to the Armidale High School (AHS) redevelopment and the temporary accommodation at Duval High School (DHS).	Note	
1.2	Minutes from meeting #03 were accepted read.	Note	
1.3	The TWG welcomes SY and LF from TfNSW to the discussion.	Note	
2.0	**Armidale HS Redevelopment**		
2.1	**Actions closed**		
	Nil actions closed out this meeting.		
	<u>Gipa request</u> Mtg 01: Council data to assist project would be helpful and a request will be provided for this by the project delivery team (Gipa request). *Mtg 04 Update – TTM obtained all available information when undertaking recent site survey*	TTM	Complete
	<u>Transport Questionnaire:</u> Mtg 02:A Questionnaire will be prepared for the AHS TIA to obtain indication about proposed mode of transport to AHS once completed. DL to coordinate survey. *Mtg 03 Update – TTM has issued draft surveys to GHD. GHD is obtaining feedback from school Principals. Survey will be undertaken next week.*	DL	Complete
	RMS to provide crash data relevant to the AHS site. JP to issue to GHD and copy in TTM / NBRS. *Mtg 04 Update – RMS has issued data for both AHS and DHS sites.*	JP	Complete
	DL to forward contact for Edwards Coaches.	DL	Complete
2.2	**Ongoing items**		
	<u>Lamb St Railway crossing.</u> Mtg 02: DL is presently awaiting clarification from TfNSW regarding the SEARs requirement for considering the at-level railway crossing on Lamb St. Mtg 03 update – Confirmed that this has been raised by ARC. Impact from pedestrian will be assessed with site survey. Further discussion to be held once this is known. Clear scope to meet SEARs requirements will be part of this discussion.	DL	Ongoing

Item	Action / Item	By Who	By when
	Mtg 04 update – no update, awaiting draft report.		
	TIA TTM has been engaged to undertake AHS TIA. Proposed program as follows: – 'Red Flag' report highlighting proposed site survey works to be prepared by TTM and issued today for RMS / ARC comment and additional input. This is to ensure site works capture all necessary information first time. CH to prepare and issue. – Cameras are being deployed to site this week. – Site survey works undertaken next week. – Draft report issued to GHD by 18/05/18. *Mtg 04 update: Draft report now due 29/05/18 due to focus on DHS plan first.*	CH	18/05/18
	RMS advised that the TTM TIA is to include impacts from temporary relocation works to and from the site. *Mtg 04 update: No update, awaiting draft report.*	TTM	18/05/18
2.3	**New items**		
	TfNSW requested additional assessment of Markham Street level crossing as part of the EIS report. TTM to include any impact from AHS on this crossing in the TIA. It was noted that it a survey of the Markham Street level crossing may be required.	CH Note	Ongoing
	TfNSW to provide train schedules (commercial and residential) relating to Markham Street level crossing	SY	30/05/18
	JM noted that Kentucky St has no formal crossing point and no formal kerb and guttering. RMS to confirm if there are any upcoming proposed works for funding for Kentucky St. MW noted that they have information regarding recent works/ maintenance issues at Kentucky St and will forward this information to JP at RMS.	JP MW	06/06/18 01/06/18
3.0	**Duval HS temporary works**		
3.1	**Actions closed**		
	Current TIA by TTM Mtg 02: DL to issue current Traffic Assessment for DHS by TTM to RMS and Council for comment. *Mtg 03 Update – Action outstanding. DL to forward report. Note that original comments provided by NBRS and GHD have not been incorporated yet.*	DL	Complete
	Transport Questionnaire: Mtg02: TTM to prepare and issue student transport questionnaire to DL. Questionnaire to include: – Current mode of transport to Duval HS / Armidale HS – Proposed mode of transport to Duval HS next year DL to coordinate survey to be undertaken prior to Term 1 holidays. (2 weeks away) *Mtg 03 Update – TTM has issued draft surveys to GHD. GHD is obtaining feedback from school Principals. Survey wil be undertaken next week.*	DL	Complete
	Gipa Request Mtg01: Council data regarding the Harper St subdivision would be helpful. A Gipper request will be made by the project team planner. *Mtg 04 Update – TTM obtained all available information when undertaking recent site survey*	TTM / MW	Complete
	DL to forward email list of RMS' concerns for DHS as received to TTM.	DL	Complete

Item	Action / Item	By Who	By when
	ARC advised that they will complete survey count for Erskine St / crest Rd intersection and make this information available to TTM.	MW	Complete
	MW to issue information regarding stormwater infiltration to DL to pass onto design team. Historic survey data will also be provided.	MW	Complete
3.2	**Ongoing items**		
	Revised TTM TMP required for RMS Certificate (as part of CDC) Proposed program as follows: – Cameras dispatched to site today – Red Flag' report highlighting proposed site survey works to be prepared by TTM and issued today for RMS / ARC comment and additional input – Site survey works undertaken next week – Draft report issued to GHD by 18/05/18 or earlier. **Noted that this report is more critical that the AHS report.** *Mtg 04 update:* – *TTM has issued updated TIA. Comments from ARC have been provided, including comments from Edwards Coaches. TTM to address in final revision.* – *TTM will complete TMP today and issue for comment.* – *ARC noted that it is acceptable for some aspects of TMP for operation and deconstruction to be completed at a later date, but would need to be finalised and accepted before those phases commenced.*	Note TTM TTM Note	 25/05/18 23/05/18
	Mtg 03: JP to confirm with RMS legal counsel that RMS that letter will be sufficient as RMS Certificate. *Mtg 04 Update: JP confirmed that the RMS letter can be issued upon confirmation by Armidale Council that they are happy with the TMP.*	JP Note	18/05/18
	TMP for DHS is to include assessment of decommissioning phase works also	TTM	18/05/18
3.3	**New items**		
	Armidale Council is seeking additional car parking to that shown in the draft TIA by TTM. DoE and / ARC to discuss potential for additional parking on Council land off with access off Harden St in separate meeting at 4:00 pm today.	DoE / ARC	23/05/18
	Discussion with Edwards Coaches regarding bus services will need to be ongoing. It is assumed that current bus services will remain in service.	Note	
4.0	**Other Business**		
4.1	Meeting ended at approximately 2:00 pm.	Note	
4.2	Next meeting will be scheduled for early June following issue of draft AHS TIA. DL to issue invite.	DL	30/05/18

Date Issued	08/06/2018		
Project	DoE, Armidale High School Redevelopment Project	From	David Logan
Subject	AHS Car Park Meeting #01	Tel	0459 805 315
Venue	Walsh Room – Level 15, 133 Castlereagh Street, Sydney	Job No	2219148
Date / Time	Tuesday 05/06/2018 – 9:00 am – 10:00 am		

A - Absent	David Logan	DL	GHD	Baqir Husain	BH	TTM
	Roger Lee	RL	GHD	Libby Ure	LU	NBRS
	John Marfleet	JF	DoE			
	Matthew Metlege	MM	DoE			

Distributed to	All attendees and; James Frost (GHD), Andrew Duffin (NBRS) / Calum Hutchinson, Paul Cai (TTM)
Attachments	Mark up of Current

Item	Action / Item	By Who	By when
1.0	**General**		
1.1	The purpose of the meeting was discuss car parking layout for Armidale Secondary College prior to Schematic Deign endorsement at PRG#11 (12/06/18) taking into consideration feedback from recent survey undertaken by TTM.	Note	
2.0	**Armidale Secondary College Car Parking**		
2.1	JM noted that the main objection from Council is off-road parking. This is heightened by the fact that any previous teachers who lived within walking distance of Duval HS will now have to drive to Armidale Secondary College.	Note	
2.2	LU noted that one consolidated staff carpark at the southern end of the school behind the existing staff carpark is currently planned. JM noted that the school will need to be able to have enough spots for all teachers to park on any given day. NBRS to review and advise.	LU	15/06/18
2.3	LU noted that a large garbage truck which enters the ring road will need a turnaround bay at the bottom in order to exit the site. LU to update drawings. JM noted there may be a possibly to create a one way ring road which exits onto Barry Street, however, this can be reviewed later if needed.	LU	15/06/18
2.4	JM noted that if we are upgrading the frontage of the school, it puts pressure on the council to also upgrade the crossing on Butler street.	Note	
2.5	BH noted that the recent AHS survey showed that 61 students utilised the at-level railway crossing which connects Lambs Ave and Mann Street.	Note	
2.6	JM noted that the path from Kentucky Street entrance into the school will need to be diverted to the administration block such that students are directed towards the main entrance and avoid crossing the ring road. Also, the crossing logo on Kentucky St to be removed from drawings.	LU	15/06/18
2.7	LU noted there that the triangular area among the carpark facing Butler Street which could be utilised as bus shelter. LU to confirm number of buses that can fit in designated bus letdown area.	Note	
2.8	NBRS to consult with school to confirm how taxi system needs for special education. Further discussions with taxi providers over proposed layout may be needed.	NBRS Note	15/06/18
2.9	JM noted that original parking to be include in current EIS submission. Any additional parking due to the PAF / Den Gymnasium upgrade will be under its own approval process.	Note	
2.10	BH to undertake survey of pedestrians crossing Kentucky St during this week's additional site survey.	BH	15/06/18
2.11	It was noted that teacher, student and public parking must be segregated from each other.	Note	
4.0	**Other Business**		

Item	Action / Item	By Who	By when
3.1	Meeting ended at approximately 10:00 am.	Note	

Date Issued	19/11/2018		
Project	DoE, Armidale Secondary College Project	From	David Logan
Subject	EIS discussion meeting with RMS & TfNSW – Meeting #01	Tel	0459 805 315
Venue	Teleconference	Job No	2219148
Date / Time	Tuesday 13/11/2018: 11:00 am – 12:00 pm		

Attendees	John Marfleet	JM	DoE	John Perkins	JP	RMS
	Terry O'Sullivan	TO	DoE	Ken Ho	KH	TfNSW
.	Matthew Metlege	MM	DoE	David Logan	DL	GHD

Distributed to	All attendees and; James Frost, Roger Lee and Stuart Collett (GHD)
Attachments	1. Site Plan for Armidale High School from EIS.

Item	Action / Item	By Who	By when
1.0	**General**		
1.1	The purpose of the meeting was to provide an update for the Armidale Secondary College Project. The key focus is the submission of the EIS to Department of Planning and Environment (DPE).	Note	
2.0	**Project status**		
2.1	The status for Armidale HS is as follows: – Schematic Design has been completed. – Contractor will be appointed soon. – Early works est. to commence Jan 2019, completed for Day 1 Term 1 2021. – EIS submitted last week and RMS and TfNSW should receive documents from DPE soon.	Note	
3.0	**EIS submission for Armidale High School**		
3.1	JP and KH both advised that they have not yet received the EIS documents. These can be sent by SINSW if not received in coming days. It was noted that DL sent the Traffic Impact Assessment Report from the EIS to JP and KH prior to the meeting to assist in pre-briefing for the meeting.	Note	
3.2	John Marfleet is the main SINSW point of contact for any comments regarding the EIS. JP and KH confirmed that they are the representative for each authority.	Note	
3.3	Key items relating to traffic noted by SINSW: – Parking on site accounts for all staff. – Student parking provided down near the Den gymnasium. – Bus bay is on street. SINSW is discussing this with Council. The bus bay shelter is on the school site. – Access to school by Butler St only; i.e no entrance off Kentucky St. – Existing school capacity is approx. 1000 students. The project reflects an increase of approx. 600 students.	Note	
3.4	KH noted that RMS has a strong focus on intersection safety in line with their 2021 Road Safety Plan. DL advised that intersection safety was completed in accordance with the requirements of the SEARs and included in the Traffic Impact Assessment.	Note	
3.5	KH asked if there was an increase in the number of buses. DL noted that the Traffic Impact Assessment Report advises 25 existing buses with a potential increase of 5	Note	

Item	Action / Item	By Who	By when
	buses which is conservative. JM advised that the overall number of buses is likely to go down.		
4.0	**Other business**		
4.1	Meeting ended at approximately 11:30 am	Note	

NSW GOVERNMENT

LEARNING HUB
ARMIDALE SECONDARY COLLEGE

NBRSARCHITECTURE.

LEGEND

- VEHICLE ACCESS
- PEDESTRIAN ACCESS
- BUS STOP
- CAR PARKS
- FENCE 2100H
- NATURE TRAIL
- COLA
- EXTERNAL LIGHT

  EXTERNAL LIGHT TO BASKETBALL COURTS (DUSK – 10PM). TO ELECTRICAL ENGINEERS SPECIFICATION."
- CAR PARKS AND INTERNAL RENOVATION AND RESTORATION TO B BLOCK SUBJECT TO SEPARATE PLANNING PATHWAY. THESE WORKS DO NOT FORM PART OF THIS PROPOSAL

PROJECT MANAGER
GHD Newcastle
Level 2 and 3, GHD Tower, 24 Honeysuckle Drive, Newcastle, NSW 2300
+61 2 4979 9999

STRUCTURAL/CIVIL ENGINEER
Birzulis Associates
583 Darling Street, Rozelle NSW 2039
+61 2 9555 7320

MECHANICAL/HYDRAULIC/FIRE/ELECTRICAL/ COMMUNICATIONS ENGINEERING
Marline
Unit 4 239 King Street Newcastle NSW 2300
+61 2 4925 9300

SECURITY
DEPARTMENT OF EDUCATION NSW

Issue

No.	Date	Description	Chkd
1	04.10.2018	DEVELOPMENT APPLICATION	

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com

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Nominated Architects:
Geoffery Deane 3766; Andrew Duffin; Garry Hoddinett 5286
ABN 16 002 247 565

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Project
ARMIDALE SECONDARY COLLEGE

at
BUTLER STREET, ARMIDALE, NSW, 2350

for
NSW Department of Education

Drawing Title
PROPOSED SITE PLAN

Date 15/10/2018 7:19:24 PM
Scale 1 : 1000 @ A1

Drawing Reference 17352- NBRS-DA-012
Revision 1

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Appendix B Notification to Residents

Armidale High School
Works notification

Notification of planned asbestos removal works at Armidale High School February 2019

Dear neighbours,

We are writing to inform you that scheduled removal of asbestos at Armidale High School is due to occur between X date and X date.

The material will be removed by a licensed asbestos removal contractor. The works will be conducted in accordance with the Department of Education's Asbestos Management Plan and Safe Work NSW requirements including the following precautionary measures:

- Isolation of the work area
- Monitoring, testing and clearance certification by a consultant hygienist

The works will take place between (insert dates) between (insert time), weather and site conditions permitting.

Please be advised that further remediation of the site will still be required and the site will remain closed for construction. The area has been secured and appropriate control and monitoring measures have been installed.

The health, safety and well-being of our neighbours is our highest priority and we will continue to keep the community updated as more information becomes available.

If you have any queries relating to the safe removal of asbestos at Armidale High School, please contact School Infrastructure NSW using the contact information below.

Thank you.

For more information contact:
School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
www.schoolinfrastructure.nsw.gov.au

Armidale High School
Works notification

Notification of planned demolition works at Armidale High School February 2019

Dear neighbours,

A new high school is being developed on the current Armidale High School site.

The main works contract has now been awarded and as such, we are writing to inform you that scheduled demolition works at Armidale High School is due to occur between X date and X date.

The area has been secured and appropriate control and monitoring measures have been installed. Noise and dust will be kept to a minimum as best as possible during this period.

The health, safety and well-being of our neighbours is our highest priority and we will continue to keep the you updated to ensure disruptions to the community are minimised.

We thank you for your patience during these works and we are thrilled to deliver this project for the school community.

If you have any queries relating to the new Armidale Secondary College, please contact School Infrastructure NSW using the contact information below.

Thank you.

For more information contact:
School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
www.schoolinfrastructure.nsw.gov.au


Letters dropped
Armidale High School
Hargrave St
Kentucky St
Garibaldi St
Butler St
Markham St
Lambs Ave
Railway Parade
Allingham St
Belle Ave
Mossman St
Stopped @ 181 Kentucky St.
Stopped @ 51Garibaldi St.
Stopped @ 180 Kentucky St.

Appendix C Site Parking

30 May 2019
Our Ref: 18SYT0036
Your Ref: -

Attention: Sam Lyons

Richard Crookes Constructions
Level 3,
4 Broadcast Way,
Artarmon NSW 2064

Dear Sam,

RE: **Armidale Secondary College, Armidale – SSD Draft Condition B26**

This letter has been prepared in response to item 'B26 Construction Parking' in the draft conditions of consent (SSD 9095) for Armidale High School Redevelopment by Department of Planning and Environment. The item is as follows:

Construction Parking

B26. Prior to the commencement of construction, the Applicant must provide sufficient parking facilities on-site, including for heavy vehicles and for site personnel, to ensure that construction traffic associated with the development does not utilise public and residential streets or public parking facilities.

Employees, tradespeople, small construction vehicles and heavy vehicles will be parked on site. As per the information received by the contractor the site is expected to accommodate 10 heavy vehicles and 180 cars for site personnel on site.

The parking area for heavy vehicles is shown in Attachment 1. The area marked with grey hatch will be used for heavy vehicle parking.

Car parking for site personnel is divided in to two areas. The smaller car parking area having 84 car parking spaces is located near the Butler Street – Lambs Avenue/Mann Street intersection. The small car parking area is shown in Attachment 2.

The school is being provided with a 122-car parking space school staff parking area. This car park is developed as part of the early works package and will be completed before the start of construction activities. Site personnel will be able to use this car park for on-site car parking. The plans for this car park is shown in Attachment 3.

TTM Consulting Pty Ltd
ABN 65 010 868 621
P 02 9418 3033
E ttmnsw@ttmgroup.com.au
PO Box 5238
Greenwich, NSW 2065
ttmgroup.com.au

The two car parking areas provide a combined 206 on-site car parking spaces. These parking spaces will be sufficient to accommodate the requirement of 180 on-site personnel car parking.

It is our advice that condition B26 in the draft conditions of consent (SSD 9095) has been satisfied.

Yours sincerely,

Baqir Husain
Project Consultant - Traffic

TTM Consulting Pty Ltd

Attachment 1 Heavy Vehicle Parking Plan

TTM Consulting Pty Ltd
ABN 65 010 868 621
P 02 9418 3033
E ttmnsw@ttmgroup.com.au
PO Box 5238
Greenwich, NSW 2065
ttmgroup.com.au


28 Apr 2019 - www.skyviewaerial.com.au

Attachment 2 Small Car Parking Area

TTM Consulting Pty Ltd
ABN 65 010 868 621
P 02 9418 3033
E ttmnsw@ttmgroup.com.au
PO Box 5238
Greenwich, NSW 2065
ttmgroup.com.au


84 Parking
Spots
28 Apr 2019 - www.skyviewaerial.com.au

Attachment 3 School Staff Car Park

TTM Consulting Pty Ltd
ABN 65 010 868 621

P 02 9418 3033
E ttmnsw@ttmgroup.com.au

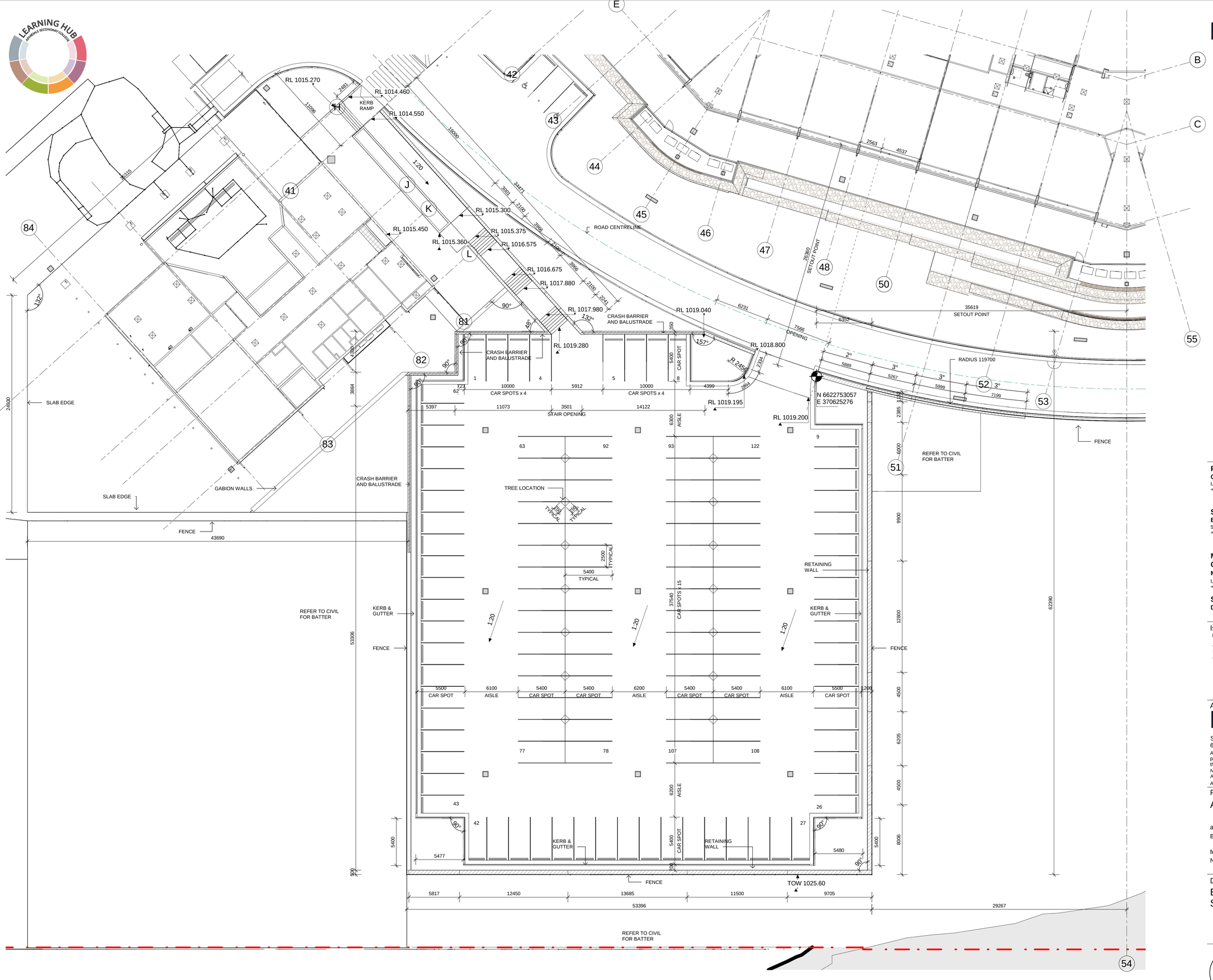
PO Box 5238
Greenwich, NSW 2065

ttmgroup.com.au

NSW GOVERNMENT

LEARNING HUB
ARMIDALE SECONDARY COLLEGE

NBRSARCHITECTURE.



PROJECT MANAGER
GHD Newcastle
Level 2 and 3, GHD Tower, 24 Honeysuckle Drive, Newcastle, NSW 2300
+61 2 4979 9999

STRUCTURAL/CIVIL ENGINEER
Birzulis Associates
583 Darling Street, Rozelle NSW 2039
+61 2 9555 7320

MECHANICAL/HYDRAULIC/FIRE/ELECTRICAL/ COMMUNICATIONS ENGINEERING
Marline
Unit 4 239 King Street Newcastle NSW 2300
+61 2 4925 9300

SECURITY
DEPARTMENT OF EDUCATION NSW

Issue

No.	Date	Description	Chkd
A	18.04.2019	For Information	
B	30.04.2019	For Construction	
C	22.05.2019	For Crown Certificate	

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com

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Nominated Architects:
Andrew Duffin NSW 5602
ABN 16 002 247 565 © 2019

Project
ARMIDALE SECONDARY COLLEGE

at
BUTLER STREET, ARMIDALE, NSW, 2350

for
NSW Department of Education

Drawing Title
EXTERNAL WORKS SETOUT - SHEET 05

Printed 22/05/2019 7:12:41 PM
Scale 1 : 200 @ A1
17352
Drawing Reference NBRS-AR-DWG-083.5
Revision C

0 1 2 3 4 5 6 7 8 9 10

Appendix G - Construction Noise & Vibration Management Plan

DAY DESIGN PTY LTD
CONSULTING ACOUSTICAL ENGINEERS

SUITE 17, 808 FOREST ROAD, PEAKHURST 2210 ABN: 73 107 291 494
P 02 9046 3800 ACOUSTICS@DAYDESIGN.COM.AU WWW.DAYDESIGN.COM.AU

Construction Noise & Vibration Management Plan

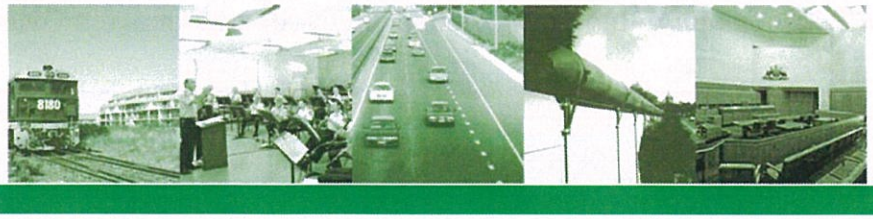
Redevelopment of Armidale Secondary College
Butler Street, Armidale, NSW

REPORT No
6495-1.2R Rev D

DATE ISSUED
15 July 2019

Prepared For:
NBRS Architects
13 / 4 Glen Street
Milsons Point NSW 2061

Attention: Ms Libby Ure



Revision History

Report	Date	Prepared	Checked	Comment
Draft	01/06/2018	Adam Shearer	Stephen Gauld	By email, for client review
Draft 2	26/06/2018	Adam Shearer	Stephen Gauld	By email, for client review
Final	02/07/2018	Adam Shearer	Stephen Gauld	
Rev A	06/02/2019	Adam Shearer	Stephen Gauld	Construction hours
Rev B	31/05/2019	Adam Shearer	Stephen Gauld	Appendix C
Rev C	07/06/2019	Adam Shearer	Stephen Gauld	Appendix D
Rev D	15/07/2019	Adam Shearer	Stephen Gauld	DPE Comments

Document R\6495-1.2R Rev D, 28 pages plus attachments

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TABLE OF CONTENTS

TABLES

1.0 EXECUTIVE SUMMARY

The Department of Education propose to redevelop the existing Armidale Secondary College at Butler Street, Armidale, NSW.

The Secondary College is located on land zoned R1 – *General Residential* under Armidale Dumaresq Local Environmental Plan (LEP) 2012. The Secondary College is bounded by Mann Street and Lambs Avenue to the north, Butler Street to the east, Kentucky Street to the south and Miller, Barry, Mossman and Stephen Streets to the west. Residential premises are located on the opposite side of Butler Street to the east and Miller and Stephen Streets to the west. The Secondary College has no shared boundary with any residential lots.

The proposal will consolidate the students from Armidale Secondary College and the nearby Duval High School. The proposal seeks approval for the following:

- Demolition of existing buildings with the exception of the heritage building (building B) and the gymnasium (Den).
- Construction of new school buildings to accommodate both Armidale Secondary College and Duval High School and allow for future growth.

The construction will include the removal of existing structures, excavation of the site and the construction of the new Armidale Secondary College buildings. The proposed hours of construction are during standard working hours.

The proposal is a State Significant Development (SSD) and has been issued Development Consent by the Minister for Planning (*SSD 9095 – 29 May 2019*). The NSW Department of Planning and Environment require an assessment against the NSW Environment Protection Authority's (EPA) *Interim Construction Noise Guideline 2009* and *Assessing Vibration: a technical guideline 2006.*

This construction noise and vibration management plan has been prepared in accordance with the Australian Standard AS2436:2010 *"Guide to noise and vibration control on construction, demolition and maintenance sites"*. Construction noise and vibration management levels have been derived from the Environment Protection Authority's *Interim Construction Noise Guideline 2009* and *Assessing Vibration: a technical guideline 2006* and are used for a quantitative assessment at the nearest affected residential receiver locations.

The major noise sources associated with the project are mobile plant and machinery to be used during the excavation and bulk earth works including rock hammering (if required) and the transport of raw materials to and from site in trucks.

There is potential, at least on some occasions, for noise emission from construction works to exceed the noise management level at some residences during various stages of the works.

All feasible and reasonable methods to reduce noise emissions and minimise the noise impact on neighbouring properties have been provided in Section 6 of this report. These include, limiting construction activity to within the prescribed hours, selecting quiet equipment, incorporating periods of respite, maintaining community consultation relations, managing noise complaints and conducting ground-borne vibration monitoring (if necessary).

Provided the recommendations in Section 6 of this report are implemented and adhered to, the level of noise and vibration from the construction works will be minimised in accordance with Australian Standard AS2436:2010 and the NSW Environment Protection Authority's *Interim Construction Noise Guideline 2009* and *Assessing Vibration: a technical guideline 2006*.

2.0 CONSULTING BRIEF

Day Design Pty Ltd has been engaged by NBRS Architects to assess the environmental noise impact of the construction of the proposed redevelopment of Armidale Secondary College at Butler Street, Armidale, NSW.

This commission involves the following:

Scope of Work:

- Inspect the site and environs
- Measure the background noise levels at critical locations and times
- Establish acceptable noise level criterion
- Quantify noise emissions from the demolition, excavation and construction works
- Calculate the level of noise emission, taking into account distance attenuation
- Prepare a site plan identifying the development and nearby noise sensitive locations
- Provide recommendations for noise control (if necessary)
- Prepare a Construction Noise and Vibration Management Plan.

3.0 PROJECT DESCRIPTION

3.1 Site Description

Armidale Secondary College is located on land zoned *R1 – General Residential* under Armidale Dumaresq Local Environmental Plan (LEP) 2012. The Secondary College is bounded by Mann Street and Lambs Avenue to the north, Butler Street to the east, Kentucky Street to the south and Miller, Barry, Mossman and Stephen Streets to the west. Residential premises are located on the opposite side of Butler Street to the east and Miller and Stephen Streets to the west, as shown on Figure 1. The Secondary College has no shared boundary with any residential lots

The nearest noise sensitive receptors to the site, in various directions, are shown in Figure 1 and as follows in Table 1.

Table 1 Noise Sensitive Receptors

Receptor and Type	Address	Direction from site
R1 – Residential	186 Mossman Street	East
R2 – Residential	187 Mossman Street	West

Each receptor location has been selected to represent the adjacent residential premises, eg R1 is representative of all residential receptors to the east of the Secondary College; R2 is representative of all residential receptors to the west of the Secondary College.

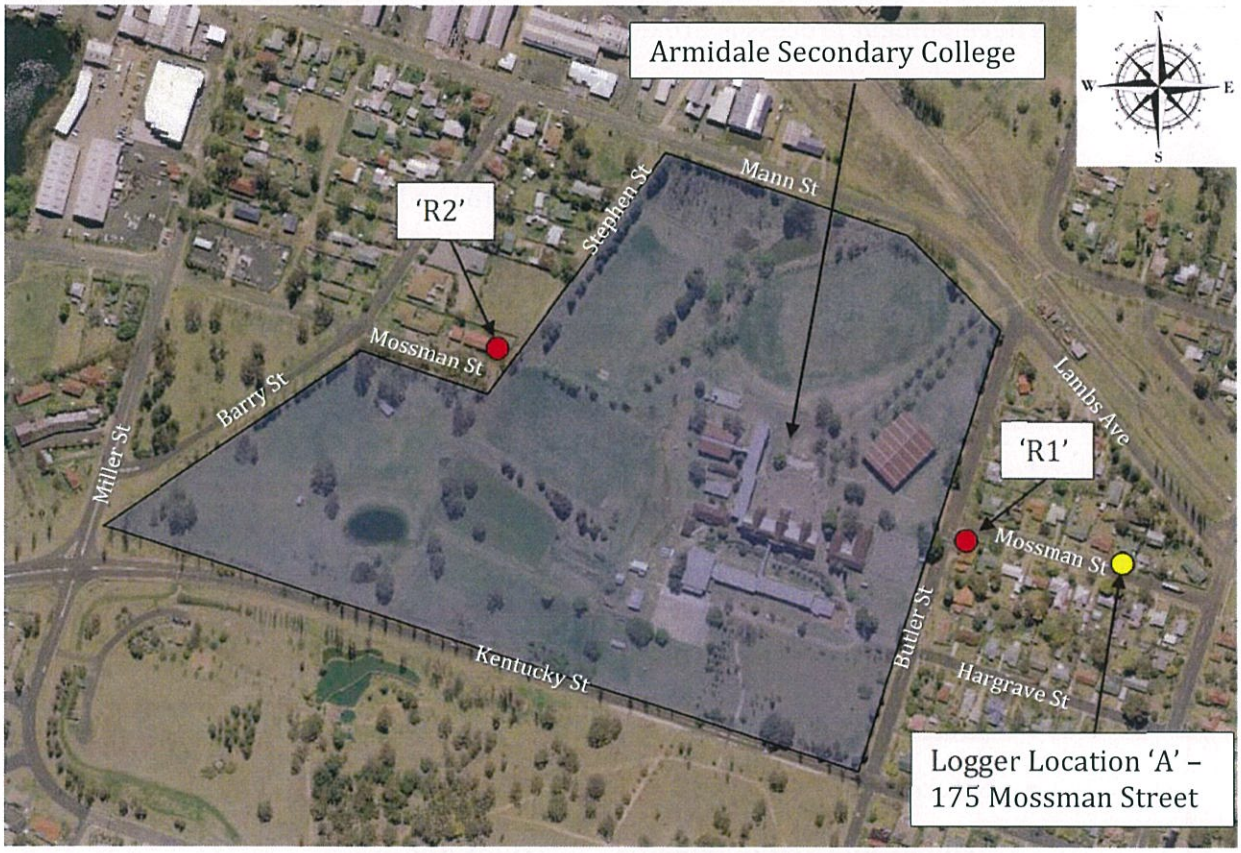


Figure 1 - Location Plan, Butler Street, Armidale, NSW.

3.2 Development Description

The development process is broken down into three phases:

- Phase 1 – Demolition of the existing buildings:
  - Expected timeframe of 4 weeks
  - Activities include use of excavator and dump trucks
- Phase 2 – Excavation and earth moving
  - Expected timeframe of 8 weeks
  - Activities include use of excavator and dump trucks, a pile bore and a rock breaker as required
- Phase 3 – Construction
  - Expected timeframe 40 weeks
  - Activities include use of cement trucks, cranes, gensets, and hand tools.

The proposed and allowable hours of construction works, including delivery of materials to and from the site, are as follows:

- Monday to Friday: 7 am to 6 pm;
- Saturdays: 8 am to 1 pm; and
- Sundays and public holidays: No work.

4.0 NOISE CRITERIA

4.1 Measured Ambient Noise Level

In order to assess the severity of a possible environmental noise problem in a residential area it is necessary to measure the ambient background noise level at the times and locations of worst possible annoyance. The lower the background noise level, the more perceptible the intrusive noise becomes and the more potentially annoying.

The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period (typically 15 minutes).

The Rating Background Level (RBL) is defined by the NSW EPA as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for the day, evening or night time periods, measured over a number of days during the proposed days and times of operation.

The places of worst possible annoyance are the nearby residential dwellings. These locations are shown in the Site Plan on Figure 1 as 'R1' to 'R2'. The times of worst possible annoyance will be during the day when the construction is occurring.

Ambient noise levels were measured in the front yard of 175 Mossman Street, Armidale, shown as Logger Locations 'A' on Figure 1, from Thursday 10 May to Friday 18 May, 2018.

The day time ambient noise levels are presented in the attached Appendix B and also below in Table 2.

Table 2 Ambient Noise Levels

Noise Measurement Location	Time Period	L_{90} Rating Background Level	Existing L_{eq} Noise Level
Logger Location 'A' - Front yard – 175 Mossman Street	Day (7 am to 6 pm)	**39 dBA**	**52 dBA**

Meteorological conditions during the testing typically consisted of clear skies and temperatures of - 4 to 20°C. Atmospheric conditions were ideal for noise monitoring. Noise measurements were therefore considered reliable and typical for the receptor areas.

4.2 NSW Department of Planning & Environment

The Minister for Planning has issued Development Consent by the Minister for Planning (*SSD 9095 – 29 May 2019*) for the Armidale High School Redevelopment, Butler Street, Armidale (SSD 9095). The Consent Conditions relating to acoustics that must be satisfied are summarised below:

'Part B PRIOR TO COMMENCEMENT OF CONSTRUCTION

Construction Environmental Management Plan

B20. Prior to the commencement of construction, the Applicant must prepare a Construction Environmental Management Plan (CEMP) and it must include, but not be limited to, the following:

(a) Details of:

(i) hours of work;

i) 24-hour contact details of site manager;

vii) community consultation and complaints handling;

(c) Construction Noise and Vibration Management Sub-Plan (see condition B23);

B23. 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;

(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 B24(b); and

(f) include a complaints management system that would be implemented for the duration of the construction.

PART C DURING CONSTRUCTION

Construction Noise Limits

C15. 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.

C16. The Applicant must ensure construction vehicles (including concrete agitator trucks) do not arrive at the site or surrounding residential precincts outside of the construction hours of work outlined under condition C5.

C17. The Applicant must implement, where practicable and without compromising the safety of construction staff or members of the public, the use audible movement alarms of a type that would minimise noise impacts on surrounding noise sensitive receivers.

C18. Any noise generated during construction of the development must not be offensive noise within the meaning of the Protection of the Environment Operations Act 1997 or exceed approved noise limits for the site.

C19. The Applicant must schedule intra-day 'respite periods' for construction activities identified in the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009) as being particularly annoying or intrusive to noise sensitive receivers. These activities are to be carried out after 8 am only and over continuous periods no exceeding three hours (with at least a one hour respite every three hours).

Vibration Criteria

C20. 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).

C21. 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 C20.

C22. The limits in conditions C20 and C21 apply unless otherwise outlined in a Construction Noise and Vibration Management Plan, approved as part of the CEMP required by condition B20 of this consent.'

4.3 Australian Standard AS2436

The Australian Standard AS2436:2010 *"Guide to noise and vibration control on construction, demolition and maintenance sites"* provides guidance on noise control in respect to construction, demolition and maintenance sites. The Standard also provides guidance for the preparation of noise and vibration management plans.

Section 1.5 'Regulatory Requirements' of the Standard states:

"Legislation associated with the control of noise and vibration on and from construction, demolition and maintenance sites in Australia is generally the responsibility of the relevant State or Territory government, local council or a designated statutory authority."

Consequently the Standard does not provide specific noise criterion rather sets out practical methods for determining the potential for noise and vibration impact on the community from construction, demolition and maintenance sites.

A qualitative method is described in Section 3.3 of the standard, which is designed to avoid the need for complex noise predictions by following a series of questions relating to, for example, whether the noise is likely to be loud, have annoying characteristics or affect sleep.

In the event that any of these outcomes are likely, a more detailed and quantitative approach should be adopted.

In relation to carrying out detailed noise impact assessments, Section 4 'General' of the standard states:

"Regulatory authorities may have relevant polices and/or guidelines for the control of noise and vibration on construction sites. These should also be referred to when developing noise and vibration management plans for such projects."

In NSW this is the NSW Environment Protection Authority's *Interim Construction Noise Guideline 2009* as outlined in Section 4.4.

The Standard further states, in Section 4.6.1, that if noisy processes cannot be avoided, then the amount of noise reaching the receiver should be minimised and goes on to provide advice and recommendations to reduce noise and vibration impacts as far as reasonably practicable.

This report has been prepared in accordance with the guidance provided in AS2436:2010.

4.4 EPA Construction Noise Guideline

The NSW Environment Protection Authority published the *Interim Construction Noise Guideline* in July 2009. While some noise from construction sites is inevitable, the aim of the Guideline is to protect the majority of residences and other sensitive land uses from noise pollution most of the time.

The Guideline presents two ways of assessing construction noise impacts; the quantitative method and the qualitative method.

The quantitative method is generally suited to longer term construction projects and involves predicting noise levels from the construction phase and comparing them with noise management levels given in the guideline.

The qualitative method for assessing construction noise is a simplified way to identify the cause of potential noise impacts and may be used for short-term works, such as repair and maintenance projects of short duration.

In this instance, the quantitative method is the most appropriate and has been used in this assessment. Details of the quantitative method are given in Section 4 of the Guideline.

Normal construction hours are defined by the EPA as follows:

- 7.00 am to 6.00 pm Monday to Friday;
- 8.00 am to 1.00 pm Saturday; and
- No work on Sunday or Public Holiday.

Table 2 in Section 4 of the Guideline sets out noise management levels at affected residences and how they are to be applied during normal construction hours. The noise management level is derived from the rating background level (RBL) plus 10 dB in accordance with the Guideline. This level is considered to be the 'noise affected level' which represents the point above which there may be some community reaction to noise.

The 'highly noise affected' level of 75 dBA represents the point above which there may be strong community reaction to noise. This level is provided in the Guideline and is not based on the RBL. Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected' noise management level.

Based on the RBLs at all sensitive residential receiver locations in the daytime, the recommended noise management level during all aspects of the construction program are summarised in Table 3.

Table 3 L_{eq} Noise Management Levels from Construction Activities

Receptor Location	Noise Management Level	How to Apply
All Residential Receptors	**49 dBA (39 + 10)**	The noise affected level represents the point above which there may be some community reaction to noise. ▪ Where the predicted or measured $L_{Aeq\ (15\ min)}$ noise level is greater than the noise affected level, the proponent should apply all feasible and reasonable* work practices to meet the noise affected level. ▪ The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. ▪ Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences); 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

*Section 6, 'work practices' of The *Interim Construction Noise Guideline*, states: *"there are no prescribed noise controls for construction works. Instead, all feasible and reasonable work practices should be implemented to minimise noise impacts. This approach gives construction site managers and construction workers the greatest flexibility to manage noise"*.

Definitions of the terms feasible and reasonable are given in Section 1.4 of the Guideline.

4.5 EPA Vibration Guideline

The NSW EPA published the *Assessing Vibration: a technical guideline* in February 2006. This guideline is based on the British Standard BS6472:1992 *"Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)."*

The guideline presents preferred and maximum vibration values for use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques. The guideline considers vibration from construction activities as Intermittent Vibration. Table 2.4 of the guideline sets out limits for Vibration Dose Values to assess intermittent vibration and is replicated below in Table 4 for residential receptor locations.

Table 4 Vibration Dose Values (VDV) from Construction Activities

Receptor Location	Daytime	
	Preferred value ($m/s^{1.75}$)	Maximum value ($m/s^{1.75}$)
All residences	0.20	0.40

The British Standard BS7385-2:1993 *"Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration"* provides guide values for transient vibration relating to cosmetic damage, replicated below in Table 5 for residential buildings.

Table 5 Transient Vibration Guide Values for Cosmetic Damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Residential buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

In our opinion, an overall peak particle velocity of **15 mm/s** at the boundaries will comply with the recommended values in Table 5, and is an acceptable criterion for intermittent vibration to prevent cosmetic damage to the adjacent residential buildings.

4.6 Project Specific Noise Criteria

In our opinion, the most relevant noise and vibration management levels for this development are those outlined in Sections 4.4 and 4.5 of this report, and summarised as follows:

- Noise management level of **49 dBA** ($L_{eq,\ 15\ minute}$) for all residential receptors;
- A Vibration Dose Value (VDV) between **0.2 – 0.4 $m/s^{1.75}$** for human annoyance in residential buildings; and
- A Peak Particle Velocity no greater than **15 mm/s** for cosmetic damage.

5.0 NOISE EMISSION

The main sources of noise on the site during the three phases of demolition and construction will be from heavy machinery such as excavators, dump trucks, cranes, cement mixers, rock breakers, etc.

Unless otherwise noted, the predicted noise levels in the following Sections assume that all equipment and plant listed are operating at the same time within the same general area along the nearest or furthest boundaries. This constitutes a worst-case scenario, however, due to the nature of the works, it is more likely that equipment will be dispersed over a wider area of the construction site and will not be continuously operating simultaneously. Typically, therefore, lower average levels can be expected.

A schedule of the sound power levels for the main demolition, excavation and construction equipment was extracted from the Day Design database of Sound Power Levels and the Australian Standard AS2436:1981 *"Guide to Noise Control on Construction, Maintenance and Demolition Sites".*

Knowing the sound power level of a noise source, the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for distance losses, barrier effects, etc.

Calculations consider distance attenuation only and the range of levels are based on the closest potential distance and furthest potential distance at which each item of plant may operate from each respective residential location. The calculated noise levels at nearby residential receptors are presented in Tables 7, 9, 11 and 12.

5.1 Phase 1 – Demolition Works

The demolition of the existing buildings is estimated to take 4 weeks and will involve the use of excavators, rock hammers to break concrete, hand tools and regular truck movements transporting waste materials from the site. The equipment likely to be used and their corresponding sound power levels are presented below in Table 6.

Table 6 Typical Demolition Plant and Equipment - Sound Power Levels

Description	Sound Power Level, dBA
Excavator – Hitachi 330	107
Truck	107
Compressor	101
Generator	99
Hydraulic Rock Breaker	118
Hand Tools	102
Bobcat	106

Note: (All sound power levels are based on previous noise measurements at various sites)

Given the intensity of work involved with concrete breaking, it is unlikely that this activity will take place at the same time as any other activity. Therefore we have assessed the noise impact of the concrete breaking individually. The calculated noise levels at nearby residential receptors are presented below in Table 7 as a worst case scenario.

Table 7 Calculated Receptor Sound Pressure Levels from Demolition Works

Receptor Location	Calculated Sound Pressure Levels (dBA)
R1 – 186 Mossman Street	57 - 75
R2 – 187 Mossman Street	53 - 59
Concrete Breaking	
R1 – 186 Mossman Street	63 - 80
R2 – 187 Mossman Street	58 - 65

5.2 Phase 2 – Excavation and Bulk Earth Works

The excavation and bulk earth works is estimated to take 8 weeks and will involve the use of excavators, rock hammers / saws, pile bores and regular truck movements transporting waste materials from the site. The equipment likely to be used and their corresponding sound power levels are presented below in Table 8.

Table 8 Typical Excavation Works Equipment - Sound Power Levels

Description	Sound Power Level, dBA
Excavator – Hitachi 330	107
Truck	107
Compressor	101
Generator	99
Piling (Bored)	111
Hydraulic Rock Breaker	118

Note: (All sound power levels are based on previous noise measurements at various sites)

Given the intensity of work involved with rock breaking, it is unlikely that this activity will take place at the same time as any other activity. Therefore we have assessed the noise impact of rock breaking individually. The calculated noise levels at nearby residential receptors are presented below in Table 9 as a worst case scenario.

Table 9 Calculated Receptor Sound Pressure Levels from Excavation Works

Receptor Location	Calculated Sound Pressure Levels (dBA)
R1 – 186 Mossman Street	56 - 73
R2 – 187 Mossman Street	51 - 58
Rock Breaking	
R1 – 186 Mossman Street	63 - 80
R2 – 187 Mossman Street	58 - 65

5.3 Phase 3 – Construction

The construction of the mixed use building is estimated to take 40 weeks and will involve the use of heavy vehicles, power tools and portable mechanical plant such as generators and compressors. The equipment likely to be used and their corresponding sound power levels are presented below in Table 10.

Table 10 Typical Construction Equipment - Sound Power Levels

Description	Sound Power Level, dBA
Cement Truck	109
Crane	104
Generator	99
Compressor	101
Power Saw	105
Nail Gun	95
Grinder	101
Bobcat	106

Note: (All sound power levels are based on previous noise measurements at various sites)

During the construction phase, work will be more dispersed across the site as the scale of work, compared to the previous phase, is less intensive. The calculated noise levels at nearby residential are presented below in Table 11 as a worst case scenario.

Table 11 Calculated Receptor Sound Pressure Levels from Construction Works

Receptor Location	Calculated Sound Pressure Levels (dBA)
R1 – 186 Mossman Street	58 - 76
R2 – 187 Mossman Street	54 - 60

5.4 Noise Emission Summary

From the calculated noise levels in Sections 5.1 to 5.3, the level of noise exceedance are presented below in Table 12.

Table 12 Calculated $L_{eq\ 15\ minute}$ Noise Levels (Without Noise Controls)

Description	Calculated Noise Levels (dBA)	
	R1 - 186 Mossman Street	R2 - 187 Mossman Street
Phase 1 – Demolition Works		
Demolition Works	57 - 75	53 - 59
Concrete Breaking	63 - 80	58 - 65
Noise Management Level	49	49
Exceedance	**Up to 31 dB**	**Up to 16 dB**
Phase 2 – Excavation Works		
Excavation Works	56 - 73	51 - 58
Rock Hammering	63 - 80	58 - 65
Noise Management Level	49	49
Exceedance	**Up to 31 dB**	**Up to 16 dB**
Phase 3 – Construction		
Construction Works	58 - 76	54 - 60
Noise Management Level	49	49
Exceedance	**Up to 27 dB**	**Up to 11 dB**

It can be seen from Table 12 above, that the predicted levels of noise from construction activities will at times be in excess of the noise management levels of 49 dBA at residential receptor locations. There is also potential for the highly noise affected level of 75 dBA to be exceeded at 'R1' during any rock hammering (if required) and also during the construction phase.

To minimise the noise impact from the construction activities we recommend that the noise controls and the management plan detailed in Section 6 of this report be implemented.

Rock hammering is not considered cumulatively as it is unknown at this stage whether it will be required, and if so where it may be required. To include it in the cumulative noise predictions would potentially over-state the predicted impact. However, as a precaution, it is recommended in the noise management controls (Section 6.2) that in the event that rock hammering is required near to residential receptors, it is conducted in the absence of any other plant operations to avoid a cumulative noise impact.

5.5 Vibration Emission

It is difficult to accurately predict levels of ground borne vibration at remote locations as there are many variables to consider including the surrounding terrain, strata, rock density, etc.

Previous measurements of ground borne vibration from rock hammering show that vibration levels can vary significantly at different distances and receptor locations. Given the distances from neighbouring developments to any potential rock hammering on site, we recommend that if warranted compliance monitoring of ground borne vibration is carried out at the nearest residences, wherever these activities are required.

Recommendations are made in Section 6.3 of this report should complaints arise from nearby residences regarding vibration from the site.

6.0 NOISE CONTROL RECOMMENDATIONS

The predicted level of noise emission from the demolition, excavation and construction activities at Armidale Secondary College, Butler Street, Armidale, NSW is in excess of the noise management levels established in Section 4.6 of this report.

In order to minimise the noise impact from all demolition, excavation and construction activities, we recommend the following engineering and management noise controls be implemented.

6.1 Engineering and Practical Noise Controls

Australian Standard AS2436:2010, Appendix C, Table C3 provides the relative effectiveness of various forms of noise control that may be applicable and implemented on various construction sites and projects. Table C3 is replicated below in Table 13.

Table 13 Relative Effectiveness of Various Forms of Noise Control

Control by	Nominal Noise Reduction Possible, dB
Distance	Approximately 6 dB for each doubling of distance
Enclosure	Normally 5 dB to 25 dB maximum 50 dB
Silencing	Normally 5 dB to 10 dB maximum 20 dB

Distance

Where applicable, we recommend locating mechanical plant near the centre of the construction area such that it is as far as practically possible from the residences to the east and west.

Enclosure

Constructing acoustical enclosures around items of mobile plant such as generators is recommended where extended use for long periods of time is expected.

Silencing

Consideration should be given to any mobile plant already acoustically treated when assessing tenders. All plant and machinery should be selected with consideration to low noise options where practicable and available.

Care should be taken to ensure that not more than one item of plant is operating simultaneously within close proximity of any given residence as far as reasonably practicable, to minimise cumulative noise impacts.

6.2 Noise Management Controls

The following noise management controls are derived from, or are in accordance with recommendations given in Australian Standard AS2436:2010 and the EPA's *Interim Construction Noise Guideline.*

Periods of Respite

We recommend that noisy construction activities such as rock hammering only operate for 2 to 3 hours at a time.

Ensure activities in any one location are staggered, for instance, if rock hammering is occurring near to a residential receptor, all other construction activities will cease in the same location so as to minimise cumulative noise impacts.

Work Practices

We recommend that workers and contractors be trained in work practices to minimise noise emission such as the following:

- Avoid dropping materials from a height.
- Avoid shouting and talking loudly outdoors.
- Avoid the use of radios outdoors that can be heard at the boundary of residences.
- Turn off equipment when not being used.
- Carry out work only within the proposed hours of operation (see Section 3.2).

Heavy Vehicles and Staff Vehicles

- Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices (for example, minimising the use of engine brakes, and no extended periods of engine idling).
- Locate site vehicle entrances away from residences where practicable.
- 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.
- Staff parking areas should be located as far from residential receiver locations as practicable.
- No motor vehicles should access the site via, or park within residential areas prior to 7 am on any occasion, in order avoid sleep disturbance.

Community Relations

- A Community Liaison Officer (Project Manager or Site Manager) is to be appointed by the contractor prior to the commencement of any works.

- The Community Liaison Officer will approach all potentially affected residents prior to the commencement of any works as an initial introduction and provide his or her contact details.
- The Community Liaison Officer will explain the project, duration of works, potentially noisy periods as well as determine any particularly sensitive receivers or sensitive time periods and schedule works accordingly, as far as reasonably practical.
- A contact number will be provided for any residents to call with complaints or queries.

Once works commence, communication with the community should be maintained by the Community Liaison Officer. Communication should be maintained via a range of media including, for example, continued individual contact, letter box drops or a clearly visible notice board at the site office or on construction site boundaries.

Consultation and cooperation between the contractor and the neighbours and the removal of uncertainty and rumour can help to reduce adverse reaction to noise.

Managing a Noise Complaint

The Community Liaison Officer should receive and manage noise complaints.

All complaints should be treated promptly and with courtesy.

Should a justified noise complaint not be resolved, noise monitoring may be carried out at the affected receptor location and appropriate measures be taken to reduce the noise emission as far as reasonably practicable.

Where it is not practicable to stop the noise, or reduce the noise, a full explanation of the event taking place, the reason for the noise and times when it will stop should be given to the complainant.

The following guidelines are recommended in Section 6 of the *Interim Construction Noise Guideline* to manage a noise complaint:

- Provide a readily accessible contact point.
- Give complaints a fair hearing.
- Have a documented complaints process, including an escalation procedure so that if a complainant is not satisfied there is a clear path to follow.
- Call back as soon as possible to keep people informed of action to be taken to address noise problems. Call back at night-time only if requested by the complainant to avoid further disturbance.
- Provide a quick response to complaints, with complaint handling staff having both a good knowledge of the project and ready access to information.
- Implement all feasible and reasonable measures to address the source of complaint.

- Keep a register of any complaints, including details of the complaint such as date, time, person receiving complaint, complainant's contact number, person referred to, description of the complaint, work area (for larger projects), time of verbal response and timeframe for written response where appropriate.

Contractor's Community Engagement

Strategies that have been developed with the community for managing high noise generating works and description of community consultation are described in Appendix C

Appendix D describes how strategies have been developed with the community for managing high noise generating works.

6.3 Vibration Monitoring

We recommend that the level of vibration be measured during any rock hammering in the event complaints arise from any nearby residences regarding vibration.

The vibration measurements can be carried out using either an attended or an unattended vibration monitor. An unattended vibration monitor should be fitted with an alarm in the form of a strobe light or siren to make the plant operator aware immediately when the vibration limit is exceeded. The vibration monitor should be set to trigger the alarm when the overall Peak Particle Velocity (PPV) exceeds **15 mm/s** at the nearest residential building.

Dilapidation reports should be commissioned for potentially affected residential premises prior to any works being undertaken. This may be reassessed once the extent of required work is known.

In the event that levels of ground-borne vibration exceed the recommended acceptable levels for cosmetic damage, vibration causing works should cease immediately and alternative methods, such as rock sawing, be considered.

6.4 Construction Disclaimer

Recommendations made in this report are intended to resolve acoustical problems only. We make no claims of expertise in other areas of building construction and therefore the recommended noise controls should be implements into the building design in consultation with other specialists to ensure they meet the structural, fire, thermal or other aspects of building construction.

We encourage clients to check with us before using materials or equipment that are alternative to those specified in our Acoustical Report.

7.0 CONCLUSION

Day Design was engaged by NBRS Architects to prepare a Construction Noise and Vibration Management Plan for the proposed redevelopment of Armidale Secondary College at Butler Street, Armidale, NSW.

Provided the recommendations in Section 6 of this report are implemented, the level of noise and vibration from the construction works at Armidale Secondary College on Butler Street, Armidale, NSW will be minimised as far as reasonably practical in accordance with the Australian Standard AS2436:2010 *"Guide to noise and vibration control on construction, demolition and maintenance sites"* and the EPA's *Interim Construction Noise Guideline 2009* and *Assessing Vibration: a technical guideline 2006*, as detailed in Section 4 of this report.

Adam Shearer, BCT (Audio), MDesSc (Audio and Acoustics), MAAS

Senior Acoustical Consultant

for and on behalf of Day Design Pty Ltd

AAAC MEMBERSHIP

Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

APPENDICES

Appendix A – Instrumentation
Appendix B – Ambient Noise Survey
Appendix C – Contractor's Community Engagement
Appendix D – Strategies to Manage High Noise Generating Works
AC108-1 to 4 – Glossary of Acoustical Terms

NOISE SURVEY INSTRUMENTATION

Noise level measurements and analysis in this report were made with instrumentation as follows:

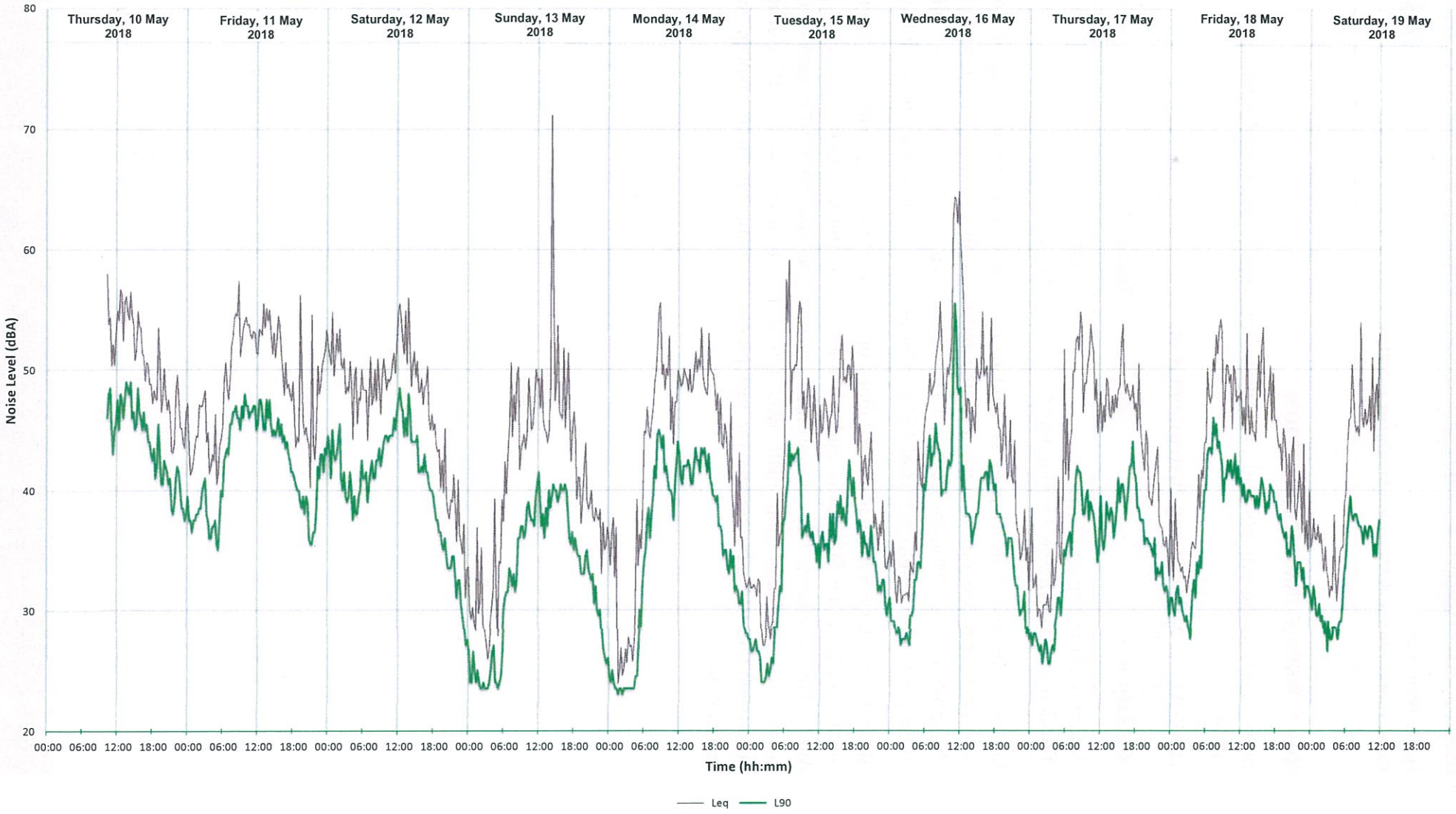
Table A1 Noise Survey Instrumentation

Description	Model No	Serial No
Infobyte Noise Logger (Type 1)	iM4	118
Condenser Microphone 0.5" diameter	MK 250	118

An environmental noise logger is used to continuously monitor ambient noise levels and provide information on the statistical distribution of noise during an extended period of time. The Infobyte Noise Monitor iM4s is a Type 2 precision environmental noise monitor meeting all the applicable requirements of AS1259 for an integrating-averaging sound level meter.

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be less than 1 dB during unattended measurements. No adjustments for instrument drift during the measurement period were warranted.

Located at 175 Mossman Street, Armidale, NSW



Letter Box Drop Flyer

The contractor has completed a letter box drop identifying the commencement of works to the community, this outlines the appropriate controls for noise and dust, controls and monitoring. The community will be updated of any disruptions that may arise. The notification includes contact delays for any quires or complaints

NSW Department of Education - School Infrastructure

Armidale High School
Works notification

Notification of planned demolition works at Armidale High School February 2019

Dear neighbours,

A new high school is being developed on the current Armidale High School site.

The main works contract has now been awarded and as such, we are writing to inform you that scheduled demolition works at Armidale High School is due to occur between X date and X date.

The area has been secured and appropriate control and monitoring measures have been installed. Noise and dust will be kept to a minimum as best as possible during this period.

The health, safety and well-being of our neighbours is our highest priority and we will continue to keep the you updated to ensure disruptions to the community are minimised.

We thank you for your patience during these works and we are thrilled to deliver this project for the school community.

If you have any queries relating to the new Armidale Secondary College, please contact School Infrastructure NSW using the contact information below.

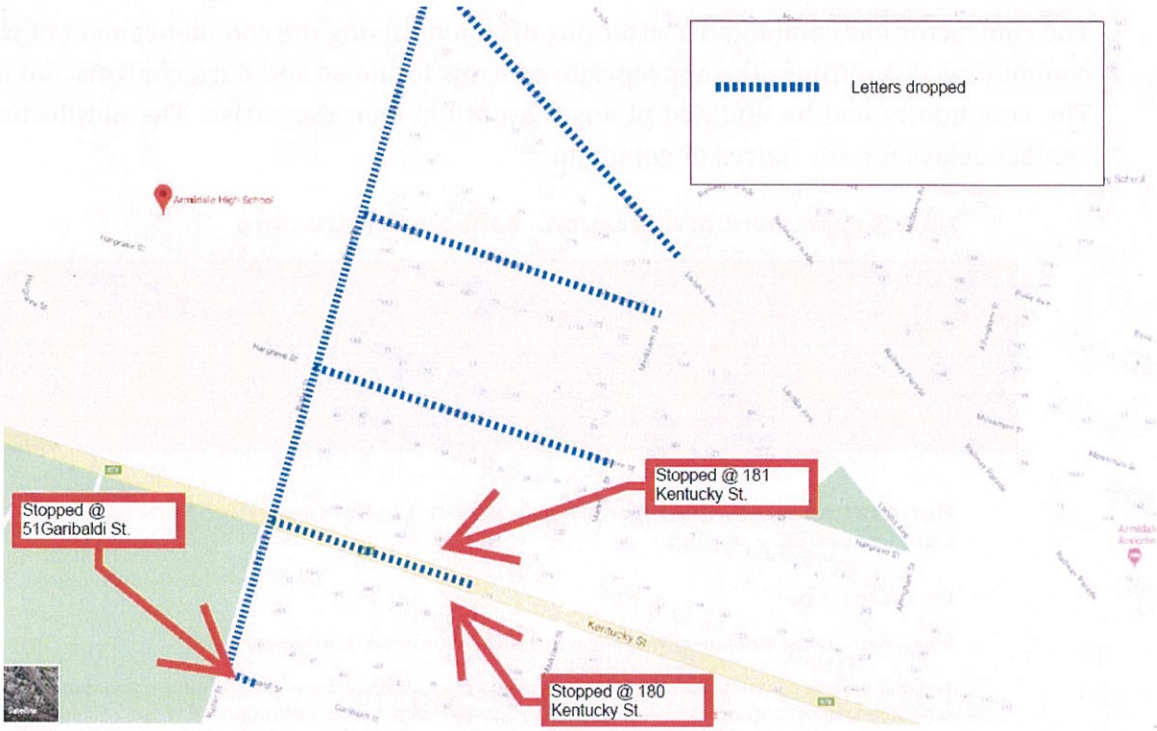
Thank you.

For more information contact:
School Infrastructure NSW
Email: schoolinfrastructure@det.nsw.edu.au
Phone: 1300 482 651
www.schoolinfrastructure.nsw.gov.au

schoolinfrastructure.nsw.gov.au

NSW

Letter Box Drop Handout Area



The contractor has also provided the community notice board at the front entry of the site. The notice board describes the current works and site contact as shown.

Community Notice Board

Complaints Management System

The contractor has implemented a complaints management system, where all complaints are reported the contractors Site & Project Managers. All complaints are placed in a register which are discussed and closed out within 24 hours.

Complaints Register

1155 - ASC

	Date	Time	Who Receieved The Complaint	Complaintants Contact details	Work Zone	Incdent/Concern/Complaint	Time of Verbal Response	Time frame for Written Response where appropriate
1	21/05/2019	5.15am	Mitch McManus	Clair Mullins 0406 117 866	Butler Street	Truck and Dogs approaching site via butler street at	Immediate	N/A
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

HOW STRATEGIES HAVE BEEN DEVELOPED WITH THE COMMUNITY FOR MANAGING HIGH NOISE GENERATING WORKS

Extensive consultation, community focus groups and workshops were undertaken as part of the EIS process for the SSD for the re-development of Armidale Secondary College.

On Wednesday 13 February, a construction project update was provided to both the school community and locally impacted residents around the Armidale High School site. The project update was designed to inform the community about upcoming demolition works and how noise and traffic would be managed during that period.

The school sent the update to the entire school community which includes the P&C and a letterbox drop was conducted to the residents.

DESCRIBES THE COMMUNITY CONSULTATION UNDERTAKEN TO DEVELOP THE STRATEGIES

To ensure adequate consultation about the works was conducted with the local residents, a door knock was conducted to provided further advice about the works and answer any questions the community had. Community contact cards were provided as well as a contact information on the project update. Refer to the following pages for a summary of the door knock.

Ongoing communication including project updates have been included in the school newsletter each month.

GLOSSARY OF ACOUSTICAL TERMS

ACOUSTICAL – Pertaining to the science of sound, including the generation, propagation, effects and control of both noise and vibration.

AMBIENT NOISE – The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including road traffic, factories, wind in the trees, birds, insects, animals, etc.

AUDIBLE – means that a sound can be heard. However, there are a wide range of audibility grades, varying from "barely audible" to "just audible", "clearly audible" and "prominent". Chapter 83 of the NSW Environment Protection Authority – Environmental Noise Control Manual (1985) states:
"noise from a particular source might be offensive if it is clearly audible, distinct from the prevailing background noise and of a volume or character that a reasonable person would be conscious of the intrusion and find it annoying or disruptive".

It follows that the word "audible" in an environmental noise context means "clearly audible".

BACKGROUND NOISE LEVEL – Silence does not exist in the natural or the built-environment, only varying degrees of noise. The Background Noise Level is the average minimum dBA level of noise measured in the absence of the noise under investigation and any other short-term noises such as those caused by cicadas, lawnmowers, etc. It is quantified by the L_{A90} or the dBA noise level that is exceeded for 90 % of the measurement period (usually 15 minutes).

- **Assessment Background Level (ABL)** is the single figure background level representing each assessment period – day, evening and night (ie three assessment background levels are determined for each 24hr period of the monitoring period). Determination of the assessment background level is by calculating the tenth percentile (the lowest tenth percent value) of the background levels (L_{A90}) for each period (refer: NSW Industrial Noise Policy, 2000).
- **Rating Background Level (RBL)** as specified by the Environment Protection Authority is the overall single figure (L_{A90}) background noise level representing an assessment period (day, evening or night) over a monitoring period of (normally) three to seven days.

  The RBL for an assessment period is the median of the daily lowest tenth percentile of L_{90} background noise levels.

  If the measured background noise level is less than 30 dBA, then the Rating Background Level (RBL) is considered to be 30 dBA.

DECIBEL – The human ear has a vast sound-sensitivity range of over a thousand billion to one. The decibel is a logarithmic unit that allows this same range to be compressed into a somewhat more comprehensible range of 0 to 120 dB. The decibel is ten times the logarithm of the ratio of a sound level to a reference sound level. See also Sound Pressure Level and Sound Power Level.

Decibel noise levels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dBA, and another similar machine is placed beside it, the level will increase to 53 dBA, not 100 dBA. Ten similar machines placed side by side increase the sound level by 10 dBA, and one hundred machines increase the sound level by 20 dBA.

dBA – The human ear is less sensitive to low frequency sound than high frequency sound. We are most sensitive to high frequency sounds, such as a child's scream. Sound level meters have an inbuilt weighting network, termed the dBA scale, that approximates the human loudness response at quiet sound levels (roughly approximates the 40 phon equal loudness contour).

However, the dBA sound level provides a poor indication of loudness for sounds that are dominated by low frequency components (below 250 Hz). If the difference between the "C" weighted and the "A" weighted sound level is 15 dB or more, then the NSW Industrial Noise Policy recommends a 5 dBA penalty be applied to the measured dBA level.

dBC – The dBC scale of a sound level meter is similar to the dBA scale defined above, except that at high sound intensity levels, the human ear frequency response is more linear. The dBC scale approximates the 100 phon equal loudness contour.

EQUIVALENT CONTINUOUS NOISE LEVEL, L_{Aeq} – Many noises, such as road traffic or construction noise, vary continually in level over a period of time. More sophisticated sound level meters have an integrating electronic device inbuilt, which average the A weighted sound pressure levels over a period of time and then display the energy average or L_{Aeq} sound level. Because the decibel scale is a logarithmic ratio the higher noise levels have far more sound energy, and therefore the L_{Aeq} level tends to indicate an average which is strongly influenced by short term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closely to the L_{Aeq} noise level.

FREE FIELD – This is a sound field not subject to significant reflection of acoustical energy. A free field over a reflecting plane is usually outdoors with the noise source resting on hard flat ground, and not closer than 6 metres to any large flat object such as a fence or wall; or inside an anechoic chamber.

FREQUENCY – The number of oscillations or cycles of a wave motion per unit time, the SI unit being the Hertz, or one cycle per second.

IMPACT ISOLATION CLASS (IIC) – The American Society for Testing and Materials (ASTM) has specified that the IIC of a floor/ceiling system shall be determined by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The IIC is a number found by fitting a reference curve to the measured octave band levels and then deducting the sound pressure level at 500 Hz from 110 decibels. Thus the higher the IIC, the better the impact sound isolation.

IMPACT SOUND INSULATION ($L_{nT,w}$) – Australian Standard AS ISO 717.2 – 2004 has specified that the Impact Sound Insulation of a floor/ceiling system be quantified by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The Weighted Standardised Impact Sound Pressure Level ($L_{nT,w}$) is the sound pressure level at 500 Hz for a reference curve fitted to the measured octave band levels. Thus the lower $L_{nT,w}$ the better the impact sound insulation.

IMPULSE NOISE – An impulse noise is typified by a sudden rise time and a rapid sound decay, such as a hammer blow, rifle shot or balloon burst.

INTRUSIVE NOISE LEVEL, L_{Aeq} – The level of noise from a factory, place of entertainment, etc. in NSW is assessed on the basis of the average maximum noise level, or the $L_{Aeq\ (15\ min)}$. This is the energy average A weighted noise level measured over any 15 minute period.

LOUDNESS – The degree to which a sound is audible to a listener is termed the loudness. The human ear perceives a 10 dBA noise level increase as a doubling of loudness and a 20 dBA noise increase as a quadrupling of the loudness.

MAXIMUM NOISE LEVEL, L_{Amax} – The rms maximum sound pressure level measured on the "A" scale of a sound level meter during a noise survey is the L_{Amax} noise level. It may be measured using either the Fast or Slow response time of the meter. This should be stated.

NOISE RATING NUMBERS – A set of empirically developed equal loudness curves has been adopted as Australian Standard AS1469-1983. These curves allow the loudness of a noise to be described with a single NR number. The Noise Rating number is that curve which touches the highest level on the measured spectrum of the subject noise. For broadband noise such as fans and engines, the NR number often equals the dBA level minus five.

NOISE – Noise is unwanted sound. Sound is wave motion within matter, be it gaseous, liquid or solid. "Noise includes sound and vibration".

NOISE REDUCTION COEFFICIENT – See: "Sound Absorption Coefficient".

OFFENSIVE NOISE - (Reference: Dictionary of the Protection of the Environment Operations Act 1997). *"Offensive Noise means noise:*

(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 likely to be harmful to) a person who is outside the premise 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."

PINK NOISE – Pink noise is a broadband noise with an equal amount of energy in each octave or third octave band width. Because of this, Pink Noise has more energy at the lower frequencies than White Noise and is used widely for Sound Transmission Loss testing.

REVERBERATION TIME, T_{60} – The time in seconds, after a sound signal has ceased, for the sound level inside a room to decay by 60 dB. The first 5 dB decay is often ignored, because of fluctuations that occur while reverberant sound conditions are being established in the room. The decay time for the next 30 dB is measured and the result doubled to determine the T_{60}. The Early Decay Time (EDT) is the slope of the decay curve in the first 10 dB normalised to 60 dB.

SOUND ABSORPTION COEFFICIENT, α – α Sound is absorbed in porous materials by the viscous conversion of sound energy to heat energy as the sound waves pass through it. Sound is similarly absorbed by the flexural bending of internally damped panels. The fraction of incident energy that is absorbed is termed the Sound Absorption Coefficient, α. An absorption coefficient of 0.9 indicates that 90 % of the incident sound energy is absorbed. The average α from 250 to 2000 Hz is termed the Noise Reduction Coefficient (NRC).

SOUND ATTENUATION – If an enclosure is placed around a machine, or a silencer is fitted to a duct, the noise emission is reduced or attenuated. An enclosure that attenuates the noise level by 30 dBA, reduces the sound energy by one thousand times.

SOUND EXPOSURE LEVEL (SEL) – The total sound energy of a single noise event condensed into a one second duration or in other words it is an L_{eq} (1 sec).

SOUND PRESSURE LEVEL, L_p – The level of sound measured on a sound level meter and expressed in decibels, dB, dBA, dBC, etc. $L_p = 20 \times \log (P/P_o)$ ... dB

where P is the rms sound pressure in Pascal and P_o is a reference sound pressure of 20 μPa. L_p varies with distance from a noise source.

SOUND POWER LEVEL, L_w – The Sound Power Level of a noise source is an absolute that does not vary with distance or with a different acoustic environment.

$L_w = L_p + 10 \log A$ ... dB, re: 1pW,
where A is the measurement noise-emission area in square metres in a free field.

SOUND TRANSMISSION CLASS (STC) – An internationally standardised method of rating the sound transmission loss of partition walls to indicate the decibels of noise reduction of a human voice from one side to the other. (Refer: Australian Standard AS1276 – 1979)

SOUND TRANSMISSION LOSS – The amount in decibels by which a random sound is reduced as it passes through a sound barrier. A method for the measurement of airborne Sound Transmission Loss of a building partition is given in Australian Standard AS1191 - 2002.

STATISTICAL EXCEEDENCE SOUND LEVELS, L_{A90}, L_{A10}, L_{A1}, etc – Noise which varies in level over a specific period of time (usually 15 minutes) may be quantified in terms of various statistical descriptors:

The L_{A90} is the dBA level exceeded for 90 % of the time. In NSW the L_{A90} is measured over periods of 15 minutes, and is used to describe the average minimum or background noise level.

The L_{A10} is the dBA level that is exceeded for 10 % of the time. In NSW the L_{A10} measured over a period of 10 to 15 minutes. It was until recently used to describe the average maximum noise level, but has largely been replaced by the L_{Aeq} for describing level-varying noise.

The L_{A1} is the dBA level that is exceeded for 1 % of the time. In NSW the L_{A1} may be used for describing short-term noise levels such as could cause sleep arousal during the night.

STEADY NOISE – Noise, which varies in level by 6 dBA or less, over the period of interest with the time-weighting set to "Fast", is considered to be "steady". (Refer AS 1055.1 1997)

WEIGHTED SOUND REDUCTION INDEX, R_w – This is a single number rating of the airborne sound insulation of a wall, partition or ceiling. The sound reduction is normally measured over a frequency range of 100 to 3,150 Hertz and averaged in accordance with ISO standard weighting curves (Refer AS/NZS 1276.1:1999).

Internal partition wall $R_w + C$ ratings are frequency weighted to simulate insulation from human voice noise. The $R_w + C$ is always similar in value to the STC rating value. External walls, doors and windows may be $R_w + C_{tr}$ rated to simulate insulation from road traffic noise. This is normally a lower number than the STC rating value.

WHITE NOISE – White noise is broadband random noise whose spectral density is constant across its entire frequency range. The sound power is the same for equal bandwidths from low to high frequencies. Because the higher frequency octave bands cover a wider spectrum, white noise has more energy at the higher frequencies and sounds like a hiss.

Appendix H - Construction Waste Management Plan

Waste and Recycling Management Plan
Armidale Secondary College

Armidale, NSW

Prepared for:
NBRS Architecture

Prepared by:
MEtech Consulting Pty Ltd

Date:
30 May 2019

Project Number:
EP98-RP01 V3.0

This document is issued in confidence to NBRS Architecture for the purposes of providing a Waste and Recycling Management Plan for the Armidale Secondary College located at Butler Street, Armidale, NSW, limited to the scope and objectives as outlined in Section 1. It must not be used for any other purpose.

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DOCUMENT OWNER

METECH CONSULTING PTY LTD
ABN 56 161 42 356
PO BOX 1184 SUTHERLAND NSW 1499
Tel: + 61 2 9575 7755
www.metech.consulting

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1 Introduction

1.1 Preamble

MEtech Consulting Pty Ltd was commissioned to prepare a Waste and Recycling Management Plan (WMP) for the Armidale Secondary College Project.

The Department of Education (DoE) has engaged NBRS Architecture as Head Design Consultant for the Armidale Secondary College Project. The project will consolidate the students from Armidale High School and Duval High School on the Armidale High School site located at Butler Street, Armidale, NSW (hereafter referred to as "the Site").

The location of the Site is shown in **Figure 1** with the existing site layout shown in **Figure 2**.

Broadly, the redevelopment comprises the construction of new, larger school buildings to accommodate both schools and allow for future growth.

It is understood that the project will have a capital investment value over $20 million and therefore has been classified as State Significant Development (SSD). SSD projects require the preparation of an Environmental Impact Statement (EIS).

It is understood that as part of the Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the redevelopment, the NSW Department of Planning and Environment have required that a Waste Management Plan (WMP) be developed for the Site.

This WMP has been prepared to address the requirements of the SEARs for inclusion as part of the EIS as well as SSD condition B24.

1.2 Scope

This WMP applies to the overall construction and on-going operation of the project.

This WMP has been prepared making reference to architectural drawings supplied by NBRS Architecture (Ref. 17352 – NBRS-DA-082 Rev 1, 10 October 2018).

This WMP has been divided into Design and Management (refer **Section 3**), and Generation and Avoidance (refer **Section 4**).

1.3 Objectives

The objectives of this WMP are to:

- Identify potential wastes likely to be generated at the Site during the construction and operational phases of the redevelopment, including a description of how waste would be handled, processed and disposed of (or re-used/recycled), in accordance with local and State requirements;
- Encourage the minimisation of waste production and maximisation of resource recovery;
- Ensure the appropriate management of contaminated/hazardous waste;
- Identify procedures and chain of custody records for waste management; and
- Assist in ensuring that any environmental impacts during the development comply with the requirements of NSW Department of Planning and Environment and other relevant authorities.

1.4 Project Description

The overall project scope is for an upgrade and expansion of the current Armidale High School including the addition of new teaching spaces and upgrades to core facilities. The project will consolidate the students from Armidale High School and Duval High School. The redeveloped Armidale Secondary College will accommodate 110 full-time equivalent staff and 1580 students (an increase of 1000).

The Site contains the 'Armidale High School – Original Circa 1921, 2-Storey Building, Grounds' heritage item, as listed on the NSW State Heritage Inventory (refer **Figure 2**). It is proposed to retain the structure of the building and redevelop the interior of the building with an all-new fit out.

The proposed development will comprise: three new buildings forming an arc around the heritage-listed building; new games courts; an extension to the existing gymnasium; and re-landscaping of the area surrounding the new buildings (refer **Figure 3**).

Demolition of the existing building and preliminary construction are to take place prior to the works addressed in this WMP. Waste minimisation strategies for this phase of works are outlined in *Waste Management Plan: Early Works, Armidale Secondary College, Armidale, NSW* (MEtech Consulting, 2018).

2 Waste Management and Recycling

2.1 Waste Management Hierarchy

This WMP aims to meet the principles of the waste management hierarchy by promoting waste as a resource through the following in order of preference:

- *Waste avoidance* through prevention or reduction of waste generation. Noting that waste avoidance is best achieved through better design and purchasing choices.
- *Waste reuse*, without substantially changing the form of waste.
- *Waste recycling* through the treatment of waste that is no longer usable in its current form to produce new products.
- *Energy recovery* through thermal treatment of residual waste materials and from green waste processing.
- *Waste disposal*, in a manner that causes the least harm to the natural environment.

2.2 Benefits of Implementing Better Practice for Waste Management and Recycling

The primary benefits of implementing a WMP strategy include:

- Enhanced social and environmental reputation of an organisation;
- Reduced costs associated with waste disposal;
- Benefits to all stakeholders and the wider community; and
- Improved environmental outcomes.

2.3 Waste Legislation and Guidance

The legislation and guidance outlined in **Table 2.1** forms the basis for the waste management strategies and requirements outlined in this WMP.

Table 2.1: Waste Legislation and Guidance

Legislation	Objectives
Waste Avoidance and Resource Recovery Act 2001	To promote extended producer responsibility in place of industry waste reduction plans. Specific objectives include: • To encourage efficient use of resources. • 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.
Protection of the Environment Operations Act (POEO) 1997 & Amendment Act 2011	Administered by the Environmental Protection Authority (EPA) to enable the Government to establish instruments for setting environmental standards, goals, protocols and guidelines. *Important note*: The owner of a premises, the employer or any person carrying on the activity which causes a pollution incident is to immediately notify the relevant authorities. A list of each relevant authority is provided in the POEO Amendment Act and will be noted in the Site's incident register.
POEO (Waste) Regulation 2014	Contains provisions relating to the waste levy, waste tracking, management requirements for certain waste types, payment schemes for councils, consumer packaging recycling and other miscellaneous provisions.
NSW EPA's Waste Classification Guidelines (Part 1) 2014	To assist waste generators to effectively classify, manage, treat and dispose of waste to ensure the environmental and human health risks associated with waste are managed appropriately and in accordance with the POEO Act and is associated regulations.
Building Code of Australia (BCA) and relevant Australian Standards (AS)	The BCA (and AS) have the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently.
EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	The NSW EPA's Better Practice Guidelines 2012 provides advice to help architects, developers, council staff and building managers to incorporate better waste management practice into the design, establishment, operation and ongoing management of waste services in commercial and industrial developments.
NSW EPA's Waste Avoidance and Resource Recovery (WARR) Strategy 2014-21	A key component of the State Government's vision for the environmental and economic future of the state that will be supported financially by the *Waste Less, Recycle More* funding initiative providing long-term targets for 6 key result areas including reduced illegal dumping.

3 Design and Operation

This section outlines waste considerations in the design of the development and addresses operational waste management considerations, including arrangements for ongoing waste service collection.

3.1 Construction Design

Facilities for garbage and recycling are essential aspects of a building that are often overlooked. A small amount of planning in the design stage saves a great deal of difficulty and inconvenience for future occupiers, building managers and collection crews throughout the future life of the building.

The proposed development is designed to generate comparatively small amounts of waste and minimise off-site disposal. It is intended that much of the new works will utilize prefabricated components and finishes to minimise waste that would typically be produced in a traditional onsite construction process. When off-site disposal is required, it will be done so with careful consideration of any reuse or recycling opportunities (outlined in **Section 4.6**).

The following have been considered in the design of the proposed development:

- The appropriate location of waste management facilities.
- Design to standard material sizes to reduce potential generation of waste.
- Use of pre-cut/prefabricated material.
- Use of basic designs to reduce the need for off-cuts.
- Use of resource efficient building materials.
- Use of glazed windows to improve thermal performance and reduce energy input.
- Potential re-use off-cuts in building design.

3.2 Ongoing Management

The proposed development is a secondary education facility with capacity for up to 1,580 students. This section outlines typical waste generation rates that may be experienced during active school year and relevant waste management procedures to accommodate.

Upon redevelopment, Armidale Secondary College should adhere to the WMP for compliance, in consultation with direction from the Management's Representative (refer **Section 3.2.5**).

3.2.1 Operational Waste Generation Rates

The NSW EPA's *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities* provides estimates for waste generation rates based on types of premises.

The guidelines do not provide generation rates for high schools. However based on an evaluation of the proposed development and with reference to the parameters of the premise types identified in these guidelines, the following comparison premises have been adopted for this WMP:

- Primary education.

- Tertiary education.
- Offices.

Details of the estimated waste generation rates for each type of premise are outlined in **Table 3.1**.

Table 3.1: Guideline Waste Generation Rates

Type of Premises	Average L per 100 m^2 per Week [A]		Maximum L per 100 m^2 per Week [A]	
	Waste Generation	Recycling Generation	Waste Generation	Recycling Generation
Primary education	35	0	35	0
Tertiary education	125	15	200	35
Offices	40	30	80	60

A. Guideline waste generation rates are reported per day. Guideline rates have been multiplied by a factor of 5 to estimate weekly generation rates.

Reported waste generation rates from the current Armidale High School, as well as examples of reported waste generation rates from other schools in NSW, were also considered, as outlined in **Table 3.2.**

Table 3.2: Examples of Comparable School Waste Generation Rates

School	Students (Approx.)	Estimated Maximum L per Week [A]		Estimated Maximum L per Week per Student	
		Waste Generation	Recycling Generation	Waste Generation	Recycling Generation
Existing Armidale High School	700	5,750	750 + 840 = 1,590 [B]	8.21	2.27
Parramatta Public School [C]	600	6,000	2,400	10.0	4.00
Parramatta High School [C]	1600	15,000	3,360	9.38	2.10

A. Based on reported waste bin sizes and collection frequencies.
B. Sum of various recycling streams. Armidale High school currently employs multiple collection services, including community initiatives such as Challenge community recycling services and commercial recycling collection.
C. The Mack Group Waste Management Consultants, 11 October 2017, *Waste Management Plan (WMP) for Operational Waste – General Waste and Recyclable Waste DA Submission – Quakers East Hill Public School*.

3.2.2 Estimation of Operational Waste Volumes

The proposed development is a secondary education facility with capacity for up to 1,580 students and a total floor area of approximately 16,890 m^2.

With reference to the guideline waste generation rates provided in **Table 3.1** and the comparable school waste generation rates in **Table 3.2** it is estimated that the waste generation will likely fall somewhere between those provided for tertiary and primary education.

Based on the proposed student capacity and floor areas provided for the development, an estimate of typical weekly waste generation volumes for the proposed development are provided below in **Table 3.3**.

Table 3.3: Anticipated Operational Waste Generation Rates

School	Anticipated Size		Estimated Maximum L per Week	
	Students (capacity)	Total Floor Area (m^2)	Waste Generation	Recycling Generation
Armidale Secondary College	1,580	16,890	14,500	4,100

Note: All waste generation rates are approximate only.

3.2.3 Waste and Recycling Storage

The proposed development is to include designated waste and recycling storage areas designed in accordance with Appendix F (Waste Management Plan Checklists - Design Phase) of the *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities*.

Space is to be provided for the storage of all waste and recycling generated by the development in the designated bin areas.

The proposed areas for waste storage during the ongoing use of the premises are shown in **Figure 3** with the proposed areas for waste storage during the construction phase shown in **Figure 4**.

Interim waste storage locations will comprise small bins placed throughout the school. A schoolgrounds caretaker or nominated waste collector will collect and transport this waste to the central waste enclosure, that is open to the sky, located adjacent to the agriculture loading zone, shown in **Figure 3**.

The waste/recycling storage areas must be designed to accommodate bins that are of sufficient volume to contain the estimated quantity of waste generated between collections (refer **Table 3.2**).

Table 3.4 offers suggested bin arrangements that are of sufficient volume to contain the estimated quantities of waste generated in between collection times (see **Table 3.4**) in typical conditions.

Table 3.4: Suggested Bin Arrangements

Suggested Type of Bin	Bin footprints	Total bin storage area required	Area required considering maneuvering space
Garbage: 3 x $3m^2$ Recycling: • Commercial: 1 x $3m^2$	$3m^3$ - $2.7m^2$	Garbage: $8.1m^2$ Recycling: $2.7m^2$	($8.1m^2$ + $2.7m^2$) x 2 = $21.6m^2$
Recycling: • Challenge (community initiative): 6 x 240L	240L – $0.43m^2$	Recycling: $0.43m^2$	($0.43m^2$) x 2 = $0.86m^2$

Bin sizes and specifications vary according to type of equipment and manufacturer. A full list of bin types and dimensions is available in Appendix B (Waste Management Equipment) of the *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities.*

Upon redevelopment, Armidale Secondary College must establish and/or maintain a valid contract with a licensed waste contractor for the regular collection and disposal of the waste and recyclables that are generated on site. The redeveloped Armidale Secondary College should keep written evidence of these contracts on site.

Arrangements must be in place for all parts of the development for the separation of recyclable materials from general waste. The type and volume of containers used to hold waste and recyclable materials must be compatible with the collection practices of the nominated waste contractor.

Table 3.5 offers suggested collection frequencies to accommodate the estimated quantities of waste generated in between collection times in typical conditions, based on the bin arrangements listed in **Table 3.4**.

Table 3.5: Suggested Collection Frequency

Suggested Type of Bin	Frequency
Garbage: 3 x $3m^2$ Recycling: • Commercial: 1 x $3m^2$	Garbage: 2 x per week Recycling: 1 x per week
Recycling: • Challenge (community initiative): 6 x 240L	Recycling: 1 x per week

3.2.4 Signage

Waste management measures must be clearly communicated to building managers, administration and cleaners. The following communication strategies are recommended to achieve this:

- Use of consistent signage and colour coding throughout the development in accordance with the requirements of Appendix E of the NSW EPA's *Better Practice Guidelines Waste Management and Recycling in Commercial and Industrial Facilities*.
- Training of all staff in correct waste separation and management procedures.
- Provision of directional signage to show location of and routes to waste storage areas in accordance with the requirements of Appendix E of the NSW EPA's *Better Practice Guidelines Waste Management and Recycling in Commercial and Industrial Facilities*.
- Clear labelling of co-mingled and general waste bins to ensure no cross contamination.

3.2.5 Responsibilities

The responsibilities for the implementation of the WMP are outlined in **Table 3.6**, noting that the Management Representative is ultimately responsible for compliance with local and State requirements.

Table 3.6: Waste Management Responsibility Allocation

Responsible Person	General Tasks
Management Representative	Ensure the WMP is implemented during the ongoing use of the premises.
	Update the WMP on a regular basis (e.g. annually) to ensure the Plan remains applicable.
	Undertake liaison and management of waste collections during the ongoing use of the premises.
	Manage any waste-related complaints and non-compliances reported through waste audits etc.
	Prepare and implement operational and maintenance plans to ensure: • Waste storage areas and equipment are kept clean and in good condition; • Bins are not overfilled; • Signage remains clean, clear and applicable; and • Interim garbage holding areas are kept tidy.
	Establish and/or maintain contracts for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.
	Retain a copy of this WMP and copies of all waste disposal receipts.
Caretaker / Nominated Waste Collector	Transport of bins to and from the bin holding areas as required.
	Cleaning of bins and waste and recycling rooms on a weekly basis or as required.
Caretaker / cleaners	Removal of general waste, recyclables, cardboard waste, bulk waste and e-waste, and hazardous waste from interim collection areas around the Site to the waste and recycling storage areas on a daily basis or as required.
Gardening Contractor	Removal of all garden organics waste generated during gardening maintenance activities for recycling at an offsite location or reuse as organic mulch on landscaped gardens.
Building Contractor	Ensure the WMP is implemented during the construction and demolition phases of the development.
	Update the WMP as necessary as further details of building plans become available to ensure the Plan remains applicable.
	Undertake liaison and management of waste collections during the construction and demolition phases of the development.
	Inform employees and subcontractors of Site waste management procedures.
	Keep a copy of this WMP and copies of all waste disposal dockets onsite.

4 Construction

The demolition and construction phases of developments have the greatest potential for waste minimisation. This section outlines waste estimates and management of site wastes during the construction phase of the redevelopment.

Waste estimates and management of site wastes during the demolition phase of the redevelopment can be found in *Waste Management Plan: Early Works, Armidale Secondary College, Armidale, NSW* (MEtech Consulting, 2018).

4.1 Waste Avoidance

The Building Contractor must identify opportunities for waste avoidance including the following:

- Appropriate sorting and segregation of construction wastes to ensure efficient recycling of wastes;
- Selecting construction materials taking into consideration their lifespan and potential for reuse;
- Ordering materials to size and ordering pre-cut and prefabricated materials;
- Planned work staging;
- Reducing packaging waste on-site by returning packaging to suppliers where possible, purchasing in bulk, requesting cardboard or metal drums rather than plastics;
- Careful on-site storage and source separation; and
- Subcontractors informed of Site waste management procedures.

4.2 Waste Generation Rates

The Building Contractor should record the types and quantities (including the volume and weight) of wastes produced during the construction phase of the development, and on this basis, the numbers and capacity of skips/bins can be determined.

A guide/estimate of the potential waste percentages is provided based on “rule of thumb” waste generation rates for construction projects, as indicated in **Table 4.1**.

Table 4.1: Guideline Waste Generation Rates

Guideline Waste Generation Rates for Construction[A]	
Material	**Estimated Waste**
Timber	5-7% of material ordered
Plasterboard	5-20% of material ordered
Concrete	3-5% of material ordered
Bricks	5-10% of material ordered

Guideline Waste Generation Rates for Construction[A]	
Material	**Estimated Waste**
Tiles	2-5% of material ordered

A. Inner Sydney Waste Board, 1998, *Waste Planning Guide for Development Application.*

4.3 Construction

The estimated volumes of waste materials generated by the construction of new buildings at the Site has been calculated using the waste generation rates (refer **Table 4.1**).

It is noted that all waste generation rates are approximate only.

Table 4.4: Estimated Quantities of Waste Construction Materials

Material	Estimated Volume (m^3)			Details
	Reuse	Recycle	Disposal	
Timber	70		-	Any additional timber will be assessed for potential reuse elsewhere onsite or removed for resale or recycling.
Concrete	-	400	-	Removed from site, crushed and on sold as drainage media and road base.
Bricks/pavers	-	300	-	Removed from site, crushed and on sold as drainage media and road base.
Plasterboard	-	55	-	Removal for recycling, return to suppliers.
Tiles	-	55	-	Separated onsite and removed for recycling.
Metal	-	1.5	-	Separated onsite, removed and returned as scrap metal for reprocessing.
Glass	-	1.5	-	Removed from site, crushed and recycled.
Fixtures & fittings	<1		-	Reused elsewhere onsite if possible or removed for resale or recycling.
Floor coverings	-	1	-	Separated onsite and removed for recycling or waste.
Plastics	-	1	-	Separated onsite and removed for recycling or waste.
Garden organics	-	-	-	Mulched for reuse on site.
Paper/cardboard	-	1	-	May be reused as mulch or recycled.
Residual waste	-	-	-	-
Hazardous wastes	-	-	-	Should any hazardous material be discovered during the construction works it is to be disposed of according to relevant guidelines and regulations. Refer **Section 4.4**.
Other	-	-	20	Separated onsite and removed for recycling or waste.

4.4 Hazardous Materials Removal

Prior to the commencement of any alterations, additions or demolition works on a building, all hazardous materials shall be removed from the subject building. Hazardous materials may include:

- Asbestos Containing Material (ACM);
- Lead-based paint;
- Class of compounds known as Polychlorinated Biphenyls (PCBs); and
- Contaminated dust and combustible materials.

Before starting any demolition works, all areas of the workplace, including basements, cellars, vaults and waste dumps, should be examined to determine whether:

- There are any items which could present a fire and explosion risk;
- Any previous use of the site might cause a risk because of the nature of and/or degradation of materials; and
- There are any toxic or hazardous chemicals present.

The Building Contractor (refer **Section 3.2.5**) should inform all workers and other persons at the workplace of the presence of hazardous chemicals and the control measures for exposure and safe disposal. Safety Data Sheets (SDS) for hazardous chemicals must be made readily available for reference.

Appropriate, clean facilities and amenities must be provided for workers to minimise risks where there are hazardous materials present.

4.4.1 Asbestos

Management and removal of ACM must be undertaken in accordance the requirements of:

- Safe Work Australia (December 2011) *Code of Practice – How to Manage and Control Asbestos in the Workplace*;
- Safe Work Australia (December 2011) *Code of Practice – How to Safely Remove Asbestos*; and
- *Work Health and Safety Regulations 2011.*

Any construction work including demolition work that involves or is likely to involve the disturbance of asbestos is defined by the WHS Regulations as high risk construction work and a SWMS must be prepared before this work commences.

Non-friable asbestos materials that are intact and structurally sound may remain in place provided that they are not disturbed (e.g. sawn, drilled, abraded or the like).

However where demolition, refurbishment, maintenance or other works are likely to disturb ACM, then the ACM must be removed in accordance with the *Asbestos Management Plan* (Richard Crookes Constructions, February 2019), refer **Appendix A.**

All asbestos waste must be disposed at a waste collection facility licensed to receive asbestos waste (refer **Section 4.4.4**). All tipping dockets should be retained.

4.4.2 Lead Paint

If it is suspected that the structure contains lead based paint, a test for the presence of lead should be conducted. Testing can recognise dried paint film with more than 1 per cent (by weight) to be lead-containing paint.

If lead is present in paint that is still in good condition and it is not a friction or impact surface, it is not likely to present a health hazard unless disturbed by sanding or mechanical or water damage. However, if the paint is in poor condition, such as flaking, peeling or badly chalking, it may present a risk.

Precautions which should be undertaken when demolishing materials containing lead are as follows:

- Minimising the generation of lead dust and fumes;
- Cleaning work areas properly during and after work;
- Wearing the appropriate PPE, such as dust masks, overalls, etc.; and
- Maintaining good personal hygiene.

All works must be carried out in accordance with the requirements of *AS4361: Guide to Lead Paint Management.*

4.4.3 Polychlorinated Biphenyls (PCBs)

Prior to the commencement of any alterations, additions or demolition works on a building, fluorescent light and fan fittings should be isolated by a licenced electrician and disassembled to confirm the presence/absence of metal type capacitors that may contain PCBs.

Appropriate control measures should be implemented when handling damaged capacitors to ensure that any spillage does not contact workers and is appropriately cleaned up and disposed of.

If PCBs are identified in fluorescent light fitting capacitators, they should be safely removed and disposed of by a competent electrician in accordance with:

- Australian and New Zealand Environment and Conservation Council (ANZECC, 1997) *Identification of PCB Containing Capacitators;*
- *WHS Regulation 2011;*
- NSW EPA (1997) *Polychlorinated Biphenyl (PCB) Chemical Control Order*; and
- ANZECC (2003) *Polychlorinated Biphenyls Management Plan, Revised Edition.*

Any equipment or parts containing PCBs should be placed in a polyethylene bag and then placed into a marked sealable metal container.

If PCBs cannot be transported immediately for disposal, all containers should be stored in a protected area which prevents any discharge of PCBs to the environment.

PPE including gloves made of materials that are resistant to PCBs (for example polyethylene, nitrile rubber or neoprene), should be provided to workers and worn when there is any likelihood of exposure to PCBs.

4.4.4 Hazardous Materials Disposal

Hazardous and/or contaminated material that is not suitable to remain onsite shall be transported for offsite disposal to a suitably licensed facility.

Hazardous materials waste should be assessed and classified for disposal in accordance with the NSW EPA (2014) *Waste Classification Guidelines: Part 1 – Classifying Waste*.

At the time of the preparation of this WMP, the Armidale Waste Management Facility is licensed to accept asbestos waste under EPL 5860 (refer **Table 4.5**).

4.5 Re-use, Recycling and Disposal of General Materials

Effective management of construction materials and construction waste, including options for reuse and recycling where applicable and practicable, must be conducted. Only project wastes that cannot be practicably and cost effectively reused or recycled are to be sent to landfill or appropriate disposal facilities.

The following specific procedures are to be implemented:

- Waste materials such as timber, metal, brick, concrete to be recycled by an appropriately licensed recycling facility for processing and reuse;
- All solid waste timber, brick, concrete, rock that cannot be reused or recycled to be taken to an appropriate landfill site and disposed of in an approved manner; and
- All garbage to be disposed of via a council-approved system.

4.6 General Materials Waste Storage and Servicing

The number and capacity of skips and bins will be determined by the Building Contractor and must be able to accommodate the estimated quantities of waste produced during construction activities (refer **Table 4.1**). Sufficient space is to be provided for waste storage ensuring local council requirements are complied with, particularly in relation to the placement of skips and traffic control, if necessary.

All building waste generated on site, when it is not able to be directly deposited into the skip bins, is to be placed in designated stockpile areas within the site for transfer to the skip bins by bobcat or other means.

The Building Contractor will be responsible for establishing on-site waste sorting and segregation systems to ensure efficient recycling of waste, including appropriate signage for recycling areas/skip bins. This must include measures to prevent the migration of waste from the Site, damage by the elements and odour and health risks, and may include bunding, skip covers, asbestos rated enclosures or other appropriate controls, as needed.

4.7 Probable Destinations for Off-Site Disposal

The nearest waste management centres to the Site are provided below in **Table 4.5**.

Table 4.5: Waste Management Centres

Location	Address	Distance from Site	Phone	Mon-Fri	Sat-Sun
Armidale Waste Management Facility	108 Long Swamp Road, Armidale	Approx. 5 km	(02) 6772 7090	7:30am-5pm	12pm-5pm
Armidale Recycling Centre	108 Long Swamp Road, Armidale	Approx. 5 km	(02) 6772 2033	7:30am-5pm	12pm-5pm
Guyra Recycling & Transfer Station	Everett Street, Guyra	Approx. 40 km	(02) 6779 2377	9am-5pm (closed Mon, Wed, Fri)	9am-5pm

Note: Not all waste types are accepted at each facility. Please refer to Armidale Regional Council website for waste types, terms and conditions.

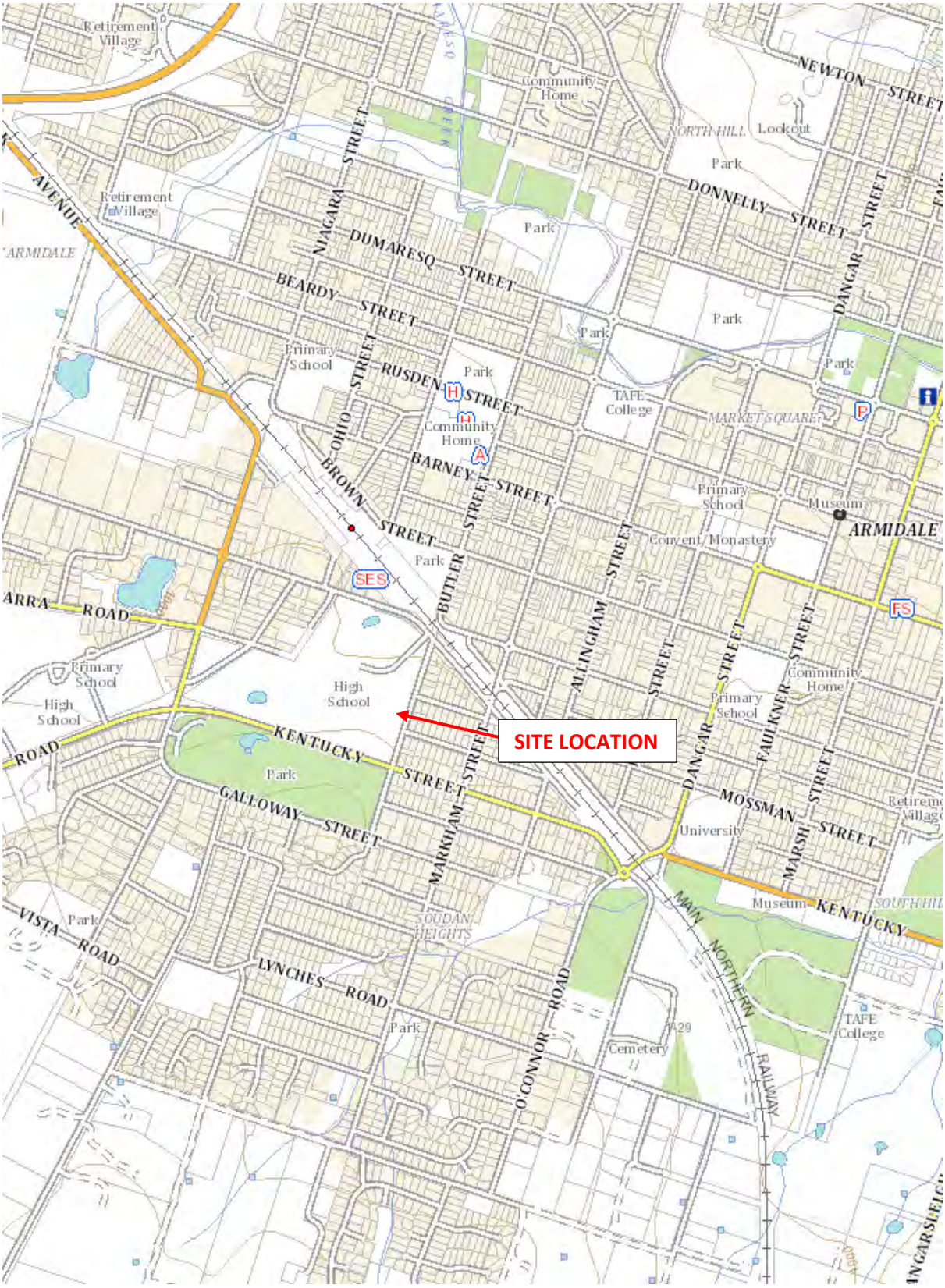
Records demonstrating lawful disposal of waste must be retained and kept readily accessible.

Armidale Waste Management Facility: https://www.armidaleregional.nsw.gov.au/environment/waste-and-recycling/waste-facilities

Armidale Recycling Centre: http://www.armidalerecycling.com.au/

Guyra Recycling & Transfer Station: No wesbite

Figures



Source: SIX Maps (2018)

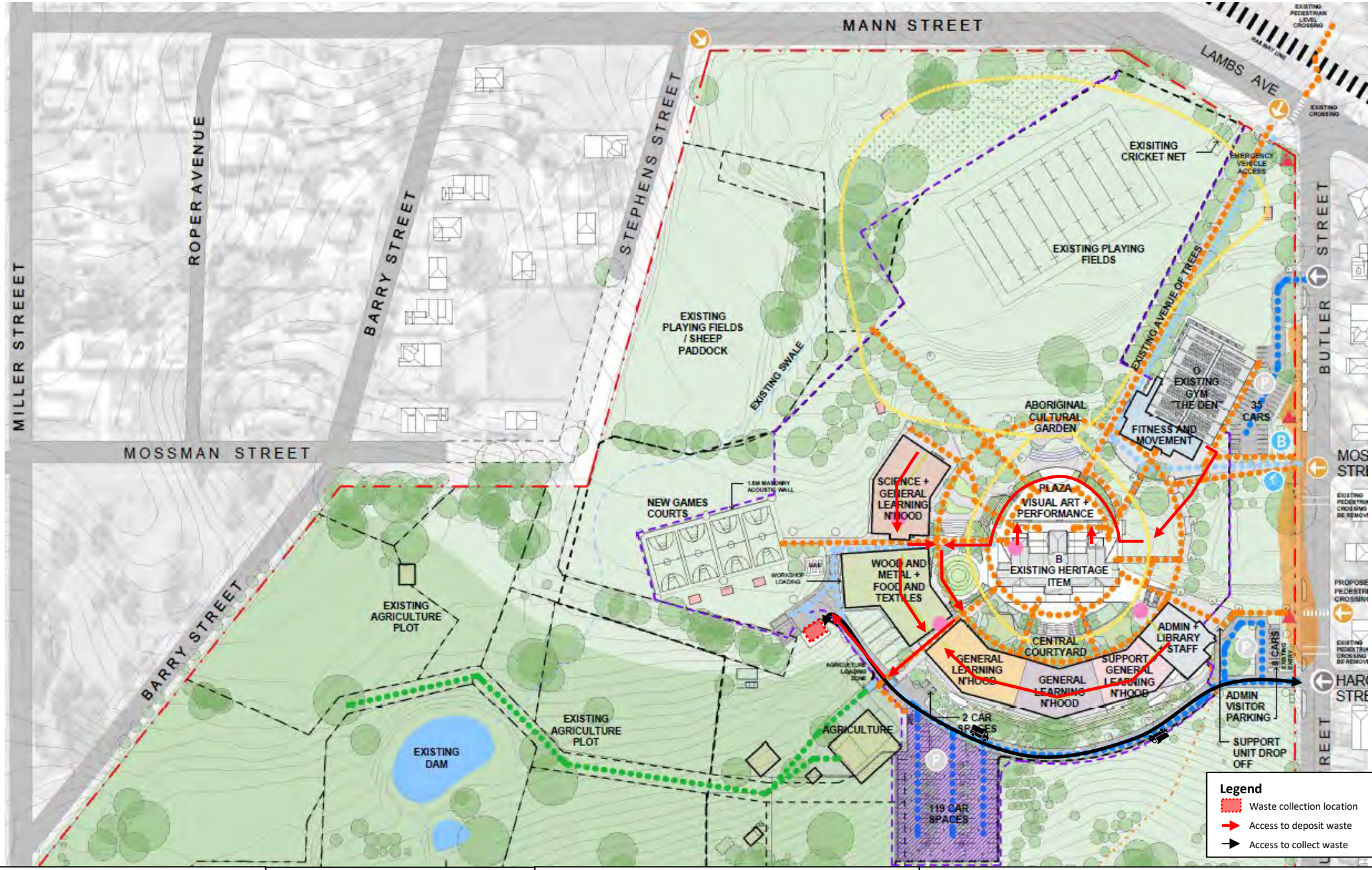
PO Box 1184
SUTHERLAND NSW 1499
PH (02) 9575 7755
admin@metech-consult.com
www.metech-consult.com

TITLE: Figure 1 – Site Location
PROJECT: Waste and Recycling Management Plan
Armidale Secondary College
Armidale, NSW
CLIENT: NBRS Architecture

PO Box 1184
SUTHERLAND NSW 1499
PH (02) 9575 7755
admin@metech.consulting
www.metech.consulting

Project Number:	EP98
Source:	NBRS Architecture – Demolition Site Plan (Ref. 17352-NBRS-DA-006 Rev 1)
Date:	15 October 2018
Approved by:	MM

TITLE:	Figure 2 – Existing Facilities Site Layout
PROJECT:	Waste & Recycling Management Plan Armidale Secondary College, Armidale, NSW
CLIENT:	NBRS Architecture

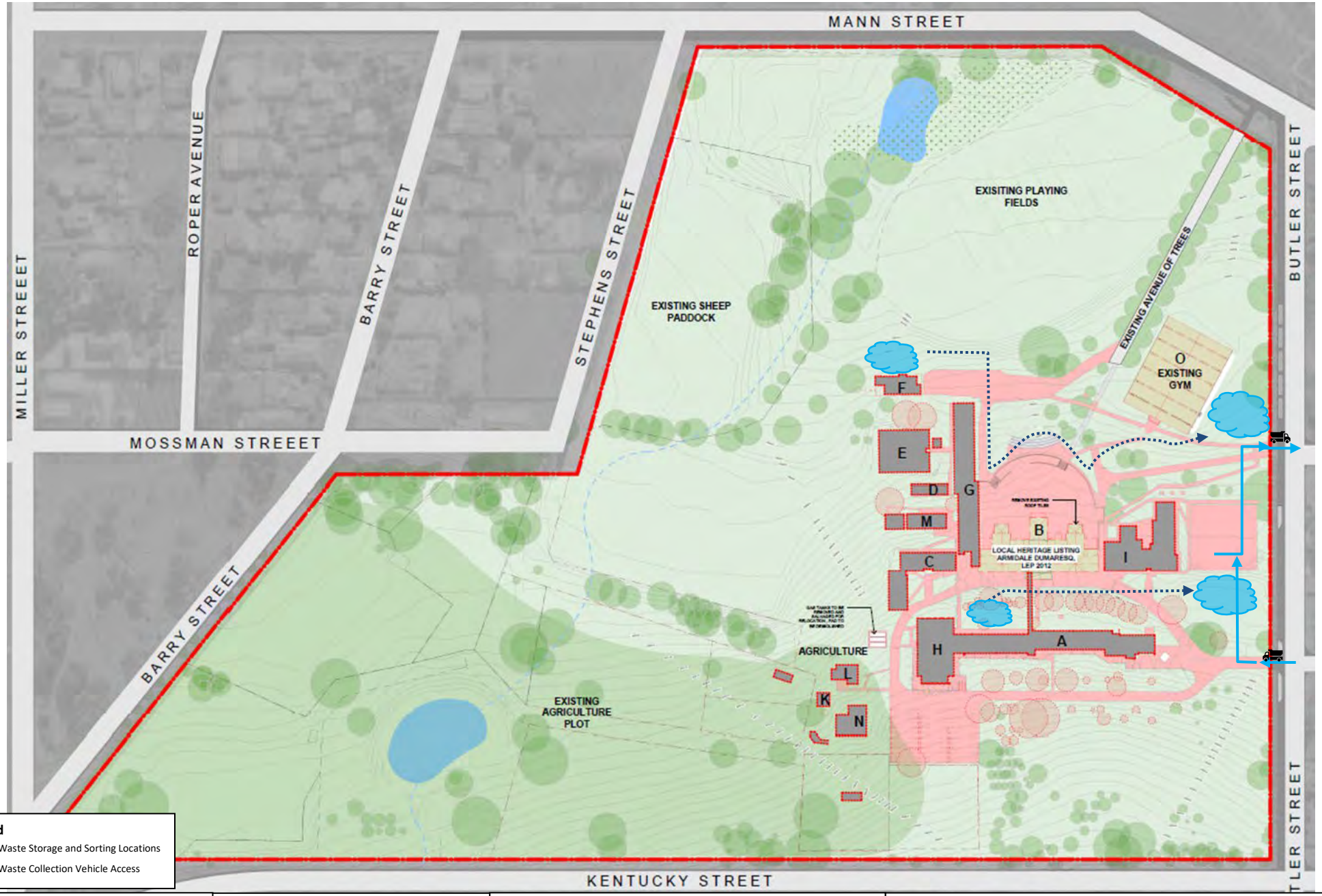


ME tech CONSULTING

PO Box 1184
SUTHERLAND NSW 1499
PH (02) 9575 7755
admin@metech.consulting
www.metech.consulting

Project Number:	EP98
Source:	NBRS Architecture – Site Circulation, Vehicle & Pedestrian Plan (Ref. 17352-NBRS-DA-082 Rev 1)
Date:	12 October 2018
Approved by:	MM

TITLE:	Figure 3 – Suggested Operational Waste Management Arrangements
PROJECT:	Waste & Recycling Management Plan Armidale Secondary College, Armidale, NSW
CLIENT:	NBRS Architecture



PO Box 1184
SUTHERLAND NSW 1499
PH (02) 9575 7755
admin@metech.consulting
www.metech.consulting

Project Number:	EP98
Source:	NBRS Architecture – Demolition Site Plan (Ref. 17352-NBRS-011 Rev A July 2018)
Date:	11 October 2018
Approved by:	MM

TITLE:	Figure 4 – Suggested Construction Waste Management Arrangements
PROJECT:	Waste & Recycling Management Plan Armidale Secondary College, Armidale, NSW
CLIENT:	NBRS Architecture

Appendix A
Asbestos Management Plan

RICHARD CROOKES
CONSTRUCTIONS

ARMIDALE SECONDARY COLLEGE
1155

ASBESTOS MANAGEMENT PLAN

5 February 2019

This plan has been approved for use by the following:

Approved by / Date	5/2/2019
Approved by / Date	Simon Karkkainen, Project Manager 5/2/2019
Approved by / Date	Craig Richmond, Business Systems , QA/Env Manager 5/2/2019
Approved by / Date	Garry Mansfield WHS Manager 5/2/2019
	Ian West, General Manager – Commercial & Risk

AUTHORITY POSITION	COMPANY NAME	NO. OF COPIES
Client	NSW Schools Infrastructure	1 copy
Superintendent	GHD	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)
5/2/2019	Original issue	

POSITION	NAME	SIGNATURE	REVISIONS			
			<DATE>	<DATE>	<DATE>	<DATE>

POSITION	NAME	SIGNATURE	REVISIONS

CONTENTS

After editing your document – Place your cursor anywhere within the Contents table, and press ctrl +A, right click and select 'Update Field' function key' to update this Table of 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

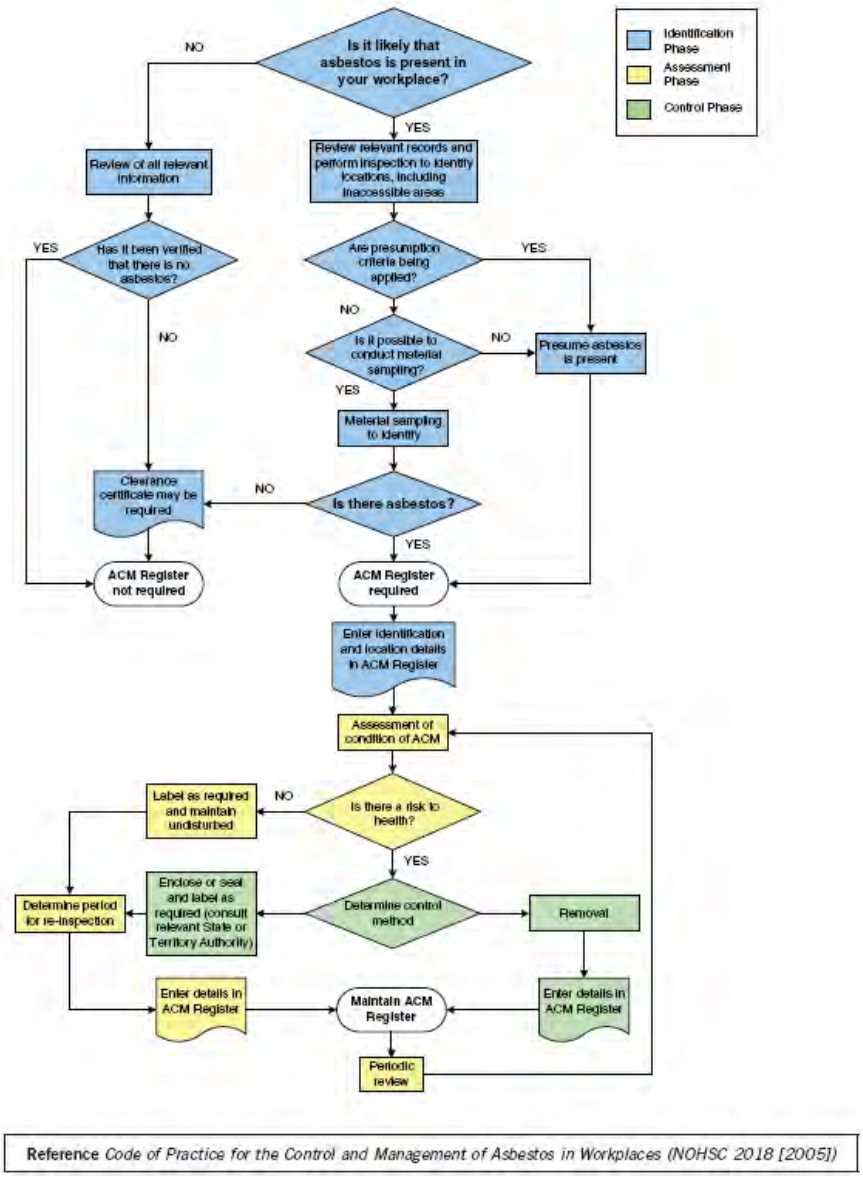


Figure 1: General principles of an asbestos management plan

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 2011

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-Dec 2011
- COP- How to safely remove asbestos-Dec 2011

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.
Site Manager (SM) Health Safety and Environmental Coordinator (HSE)	▪ Obtain from Subcontractor, copy of WorkCover 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 ▪ 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: 2002 (2005)].

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 WORKCOVER – NOTIFICATION

For Bonded ACM, in quantities greater than 10m², requiring a licensed contractor (AS-B) to complete the removal works, a WorkCover 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. WorkCover will review the application and return the first two pages, stamped with an official WorkCover approval. No works are to proceed prior to the receipt of the Notification.

RCC will require a copy of the WorkCover stamped 'Notification' prior to issuing an RCC Asbestos removal permit.

5.1.3 WORKCOVER – PERMIT

For all Friable removal works, regardless of quantity, a suitably licensed contractor (AS-A) must apply to WorkCover 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. WorkCover will review the application and return the first two pages stamped with an official WorkCover 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 WorkCover '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 REMEDIATION

All remediation works will be carried out in line with the remediation action plan for the redevelopment works at Armidale High School, Butler Street, Armidale 2350 as prepared by WSP September 2018

5.1.7 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 in to 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 Statelegislative 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 WorkCover 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 into the area indicating that 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 WorkCover 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.

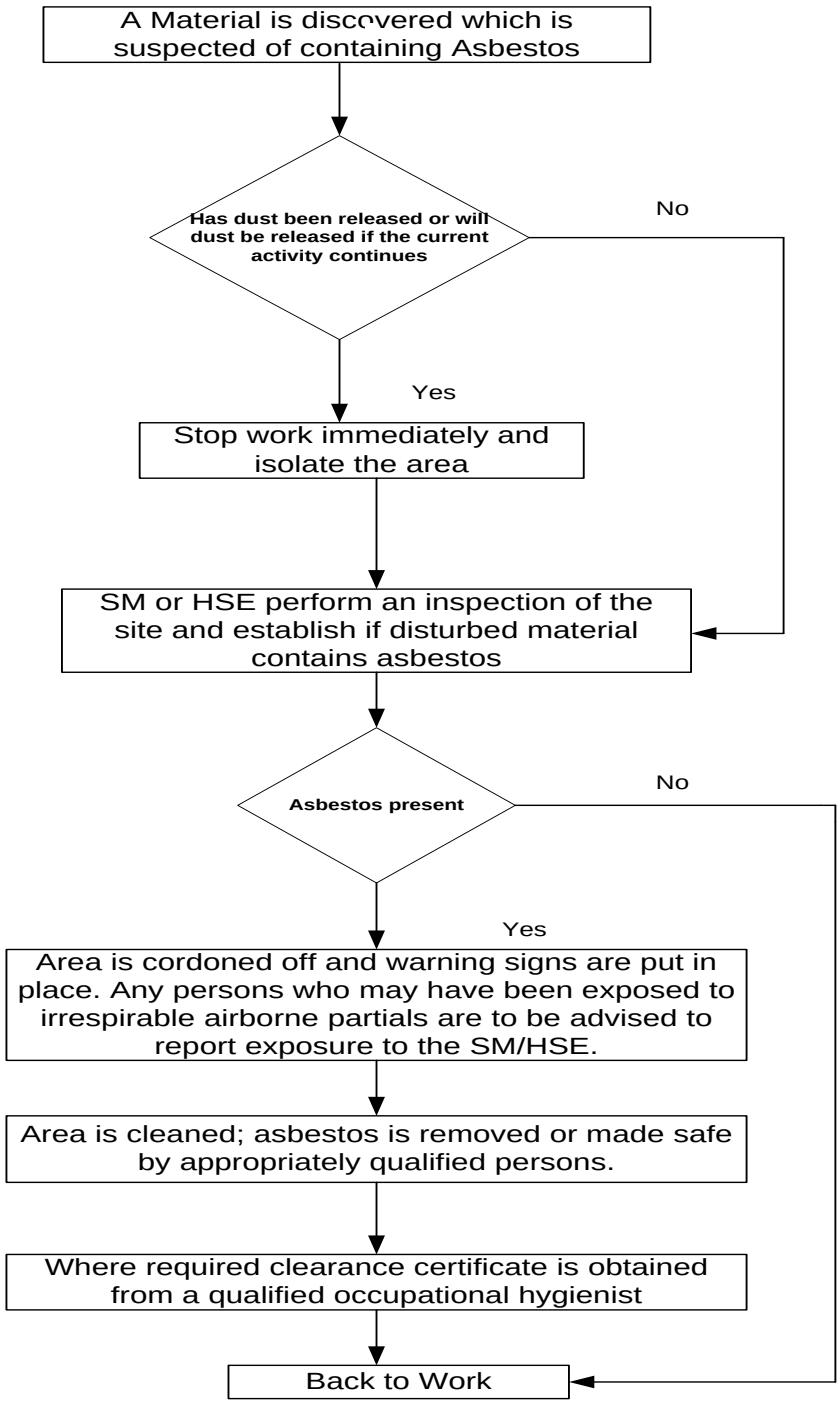
Before being issued with an Asbestos Removal Permit, individuals will be required to peruse the RCC Asbestos Management Plan and the Asbestos Register. Where practicable, contractors should be made aware of the requirements of the plan prior to tendering to ensure they allow for such requirements when 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, NSW region training conducted by MBA or other ATO accredited company mandatory for NSW 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 Work Cover 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	Determine methodology for removal Remove any loose sections prior to

	General disturbance Manual handling	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

DRAFT

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 / WorkCover 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 2011
Codes of Practice: COP For the safe removal of Asbestos [NOHSC:2002(2005)] COP- How do manage and control asbestos in the workplace-Dec 2011 COP- How to safely remove asbestos- Dec 2011
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

DRAFT

SYDNEY

LEVEL 3, 4 BROADCAST WAY
ARTARMON NSW 2064

PO BOX 1024
CROWS NEST NSW 1585

PHONE: +61 2 9902 4700
FAX: +61 2 9439 1114

NEWCASTLE

LEVEL 1, 118A BELFORD ST
BROADMEADOW NSW 2292

PO BOX 835
HAMILTON NSW 2303

PHONE: +61 2 9902 4700
FAX: +61 2 6766 3022

TAMWORTH

SUITE 1, 493 PEEL ST
TAMWORTH NSW 2340

PO BOX 576
TAMWORTH NSW 2340

PHONE: +61 2 6766 5225
FAX: +61 2 6766 3022

ACT

UNIT 1, 155 NEWCASTLE ST
FYSHWICK ACT 2609

PO BOX 771
FYSHWICK ACT 2609

PHONE: +61 2 6143 2900
FAX: +61 2 6280 8774

richardcrookes.com.au

Delivering Certainty

Appendix I - Construction Soil & Water Management Plan

BIRZULIS ASSOCIATES Pty Ltd
Consulting Structural + Civil Engineers
ACN 003 797 911 ABN 99 003 797 911

Sydney Office
583 Darling Street, Rozelle NSW 2039
Telephone: 9555 7230
Email: office@birzulisassociates.com
Newcastle Office
105 Merewether Street, Merewether NSW 2291
Telephone: 4049 4855
Email: office@birzulisassociates.com

CONSTRUCTION SOIL AND WATER MANAGEMENT REPORT

ARMIDALE SECONDARY COLLEGE ARMIDALE NSW

Prepared For:
Armidale Secondary College
c/- NBRS Architecture Pty Ltd
Level 3, 4 Glen Street
MILSONS POINT NSW 2061

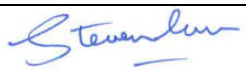
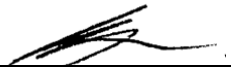
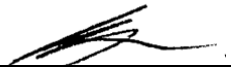
Prepared by:
Birzulis Associates Pty Ltd
583 Darling Street
ROZELLE NSW 2039

***Rev*: B**

DIRECTORS
B Fimmano B.E. (Hons), M.I.E. Aust., C.P.Eng.
M A Grogan B.E., M.Eng., M.I.E. Aust., C.P.Eng.
ASSOCIATE DIRECTOR
P W Grogan B.E. (Hons), M.E.(Struct), M.I.E. Aust., C.P.Eng.
CONSULTANT
A J Birzulis OAM, B.E., M.Eng. Sc., F.I.E. Aust., C.P.Eng.

DOCUMENT VERIFICATION

Project Title	Construction Soil & Water Management Report
Project No.	7070
Client Contact	NBRS Architecture Pty Ltd

	Name	**Signature**
Prepared by	Steven Luu	
Checked by	Michael Grogan	
Issued by	Michael Grogan	

Document History

Date	**Revision**	**Issued to**	**No. Copies**
17 May 2019	A	NBRS Architecture Pty Ltd	PDF
27 May 2019	B	NBRS Architecture Pty Ltd	PDF
11 July 2019	C	NBRS Architecture Pty Ltd	PDF

Contents

Appendices

Appendix A – Drains Model

Appendix B – Ocean Protect – Manufacturer's Specifications & Installation

Appendix C – Armidale Flood Planning Level Map

Appendix D – Construction map during wet weather.

1 INTRODUCTION

Birzulis Associates Pty Ltd has been commissioned by NBRS Architecture Pty Ltd on behalf of Schools Infrastructure to prepare this Construction Soil and Water Management Report in support of a proposed development for the site.

The site is located on the southern side of Mann Street between Butler Street and Barry Street, Armidale, NSW. The proposed development is for a co-educational public secondary school consisting of numerous multi storey classroom buildings, office facilities and car parks.

This report provides a summary of the stormwater management design principles and planning objectives for the management of stormwater quality and quantity. The objectives for the development are to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design consistent with the requirements of Armidale Regional Council's (ARC) water quality objectives.

A set of drawings have been prepared to show that the proposed stormwater quantity and quality requirements for the development can be met. These drawings cover stormwater management elements which cover surface levels and drainage layouts.

The consent authority is the Minister for Planning. The engineering and policy requirements of ARC have also been considered in the design. The stormwater management design had been discussed with the Stormwater Engineer at ARC throughout the design stages of this project. It was agreed that the use of rainwater tanks for water re-use and agricultural purposes would benefit the site, in conjunction with the use of an on-site detention tank. The proposed stormwater drainage system will also introduce the use of gross pollutant traps to treat stormwater runoff from the school site before entering water course.

There has been consultation with the Armidale Council representative, Mark Wilson (Program Leader Investigations & Design Department), who has reviewed and endorsed the soil and water management plan described in this report which is to be implemented.

This report will also provide a plan of how all construction works will be managed in wet-weather events and details of all off-site flows from the site. The measures that are to be implemented to manage stormwater and flood flows for small and large sized events will be discussed.

2 SITE CHARACTERISTICS

2.1 Site Description

The proposed development is located in the suburb of Armidale on Butler Street with an area of approximately 18.3 hectares in area, as shown in **Figure 2.1.**

The site is bounded by Mann Street to the north, arboretorium to the south and low density residential land to the east and west.

Figure 2.1 Locality Plan

2.2 Proposed Development

The proposed development is for the construction of a new secondary college.

An indicative layout of the development has been produced by NBRS Architecture and can be seen in **Figure 2.2**.

The development will include the following engineering components:

- Earthworks to provide foundation support for the classroom buildings including the excavation for underground on-site detention tanks;
- Construction of an access driveway off Butler Street;
- Maintaining the natural gradient of the site and overland flow path through the development site;

♦ Stormwater drainage system based on a major/ minor design philosophy and SSD conditions B25

♦ Management of stormwater quality using a treatment train approach to pollutant loads on a developed catchment in accordance with ARC's recommendations; and

♦ Management of stormwater quantity by reducing post developed flow to pre- developed over the range of storms between the 1 in 5 year Average Recurrence Interval (ARI) to the 1 in 20 year ARI as per council policy and recommendations.

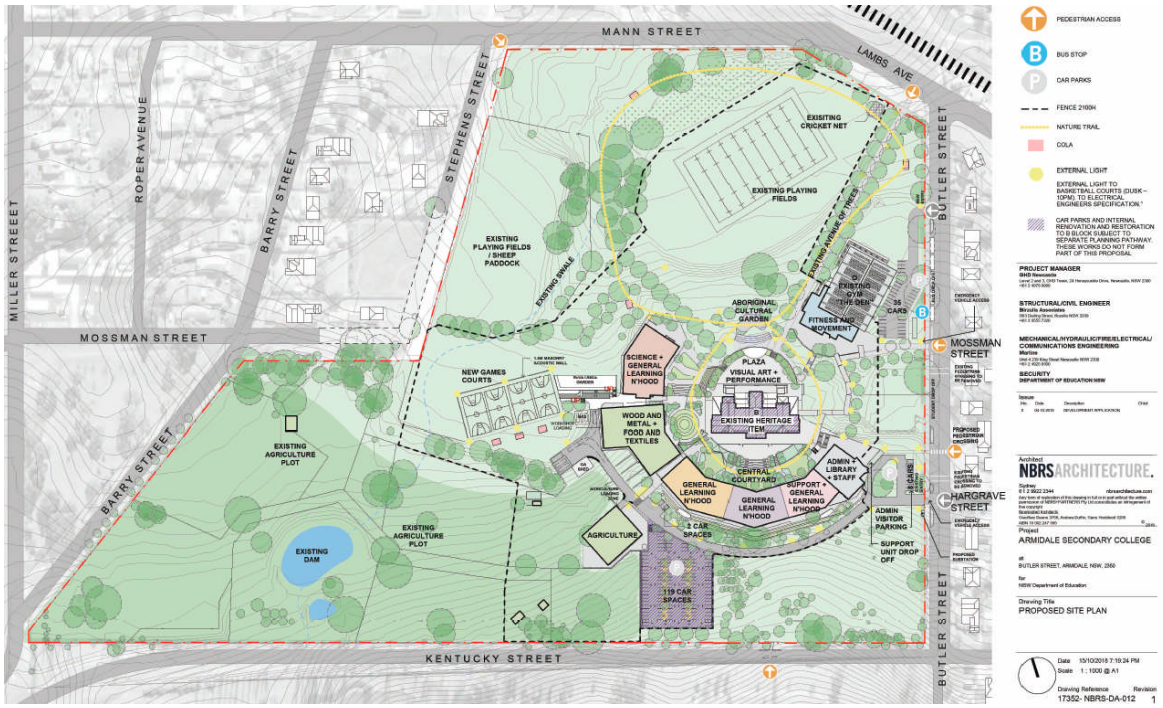


Figure 2.2 Architectural Plan (refer to next page for full size version)

NSW GOVERNMENT

LEARNING HUB
ARMIDALE FUTURE SCHOOL

NBRSARCHITECTURE.

MANN STREET

287° 04' 12"
210.06 m

318° 42' 00"
102.66 m

MILLER STREET

ROPER AVENUE

BARRY STREET

STEPHENS STREET

212° 50' 57"
230.93 m

BUTLER STREET

17° 04' 12"
368.89 m

MOSSMAN STREET

287° 04' 12"
125.28 m

BARRY STREET

235° 41' 00"
245.98 m

KENTUCKY STREET

107° 04' 12"
437.63 m

HARGRAVE STREET

EXISITING CRICKET NET

EXISTING PLAYING FIELDS

EXISTING PLAYING FIELDS / SHEEP PADDOCK

EXISTING SWALE

EXISTING AVENUE OF TREES

EXISTING GYM "THE DEN"

FITNESS AND MOVEMENT

35 CARS

BUS DROP OFF

ABORIGINAL HERITAGE GARDEN

NEW GAMES COURTS

SCIENCE + GENERAL LEARNING N'HOOD

PLAZA

VISUAL ART + PERFORMANCE B BLOCK

B

EXISTING HERITAGE ITEM

RELOCATED GAS

WORKSHOP LOADING

WOOD AND METAL + FOOD AND TEXTILES

CENTRAL COURTYARD

ADMIN + LIBRARY + STAFF

GENERAL LEARNING N'HOOD

GENERAL LEARNING N'HOOD

SUPPORT + GENERAL LEARNING N'HOOD

8 CARS

STUDENT DROP OFF

EXISTING ENTRY

EXISTING ENTRY

ADMIN VISITOR PARKING

SUPPORT UNIT DROP OFF

EXISTING AGRICULTURE PLOT

AGRICULTURE LOADING ZONE

AGRICULTURE

AGRICULTURE

EXISTING AGRICULTURE PLOT

EXISTING DAM

NEW BUILDING

EXISTING CAR PARK

112 CAR SPACES TOTAL

EXTENSION TO EXISTING CAR PARK

VEHICLE ACCESS

PEDESTRIAN ACCESS

BUS STOP

CARPARKING

EXTERNAL LIGHT

External light to basketball courts (Dusk – 10pm). To electrical engineers specification."

Issue

No.	Date	Description	Chkd
A	25.07.2018	FOR TENDER	

PROJECT MANAGER
GHD Newcastle
Level 2 and 3, GHD Tower, 24 Honeysuckle Drive,
Newcastle, NSW 2300
+61 2 4979 9999

STRUCTURAL /CIVIL ENGINEER
Birzulis Associates
583 Darling Street, Rozelle NSW 2039
+61 2 9555 7230

MECHANICAL / HYDRAULIC / FIRE / ELECTRICAL / COMMUNICATIONS ENGINEERING
Marline
Unit 4 239 King Street Newcastle NSW 2300
+61 2 4925 9300

SECURITY
DEPARTMENT OF EDUCATION NSW

Architect
NBRSARCHITECTURE.
Sydney
61 2 9922 2344 nbrsarchitecture.com

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Nominated Architects: Geoffery Deane 3766; Andrew Duffin 5602; Garry Hoddinett 5286
ABN 16 002 247 565

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Project
ARMIDALE SECONDARY COLLEGE

at
BUTLER STREET, ARMIDALE, NSW, 2350

for
NSW Department of Education

Drawing Title
SITE PLAN

Date JULY 2018
Scale 1000@A1 or 2000@A3

Drawing Reference 17352- NBRS-012
Revision A

0 1 2 3 4 5 6 7 8 9 10

3 STORMWATER DRAINAGE

3.1 Site Drainage

3.1.1 Existing Site Drainage

The property is currently developed as public high school with a large portion of the property utilized for agricultural purposes. All current overland flows travel towards the north of the site via a grassed channel and then into a headwall that drains under Mann Street into an underground reinforced concrete pipe approximately 1200mm diameter, travelling in a northerly direction.

3.1.2 Proposed Site Drainage

The proposed system to be completed generally in accordance with the following *general engineering practice, the guidelines of ARC and the following regime:*

As per SSD condition C29 requires written approval from Council to connect or discharge site stormwater to Council's stomwater drainage system or street gutter.

- The proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater runoff from the development to the legal point of discharge

- The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 5-year ARI storm event. This results in the piped system being able to convey all stormwater runoff up to and including the Q5 event. This meets the requirements of ARC stormwater criteria.

- The major system will be designed to cater for storms up to and including the 1 in 20-year ARI storm event. The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site. Discussions were held with ARC stormwater engineer and a 1 in 20-year ARI storm event was deemed to be satisfactory due to the semi-rural nature of the site. Due to the size of the existing site, a 1-in-100 year ARI storm event was considered to be conservative and unrealistic to capture all stormwater from the entire site, hence Birzulis and Armidale Regional Council agreed a 1-in-20 year ARI storm would be adequate for stormwater design purposes. Also mentioned in councils engineering policy, the design average recurrence interval depending on the zoning of the land, the design ARI's are to be used:
  - Commercial/Industrial – 20 years
  - Residential – 5 years
  - Rural residential – 5 years
  - Parks & reserves – 1 year

- In the event of wet weather, the construction methodology may be carried out differently but in a safe manner. Refer to Appendix D for additional information.

- The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of ARC and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (2016 Edition), Volumes 1 and 2 (AR&R).

- The site area taken into consideration for stormwater design is shown in **Figure 3.1**.

  Stormwater Management is required to be provided for water quantity and quality in accordance with the requirements of ARC DCP. Allowance for conveyance of the existing overland flow through the site will be required as discussed in **Section 5.2** of the report.

  Further discussion on the Stormwater Management Strategy is provided in **Section 4** and **5** of this report.

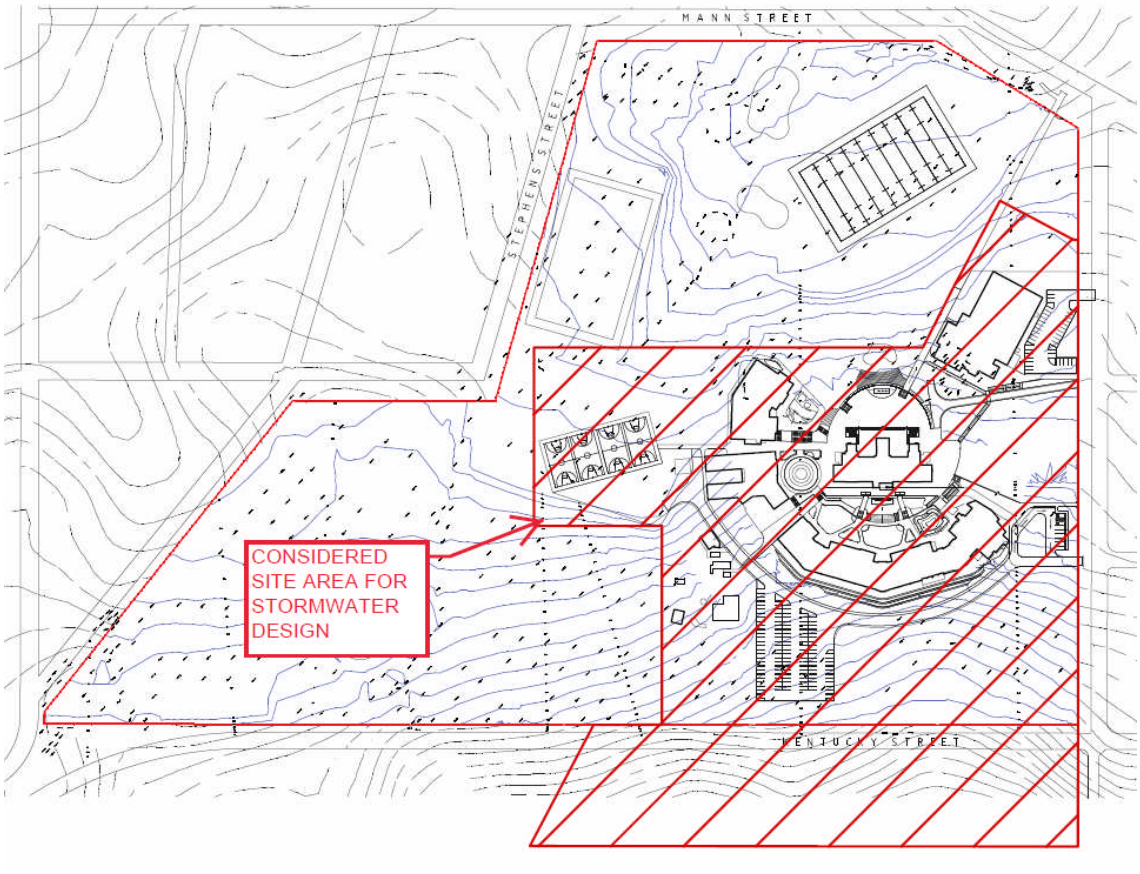


Figure 3.1. Site area taken for stormwater design.

6 IMPACT ASSESSMENT

6.1 Construction

Construction activities such as excavation, other earthworks and the use of water for construction activities may cause runoff, sedimentation and erosion impacts to the local waterways if not appropriately managed.

Potential adverse impacts would include:

- Inadequate containment of spills or leaks of fuels and/or oils from construction plant and equipment and/or from vehicle/trucks that may result in pollutants entering the local waterway;
- Excavation, vegetation clearing and grading that may cause increased sediment and pollutant load in runoff;
- Stockpiling of spoil and construction materials may lead to polluted water runoff and sedimentation of waterways;
- Uncontrolled water use for construction activities resulting in pollutants entering the receiving waterway and potential increased scour and erosion effects;
- Litter from construction activities entering waterways; and
- Exposure of soils containing acid sulphides to oxygen resulting in the production of sulfuric acid, which may negatively affect the environment and waterways.

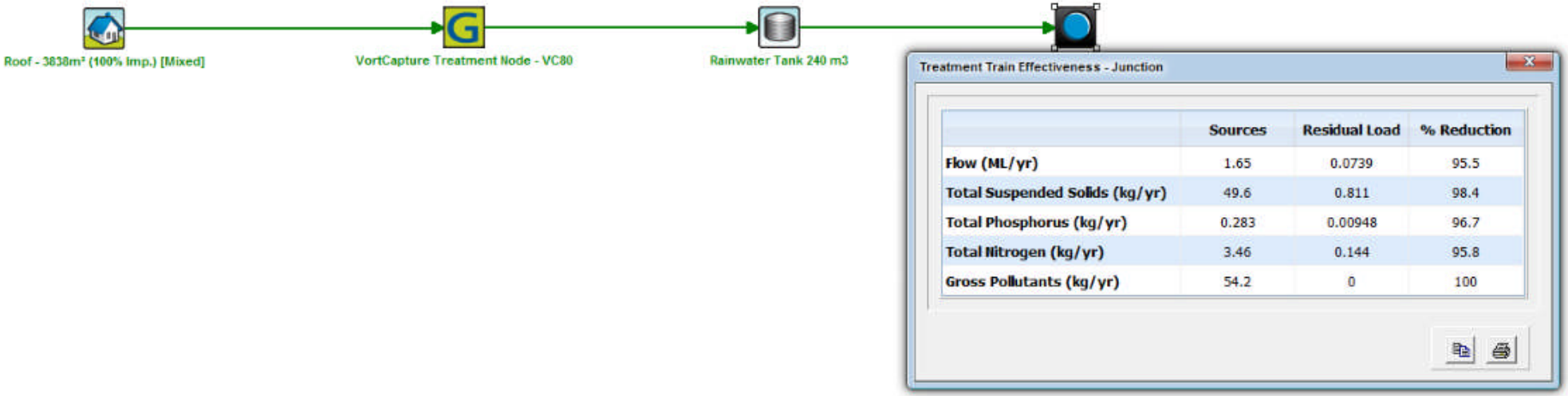
6.2 Mitigation

Erosion and sediment control measures will be provided in accordance with the “Blue Book” – Managing Urban Stormwater – Soils and Construction (Landcom, 2004) to Development to mitigate potential impacts to the downstream water quality from construction activities.

Controls would include:

- Sediment management devices, such as fencing, hay bales or sand bags;
- Measures to divert or capture and filter water prior to discharge, such as drainage channels and first flush and sediment basins;
- Installation of measures at work entry and exit points to minimise movement of material onto adjoining roads, such as rumble grids or wheel wash bays;
- Appropriate location and storage of construction materials, fuels and chemicals, including bunding where appropriate;
- All refuelling of vehicles and equipment on site would be undertaken a minimum of 50 metres away from water bodies and surface drains, where possible and;
- Any fuel, oil or other liquids stored onsite would be stored in an appropriately sized impervious bunded area.
- Measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site. This could be the installation of an on-site vehicle wash bay prior to vehicles leaving the site.

An Erosion and Sediment Control Plan would also be prepared as part of the Construction Environmental Management Plan. Implementation of these measures would mitigate off-site impacts to the downstream water quality of the site during construction of the school.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.65	0.0739	95.5
Total Suspended Solids (kg/yr)	49.6	0.811	98.4
Total Phosphorus (kg/yr)	0.283	0.00948	96.7
Total Nitrogen (kg/yr)	3.46	0.144	95.8
Gross Pollutants (kg/yr)	54.2	0	100

Figure 2. Results from MUSIC model

7 FLOODING & OVERLAND FLOW

The assessed site has been identified by Armidale Regional Council as being unaffected by overland flow from an external catchment. Refer to the flood map in **Appendix C** (1 in 100 year Annual Exceedance Probability, based on Armidale Flood Study 2004 and Martins Gully Update 2011) provided by Armidale Regional Council.

A flood risk assessment for this site has been prepared by Eco Logical Australia. Please refer to report 'Eco Logical Australia 2018. *Armidale Future Secondary School Redevelopment Project, Flood Risk Assessment*. Prepared for NBRS Architecture' for further information.

8 CONCLUSION

This Civil Engineering Details Report has been prepared to support the application for a proposed development at Armidale High School, Butler Street, Armidale.

A Stormwater Management strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout. The strategy for stormwater quantity and quality management has been developed to reduce both peak flows and pollutant loads in stormwater leaving this site. The stormwater management for the development has been designed in accordance with Armidale Regional Council's Engineering Code Design Specification D5 - Stormwater Drainage Design (Dated September 2016) and SSD conditions.

The stormwater layout for the development maintains the existing catchment breakdown and a proposed two discharge points. A hydrological assessment has been undertaken which confirms local post development flows from the site will be less than pre-development flows and demonstrates that the site discharge would not adversely affect any land, drainage system or watercourse as a result of the development. A stormwater retention system comprising an active storage of $240m^3$ is proposed to attenuate developed stormwater flows to pre-developed flows. This will be provided by an underground retention tank.

During the construction phase, an erosion and sediment control plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

During the operational phase of the development, a treatment train incorporating the use Stormwater Treatment Measures (STM's) comprising a proprietary treatment train of Enviropod pit inserts, retention tanks and SW360 stormfilters been proposed to mitigate the increase in stormwater pollutant loads generated by the development. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

9 REFERENCES

- Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);
- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM); and
- Armidale Regional Council's Engineering Code Design Specification D5 - Stormwater Drainage Design (Dated September 2012)

From:	Mark Wilson
To:	"Steven Luu"; Sam Lyons
Cc:	John Goodall; Michael Flynn
Subject:	RE: TRIM: Armidale secondary college - construction soil and water management report - acknowledgment
Date:	Monday, 22 July 2019 5:03:11 PM
Attachments:	image001.png image002.png image003.png

Dear Steven

The submitted report for soil and water management during construction has been reviewed and is endorsed for implementation by council. Please note that in the conclusion there is a reference to SW360 Jellyfish devices. It is our understanding and it is referenced earlier in the report, that a single GPT would be installed at the outlet to the gully. Consideration was to be given to removal o the other devices originally designed to be installed in all pit. We have no objection to same but feel they are unnecessary and will become and ongoing maintenance issue for the school. Please ensure the conclusion is reflective of the intent.

Regards

Mark Wilson

Program Leader Investigations & Design

P 02 6770 3877 **M** 0427 896 568 **F** 02 6772 9275
E mwilson@armidale.nsw.gov.au **W** armidaleregional.nsw.gov.au
135 Rusden Street | PO Box 75A Armidale NSW 2350

From: Steven Luu [mailto:sluu@birzulisassociates.com]
Sent: Friday, 19 July 2019 3:38 PM
To: Mark Wilson
Subject: TRIM: Armidale secondary college - construction soil and water management report

Hi Mark,

As discussed over the phone, Please find attached the construction soil and water management report for your review. If you could get back to me as soon as you can as a matter of urgency that would be appreciated. Please feel free to leave feedback or let me know if you are satisfied with the report. I look forward to hearing from you.

Kind regards,
Steven Luu
Structural Engineer

5944_BA Logo_CMYK

583 Darling Street
Rozelle NSW 2039
☎ (02) 9555 7230
sluu@birzulisassociates.com
www.birzulisassociates.com

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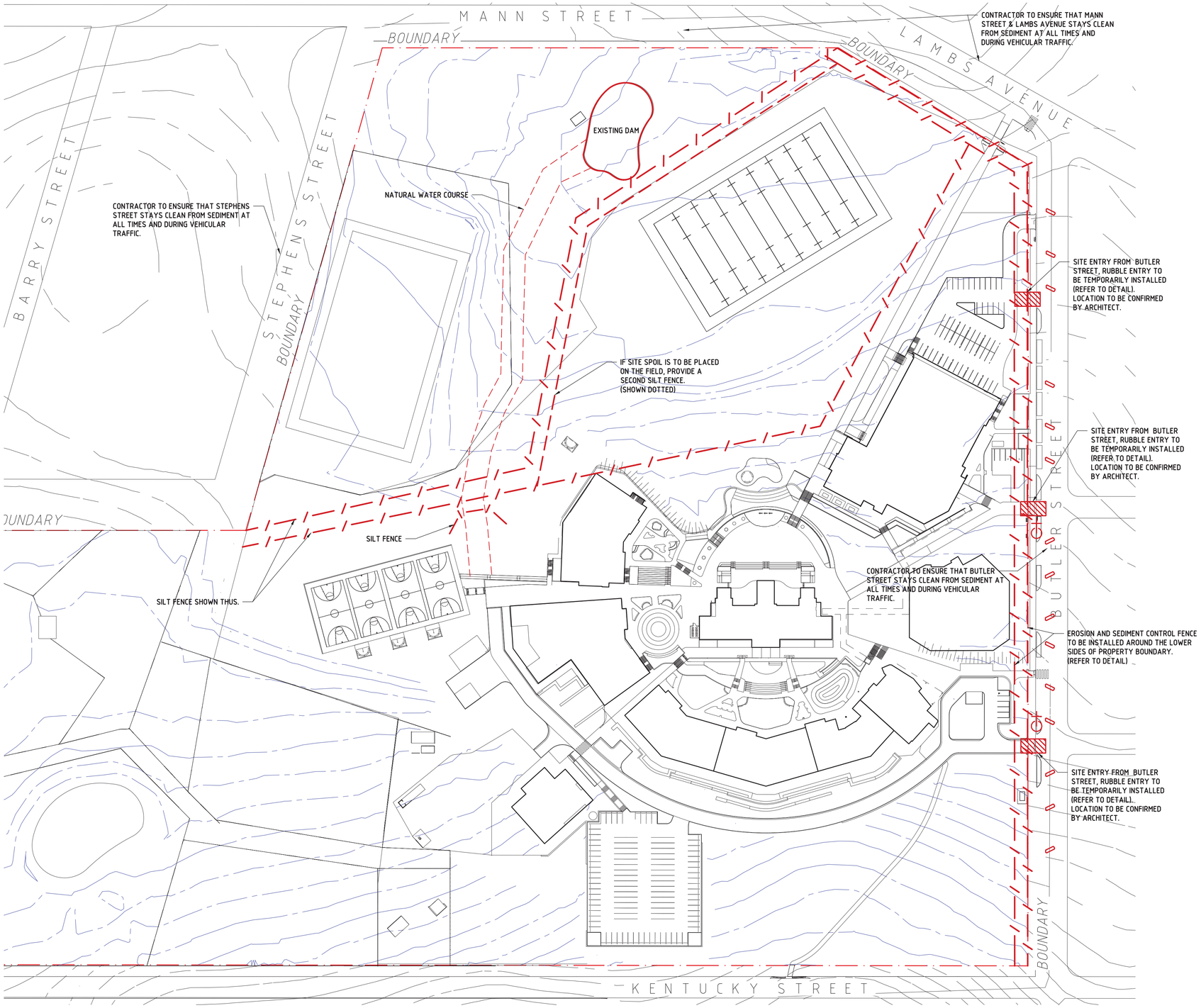


SOIL AND EROSION SEDIMENT CONTROL PLAN

SCALE 1:1000

EROSION & SEDIMENTATION CONTROL NOTES

1. CONTRACTOR SHALL PROVIDE SEDIMENT FENCING MATERIAL DURING CONSTRUCTION TO THE LOW SIDE OF THE WORKS. TIE SEDIMENT FENCING MATERIAL TO CYCLONE WIRE SECURITY FENCE. SEDIMENT CONTROL FABRIC SHALL BE AN APPROVED MATERIAL (EG. HUMES PROPEX SILT STOP) STANDING 300mm ABOVE GROUND & EXTENDING 150mm BELOW GROUND.

2. EXISTING DRAINS LOCATED WITHIN THE SITE SHALL ALSO BE ISOLATED BY SEDIMENT FENCING MATERIAL.

3. NO PARKING OR STOCKPILING OF MATERIAL IS PERMITTED ON THE LOWER SIDE OF THE SEDIMENT FENCE.

4. GRASS VERGES SHALL BE MAINTAINED AS MUCH AS PRACTICAL TO PROVIDE A BUFFER ZONE TO THE CONSTRUCTION SITE.

5. CONSTRUCTION ENTRY/EXIT SHALL BE VIA THE LOCATION NOTED ON THE DRAWING. CONTRACTOR SHALL ENSURE ALL DROPPABLE SOIL & SEDIMENT IS REMOVED PRIOR TO CONSTRUCTION TRAFFIC EXITING SITE. CONTRACTOR SHALL ENSURE ALL CONSTRUCTION TRAFFIC ENTERING & LEAVING THE SITE DO SO IN A FORWARD DIRECTION.

GENERAL NOTES.

1. THIS PLAN IS A CONCEPT PLAN ONLY FOR STORMWATER DISPOSAL & EROSION CONTROL. IT IS NOT SUITABLE FOR CONSTRUCTION. THIS PLAN SHOULD BE ADAPTED BY THE BUILDER DURING DEMOLITION, EXCAVATION & CONSTRUCTION PHASES TO ENSURE ADEQUATE PERFORMANCE.

2. ALL DRAINAGE LAYOUT & DETAILS ARE DIAGRAMMATIC & INDICATIVE ONLY. ACTUAL LOCATION, SIZES, LEVELS & GRADES MAY LATER WHEN DETAIL DESIGN WORKS ARE DOCUMENTED.

CLAY SOILS

A SYSTEM SHALL BE INSTALLED TO EITHER:

1. TRANSPORT STORMWATER RUNOFF WITH SUSPENDED SOLIDS FROM SITE VIA PUMP TRUCKS.

2. TREAT THE STORMWATER RUNOFF WITH SUSPENDED SOLIDS SO THE DISCHARGE WATER QUALITY TO COUNCIL STORMWATER DRAINAGE SYSTEM HAS A MAXIMUM CONCENTRATION OF SUSPENDED SOLIDS THAT DOES NOT EXCEED 50 MILLIGRAMS PER LITRE IN ACCORDANCE WITH THE PROTECTION OF THE ENVIRONMENT OPERATION ACT (POEO 1997) AND SHALL BE APPROVED BY THE LOCAL COUNCIL.

Issue

No.	Date	Description	Chkd
C	21.06.19	FOR CONSTRUCTION	SL
B	24.05.19	EFSG DD REVIEW	SL

PROJECT MANAGER
GHD Newcastle
Level 2 and 3, GHD Tower, 24 Honeysuckle Drive,
Newcastle, NSW 2300
+61 2 4979 9999

STRUCTURAL /CIVIL ENGINEER
Birzulis Associates
583 Darling Street, Rozelle NSW 2039
+61 2 9555 7230

MECHANICAL / HYDRAULIC / FIRE / ELECTRICAL / COMMUNICATIONS ENGINEERING
Marline
Unit 4 239 King Street Newcastle NSW 2300
+61 2 4925 9300

SECURITY
DEPARTMENT OF EDUCATION NSW

Architect
NBRSARCHITECTURE.

Structural/Civil Engineer
BIRZULIS ASSOCIATES
CONSULTING STRUCTURAL & CIVIL ENGINEERS
583 DARLING STREET ROZELLE NSW 2039
tel: (02) 9555 7230 email : office@birzulisassociates.com
www.birzulisassociates.com

Project
ARMIDALE SECONDARY COLLEGE

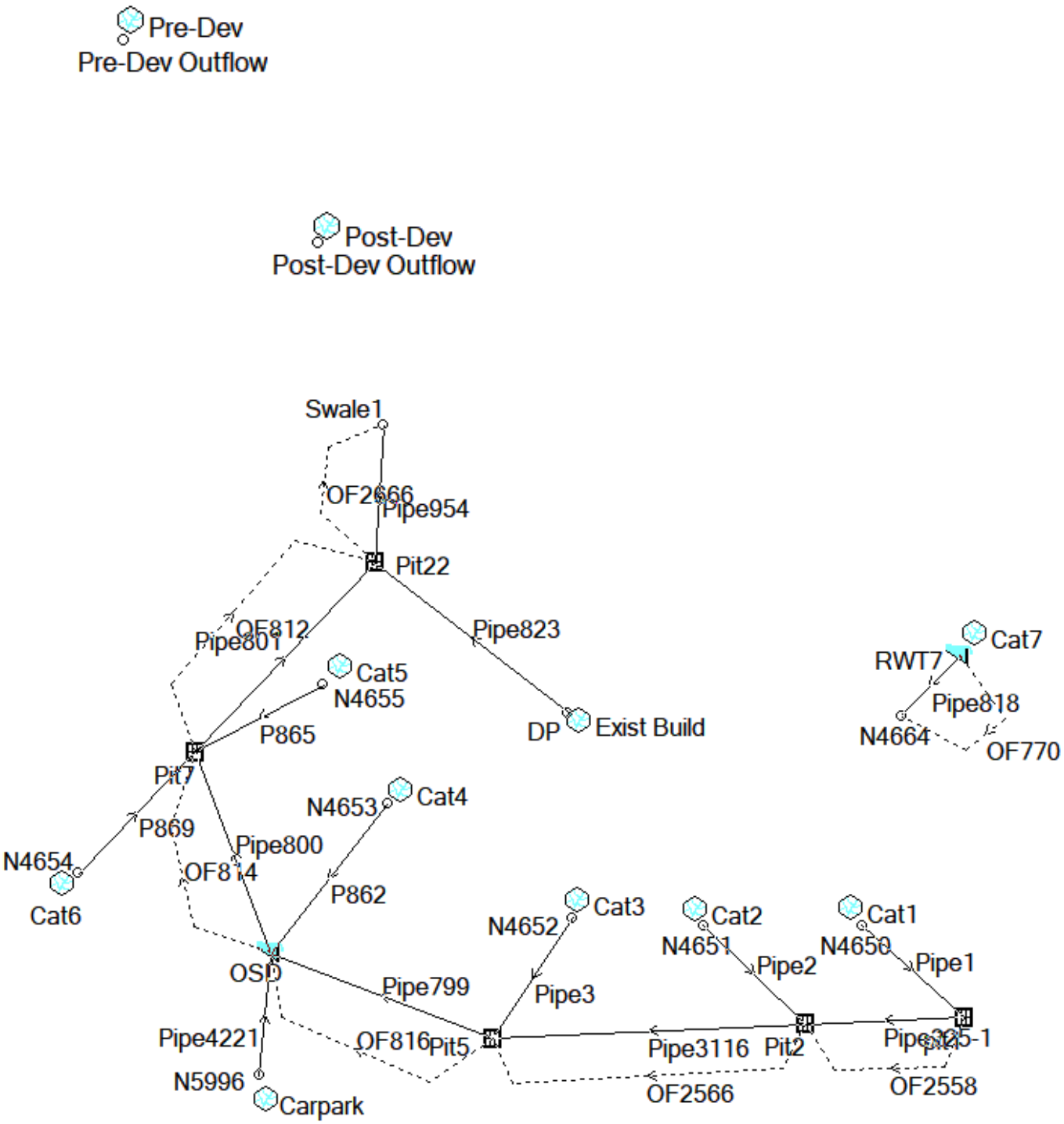
at
BUTLER STREET, ARMIDALE, NSW, 2350

for
NSW Department of Education

Drawing Title
SOIL AND EROSION
SEDIMENT CONTROL PLAN

Date: 14/03/2018
Scale: 1:1000 @ A1
Drawing Reference: 7070-BIRZ-SW-13
Revision: C

APPENDIX A - DRAINS MODEL



DRAINS results prepared from Version 8

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N4664	98.23			0			
DP	98.12			0.126			
Pit22	97.55			0	0.49	0	None
Swale1	96.29			0			
N4650	100.97			0.022			
pit1	100.82			0	0.93	0	None
Pit2	100.78			0	0.92	0	None
Pit5	100.48			0	0.82	0	None
Pit7	98.15			0	0.39	0	None
N4651	101.01			0.027			
N4652	101.01			0.041			
N4653	99.12			0.037			
N4654	98.78			0.023			
N4655	98.8			0.035			
N5996	100.65			0.098			

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Pre-Dev	0.596	0.519	0.17	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Cat7	0.047	0.047	0	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Exist Build	0.126	0.119	0.013	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Post-Dev	0.803	0.736	0.143	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Cat1	0.022	0.022	0	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Cat2	0.027	0.027	0	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Cat3	0.041	0.041	0	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Cat4	0.037	0.037	0	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Cat6	0.023	0.023	0	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Cat5	0.035	0.035	0	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Carpark	0.098	0.094	0.005	5	10	5	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2

Outflow Volumes for Total Catchment (7.09

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 5 year, 5 minutes storm, average 111	1197.05	275.87 (23.0%)	275.87 (42.0%)	0.00 (0.0%)
AR&R 5 year, 30 minutes storm, average	3086.45	1439.47 (46.6%)	1223.57 (72.3%)	215.89 (15.5%)
AR&R 5 year, 1 hour storm, average 31.5	4076.45	2128.30 (52.2%)	1720.14 (77.0%)	408.16 (22.2%)
AR&R 5 year, 2 hours storm, average 20.2	5228.1	2854.31 (54.6%)	2297.79 (80.2%)	556.52 (23.6%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe818	0.009	3.23	101.231	98.231	AR&R 5 year, 2 hours storm, average 20.2 mm/h, Zone 2
Pipe823	0.125	1.93	98.119	97.557	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe954	0.215	3.85	97.289	96.293	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe1	0.022	1.18	100.975	100.823	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe225-1	0.022	0.48	100.806	100.778	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe3116	0.049	1.07	100.691	100.484	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe799	0.09	2	100.192	99.728	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe800	0.041	1.27	98.26	98.15	AR&R 5 year, 1 hour storm, average 31.5 mm/h, Zone 2
Pipe801	0.09	2.42	98.047	97.588	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe2	0.027	1.46	101.009	100.778	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe3	0.041	2.2	101.009	100.484	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
P862	0.037	2	99.122	98.999	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
P869	0.023	2.59	98.775	98.15	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
P865	0.035	2.85	98.797	98.15	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2
Pipe4221	0.098	4.15	100.653	99.623	AR&R 5 year, 30 minutes storm, average 47.7 mm/h, Zone 2

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Stor
OF770	0	0	0.007	0	0	0	0	0
OF2666	0	0	0.908	0	0	0	0	0
OF2558	0	0	0.908	0	0	0	0	0
OF2566	0	0	0.908	0	0	0	0	0
OF816	0	0	0	0	0	0	0	0
OF814	0	0	0.018	0	0	0	0	0
OF812	0	0	0.007	0	0	0	0	0

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
RWT7	104.11	46.6	0.009	0.009	0
OSD	99	134	0.041	0.041	0

CONTINUITY CHECK for AR&R 5 year, 30

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Pre-Dev Outflow	482.71	482.71	0	0
RWT7	34.12	0	34.12	0
N4664	0	0	0	0
DP	94.5	94.41	0	0.1
Pit22	229.19	227.86	0	0.6
Swale1	227.86	227.86	0	0
Post-Dev Outflow	622.46	622.46	0	0
N4650	15.85	15.84	0	0.1
pit1	15.84	15.77	0	0.4
Pit2	35.29	35.3	0	0
Pit5	64.76	64.7	0	0.1
OSD	163.16	93.94	69.21	0
Pit7	136.13	134.78	0	1
N4651	19.59	19.52	0	0.4
N4652	29.42	29.45	0	-0.1
N4653	26.79	26.57	0	0.8
N4654	16.8	16.79	0	0.1
N4655	25.41	25.4	0	0.1
N5996	71.82	71.88	0	-0.1

Run Log for Armidale_OSD_v4.drn run at
No water upwelling from any pit. Freeboard
Flows were safe in all overflow routes.

DRAINS results prepared from Version
2018.05

PIT / NODE DETAILS

Version 8

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N4664	98.25			0			
DP	98.19			0.188			
Pit22	97.8			0		0.24	0 None
Swale1	96.33			0			
N4650	102			0.03			
pit1	101.73			0		0.02	0 None
Pit2	101.64			0		0.06	0 None
Pit5	101.11			0		0.19	0 None
Pit7	98.18			0		0.36	0 None
N4651	102.07			0.037			
N4652	102.07			0.056			
N4653	99.65			0.051			
N4654	98.79			0.032			
N4655	98.83			0.048			
N5996	100.68			0.135			

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Pre-Dev	1.147	0.706	0.55	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Cat7	0.065	0.065	0	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Exist Build	0.188	0.162	0.034	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Post-Dev	1.345	1	0.433	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Cat1	0.03	0.03	0	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Cat2	0.037	0.037	0	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Cat3	0.056	0.056	0	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Cat4	0.051	0.051	0	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Cat6	0.032	0.032	0	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Cat5	0.048	0.048	0	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Carpark	0.135	0.128	0.009	5		10	5 AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2

Outflow Volumes for Total Catchment
(7.09 impervious + 5.85 pervious =
12.9 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
AR&R 20 year, 5 minutes storm, average 155 mm/h, Zone 2	1671.56	517.82 (31.0%)	513.88 (56.1%)	3.95 (0.5%)
AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2	4192.92	2531.36 (60.4%)	1778.56 (77.4%)	752.79 (39.7%)
AR&R 20 year, 1 hour storm, average 42.3 mm/h, Zone 2	5474.08	3494.28 (63.8%)	2421.18 (80.7%)	1073.10 (43.4%)
AR&R 20 year, 2 hours storm, average 26.8 mm/h, Zone 2	6936.43	4535.00 (65.4%)	3154.67 (83.0%)	1380.33 (44.0%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe818	0.02	4.08	101.247	98.247	AR&R 20 year, 1 hour storm, average 42.3 mm/h, Zone 2
Pipe823	0.182	1.95	98.194	97.8	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe954	0.291	4.14	97.327	96.33	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe1	0.03	1.61	102.002	101.726	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe225-1	0.03	0.65	101.694	101.644	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe3116	0.067	1.45	101.485	101.11	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe799	0.122	2.65	100.574	99.742	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe800	0.048	1.3	98.282	98.181	AR&R 20 year, 1 hour storm, average 42.3 mm/h, Zone 2
Pipe801	0.114	2.66	98.062	97.8	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe2	0.037	1.99	102.065	101.644	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe3	0.056	2.99	102.067	101.11	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
P862	0.051	2.72	99.651	99.31	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
P869	0.032	2.79	98.791	98.181	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
P865	0.048	2.85	98.831	98.181	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2
Pipe4221	0.135	4.48	100.681	99.651	AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	
OF770	0	0	0.206	0	0	0	0	0
OF2666	0	0	1.479	0	0	0	0	0
OF2558	0	0	1.479	0	0	0	0	0
OF2566	0	0	1.479	0	0	0	0	0
OF816	0	0	0.288	0	0	0	0	0
OF814	0	0	0.362	0	0	0	0	0
OF812	0	0	0.206	0	0	0	0	0

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level	
RWT7	104.19	47.9	0.02	0.02		0
OSD	99.31	208.6	0.048	0.048		0

CONTINUITY CHECK for AR&R 20 year, 30 minutes storm, average 64.8 mm/h, Zone 2

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Pre-Dev Outflow	944.82	944.82	0	0
RWT7	49.59	4.16	45.43	0
N4664	4.16	4.16	0	0
DP	149.68	149.56	0	0.1
Pit22	321.15	319.41	0	0.5
Swale1	319.41	319.41	0	0
Post-Dev Outflow	1086.7	1086.7	0	0
N4650	23.04	23.04	0	0
pit1	23.04	22.96	0	0.3
Pit2	51.36	51.37	0	0
Pit5	94.17	94.02	0	0.2
OSD	238.83	111.82	127.01	0
Pit7	173.14	171.59	0	0.9
N4651	28.47	28.4	0	0.3
N4652	42.77	42.81	0	-0.1
N4653	38.94	38.72	0	0.6
N4654	24.41	24.4	0	0
N4655	36.94	36.92	0	0
N5996	105.99	106.09	0	-0.1

Run Log for Armidale_OSD_v4.drn run at 14:56:27 on 12/6/2018
No water upwelling from any pit.
Freeboard was less than 0.15m at Pit2, pit1

Flows were safe in all overflow routes.

APPENDIX B

MANUFACTURER'S SPECIFICATIONS & INSTALLATION

OCEAN PROTECT

Vortechs

Operations & Maintenance Manual

Table of Contents

Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes as recommended by the manufacturer.

The Vortechs system is a high-performance hydrodynamic separator that effectively removes fine sediment, oil and grease, as well as floating and sinking pollutants. Its swirl concentrator and flow control features, work together to minimise turbulence and provide stable storage of captured pollutants. The design also allows for easy inspection and unobstructed maintenance access.

Why do I need to perform maintenance?

Adhering to the maintenance schedule of each stormwater treatment device is essential to ensuring that it works properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It's also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up).

Health and Safety

Access to a Vortechs unit requires removing heavy access covers/grates, additionally it might become necessary to enter into a confined space. Pollutants collected by the Vortechs will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your Vortechs require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel, as a result it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the Vortechs, precautions should be taken in order to minimise (or, when possible, prevent) contact with sediment and other captured pollutants by maintenance personnel. In order to achieve this the following personal protective equipment (PPE) is recommended:

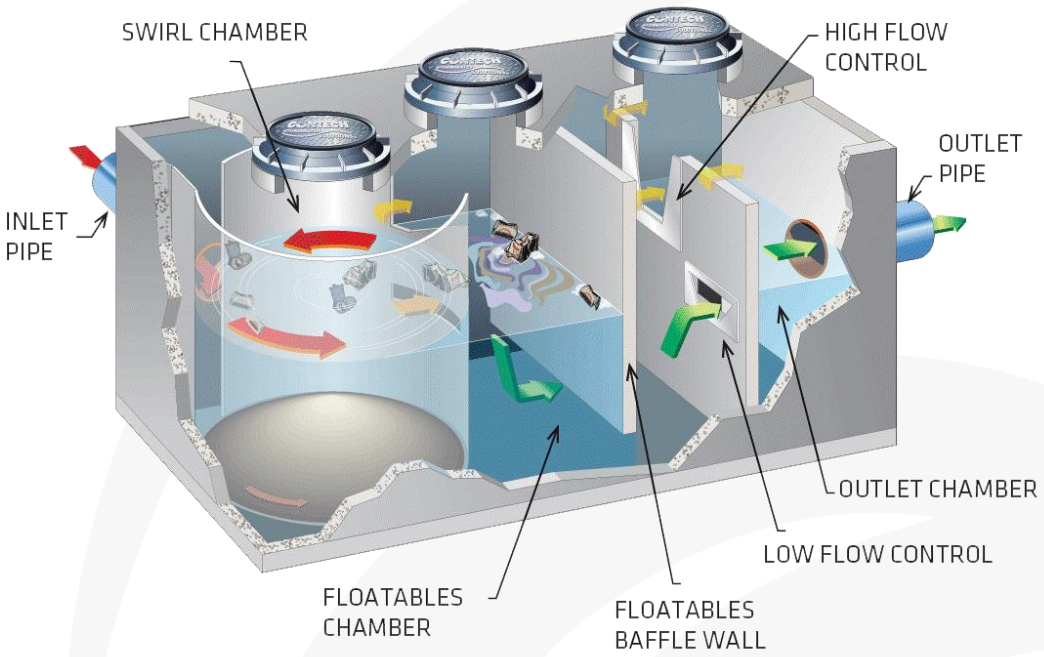
- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst the minor maintenance for the Vortechs can be performed from surface level, there may be a need to enter the pit (confined space) during major services. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification in confined space entry requirements.

How does it Work?

Stormwater enters the swirl chamber at a tangent, creating a swirling flow pattern and enhancing gravitational separation. Sinking pollutants stay in the swirl chamber while floating pollutants are stopped at the floatables baffle wall. During larger storms, the water level rises above the low flow control and begins to flow through the high flow control.



As a storm event increases in intensity, the swirling action increases proportionately, this assists in in the prevention of re-suspension. When flowing at peak capacity, the water surface in the system approaches the top of the high flow control. The Vortechs should be sized so that previously captured pollutants are retained in the system even during these infrequent events. As a storm subsides, treated runoff decants out of the Vortechs system at a controlled rate, restoring the water level to a dry-weather level equal to the invert of the inlet and outlet pipes.

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the Vortechs requires a minor service every 6 months and a major service every 12 months.

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the Vortechs.

	Description of Typical Activities	Frequency
Minor Service	Visual inspection of swirl, floatables and outlet chambers Removal of large floatable pollutants Measuring of sediment depth	At 6 Months
Major Service	Removal of accumulated sediment and gross pollutants Inspection of the swirl chamber, baffle wall and outlet controls	At 12 Months

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to assess the condition of the device and record necessary information that will inform the activities to be undertaken during a major service.

1. Establish a safe working area around the access point
2. Remove access cover over the swirl chamber
3. Visually inspect the chamber
4. Remove large floatable pollutants with a net
5. Measure and record sediment depth
6. Replace access cover
7. Repeat steps 2-6 for floatable and outlet chambers

Major Service

This service is designed to return the Vortechs device back to optimal operating performance.

1. Establish a safe working area around the access point
2. Remove access cover over the swirl chamber
3. Using a vacuum unit remove any floatable pollutants
4. Decant water until water level reaches accumulated sediment
5. Remove accumulated sediment and gross pollutants with vacuum unit (if required)
6. Repeat steps 2-5
7. Inspect the swirl chamber, baffle wall and outlet controls
8. Use high pressure water to clean sump area (if required)
9. Replace access covers

When determining the need to remove accumulated sediment from the Vortechs unit, the specific sediment storage capacity for the size of unit should be considered (see table below).

Vortechs Model	Swirl Chamber Diameter (m)	Sediment Storage Capacity (m^3)
VX1000	0.9	0.5
VX2000	1.2	0.9
VX3000	1.5	1.4
VX4000	1.8	1.8
VX5000	2.1	2.4
VX7000	2.4	3.1
VX9000	2.7	3.7
VX11000	3.0	4.3
VX16000	3.7	5.4

Additional Types of Maintenance

The standard maintenance approach is designed to work towards keeping the Vortechs operational during normal conditions. From time to time, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the Vortechs unit that potentially received flow should be inspected and cleaned. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event.

Blockages

In the unlikely event that flooding occurs upstream of the Vortechs system, the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

1. Inspect the upstream diversion structure (if applicable) ensuring that it is free of debris and pollutants
2. Decant water from Vortechs unit in preparation for confined space entry
3. Inspect the high flow and low flow control elements as well as both inlet and outlet pipes for obstructions, if present remove any built up pollutants or blockages.

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the Vortechs after a major storm event. The focus is to inspect for higher than normal sediment accumulation that may result from localised erosion, where necessary accumulated pollutants should be removed and disposed.

Disposal of Waste Materials

The accumulated pollutants found in the Vortechs must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the system has been exposed to any hazardous or unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our Vortechs system we offer long term pay-as-you-go contracts and pre-paid once off servicing.

For more information please visit www.OceanProtect.com.au

APPENDIX C

FLOOD PLANNING LEVEL MAP

ARMIDALE REGIONAL COUNCIL

Armidale Flood Planning Level Map

(Based on Armidale Flood Study 2004 and Martins Gully Update 2011)

- Flood Planning Level (1Percent AEP + 0.5m)
- Watercourse
- Parcel Boundary
- Roads
- Railway Line

DISCLAIMER:

- **The extent of flooding depicted on these maps is approximate as ground levels used are sourced from aerial photography. For a more accurate assessment of the extent of flooding, actual ground levels must be obtained and compared to predicted flood levels.**
- **The map depicts flooding from rising water from natural watercourses only.**
- **The map does not indicate possible extents of flooding from flash flooding - local high intensity storms and associated run-off.**
- **Information is a pictorial representation only.**
- **Ground truthing is required.**
- **Contours are a general indication of ground shape only.**
- **Provided for intended purpose only.**
- **Should not be used for any other purpose.**

COPYRIGHTS:

- **Cadastral Information - Land and Property Management Authority**
- **State Forest - State Forests NSW**
- **National Parks - National Parks and Wildlife Service NSW**
- **Geology - Department of Mineral Resources NSW**
- **Council Information - Armidale Dumaresq Council**

New flood studies have recently been completed by BMT WBM for Council. It is anticipated that these will go on display, as part of a public consultation process, at the end of January 2015. In the meantime the forecast flood planning limits shown on this map should treated with caution. For more accurate information contact Mike Brooks, Senior Engineer Utilities, on 6770 3894.

0 1.000

kilometers

N W E S

AUTHOR: ADC GIS OFFICER
DATE : APRIL 2011

APPENDIX D

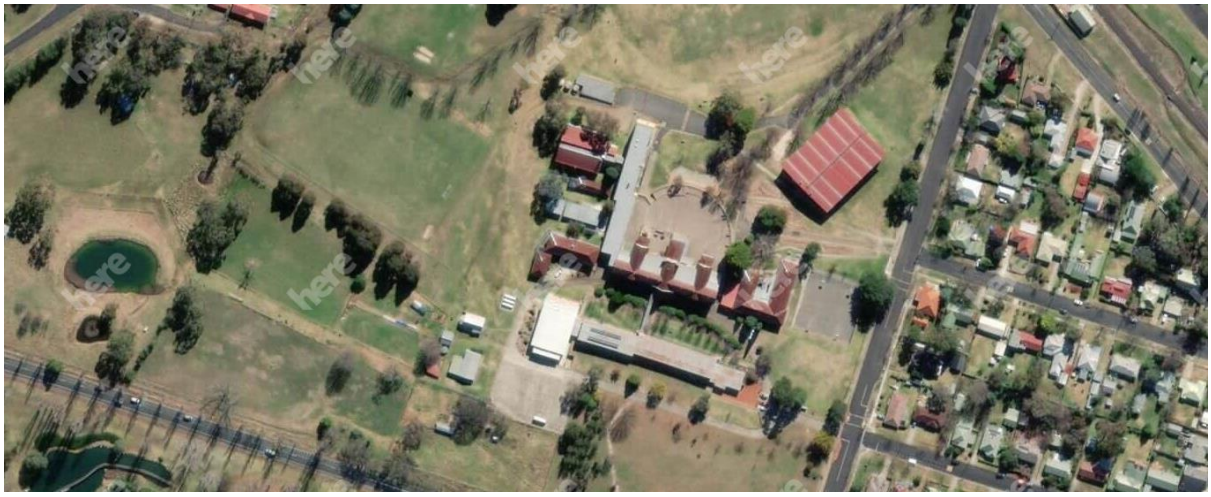
CONSTRUCTION MAP DURING WET WEATHER


After wet weather events the Site Manager & WHS&E 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 be on site weekly and will review all steep batters and cut areas to ensure they are stable.
Weekly walks are completed to review all sediment controls and decisions will be made on what is required to be reinstated, repaired or where additional sediment controls are required.
Truck Wash Down Area
Site sheds, amenities & storage containers. Which have covered walk ways with temporary Geohex & DGB paths for access. All sheds and containers are raised to prevent any water access. This area has a natural fall, so in the event of heavy rain the water will not pool. In addition there are silt fences surrounding the site compound to catch any sediment run off.
Site parking,using an old basketball slab and the extension made from crushed concrete
28 Ap
skyviewaerial.com.au

Appendix J – Unexpected Finds Protocol

UNEXPECTED FINDS PROCEDURE (ASBESTOS)

Armidale High School



PREPARED FOR:

DEMEX
Demolition | Excavation | Asbestos
PO Box 5557, Q Super Centre 4218

PREPARED BY:

Site Environmental & Remediation Services Pty Ltd
95 Sandgate Road
Albion QLD
T: 1300 320 696 **F:** +61 8 9220 2010 **Web:** www.sers.net.au

DOCUMENT CONTROL SHEET

Issued by: Site Environmental & Remediation Services Pty Ltd
95 Sandgate Road
Albion QLD

Tel: 1300 320 696
Fax: +61 8 9220 2010
www.sers.net.au

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Approved By		Matt Campbell	

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1	1st May 2019	Issued for site use

CONTENTS

1. Purpose of the Unexpected Finds Procedure

Following the frequent discovery of potential Asbestos Containing Materials (PACM) onsite at Armidale High School, DEMEX requested SERS develop an Unexpected Finds (UF) Procedure.

The purpose of this procedure is to ensure that all DEMEX operatives and subcontractors are aware of the correct method of dealing with PACM finds during works processes onsite and the steps to follow to mitigate risk to unprotected personnel.

2. Initiation of the Unexpected Finds Procedure.

If PACM are uncovered during works, it is the responsibility of the staff member to report this find immediately to the Demex Site Supervisor or onsite management. Works must be halted within the vicinity of the PACM. If the location can be safely marked and barricaded, this should be carried out. If not, it is advised that the staff member exit the immediate area, remain within 10 metres of the potential ACM to warn other staff of the risk and to await further instruction or assistance from the management team. The management team and site supervisors will then exclude the area until the onsite Licensed Asbestos Assessor (LAA) can conduct a suitable investigation.

To re-iterate the key points above, upon discovery of PACM the following should be carried out:

1. Stop work and inform management or site supervisor of the PACM.
2. Egress from immediate area and warn other staff to stay clear of the area.
3. Barricade the area if possible or await further assistance.
4. Management will exclude the area and re-direct staff to other tasks.
5. Onsite LAA will attend to conduct assessment.

Once Demex have been made aware of the unexpected find, they must notify a staff member of RCC. RCC will then witness the unexpected find with Stuart Collett and document the required information. From this an early warning is sent to Stuart Collett from RCC containing, Images, a completed unexpected find form an any other relevant information.

3 Initial Investigation by Licensed Asbestos Assessor

Once the area has been excluded, the LAA will attend to determine the risk posed by the PACM, the PPE/RPE required for the investigation, the extent of the potential contamination, whether further works or equipment are required to delineate the extent, the likely quantities of materials and to help develop an appropriate remediation strategy. Should the LAA require assistance in the investigation, it is highly advised that assisting staff are trained as Licensed Asbestos Removalists (LAR).

If contamination is observed to be of a significant level (ie. Greater than $5m^3$) soil sampling must be conducted to the appropriate levels for delineation and waste classification as per the WSP Remedial Action Plan (RAP) for the site:

- Volumes up to $200m^3$ require one sample per every $25m^3$ of soil;
- From $200m^3$ to $3000m^3$, 10 samples are required;
- Levels greater than $3000m^3$ require a sample to be taken every $250m^3$

The following steps should be carried out by the LAA prior to entry to the potentially ACM impacted area:

1. Selection and usage of PPE/RPE appropriate to the task.
2. Visual observation of the barricade boundary to ensure it encompasses all of the contamination readily identified. Redefining boundary as required.
3. Conduct visual assessment throughout the barricaded area to identify the extent of the material, type, friability and condition.
4. Determine if additional materials must be removed to categorise the extent of the contamination by removing walls, flooring, soils etc.
5. Sampling of all different types of PACM and estimated quantities.
6. Log location of UF area and capture photographic record.
7. Send sample to NATA accredited laboratory for analysis.

4 Awaiting Results

While the sampling results are pending, all UF areas must be treated as containing Asbestos. Any unauthorised entry in these areas must be prohibited. If entry to an UF area must be gained, then it is a requirement that the entrant should follow all entry procedures as advised by the LAA.

Disturbance of any kind within the UF area can result in potential fibre release or the unintentional contamination of adjacent areas. As such, entry to the UF area should be kept to a minimum.

5 Reporting Results

Once NATA Accredited sample results have been received, it is the responsibility of the LAA to present the information in a clear and concise way. The most appropriate measure is the development of mapping, detailing the sampling locations of the materials, the presence of ACM, the friability and the likely extent and providing a photographic record of the material types sampled.

Alongside the mapping, the LAA should assist Demex with appropriate remediation strategies to successfully remove the risk from the area. The LAA should provide multiple options, as far as reasonably practicable, to the client. These remediation strategies should be considered in conjunction with the RAP and the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia May 2009.

At the conclusion of Step 5, the following tasks should have been completed:

1. Sampling results provided to client with appropriate report.
2. Mapping and/or photographs provided detailing at minimum the Asbestos Containing Materials identified and if it is friable.
3. Provide assistance in the development of suitable remediation methods

6 Approval of UF and remediation works

Once remediation of the UF is approved and prior to commencement of the remediation works, the LAA should determine the risk of fibre release during the removal works, the proximity of other trades operating in the vicinity and if there are any potential impacts to the public.

The need for respirable fibre air monitoring or an enclosure will be determined by the LAA. The PPE/RPE requirement will be specified by the Licensed Asbestos Removalist Supervisor prior to the commencement of works. If a spotter needs to be engaged for the works, it is recommended that the spotter be a Licensed Asbestos Removalist. During soil removal works, the spotter can situate themselves closer to the excavated area, potentially identifying any additional materials being unearthed and assisting the LAA to expand the area if required.

Soil remediation works must be conducted in conjunction with the remediation methods outlined in the RAP which can be found in **Appendix A** at the end of this document

1. LAA to determine the risks to staff and institute controls or monitors as required.
2. LAR supervisor to determine appropriate PPE/RPE and decontamination needed for the task.
3. LAR spotter to be engaged for ACM impacted soil works.
4. LAA to regularly attend area to assess progress and inspect for hot spots.
5. Once works are complete, LAR supervisor to advise LAA to attend for clearance or validation purposes.

7 Clearance or Validation Procedure

Once notified by the LAR supervisor that they are confident the area is successfully remediated, the LAA will attend to conduct a visual inspection, prior to demobilisation of staff or equipment.

The LAA will visually inspect all areas immediately surrounding the UF barricaded area to determine if cross contamination has occurred. The LAA will then enter the UF area and visually assess for the presence of Asbestos. If the remediation of the work area is not to a satisfactory standard, the LAA will instruct the LAR supervisor that additional removal works need to occur, and the LAR staff will continue until it is to a satisfactory standard.

Once the area is considered to be of satisfactory standard, the LAA will carry out soil validation samples or clearance air monitoring as deemed necessary by the LAA. Clearance air monitoring is a mandatory requirement for all friable removal works and will be carried out in all cases.

Validation soil sampling will be carried out in accordance with NEPM Schedule B2 guidelines, or in accordance with *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia May 2009.*

8 Relevant Legislation and Guidelines

In dealing with hazardous containing materials generally the following pieces of Legislation, Codes of Practice and Guidance Notes are required to be adhered to by all stakeholders within New South Wales:

- *Work Health and Safety Act 2011 (New South Wales);*
- *Work Health and Safety Regulation 2011 (New South Wales);*
- *Contaminated Land Management Act 1997 (New South Wales);*
- *AS 2601-2001 Demolition of Structures;*
- *Code of Practice – How to Safely Remove Asbestos (Safe Work Australia, 2016);*
- *Code of Practice – How to Manage and Control Asbestos in the Workplace (Safe Work Australia, 2016);*
- *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)];*
- *Adopted National Exposure Standards for Atmospheric Contaminates in the Occupational Environment [NOHSC:1003(1995)];*
- *Atmospheric Contaminates in the Occupational Environment [NOHSC:1003(1995)];*
- *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia May 2009;*
- *NEPM Schedule B1 and B2 - Guideline on site characterisation*

9 Disposal Of Material

Any material contaminated material to be removed from site, will require the below information to be submitted to the Planning Secretary:

- -Disposal
- -Location
- Results of testing

This information is required to be submitted to Planning prior to the removal of the contaminated material from site.

When waste is being removed from site it must secured and maintained at all times. Concrete waste and rinse water from the contamination are not to be disposed of on site or enter any natural or artificial watercourse.

Appendix A: Soil Remediation Guidelines

REMEDIATION METHODOLOGY	DESCRIPTION	ASSESSMENT	RECOMMENDATION
Treatment	Treatment technologies are used to permanently and significantly reduce the toxicity, mobility or volume of contaminated wastes. Generally, treatment technologies may be targeted towards in situ or ex situ remediation and include biological, thermal and physical/chemical treatment and containment.	For the contamination identified at the site, asbestos and PAHs, treatment technologies are minimal and not considered practical.	Not recommended
Removal to landfill	Removal to landfill involves physically moving impacted soil to an off-site location for storage, treatment or disposal. If the chemical concentrations of the impacted soil exceed the landfill criteria stipulated within the NSW EPA (2014) *Waste Classification Guidelines*, treatment of the soil material may be required prior to disposal. Excavation and disposal will remove impacted material and subsequently any ongoing liability or need for any long-term management.	Based on the soil results obtained during the soil assessments, material to be excavated from the site is likely to be a mixture of general solid waste and special waste (asbestos), with the possibility that some material may also be classified as restricted solid waste. Disposal costs can vary depending on quantity of material requiring disposal, disposal facility selection, and changes in government environmental levies.	Recommended

REMEDIATION METHODOLOGY	DESCRIPTION	ASSESSMENT	RECOMMENDATION
Physical barrier systems	Physical barrier systems (or capping) limit access to the impacted material, mitigate surface water infiltration through the underlying material, and control or reduce migration of the substances into the surrounding environment. This option can include creating barriers around and on top of the impacted material in place, or relocating the impacted material to a constructed encapsulation area. In addition, the barrier may also be used to control the emission of odours and gases/vapours, reduce erosion and improve aesthetics.	The impacts identified at the site are present in the surface 0.2 mBGL of soil; which makes capping impractical. The cap would need to be built on top of the existing ground surface, and would therefore be unsightly and difficult to maintain. In addition, some of the impacts will be excavated as part of the redevelopment works.	Not recommended
Institutional controls	Institutional controls include measures such as land use restriction through zoning, site management and access restrictions, restrictions on intrusive works, and relocation of receptors. Although exposure can be reduced by these means, the impacted media are not directly affected or treated. Institutional controls are sometimes used in conjunction with other remedial options in order to manage potential risks from residual materials.	Changing the use of the site is not practical and would not meet the goals of the client, and therefore this strategy on its own is not considered an appropriate option.	Not recommended

REMEDIATION METHODOLOGY	DESCRIPTION	ASSESSMENT	RECOMMENDATION
No action	No remediation is undertaken, and soil impacts remain in place.	The elevated concentrations of contaminants present an unacceptable potential risk to human under the proposed future land use for the site. Therefore, taking no action to address the identified contamination is considered inadvisable and has not been considered in further detail.	Not recommended

SERS
Site Environmental and Remediation Services

END OF DOCUMENT

DISCLAIMER

This report is prepared for a particular client objective and is formulated on this basis only. All limitations and conditions in the writing of this report are clearly agreed to by the client and SERS prior to its formulation and may not be suitable or applicable for any other use other than that of the original intended objective. No other parties other than the client and SERS should use this information without firstly conferring with SERS.

Whilst all due care is taken any information within this report that has relied on information from previous assessments made by others including visual inspections, laboratory testing and overall methodologies cannot be guaranteed for its accuracy or competency by SERS.

This report should be reproduced in full at all times when either reviewed or accessed. If the report is to be used by a third party for whatever means the scope and limitations of the report should be clearly defined to the third party.

Appendix K - Protocol For Aboriginal & Non-Aboriginal Unexpected Finds

ARMIDALE COLLEGE UPGRADE

ARCHAEOLOGICAL WATCHING BRIEF

Report to Richard Crookes Constructions

February 2019

APEX ARCHAEOLOGY

PO Box 236, Nowra, NSW 2541 | heritage@apexarchaeology.com.au | www.apexarchaeology.com.au

ABN 56 625 618 993

Apex Archaeology would like to acknowledge the Aboriginal people who are the traditional custodians of the land in which this project is located. Apex Archaeology would also like to pay respect to Elders both past and present.

1.0 Background

Apex Archaeology has been engaged by Richard Crookes Construction as the Archaeology Watching Brief Consultant for the upgrade of Armidale College.

Armidale College (formerly Armidale High School) has been identified as having historical significance due to the association of the building with higher education since the 1920s.

Whilst no archaeological potential within the proposed construction areas has been identified, a Watching Brief was recommended by NBRS (2018). This document outlines the requirements for the watching brief.

1.1 Objectives of the Watching Brief

The Statement of Heritage Impact (SoHI) prepared by NBRS (2018) for the project states that "the Heritage Assessment of Armidale High School…does not assess archaeological potential however archaeological material may be uncovered during the works. It is recommended an archaeological watching brief form part of the contract for the redevelopment of the site."

As such, the objectives of the watching brief for the project are to:

- Observe the bulk excavations undertaken on the site, including during demolition, for the purpose of identifying any archaeological material which may be revealed by the excavations, and hence recording this evidence;
- If identified, to analyse the evidence with reference to the available documentary evidence; and
- To provide a report on the results of the watching brief, regardless of the results.

1.2 Archaeologists

The watching brief will be fulfilled by Leigh Bate, Director and Archaeologist with Apex Archaeology, and/or Jenni Bate, Director and Archaeologist with Apex Archaeology. Both have over eleven years of consulting experience within NSW.

Appropriately qualified archaeologists may also be deployed to fulfil the watching brief as required.

2.0 Unexpected Finds Protocols

2.1 Unexpected Historical Archaeology

The SoHI prepared by NBRS did not identify the potential for historical archaeological remains to be present within the proposed development area. Nevertheless, in the event of the discovery of unexpected historical archaeological remains, it will be necessary to stop works in the vicinity of the find and notify the Heritage Division of the Office of Environment and Heritage (OEH) via OEH's Environment Line on 131 555. A suitably qualified archaeologist such as the Archaeological Watching Brief Consultant must make an assessment of the find and determine the requirement for further approvals prior to work recommencing.

2.2 Skeletal Remains

In the unlikely event of suspected human skeletal remains being identified on the site, works must immediately cease in the vicinity of the find, the area secured, and the local police (6771 0699) must be informed in the first instance. A forensic archaeologist may be required to determine the nature of the find. All human skeletal remains are subject to statutory and protections. All bones must be treated as potential human skeletal remains .

If the remains are identified as Aboriginal in origin, the Armidale Local Aboriginal Land Council (LALC) (6772 6048) and OEH's Environment Line (131 555) must be informed. Further assessment and permits would be necessary prior to work recommencing.

If the remains are not identified as Aboriginal, the NSW Police and/or the Coroner will determine further requirements. Historic burials may also require further assessment prior to work recommencing.

The above is to be completed in line with Guidelines for management of human skeletal remains (NSW Heritage Office, 1988)

2.3 Unexpected Aboriginal Archaeology

In the unlikely event of Aboriginal archaeological material being identified within the site, works must cease in the vicinity of the find, and a qualified archaeologist such as the Archaeological Watching Brief Consultant called to make an assessment of the find. If the find is determined to be Aboriginal in origin, the Aboriginal Division of OEH via OEH's Environment Line (131 555) and the Armidale LALC (6772 6048) must be notified. The find must be registered on the Aboriginal Heritage Information Management System (AHIMS) and if the area cannot be avoided by the development, further archaeological assessment and permits may be required prior to work recommencing.

Appendix L – Waste Classification & Validation

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REMEDIAL ACTION PLAN FOR REDEVELOPMENT WORKS, ARMIDALE HIGH SCHOOL

BUTLER STREET,
ARMIDALE NSW 2350

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SEPTEMBER 2018

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Remedial action plan for redevelopment works, Armidale High School Butler Street, Armidale NSW 2350

NBRS & Partners Pty Ltd

WSP
Level 3, 51-55 Bolton St
Newcastle NSW 2300
PO Box 1162
Newcastle NSW 2300

Tel: +61 2 4929 8300
Fax: +61 2 4929 8382
wsp.com

REV	DATE	DETAILS
A	10/09/2018	Draft
B	27/09/2018	Final

	NAME	DATE	SIGNATURE
Prepared by:	Amy Valentine	27/09/2018	
Reviewed by:	Imogen Powell	27/09/2018	
Approved by:	Amy Valentine	27/09/2018	

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ABBREVIATIONS

ASRIS	Australian Soil Resource Information System
BTEXN	Benzene, toluene, ethylbenzene, xylene and naphthalene
CEMP	Construction environmental management plan
CRC CARE	Cooperative Research Council for Contamination Assessment and Remediation for the Environment
CSIRO	Commonwealth Scientific and Industrial Research Organisation
HIL	Health investigation levels
HSL	Health screening levels
LEP	Local environmental plan
mAHD	Metres above Australian Height Datum
mBGL	Metres below ground level
mg/kg	Milligram per kilogram (or part per million)
mg/L	Milligram per litre (or part per million)
ND (nd)	Not detected above the PQL
NOHSC	National Occupational Health and Safety Commission
NSW DECCW	NSW Department of Environment, Climate Change and Water
NSW DUAP	NSW Department of Urban Affairs and Planning
NSW EPA	NSW Environmental Protection Agency
PAH	Polycyclic aromatic hydrocarbon
POEO Act	*Protection of the Environment Operations Act 1997*
RAP	Remediation action plan
SEPP55	State Environmental Planning Policy No 55—Remediation of Land

1 INTRODUCTION

1.1 BACKGROUND

NBRS & Partners Pty Ltd (NBRS) commissioned WSP Australia Pty Ltd (WSP) to prepare a remedial action plan (RAP) for Armidale High School located at Butler St, Armidale, NSW 2350 (the site). A site plan is provided as Figure 1, Appendix A.

A soil assessment was undertaken by WSP in January 2018 at the site to provide information on the soil conditions and indicative waste classification prior to the redevelopment work. The assessment found contamination exceeding the health investigation levels at four locations, identified as HA1, HA11, HA12 and HA18. This RAP has been prepared to document the proposed remediation for these locations.

1.2 OBJECTIVE

The objective of this RAP is to document the remediation required and provide a framework for the work practices and environmental management techniques to be implemented while undertaking soil remediation at the site.

1.3 SCOPE OF WORKS

The RAP includes:

- a summary of the site conditions and surrounding environment
- a summary of the contamination status at the site and its surroundings
- assessment of data gaps that may require further investigation
- identification of remediation goals
- outline the validation requirements
- timing and schedule of the remedial work
- site management issues
- contingency management issues
- workplace health and safety (WHS) issues.

1.4 TECHNICAL FRAMEWORK

The RAP was prepared in accordance with the following guidelines:

- *Contaminated Land Management Act 1997* (NSW).
- National Occupational Health and Safety Commission (NOHSC) 1995, *Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment*.
- NSW Department of Environment, Climate Change and Water (NSW DECCW) 2009, *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*.
- NSW Department of Urban Affairs and Planning (NSW DUAP) 1998, *Managing Land Contamination. Planning Guidelines SEPP 55 – Remediation of Land*.

- NSW Environmental Protection Agency (NSW EPA) 1997, *Guidelines for Consultants Reporting on Contaminated Sites*.
- NSW EPA 2014, *Waste Classification Guidelines. Part 1: Classifying Waste*.
- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM; as amended 2013).
- *Protection of the Environment Operations Act 1997* (POEO Act; NSW).

1.5 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Previous environmental investigations conducted at the site have documented in the following reports:

- GeoEnviro Consultancy Pty Ltd (GeoEnviro) in 2017, titled *Geotechnical, Salinity and Contamination Investigation Proposed Redevelopment, Armidale High School, Butler Street Armidale NSW.*
- WSP 2018, *Targeted soil contamination assessment, Armidale High School, Butler St, Armidale, NSW 2350*.

2 SITE CHARACTERISICS

2.1 SITE IDENTIFICATION AND DESCRIPTION

The site identification details are provided below in Table 2.1.

Table 2.1 Site identification details

Site name	Armidale High School
Site address	Butler Street, Armidale, NSW 2350
Legal identification	The site is comprised of the following lots: — Lot 1 in deposited plan (DP) 196298 — Lot 1, Section 161 in DP 758032 — Lot 1151 in DP 821627 — Lot 704 in DP 755808 — Lots 1 and 2, Section 49 in DP 758032 — Lot 7005 in DP 1052246.
Local government area	Armidale Regional Council
Zoning	R1- general residential under the *Armidale Dumaresq Local Environmental Plan 2012* (Armidale LEP)
Current land use	Secondary school
Proposed site use	Continued use as a secondary school
Land size	18.38 ha approximately

The site is bounded by Mann Street, which becomes Lambs Avenue, to the north, Butler Street to the east, Kentucky Street to the south and Miller, Barry and Steven Streets to the west. Low-density residential dwellings are present to the east and west. To the north is a light industrial/commercial zone with Armidale train station approximately 200 m north and residential properties beyond. To the south is Armidale Bicentennial Arboretum, which is a public recreation space, followed by suburban residential properties.

The majority of the site is grass or other vegetation. In the centre and east of the site are the school buildings, with paved car park areas along the eastern site boundary and south of the school buildings. Access roads entre the site at the north-eastern corner from Lambs Avenue and from the eastern boundary with Butler Street at Mossman Street and Hargrave Street.

2.2 SITE ZONING

The site is zoned R1 general residential in the Armidale LEP. The objectives of this zone are to:

- provide for residential housing needs of a variety of types and densities
- enable other land uses that provide facilities or services for residents.

3 SITE ENVIRONMENTAL SETTING

3.1 TOPOGRAPHY AND HYDROLOGY

Based on Google Earth, the site generally slopes down to the north from approximately 1,030 metres in Australian Height Datum (mAHD) to 1,000 mAHD, with steep slopes from the gymnasium down towards the main sports oval in the north of the site, and from the southern carpark and western buildings down towards the sports oval.

The nearest surface water bodies include an on-site dam located in the south-west portion of the site, a dam located in the Armidale Bicentennial Arboretum approximately 35 m south if the site and a dam located approximately 250 m north-west of the site.

3.2 GEOLOGY

The site is underlain by Devonian-Carboniferous sedimentary rocks, comprising quartz-rich pebbly sandstone, conglomerate units deposited in fluvial (river) systems, and siltstone, mudstone and sandstone with lithic fragments, all of which were deposited 300 to 419 million years old (Geological Survey of NSW Department of Resources and Energy – Interactive Geological Map of NSW; https://www.resourcesandenergy.nsw.gov.au/; accessed 24 January 2018).

3.3 HYDROGEOLOGY

A review of the Department of Primary Industries registered groundwater bore database (allwaterdata.water.nsw.gov.au) conducted on 24 January 2018 identified 80 groundwater bores registered within a 1 km radius of the site. The bores are located in three clusters; around a Telstra site at 129 Allingham Street, the industrial zone north-west of the site around the Rose Valley Steel Works on Mann Street and at the Lowes Petroleum fuel depot on McLennan Street. The majority of these wells were registered for monitoring. None of the bores was registered for domestic uses.

3.4 ACID SULFATE SOILS

The acid sulfate soils map for the area prepared by Commonwealth Scientific and Industrial Research Organisation (CSIRO) indicates that the site is located within an area where there is low probability of acid sulfate soils.

4 CONTAMINATION AND POTENTIAL HEALTH RISKS

4.1 SUMMARY OF PREVIOUS INVESTIGATIONS

One previous assessment report was provided by NBRS prior to WSP's assessment in 2018, undertaken by GeoEnviro in 2017. The geotechnical and contamination investigation found that the site is generally underlain by natural ground; topsoil over natural silty clay and gravelly clay overlying siltstone and sandstone. No obvious signs of foreign fill material or building debris were identified except for a thin layer of fill at two borehole locations (BH1 and BH9).

Soil samples were collected and analysed from four boreholes (BH1, BH4, BH5 and BH8) for metals, organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAHs) and asbestos. The majority of results were below laboratory reporting limits, although metals were detected at concentrations below the site criteria. PAHs were detected in two samples, from BH4 and BH8. Although they did not exceed the site criteria the result from BH8 was equal to the site criteria for benzo(a)pyrene toxicity equivalency quotient (BaP TEQ). GeoEnviro considered the PAHs to likely be due to leaching from the asphalt at the site.

WSP undertook additional soil assessment in January 2018, comprising advancement of soil bores at 18 locations using a hand auger to target depths of 0.5 to 1 metre depth. The bores targeted the proposed new building, new gym addition, new games courts and PAHs identified by GeoEnviro (2017). Samples were analysed for TRH, BTEXN, PAHs, metals and asbestos. Four composite samples were also collected and analysed for PCBs and pesticides.

The analytical results included the following with respect to the health and ecological criteria:

- Chrysotile and amosite asbestos was detected as present in sample HA1_0.
- BaP TEQ exceeded the health-based criteria in samples HA1_0, HA11_0 and HA12_0, as well as duplicate samples QA1 and QA1A (primary sample HA18_0) and QA2 and QA2A (primary sample HA11_0).
- Benzo(a)pyrene exceeded the ecological criteria in samples HA1_0, HA4_0, HA10_0, HA11_0 (and QA2A), HA12_0, HA16_0 and HA18_0. Nickel exceeded the ecological criteria in samples HA5_0, HA6_0.5, HA7_0.7 and HA15_0 and zinc exceeded the ecological criteria in sample HA1_0.
- No exceedances were identified in adopted health or ecological criteria for TRH/BTEXN concentrations, with most samples below the limits of reporting (LORs). All samples analysed for PCBs, OCPs and OPPs had concentrations below the LORs.

The results indicated that PAHs exceed the health criteria in some shallow soil samples, including samples taken to confirm the previous assessment's findings. Shallow impacted soils at locations HA1, HA11 and HA12 will be excavated during the proposed redevelopment work, although the soil at HA18 is not anticipated to be excavated as part of the work. Based on the results some soil around HA18 was identified as requiring excavation to natural soil or management.

No other unacceptable health risk was identified for on-site or off-site receptors, including but not limited to students, teachers and maintenance workers.

A potential risk was identified to ecological receptors due to elevated benzo(a)pyrene and metals concentrations in soil across the site. However, no stressed vegetation or evidence of ecological effects were noted.

The results indicated that the soil at the site is likely to be classified as general solid waste for the majority of the site, except for the area around HA1, which has an indicative classification of asbestos waste in a matrix of restricted solid waste. The results were indicative only; additional sampling would be required for waste classification purposes.

Historical soil results are included in Appendix B.

4.2 CONTAMINANTS OF POTENTIAL CONCERN

Based on the results of the previous environmental investigations, the contaminants of potential concern for the site were identified as:

- PAHs
- asbestos.

For waste classification purposes, analysis of heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) will also be required.

4.3 EXTENT OF CONTAMINATION

Soil investigations targeted areas where the proposed redevelopment will occur and the previously identified PAHs. Exceedances of health-based criteria that require remediation were identified in shallow fill material at HA1, in the centre of the site where the new school building will be constructed, HA11 and HA12 were the gymnasium extension will be constructed and HA18, adjacent to the southern car park. It is noted that the most recent design plans provided do not show the gymnasium extension extending as far as HA11, and some additional excavation in this area will be required.

The impacts requiring remediation comprised BaP TEQ at all locations and asbestos at HA1. The impacts were vertically delineated by samples of the underlying natural soil, present at approximately 0.2 m below ground level (mBGL).

5 REMEDIATION GOALS AND STRATEGIES

5.1 REMEDIATION OBJECTIVES

The primary objective of the remediation is to remove impacts identified in fill material and make the site suitable for ongoing use as a secondary school.

5.2 REMEDIATION CATEGORY UNDER SEPP 55

Based on the requirements of the State Environmental Planning Policy 55 - Remediation of land (SEPP 55), the proposed remediation works are considered to be classified as 'Category 1' remediation work, work requiring consent, due to the presence of heritage items on the site. It is understood that the remediation work will be included with the development application already being prepared for the redevelopment work.

5.3 REMEDIATION OPTIONS

The preferred order of options for remediation, as stated in the NEPM (2013) is:

1. On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level.
2. Off-site treatment of excavated soil which, depending on the residual levels of contamination in the treated material is then returned to the site, removed to an approved waste disposal site or facility or used as fill or landfill.

Should it not be possible for either of these options to be implemented, then other options that are to be considered include:

1. Consolidation and isolation of the soil on-site by containment with a properly designed barrier.
2. Removal of contaminated soil to an appropriate site or facility, followed where necessary by replacement with clean fill.

The guidance also notes that if remediation is likely to have no net environmental benefit or cause a greater adverse effect on any aspect of the site or surrounds than what would occur if the site was left undisturbed, then an appropriate management strategy should be adopted.

The following broad categories of soil remediation options are considered to meet the remedial objectives:

- treatment
- removal to landfill
- physical barrier systems
- institutional controls
- no action.

The remedial options are considered in Table 5.1.

Table 5.1 Remedial options assessment

REMEDIATION METHODOLOGY	DESCRIPTION	ASSESSMENT	RECOMMENDATION
Treatment	Treatment technologies are used to permanently and significantly reduce the toxicity, mobility or volume of contaminated wastes. Generally, treatment technologies may be targeted towards in situ or ex situ remediation and include biological, thermal and physical/chemical treatment and containment.	For the contamination identified at the site, asbestos and PAHs, treatment technologies are minimal and not considered practical.	Not recommended
Removal to landfill	Removal to landfill involves physically moving impacted soil to an off-site location for storage, treatment or disposal. If the chemical concentrations of the impacted soil exceed the landfill criteria stipulated within the NSW EPA (2014) *Waste Classification Guidelines*, treatment of the soil material may be required prior to disposal. Excavation and disposal will remove impacted material and subsequently any ongoing liability or need for any long-term management.	Based on the soil results obtained during the soil assessments, material to be excavated from the site is likely to be a mixture of general solid waste and special waste (asbestos), with the possibility that some material may also be classified as restricted solid waste. Disposal costs can vary depending on quantity of material requiring disposal, disposal facility selection, and changes in government environmental levies.	Recommended
Physical barrier systems	Physical barrier systems (or capping) limit access to the impacted material, mitigate surface water infiltration through the underlying material, and control or reduce migration of the substances into the surrounding environment. This option can include creating barriers around and on top of the impacted material in place, or relocating the impacted material to a constructed encapsulation area. In addition, the barrier may also be used to control the emission of odours and gases/vapours, reduce erosion and improve aesthetics.	The impacts identified at the site are present in the surface 0.2 mBGL of soil; which makes capping impractical. The cap would need to be built on top of the existing ground surface, and would therefore be unsightly and difficult to maintain. In addition, some of the impacts will be excavated as part of the redevelopment works.	Not recommended

REMEDIATION METHODOLOGY	DESCRIPTION	ASSESSMENT	RECOMMENDATION
Institutional controls	Institutional controls include measures such as land use restriction through zoning, site management and access restrictions, restrictions on intrusive works, and relocation of receptors. Although exposure can be reduced by these means, the impacted media are not directly affected or treated. Institutional controls are sometimes used in conjunction with other remedial options in order to manage potential risks from residual materials.	Changing the use of the site is not practical and would not meet the goals of the client, and therefore this strategy on its own is not considered an appropriate option.	Not recommended
No action	No remediation is undertaken, and soil impacts remain in place.	The elevated concentrations of contaminants present an unacceptable potential risk to human under the proposed future land use for the site. Therefore, taking no action to address the identified contamination is considered inadvisable and has not been considered in further detail.	Not recommended

5.4 SUMARY OF REMEDIAL OPTIONS

The preferred remedial option identified is off-site disposal. The other potentially suitable remediation options either did not meet the client's requirements for the site or did not adequately address the identified contamination.

5.5 SOIL VALIDATION CRITERIA

The purpose of the remediation is to make the site suitable for continued use as a secondary school. Assessment criteria applicable for assessing validation data from the remediation is provided by the following:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM; as amended 2013), specifically Schedule B1, Investigation Levels for Soil and Groundwater.
- Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) *Technical Report No. 10 Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, Part 2: Application Document* (Friebel and Nadebaum, 2011).

Schedule B1 of the NEPM (2013) provides health screening levels (HSLs) for the assessment of hydrocarbon impacted soil and health investigation levels (HILs) for metals and other organic substances. HSLs/HILs are scientifically based, generic assessment criteria designed to be used in the first stage (Tier 1 or 'screening') of an assessment of potential risks to human health from chronic exposure to contaminants.

HSLs have been developed for selected petroleum compounds and fractions, and are applicable to assessing human health risk via vapour intrusion and inhalation. The HSLs depend on specific soil physicochemical properties and land use scenarios, with criteria presented for sand, silt and clay soils at several depth intervals. Where there is reasonable doubt as to the appropriate soil texture to select, either a conservative selection should be made (i.e. sand) or laboratory analysis carried out to determine particle size and hence soil texture sub-class.

HILs have been developed for metals and organic substances and are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are general for all soil types and generally apply to the top 3 m of soil.

HSLs/HILs have been developed for four generic land use settings:

- HSL/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, as well as secondary school buildings (HSL only)
- HSL/HIL B: Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats
- HSL/HIL C: Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary school playing fields and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate
- HSL/HIL D: Commercial/industrial such as shops, offices, factories and industrial sites.

For this investigation, criteria for HSL A, HSL C and HIL C have been adopted based on the current land use under the zoning as a secondary school. For HSLs, sand was adopted as the soil type for on-site soil assessment. Although on the soils on-site were predominantly silt and clay, some gravel and sand was reported in the shallow fill and reworked natural soil.

The CRC CARE Technical Report No. 10 (Friebel and Nadebaum, 2011) provides HSLs for petroleum hydrocarbons specifically for vapour inhalation for intrusive maintenance workers in shallow trenches, and for direct contact. These have also been adopted.

The HSLs and HILs for the future site users and the intrusive maintenance workers are summarised in Table 5.2.

Table 5.2 Soil criteria for commercial/industrial land use settings

ANALYTE	HSL A[1] SAND, 0 m to <1 m (mg/kg)	HSL C[2] SAND, 0 m to <1 m (mg/kg)	HIL C[3] (mg/kg)	INTRUSIVE WORKERS[4] (mg/kg)	DIRECT CONTACT[5] (mg/kg)
TRH C_6–C_{10} less BTEX (F1)	45	NL	-	NL	5,100
TRH >C_{10}–C_{16} less naphthalene (F2)	110	NL	-	NL	3,800
TRH >C_{16}-C_{34}	-	-	-	-	5,300
TRH >C_{34}-C_{40}	-	-	-	-	7,400
Benzene	0.5	NL	-	77	120
Toluene	160	NL	-	NL	18,000
Ethylbenzene	55	NL	-	NL	5,300
Xylene (total)	40	NL	-	NL	15,000
Naphthalene	3	NL	-	NL	1,900
Carcinogenic PAHs (as BaP TEQ)	-	-	3	-	-
Total PAHs	-	-	300	-	-
Arsenic	-	-	300	-	-
Cadmium	-	-	100	-	-
Chromium	-	-	300	-	-
Copper	-	-	17,000	-	-
Lead	-	-	600	-	-
Mercury	-	-	80	-	-
Nickel	-	-	1,200	-	-
Zinc	-	-	30,000	-	-
Bonded asbestos[6]	0.02%		-	-	-
Asbestos fines and friable asbestos[6]	0.001%		-	-	-
Surficial asbestos (all forms)[6]	None visible		-	-	-

– No assessment criteria available.

NL Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

(1) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low – high density residential (mg/kg).

(2) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space (mg/kg).

(3) NEPM (2013) Schedule B-1 Investigation Levels for Soil and Groundwater – Table 1A(1) HILs for soil contaminants – Recreational C (mg/kg).

(4) CRC CARE technical report no. 10. – Table B3 Soil health screening levels for vapour intrusion (mg/kg).

(5) CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg).

(6) NEPM (2013) Schedule B1 Health Screening Levels for Asbestos Contamination in Soil – Table 7.

5.6 WASTE CLASSIFICATION CRITERIA

Prior to the transportation of soils off-site for disposal, the excavated soils will be analysed and in accordance with the NSW EPA 2014, *Waste Classification Guidelines – Part 1: Classifying Waste*. The guidelines provide the criteria for classifying waste and follow a step-by-step process to classify wastes into groups that pose similar risks to the environment and human health, enabling their management and appropriate disposal.

For solid waste the waste may be classified as general solid waste (putrescible or non-putrescible), restricted solid waste or hazardous waste. Any waste that contains asbestos must be classified as asbestos waste. Asbestos is the fibrous form of mineral silicates within the serpentine or amphibole groups of rock-forming minerals.

The soil is assessed initially using the contaminant threshold (CT). Where the concentrations exceed the CT values it is assessed using the specific contaminant concentration (SCC) values and the leachable concentration using toxicity characteristics leaching procedure (TCLP) values.

A summary of the waste acceptance criteria is included in Table 5.3.

Table 5.3 Waste classification criteria

CHEMICALS	**CT (WITHOUT TCLP)[1]**		**SCC (WITH TCLP)[2]**			
	GENERAL SOLID (CT1)	RESTRICTED SOLID (CT2)	GENERAL SOLID		RESTRICTED SOLID	
			TCLP1	SCC1	TCLP2	SCC2
	(mg/kg)	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)	(mg/kg)
TRH C_6-C_9	650[3]	2,600[3]	NA	650	NA	2,600
TRH C_{10}-C_{36}	10,000[3]	40,000[3]	NA	10,000	NA	40,000
Benzene	10	40	0.5	18	2	72
Toluene	288	1,152	14.4	518	57.6	2,073
Ethylbenzene	600	2,400	30	1,080	120	4,320
Total xylene	1,000	4,000	50	1,800	200	7,200
Benzo(a)pyrene	0.8	3.2	0.04	10	0.16	23
Total PAHs	200[3]	800[3]	NA	200	NA	800
Arsenic	100	400	5	500	20	2,000
Cadmium	20	80	1	100	4	400
Chromium (VI)	100	400	5	1,900	20	7,600
Lead	100	400	5	1,500	20	6,000
Mercury	4	16	0.2	50	0.8	200
Nickel	40	160	2	1,050	8	4,200

NA Not applicable

(1) Extracted from Table 1 in Waste Classification Guidelines. Part 1: Classifying Waste (NSW EPA, 2014).

(2) Extracted from Table 2 in Waste Classification Guidelines. Part 1: Classifying Waste (NSW EPA, 2014).

(3) These chemicals are assessed using SCC values only, except for nickel and benzo(a)pyrene that were assessed using TCLP values.

6 REMEDIATION STRATEGY

6.1 PRELIMINARIES

Prior to commencement of remedial works at the site, the following activities would need to be completed:

- receipt of all relevant regulatory approvals for the use of the chosen remediation technology
- preparation of a health, environmental and safety plan (HESP) prior to commencement of site works
- induction of all site personnel to ensure that they are aware of the health, safety and environmental management requirements relating to the excavation of potentially contaminated soils
- confirmation that the contractor conducting the excavation has adequate safety equipment (for example, adequate fencing, barrier boards, barricades and warning signage) to secure the work area and minimise the danger to contractor personnel and the public for the duration of the tank replacement works.

6.2 APPROVAL AND LICENCES

All works will be undertaken in accordance with the following regulations and guidelines:

- Department of Planning 1998, *Managing Contaminated Land Planning Guidelines – SEPP55 Remediation of Land*.
- NSW EPA 2014, *Waste Classification Guidelines*.
- *Protection of the Environment Operations Act 1997* (NSW).
- *Protection of the Environment Operations (Waste) Regulation 2005* (NSW).
- *Protection of the Environment Legislation Amendment Act 2011* (NSW).
- *Work Health & Safety Act 2011* and *Work Health and Safety Regulations 2011* (NSW).
- WorkCover NSW requirements, guidelines and codes of practice.

All excavation works should be undertaken by licensed contractors, experienced in the remediation of contaminated soils.

Due to asbestos being identified in the fill, statutory notification will be required to be provided to WorkCover prior to removal. Transporters of contaminated waste are required to be licensed and receiving facilities are required to be licensed for the category of waste they are scheduled to receive. For all asbestos removal works, a licensed asbestos removal contractor must be engaged.

6.3 SITE PREPARATION

Table 6.1 summarises the measures that should be implemented prior to remediation works at the site.

Table 6.1 Site preparation measures

ITEM	DESCRIPTION
Access	Access to the redevelopment area of the site will be controlled by the lead contractor performing the works and the site will be off limits to all non-essential personnel. The public will not have access to this area of the site.

ITEM	DESCRIPTION
Signage	Signage will be installed on the site, with direction to key areas (including to the site offices, decontamination units, wash down areas, exits, etc.) and traffic restrictions. Signage at the main access points will include after-hours contact details.
Fencing/hoarding	Perimeter security fencing will be maintained around the redevelopment area where physical barriers (such as walls, buildings and existing fences) are not already in place. Shade cloth will be installed on fences and hoardings. Additional fencing will be erected where required to secure work areas and exclusion zones. Regular maintenance and repair of all retained fences and hoardings within and surrounding the site will be undertaken during the period of the remediation work.
Haul roads/parking areas and traffic management	The contractor will need to transport impacted soils off-site and potentially clean fill material on-site. Transport to and from site will need to consider traffic management options which take into account any access restrictions to the site. At the site, parking for private, pick-up and delivery and site vehicles is already in place. Additional designated areas may need to be marked as appropriate.
Decontamination facilities	A wheel washing facility may have to be installed for all vehicles leaving the redevelopment area of the site, either for waste disposal or other activities. This will minimise spread of dust and dirt in residential streets.
Supply of utilities	The installation and commissioning of all temporary site services (e.g. electricity, water, sewerage and telecommunications) required for the duration of the works should be installed to the requirements of the appropriate regulatory authorities. All approvals in respect to the installation, operation and eventual removal of temporary services shall be obtained.
Contractor's facilities	All site accommodation and facilities required for the remediation works will be established in conformance with relevant regulations and authority's requirements. Existing site infrastructure may be utilised for this purpose. Licensed persons in accordance with statutory requirements will carry out all connections. The following facilities may need to be established at the site: — site offices — amenities — work sheds (including decontamination facilities) and changing areas for the use of the remediation contractor, all subcontractors and consultants — temporary site sheds — bins for rubbish generated by personnel.

6.4 EXCAVATION AND DISPOSAL OF IMPACTED SOIL

6.4.1 EXCAVATION OF IMPACTED SOIL

Fill material in the vicinity of locations HA1, HA11, HA12 and HA18 should be excavated to the depth of natural soil at a minimum (approximately 0.2 mBGL). The soil at HA1 and HA12 is anticipated to be excavated as part of the redevelopment work. The excavation for the gymnasium extension should be extended at the south-eastern corner to extend approximately 2 m beyond location HA11. The soil at location HA18 should be excavated to natural soil and a lateral extent of the edge of the asphalt car park to the east, to the west approximately 4 m from the edge of the car park

and an approximate 2 m extent to the north and 2 m to the south from HA18. The impacts at HA18 are considered a hotspot, and the excavation extent will need to be confirmed by validation sampling before backfilling.

6.4.2 STOCKPILING

Stockpile management procedures, soil erosion and sedimentation controls and procedures to manage contamination will be applied to all wastes prior to removal off-site for disposal. The location of the stockpiles will be selected to fit with the expected stages of the project. Stockpiles will be located in accordance with the following general requirements:

- stockpiles will only be placed at approved locations
- stockpiles will be strategically located to mitigate environmental impacts while facilitating material handling requirements
- contaminated materials will only be stockpiled in non-remediated areas of the site or at locations that do not pose any risk of environmental impairment of the stockpile area or surrounding areas (i.e. sealed surfaces such as sealed concrete, asphalt, plastic sheeting or a mixture of these)
- stockpiles will only be constructed in areas of the site that have been located and prepared in accordance with the requirements of this RAP. All such preparatory works will be undertaken prior to the placement of material in the stockpile
- access routes will be established around the material stockpiles to enable access from adjoining haul roads.

6.4.3 WASTE CLASSIFICATION

Impacted materials will require sampling and analysis for suspected contaminants to enable classification in accordance with the NSW EPA (2014) *Waste Classification Guidelines*. Samples for waste classification should be collected at a density of:

- for volumes of up to 200 m^3, one sample per 25 m^3 of soil
- for volumes from 200 m^3 to 3,000 m^3, 10 samples
- for volumes greater than 3,000 m^3, one sample per 250 m^3.

Contaminated fill material removed from the site will be disposed of off-site to a NSW EPA licenced waste facility approved to accept the class of waste to be disposed of. Prior to the disposal of fill material, the contractor will seek approval from the facility to accept the waste.

6.4.4 MATERIAL TRACKING

Materials excavated from the site and relocated on-site or disposed of off-site should be tracked in order to provide detail and accurate information about the location and quantity of all materials both on- and off site from the time of their excavation until their encapsulation or disposal. Asbestos waste must be tracked using the NSW EPA's WasteLocate system from pickup to disposal.

The location of disposal locations will be determined by the remediation contractor. For any truck moving contaminated material on-site or off-site, the following information would be recorded:

- origin of material
- material type
- approximate volume
- final destination
- truck registration number (for off-site disposal only).

This information, along with the landfill docket number for materials disposed of to an off-site facility, will be provided in the validation report.

6.5 REINSTATEMENT OF EXCAVATIONS

Following validation, excavations will be backfilled where necessary, depending on the final ground level required for the development. Backfilling is expected to be required in the vicinity of HA11 and HA18.

Backfill may be accomplished with material excavated during the construction from non-contaminated areas of the site. Site soil proposed to be used for reinstatement must be sampled to confirm it is suitable. Sampling requirements are detailed in Section 6.6.3.

Where sufficient suitable material is not available from the site, virgin excavated natural material (VENM) or excavated natural material (ENM) will be imported for use as backfill. Sampling requirements for imported backfill material are detailed in Section 6.6.4.

6.6 VALIDATION STRATEGY

Systematic planning is critical to successful implementation of a validation assessment and is used to define the type, quantity and quality of data needed to inform decisions. The United States Environmental Protection Agency has defined a process for establishing data quality objectives (DQOs), which has been referenced in the NEPM (2013) Schedule B2 – Guideline on Site Characterisation.

DQOs ensure that:

- the study objectives are set
- appropriate types of data are collected (based on contemporary land use and contaminants of concern)
- the tolerance levels are set for potential decision making errors.

The DQO process is a seven-step iterative planning approach. The outputs of the DQO process are qualitative and quantitative statements which are developed in the first six steps. They define the purpose of the data collection effort, clarify what the data should represent to satisfy this purpose and specify the performance requirements for the quality of information to be obtained from the data. The output from the first six steps is then used in the seventh step to develop the data collection design that meets all performance criteria and other design requirements and constraints. The DQO process adopted for the validation assessment is outlined in Table 6.2.

Table 6.2 DQO process

STEP	DESCRIPTION	OUTCOMES
1	State the problem	Surficial soils in specific areas of the site are impacted with PAHs and asbestos at concentrations that pose a potential risk to human health (from dermal contact, inhalation and ingestion) for the proposed future land use.
2	Identify the decisions	The decisions to be made are as follows: — Has the identified and potential soil contamination at the site been remediated and/or managed to a level suitable for the respective land uses that would pose no unacceptable risk to human health or the environment? — Is all imported material validated as suitable for the proposed land uses?

STEP	DESCRIPTION	OUTCOMES
3	Identify the inputs to the decision	The inputs required to make the above decisions are as follows: — Previous investigations. — RAP outlining the nature and extent of impacted soils requiring remediation. — National and NSW EPA endorsed or approved methodologies and technical requirements.
4	Define the study boundaries/ constraints on data	The boundaries of the remedial and validation works have been identified as follows: Spatial boundaries: The spatial boundary of the site and the remediation areas is shown on Figure 1. The vertical boundary is the depth of impacted material, approximately 0.2 mBGL. Temporal boundaries: As the data and information obtained from the previous investigation has been relied upon, then the temporal boundary will be from the date of assessment to the date of acquisition of the final validation laboratory results. Constraints within the study boundary: No constraints have been identified.
5	Develop a decision rule	The purpose of this step is to define the parameter of interest, specify the action level and combine the outputs of the previous DQO steps into an 'if…then…' decision rule that defines the conditions that would cause the decision maker to choose alternative actions. If validation samples indicate concentrations remain in soil above the validation criteria, then further remediation or management may be required.
6	Specify limits on decision errors	The acceptable limits on decision errors to be applied in the investigation and the manner of addressing possible decision errors have been developed based on the data quality indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness and are presented in Table 6.3 and Table 6.4. A probability that 95% of data will satisfy the DQIs has been assumed, therefore the limit on the decision error that a conclusive statement may be incorrect is 5%. The potential for significant decision errors are to be minimised by completing a robust quality assurance/quality control (QA/QC) program and by completing a validation program that has an appropriate sampling and analytical density for the purposes of the assessment and that representative sampling is undertaken.
7	Optimise the design for obtaining data	The purpose of this step is to identify a resource-effective data collection design for generating data that satisfies the DQOs. This assessment has been designed considering the information and data from the previous assessment. To ensure the design satisfies the DQOs, DQIs (for accuracy, comparability, completeness, precision and reproducibility) have been established to set acceptance limits on field methodologies and laboratory data collected. Compliances and non-compliances to the DQIs are to be assessed.

6.6.1 DATA QUALITY INDICATORS

DQIs for sampling techniques and laboratory analyses of collected representative soil samples are defined as the acceptable level of error required for this validation assessment. The adopted field methodologies and data obtained will be assessed by reference to DQIs as follows:

- Precision: a quantitative measure of the variability (or reproducibility) of data.
- Accuracy: a quantitative measure of the closeness of reported data to the true value.

- Representativeness: the confidence (expressed qualitatively) that data are representative of each media present on the site.
- Comparability: a qualitative parameter expressing the confidence with which one data set can be compared with another.
- Completeness: a measure of the amount of useable data (expressed as a percentage) from a data collection activity.

A summary of the field and laboratory DQIs for the validation assessment are provided in Table 6.3 and Table 6.4.

Table 6.3 DQIs – field techniques

DQI
ACCURACY
Standard operating procedures (SOPs) appropriate and complied with
Collection of rinsate blanks
COMPARABILITY
Same SOPs used on each occasion
Experienced sampler
Climatic conditions (temperature, rainfall, wind)
Same types of samples collected
COMPLETENESS
SOPs appropriate and complied with
All required samples collected
REPRESENTATIVENESS
Appropriate media sampled according to RAP
PRECISION
SOPs appropriate and complied with
Collection of inter-laboratory and intra-laboratory duplicates

Table 6.4 DQIs - laboratory

DQI	ACCEPTABLE LIMITS
ACCURACY	
Analysis of laboratory prepared trip blanks (one per day per batch)	Below practical quantitation limits (PQLs) for contaminants analysed
Analysis of rinsate blanks (one per day of sampling)	Below PQLs for contaminants analysed
Analysis of method blanks	Below PQLs for contaminants analysed
Analysis of matrix and surrogate spikes and laboratory control samples	Laboratory specific
Analysis of matrix spike duplicates	Laboratory specific

DQI	ACCEPTABLE LIMITS
Analysis of reference materials	Laboratory specific
Analysis of reagent blanks	Below PQLs for contaminants analysed
COMPARABILITY	
Sample analytical methods	As per NEPM (2013)
Same units	Justify/quantify if different
Same laboratories	Justify/quantify if different
Sample PQLs	Less than nominated criteria
COMPLETENESS	
All critical samples analysed	As per RAP
All required analytes analysed	As per RAP
Appropriate methods and PQLs	As per NEPM (2013)
Sample documentation complete	As per NEPM (2013)
Sample holding times complied with	As per NEPM (2013)
REPRESENTATIVENESS	
All required samples analysed	As per RAP
PRECISION	
Analysis of intra-laboratory and inter-laboratory duplicates for contaminants of concern at rate of 1:20 primary samples for the same analysis of primary samples	Relative per cent differences (RPDs) <30%, justify/quantify if exceedances
Analysis of laboratory duplicates	Laboratory specific
Analysis of laboratory prepared trip spikes (one per day per batch of volatiles)	Recovery of 70-130%
National Association of Testing Authorities (NATA) certified laboratories used	As per NEPM (2013)

6.6.2 VALIDATION OF EXCAVATED AREAS

Once remediation target depths have been achieved and the environmental consultant has confirmed that the excavation has either been terminated on native soils or all impacted materials have been removed, soil validation samples will be collected for laboratory analysis and results compared to the validation criteria to ensure that the site will be suitable for the proposed future land use following the completion of the remediation works. Validation samples will be collected from the base and walls of excavations where the surface soils will present a future exposure risk; i.e., where not covered by buildings or hardstand.

Validation samples will be analysed for TRH, BTEXN, PAHs, metals and asbestos. Results will be compared to the validation criteria, provided in Section 5.5.

6.6.3 VALIDATION OF SITE SOIL FOR REUSE

Soil excavated as part of the construction process outside the remediation areas may be suitable to use for backfill where excavations exceed the design levels. To validation site soil for reuse, samples will be collected at a rate of 1 sample per 25 m^3 of soil, with a minimum of 3 samples collected, and analysed for TRH, BTEXN, PAHs, metals and asbestos. Results will be compared to the validation criteria, provided in Section 5.5.

6.6.4 VALIDATION OF IMPORTED SOILS

Where VENM is required for backfilling, it should be certified as VENM and be assessed to determine that it is suitable for the intended use. This would involve:

- reviewing the history of the source of the material
- a visual inspection for foreign material or unusual staining
- confirmation sampling.

Where ENM is to be imported to the site for use as backfill, the material should be assessed in accordance with the NSW EPA requirements under the Resource Recovery Order under Part 9, Clause 93 of the *Protection of the Environment Operations (Waste) Regulation 2014* (NSW Government, 2014*)* prior to being imported to the site. Confirmation sampling will be undertaken of ENM imported to site.

Confirmation sampling for VENM and ENM will be undertaken at a rate of 1 sample per 100 m^3 of material, with a minimum of 3 samples collected. Samples will be analysed for TRH, BTEXN, PAHs, metals and asbestos.

6.7 QA/QC

The data quality indicators (DQIs) for validation and groundwater monitoring are presented in Table 6.1.

Table 6.5 Data quality indicators

INDICATORS	DESCRIPTION
Procedures	All approvals and licences required must be obtained prior to work commencing. All field work will be carried out in accordance with relevant guidelines and standard operating procedures. All site staff must sign site register and be inducted. Remediation equipment must be regularly inspected. All field work information to be recorded on field day sheets. All works to be undertaken by experienced staff.
Storage and transport	Samples collected will be placed directly into laboratory supplied containers and stored in a secure, chilled box. Chain of custody documentation will be used to ensure the integrity of the samples from collection to receipt by the analytical laboratory.
Laboratory	All laboratories used should comply with AS/NZS ISO 9001:2001 quality assurance programs, be accredited by the National Association of Testing Authorities for the analyses requested and perform their own internal QA/QC programs.

INDICATORS	DESCRIPTION
QA/QC – Field work	The field QA/QC procedures, at the minimum, should comprise: — Duplicate samples: 1 in 20 blind duplicates (intra-laboratory) to the primary laboratory and 1 in 20 split duplicates (inter-laboratory) to the secondary laboratory. NEPM (2013) indicated that for soil samples if the relative per cent difference (RPD) for the primary and duplicate is greater than 30%, a review should be conducted of the cause (e.g. instrument calibration, extraction efficiency, appropriateness of the method used, etc.). The RPD variation can be expected to be higher for organic analysis than for inorganics, and for low concentrations analytes (AS4482.1, 2005). — Sample blanks: Sample blanks to be collected to verify that cross-contamination has not occurred during sampling or during transportation of the samples. Equipment rinsate samples will be collected for each sampling day and analysed for the contaminant of concern. Trip blanks (prepared by the laboratory) will be analysed for each batch of soil and groundwater samples submitted to the laboratory. The trip blanks will be analysed for volatile contaminants. — Trip spike: The purpose of a trip spike is to confirm the adequacy of sample preservation in the field and during sample transportation to the laboratory by measuring the amount of volatile losses. Trip spikes will be prepared by the laboratory. Non-compliance is to be documented in the report and the sample to be re-analysed or higher level to be conservatively adopted.
QA/QC – Laboratory	Laboratory QA/QC limits vary between analytes and between laboratories. If duplicate results are not satisfactory, non-compliance is to be documented in laboratory reports. Primary laboratory QA/QC acceptance limits are as follows: — surrogates: 70 – 130% recovery — matrix spikes: 70 – 140% recovery (organics) and 80-120% (inorganics) — control samples: 70 – 139% recovery (soil) and 80-120% (water) — duplicate samples: RPD less than 30% — method blanks: 0 to < practical quantitation limit.

6.8 REPORTING

Following the remediation and validation works a final report will be prepared in accordance with the NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites*. The validation report will detail the extent and nature of the remedial works undertaken, characterisation and disposal of contaminated soils, the validation of imported clean fill and topsoil (if any) and will consider the overall status of the site.

The report will include the following sections:

- executive summary
- scope of works
- site identification
- site history
- site conditions and surrounding environment

- geology and hydrogeology
- previous investigation results
- summary of the RAP
- validation criteria
- nature and extent of the remediation undertaken
- sampling and analysis plan and sampling methodology
- field and laboratory QA/QC
- results of the validation sampling and sampling of imported fill materials
- contractor supplied information (such as waste disposal documentation)
- discussion of the land use suitability at the completion of remedial works
- conclusions.

It should be noted that to enable the validation report to be produced, the contractor will be required to supply:

- the quantities and types of waste disposed of
- details of the receiving facility/facilities accepting waste from the site
- disposal dockets for the waste disposed
- details of any imported materials (including VENM certification, laboratory results, origin and supplier, exemption details, quantities and areas of placement).

7 SITE SAFETY PLAN

A HESP will be prepared prior to performing on-site works associated with this RAP. The HESP will address the health and safety of residents and workers in the surrounding area. As a minimum, it will consider:

- site security
- asbestos controls
- potential exposure to contamination
- excavation safety
- vibration
- noise
- odour
- dust.

Work associated with the remediation of the site will conform, at a minimum, to the requirements of the SafeWork NSW requirements and associated regulations. Typically, the HESP will address the following issues:

- regulatory requirements
- responsibilities
- hazard identification and control
- chemical hazard control
- sample and chemical handling procedures
- personal protective equipment
- work zones
- decontamination procedures
- emergency response plans
- contingency plans
- incident reporting.

An asbestos management plan will be prepared, either as a standalone document or as part of the HESP or construction environmental management plan (CEMP) for the work. The asbestos management plan will include monitoring requirements, dust control measures, personal protective equipment, decontamination and waste requirements.

8 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

A CEMP should be developed as industry best practice for the site remediation works to ensure that the on-site and off-site environment is not adversely impacted during the remediation works. The CEMP should address and take into consideration the issues discussed in the following sections. The CEMP should be prepared by the civil contractor.

8.1 VEHICLE TRAFFIC

The remediation works may slightly increase vehicle traffic in the vicinity of the site. Where necessary, details of traffic management will be incorporated into the CEMP to control traffic movement associated with the works and mitigate any disruption to local residents and road users.

8.2 WASTE TRANSPORT

All excavated soil requiring off-site disposal will be transported (subsequent to assigned classification) to an appropriate landfill facility. Asbestos waste must be tracked using the NSW EPA's WasteLocate system from pickup to disposal.

All transport trucks loaded with contaminated soil for off-site disposal should be sealed and the load completely/securely covered to prevent wind-blown emissions or spillages, and covers should be maintained until unloading. All truck tailgates should be securely fixed prior to loading and immediately after unloading soils and all vehicles are to be operated in a manner so as to prevent loss of soils during loading, transport and unloading activities.

Truck wheels should be cleaned or driven through a constructed wash bay or similar control (e.g. rumble grid) to prevent potentially contaminated soil from being transported onto local roads.

8.3 ODOUR AND VAPOUR

The remediation works are not considered likely to result in significant vapours and odours being released into the atmosphere. If vapours or odours do occur during the remediation, control measures could be implemented, including the following:

- wetting down the excavated soil with the use of water sprays containing odour suppressant
- all soil loaded onto trucks for off-site disposal are to be securely covered.

8.4 DUST

Dust will be visually monitored during the earthworks and areas generating excessive dust will be sprayed with water to reduce the dust levels. Soil that is to be stockpiled should be covered or wetted down to minimise potential dust generation.

8.5 ASBESTOS

Air monitoring for asbestos fibres may be carried out in the remediation areas during the excavation phase of the project, in with a site-specific asbestos management plan (to be developed prior to any excavation/civil works).

Dust suppression (see Section 8.4) will be employed when excavating where asbestos has been identified or where asbestos is suspected.

8.6 PLANT AND MACHINERY

It is the responsibility of the remediation contractor to ensure that all plant and machinery used on the site is properly maintained and in good working condition. Any plant or machinery used should be appropriate for the task.

8.7 NOISE

Increased noise levels may result from the use of on-site and off-site mechanical equipment during the course of the remediation works. To mitigate any noise which may arise as a result of site works, all works should be carried out during normal working hours and in accordance with NSW regulations on this matter.

Noise control measures to be implemented during the remediation works may include:

- specified entry controls for construction vehicles entering and leaving the site
- suitable construction techniques and methodologies
- use of quieter equipment
- restricted use of reversing alarms and all equipment should be fitted with alarm types that adjust output sound levels according to the prevailing ambient noise level.

All practical measures will be taken to minimise generation of noise, and contact information for enquires or complaints will be posted on the site entrance gate.

8.8 WATER AND SEDIMENT MANAGEMENT

8.8.1 SURFACE WATER

Soil stockpiled during excavation works should be suitably contained to prevent run-off of any potentially contaminated water or soil to the surrounding environment, including the stormwater system. Control measures should be established to prevent surface water run-off entering and leaving excavation and stockpile areas. Control measures may include:

- temporary bunding or diversion drains
- impermeable sheeting placed under and/or over stockpiles
- silt fences/silt socks to surround stockpiles
- protection of existing drains with silt fencing/sand bags.

These mitigation measures should be regularly inspected to ensure that they are in good condition and if necessary upgraded where their performance is deteriorating.

8.8.2 SEDIMENT

Drains, gutters, roads and access ways shall be free of sediment in accordance with regulatory requirements. Where required, gutters and roadways shall be swept regularly to keep them free from sediment. As for surface water, control measures should be implemented.

The erosion and sediment controls put in place during the civil works must be in accordance with:

- POEO Act
- The “Blue Book” – Managing Urban Stormwater: Soils and Construction (Landcom, 2004).

8.9 EQUIPMENT AND CLEANING OPERATIONS

During remediation, controls will be placed on the operation and movement of equipment. General procedures that will be implemented include the following:

- Excavation equipment will be cleaned in an environmentally sound manner prior to leaving the site.
- If necessary, effective truck wheel-washing facilities will be provided to ensure that contaminated soil is not tracked off-site.
- No trucks or equipment carrying contaminated soils should be allowed to move across unsealed ground surfaces, with the exception of designated transport corridors.

All contaminated soil requiring off-site disposal will be transported to an appropriate landfill facility. All transport trucks loaded with contaminated soil for off-site disposal should be sealed and the load securely covered to prevent wind-blown emissions or spillages. Covers should be in place until the final unloading. All truck tailgates should be securely fixed prior to loading and immediately after unloading soils and all vehicles are to be operated in a manner so as to prevent loss of soils during loading, transport and unloading activities.

As part of the CEMP, a preferred transport route to the nominated facility is required to be identified.

8.10 SITE SECURITY

During construction works, work areas will be barricaded or secured by a chain-wire fence, which will remain in place for the duration of the remediation works in order to exclude public visitors. Appropriate safety and/or warning signs will be posted in accordance with the SafeWork NSW requirements. If an excavation is to be left open while the environmental project manager and contractor are not on site for a substantial period of time (such as overnight), a temporary fence will be erected around the excavation. Should the excavation be deeper than 1.5 m, the edges of the excavation should be battered to a 45 degree slope or benched into 1 m steps based on industry best practices.

8.11 WORKING HOURS

Working hours should be undertaken in accordance with the conditions of development consent granted for the construction work, presumed to be normal working hours (7 am to 6 pm). Any works to be conducted outside the normal working hours needs to have prior agreement with the client and the Council's consent.

8.12 CONTACT INFORMATION

Contact details of the appropriate civil contractors and the Project Manager should be displayed in a prominent location at the site (such as the entrance or site office). Any incidents should be initially reported to the site manager, who will prepare an incident report for the Project Manager as soon as practicable.

8.13 INCIDENT RESPONSE

Responses to incidents occurring on site will be in accordance with the contractor's and client's emergency and evacuation procedures and incident reporting procedures. A health and safety plan and incident contact number/s are to be kept in an on-site register. All other relevant emergency contact numbers such as police, fire brigade and hospital will be listed in the HESP and posted on site for easy access.

Local contractors (including a plumber and electrician) should be on call in case an incident is reported by the site workers or local residents.

8.14 CONTINGENCY MANAGEMENT

Contingency plans for anticipated environmental problems that may arise during the remediation works are summarised below in Table 8.1.

Table 8.1 Contingency management plans

ANTICIPATED PROBLEMS	CORRECTIVE ACTIONS
Excessive dust	Use water sprays to suppress the dust or stop the site activities generating the dust until it abates.
Excessive noise	Identify the source, isolate the source if possible, and modify the actions of the source. Ensure hearing protection is worn if the noise cannot be reduced.
Excessive odours/vapours	If excessive organic odours/vapours are being generated, stop works and implement control measures including use of odour suppressants and/or wetting down of excavated soil.
Excessive rainfall	Ensure sediment and surface water controls are operating correctly. If possible, divert surface water away from active work areas and/or excavations.
Water in excavations	Collect samples and assess against relevant assessment criteria to enable disposal options to be formulated.
Leaking machinery or equipment	If possible, stop the identified leak and clean up the spill with absorbent material. Stockpile the impacted soil in a secure location, sample and determine the appropriate disposal/treatment option.
Failure of erosion or sedimentation control measures	Stop work and repair the failed control measure.
Unearthing unexpected fill or waste	Stop activities and contact a qualified environmental consultant. Prepare a management plan to address the issue if necessary.
Equipment failures	Ensure that spare equipment is on hand at the site or ensure that the failed equipment can be serviced by on-site personnel or a local contractor.
Complaint management	Notify client representative following the complaint and report the complaint in accordance with management procedures. If possible, implement control measures to address the reason/s for complaint.
Asbestos	If unexpected asbestos material is identified in the soil, notify client and the consultant Project Managers. Asbestos monitoring may be required to continue works.
Acid sulfate soils	If acid sulfate soils are suspected, stop works and assess the material. If actual or potential acid sulfate soils are present, prepare an acid sulfate soils management plan then work according to the plan.

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- NSW DUAP 1998, *Managing Land Contamination. Planning Guidelines SEPP 55 – Remediation of Land*
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- *Protection of the Environment Operations Act 1997* (NSW).
- *Protection of the Environment Operations (Waste) Regulation 2005* (NSW).
- *Protection of the Environment Legislation Amendment Act 2011* (NSW).
- *State Environmental Planning Policy 55 - Remediation of land* (NSW).
- *Work Health & Safety Act 2011* and *Work Health and Safety Regulations 2011* (NSW).
- WSP 2018, *Targeted soil contamination assessment, Armidale High School, Butler St, Armidale, NSW 2350.*

9 LIMITATIONS

This Report is provided by WSP Australia Pty Limited (WSP) for NBRS & Partners Pty Ltd (Client) in response to specific instructions and agreement from the Client on 3 September 2018.

PERMITTED PURPOSE

This Report is provided by WSP for the purpose described in the Agreement and no responsibility is accepted by WSP for the use of the Report in whole or in part, for any other purpose (Permitted Purpose).

QUALIFICATIONS AND ASSUMPTIONS

The services undertaken by WSP in preparing this Report were limited to those specifically detailed in the Report and are subject to the scope, qualifications, assumptions and limitations set out in the Report or otherwise communicated to the Client.

Except as otherwise stated in the Report and to the extent that statements, opinions, facts, conclusion and / or recommendations in the Report (Conclusions) are based in whole or in part on information provided by the Client and other parties identified in the report (Information), those Conclusions are based on assumptions by WSP of the reliability, adequacy, accuracy and completeness of the Information and have not been verified. WSP accepts no responsibility for the Information.

The Conclusions are reflective of the current Site conditions and cannot be regarded as absolute without further extensive intrusive investigations, outside the scope of the services set out in the Agreement and are indicative of the environmental condition of the Site at the time of preparing the Report. As a general principle, vertical and horizontal soil or groundwater conditions are not uniform. No monitoring, common or intrusive testing or sampling technique can eliminate the possibility that monitoring or testing results or samples taken, are not totally representative of soil and / or groundwater conditions encountered at the Site. It should also be recognised that Site conditions, including subsurface conditions can change with time due to the presence and concentration of contaminants, changing natural forces and man-made influences.

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APPENDIX A

FIGURES

Map: PS107410_GIS_001_A2	Author: David.Naiken		0 25 50 m 1:3,000 Scale ratio correct when printed at A4 Coordinate system: GDA 1994 MGA Zone 56
Date: 10/09/2018	Approved by: -		

Source: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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PRELIMINARY

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Armidale Future School
Figure 1
Soil remediation areas

APPENDIX B

HISTORICAL SOIL RESULTS

Table E1
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - TRH & BTEXN

ADOPTED ASSESSMENT CRITERIA	TRH								BTEXN							Asbestos
	C_6-C_9	C_6-C_{10}	F1	>C_{10}-C_{16}	F2	>C_{16}-C_{34}	>C_{34}-C_{40}	C_{10} - C_{36} (Sum of total)	Benzene	Toluene	Ethyl-benzene	Xylene (m&p)	Xylene (o)	Total Xylene	Naphthalene	
HSL A [1]																
HSL C [2]	-	-	NL	-	NL	-	-	-	NL	NL	NL	-	-	NL	-	-
HIL C [3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Direct contact [4]	-	-	5,100	-	3,800	5,300	7,400	-	120	18,000	5,300	-	-	15,000	-	-
ESL C [5]	-	-	180	-	120	1,300	5,600	-	65	105	125	-	-	45	-	-
EIL C [6]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170	-

Sample ID	Sample date	Laboratory report reference	Sample depth (mBGL)	Analytical results														
HA1_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	130	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	Yes
HA1_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA2_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA3_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA3_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA4_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	50	50	930	260	1,000	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA6_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA6_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA7_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA7_0.7	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA8_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA9_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA9_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA10_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	430	170	490	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA12_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	200	<100	260	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA13_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA14_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA14_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA15_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA16_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA17_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA18_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
QA1	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	110	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
QA2	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	150	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
QA1A	18-01-18	SE174604	0 - 0.1	<20	<25	<25	<25	<25	<90	<120	<110	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.1	-
QA2A	18-01-18	SE174604	0 - 0.1	<20	<25	<25	<25	<25	240	<120	270	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<0.1	-
ALS Practical quantitation limit				**10**	**10**	**10**	**50**	**50**	**100**	**100**	**50**	**0**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**1**	**Yes/No**
SGS Practical quantitation limit				**20**	**25**	**25**	**25**	**25**	**90**	**120**	**110**	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**	**0.3**	**0.1**	**-**

Notes:

Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

F1 = C_6-C_{10} Fraction minus BTEX

F2 = TRH >C_{10}-C_{16} less naphthanlene

NL = Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

[1] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential

[2] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space

[3] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C

[4] CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)

[5] NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.

[6] NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

Table E2
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - PAHs & metals

ADOPTED ASSESSMENT CRITERIA	PAHs																		Metals							
	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(bj)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ	Total PAH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
HSL A [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL C [2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HIL C [3]	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	3	300	300	90	300	17,000	600	80	1,200	30,000
Direct contact [4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ESL C [5]	-	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIL C [6]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	400 [8]	95 [10]	1,100 [7]	-	30 [8]	230 [9]

Sample ID	Sample date	Laboratory report reference	Sample depth (mBGL)	Analytical results																							
HA1_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.9	**2.5**	2.7	1.1	1.7	2.2	<0.5	5.3	<0.5	1.3	<0.5	2.9	5.1	**3.2**	26.7	35	<1	36	40	170	1.1	16	324
HA1_0.5	18/01/2018	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	74	13	16	<0.1	19	29
HA2_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	64	18	15	0.1	24	101
HA3_0.5	18/01/2018	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	118	22	10	<0.1	**43**	21
HA4_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1	**1.1**	0.9	<0.5	<0.5	1	<0.5	2.3	<0.5	<0.5	<0.5	1.7	2.3	1.3	10.3	<5	<1	42	21	26	<0.1	**33**	90
HA5_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	0.7	1.2	0.6	4.1	<5	<1	45	23	66	<0.1	**61**	41
HA5_0.5	18/01/2018	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	69	24	6	<0.1	**44**	24
HA6_0.5	18/01/2018	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	86	24	<5	<0.1	**75**	24
HA7_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	1.6	<5	<1	39	12	13	<0.1	23	25
HA7_0.7	18/01/2018	ES1802402	0.6 - 0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	77	27	5	<0.1	**98**	25
HA8_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	1.5	<5	<1	38	13	10	<0.1	26	31
HA9_0.5	18/01/2018	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	32	5	<5	<0.1	7	<5
HA10_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	0.7	**0.8**	0.8	<0.5	<0.5	0.8	<0.5	2.2	<0.5	<0.5	<0.5	1.4	1.9	1	8.6	<5	<1	74	16	28	0.3	15	36
HA11_0	18/01/2018	ES1802402	0 - 0.1	<0.5	1.2	2.1	7.6	**7.9**	8	2.3	2.7	7.6	0.7	16.8	<0.5	2.4	<0.5	11.4	17	**10.7**	87.7	<5	<1	58	17	23	<0.1	24	49
HA11_0.5	18/01/2018	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	63	14	9	<0.1	26	13
HA12_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	0.6	2.3	**2.8**	2.9	1.1	1.1	2.6	<0.5	6.9	<0.5	0.9	<0.5	4.3	6.5	**3.6**	32	<5	<1	54	12	19	<0.1	15	37
HA13_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	0.5	0.9	<0.5	2.3	<5	<1	27	8	18	<0.1	6	22
HA14_0.5	18/01/2018	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	76	22	10	<0.1	29	22
HA15_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	93	35	10	<0.1	**55**	58
HA16_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.1	**1.3**	1.1	<0.5	<0.5	1.2	<0.5	2.7	<0.5	<0.5	<0.5	1.6	2.7	1.5	<0.5	<5	<1	45	21	20	<0.1	**32**	43
HA17_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	0.5	0.8	<0.5	2.1	<5	<1	44	21	13	<0.1	24	39
HA18_0	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.6	**1.7**	1.6	0.6	0.9	1.6	<0.5	2.7	<0.5	0.7	<0.5	1.2	2.8	2.2	15.4	<5	<1	30	15	14	<0.1	18	55
QA1	18/01/2018	ES1802402	0 - 0.1	<0.5	<0.5	0.6	2.8	**2.6**	2.5	1	1.3	2.7	<0.5	4.9	<0.5	1	<0.5	2.3	4.9	**3.4**	26.6	<5	<1	31	12	15	<0.1	19	39
QA2	18/01/2018	ES1802402	0 - 0.1	<0.5	0.6	1.3	3.4	**3**	2.9	1	1.3	3.4	<0.5	6.8	<0.5	1.1	<0.5	4.9	6.7	**3.5**	36.4	<5	<1	62	12	10	<0.1	17	15
QA1A	18/01/2018	SE174604	0 - 0.1	<0.1	0.4	0.3	2.3	**2.5**	2.7	1.1	1.1	1.8	0.2	3.3	<0.1	1.5	<0.1	1.7	3.7	**3.9**	23	4	<0.3	38	15	16	<0.05	22	54
QA2A	18/01/2018	SE174604	0 - 0.1	0.3	1.0	1.7	6.5	**6.2**	6.4	2.8	2.5	4.4	0.4	11	0.6	3.4	0.2	6.8	11	**8..6**	65	<3	<0.3	70	25	23	<0.05	28	67
ALS Practical quantitation limit				**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**		**0.5**	**5**	**1**	**2**	**5**	**5**	**0.1**	**2**	**5**
SGS Practical quantitation limit				**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**	**0.1**	**0.1**		**0.8**	**3.0**	**0.3**	**0.3**	**0.5**	**1.0**	**0.1**	**0.5**	**0.5**

Notes:
Bold Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise

[1] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential
[2] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space
[3] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C
[4] CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)
[5] NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
[6] NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties
[7] NEPM (2013) Schedule B1 Table 1B(4) EILs for Generic added contaminant limits for lead in soils irrespective of their physicochemical properties
[8] NEPM (2013) Schedule B1 Table 1B(3) Soil-specific added contaminant limits for aged chromium III and nickel in soil
[9] NEPM (2013) Schedule B1 Table 1B(1) Soil-specific added contaminant limits for aged zinc in soil
[10] NEPM (2013) Schedule B1 Table 1B(2) Soil-specific added contaminant limits for aged copper in soils

Table E3
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - PCBs, OCPs & OPPs

ADOPTED ASSESSMENT CRITERIA	PCBs	OCPs																				OPPs									
	Total Polychlorinated biphenyls	pp-DDE	Aldrin	cis-Chlordane	trans-Chlordane	delta-BHC	pp-DDD	pp-DDT	Dieldrin	alpha-Endosulfan	beta-Endosulfan	Endosulfan sulphate	Endrin	Endrin aldehyde	alpha - BHC	beta - BHC	delta- BHC	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinphos methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Fenthion	Ethion	Malathion	Parathion
HSL A [1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
HSL C [2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
HIL C [3]	1	400	10	70	70	-	400	400	10	-	-	-	20	-	-	-	-	10	-	10	400	-	-	250	-	-	-		-	-	-
Direct contact [4]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
ESL C [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
EIL C [6]	-	-	-	-	-	-	-	180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	Analytical Results																												
C1	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
C2	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
C3	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
C4	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
ALS Practical quantitation limit				**0.1**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.2**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.2**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.20**

Notes:
Bold Sample concentration exceeds the adopted assessment criteria
All results expressed as mg/kg, unless stated otherwise

[1] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL A Low - high density residential
[2] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(3) Soil HSLs for vapour intrusion (in sand) – HSL C Recreational/Open space
[3] NEPM National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPC 2013) - Table 1A(1) HILs for soil contaminants – Recreational C
[4] CRC CARE technical report no. 10. – Table B4 Soil health screening levels for direct contact (mg/kg)
[5] NEPM (2013) Schedule B1 Table 1B(6) ESLs for TPH Fractions F1 to F4, BTEX and benzo(a)pyrene in soil.
[6] NEPM (2013) Schedule B1 Table 1B(5) EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

Table E4
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - Waste Classification - TRH & BTEXN

ADOPTED ASSESSMENT CRITERIA	TRH								BTEXN							Asbestos
	C_6-C_9	C_6-C_{10}	F1	>C_{10}-C_{16}	F2	>C_{16}-C_{34}	>C_{34}-C_{40}	C_{10} - C_{36} (Sum of total)	Benzene	Toluene	Ethyl benzene	Xylene (m&p)	Xylene (o)	Total Xylene	Naphthalene	
NSW 2014 General Solid Waste CT1 (No Leaching)[1]	650	-	-	-	-	-	-	10,000	10	288	600	-	-	1,000	-	-
NSW 2014 General Solid Waste SCC1 (Leached)[2]	650	-	-	-	-	-	-	10,000	18	518	1,080	-	-	1,800	-	-
NSW 2014 General Solid Waste TCLP1 [3]	NA	-	-	-	-	-	-	NA	1	14	30			50	-	-
NSW 2014 Restricted Solid Waste CT2 (No Leaching)[4]	2,600	-	-	-	-	-	-	40,000	40	1,152	2,400	-	-	4,000	-	-
NSW 2014 Restricted Solid Waste SCC2 (Leached)[5]	2,600	-	-	-	-	-	-	40,000	72	2,073	4,320	-	-	7,200	-	-
NSW 2014 Restricted Solid Waste TCLP2 [6]	NA	-	-	-	-	-	-	NA	2	58	120	-	-	200	-	-

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	Analytical Results														
HA1_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	130	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	Yes
HA1_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA2_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA3_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA3_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA4_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	50	50	930	260	1,000	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA5_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA6_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA6_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA7_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA7_0.7	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA8_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA9_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA9_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA10_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	430	170	490	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA11_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA12_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	200	<100	260	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA13_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA14_0	18-01-18	ES1802402	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No
HA14_0.5	18-01-18	ES1802402	0.4 - 0.5	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	-
HA15_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA16_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA17_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
HA18_0	18-01-18	ES1802402	0 - 0.1	<10	<10	<10	<50	<50	120	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<1	No
ALS Practical quantitation limit				**10**	**10**	**10**	**50**	**50**	**100**	**100**	**50**	**0**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**1**	**Yes/No**
SGS Practical quantitation limit				**20**	**25**	**25**	**25**	**25**	**90**	**120**	**110**	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**	**0.3**	**0.1**	**-**

Notes:

Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

F1 = C_6-C_{10} Fraction minus BTEX

F2 = TRH >C_{10}-C_{16} less naphthanlene

NL = Non-limiting due to maximum vapour concentrations being below the acceptable health risk level.

TCLP1 & TCLP2 unit are mg/L

NA = Not applicable

[1] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1

[2] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration

[3] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration

[4] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2

[5] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration

[6] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration

Table E5
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - Waste Classification - PAHs & metals

ADOPTED ASSESSMENT CRITERIA	PAHs																Metals							
	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
NSW 2014 General Solid Waste CT1 (No leaching)[1]	-	-	-	-	0.8	-	-	-	-	-	-	-	-	-	-	-	200	100	20	100	-	100	4	40	-
NSW 2014 General Solid Waste SCC1 (Leached)[2]	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	200	500	100	1900	-	1500	50	1050	-
NSW 2014 Restricted Solid Waste CT2 (No leaching)[3]	-	-	-	-	3.2	-	-	-	-	-	-	-	-	-	-	-	800	400	80	400	-	400	16	160	-
NSW 2014 Restricted Solid Waste SCC2 (Leached)[4]	-	-	-	-	23	-	-	-	-	-	-	-	-	-	-	-	800	2000	400	7600	-	6000	200	4200	-

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	Analytical Results																						
HA1_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.9	**2.5**	2.7	1.1	1.7	2.2	<0.5	5.3	<0.5	1.3	<0.5	2.9	5.1	26.7	35	<1	36	40	**170**	1.1	16	324
HA1_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	74	13	16	<0.1	19	29
HA2_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	64	18	15	0.1	24	101
HA3_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	**118**	22	10	<0.1	**43**	21
HA4_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1	**1.1**	0.9	<0.5	<0.5	1	<0.5	2.3	<0.5	<0.5	<0.5	1.7	2.3	10.3	<5	<1	42	21	26	<0.1	33	90
HA5_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	0.7	1.2	4.1	<5	<1	45	23	66	<0.1	**61**	41
HA5_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	69	24	6	<0.1	**44**	24
HA6_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	86	24	<5	<0.1	**75**	24
HA7_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	0.8	1.6	<5	<1	39	12	13	<0.1	23	25
HA7_0.7	18-01-18	ES1802402	0.6 - 0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	77	27	5	<0.1	**98**	25
HA8_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.8	1.5	<5	<1	38	13	10	<0.1	26	31
HA9_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	32	5	<5	<0.1	7	<5
HA10_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	0.7	**0.8**	0.8	<0.5	<0.5	0.8	<0.5	2.2	<0.5	<0.5	<0.5	1.4	1.9	8.6	<5	<1	74	16	28	0.3	15	36
HA11_0	18-01-18	ES1802402	0 - 0.1	<0.5	1.2	2.1	7.6	**7.9**	8	2.3	2.7	7.6	0.7	16.8	<0.5	2.4	<0.5	11.4	17	87.7	<5	<1	58	17	23	<0.1	24	49
HA11_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	63	14	9	<0.1	26	13
HA12_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	0.6	2.3	**2.8**	2.9	1.1	1.1	2.6	<0.5	6.9	<0.5	0.9	<0.5	4.3	6.5	32	<5	<1	54	12	19	<0.1	15	37
HA13_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	0.5	0.9	2.3	<5	<1	27	8	18	<0.1	6	22
HA14_0.5	18-01-18	ES1802402	0.4 - 0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<1	76	22	10	<0.1	29	22
HA15_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<1	93	35	10	<0.1	**55**	58
HA16_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.1	**1.3**	1.1	<0.5	<0.5	1.2	<0.5	2.7	<0.5	<0.5	<0.5	1.6	2.7	<0.5	<5	<1	45	21	20	<0.1	32	43
HA17_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	0.5	0.8	2.1	<5	<1	44	21	13	<0.1	24	39
HA18_0	18-01-18	ES1802402	0 - 0.1	<0.5	<0.5	<0.5	1.6	**1.7**	1.6	0.6	0.9	1.6	<0.5	2.7	<0.5	0.7	<0.5	1.2	2.8	15.4	<5	<1	30	15	14	<0.1	18	55

ADOPTED ASSESSMENT CRITERIA																									
NSW 2014 General Solid Waste TCLP1 [5]	-	-	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	NA	5	1	5	-	5	0.2	2	-
NSW 2014 Restricted Solid Waste TCLP2 [6]	-	-	-	-	0.16	-	-	-	-	-	-	-	-	-	-	-	NA	20	4	20	-	20	0.8	8	-

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)	TCLP Analytical Results																						
HA3_0.5	18-01-18	ES1804634	0.4 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-
HA5_0	18-01-18	ES1804634	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-
HA6_0.5	18-01-18	ES1804634	0.4 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-
HA7_0.7	18-01-18	ES1804634	0.6 - 0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-
HA11_0	18-01-18	ES1804634	0 - 0.1	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA12_0	18-01-18	ES1804634	0 - 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	-	-	-	-	-
QA1	18-01-18	ES1804634	0 - 0.1	-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALS Practical quantitation limit				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	1	2	5	5	0.1	2	5
SGS Practical quantitation limit				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	0.1	0.1	0.1	0.8	3.0	0.3	0.3	0.5	1.0	0.1	0.5	0.5

Notes:

Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

TCLP1 & TCLP2 unit are mg/L

NA = Not applicable

[1] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1

[2] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Specific contaminant concentration

[3] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2

[4] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration

[5] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration

[6] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration

Table E6
Armidale High School
Butler Street, Armidale NSW 2350
Soil analytical results - Waste Classification - PCBs, OCPs & OPPs

ADOPTED ASSESSMENT CRITERIA	PCBs	OCPs																			OPPs										
	Total Polychlorinated biphenyls	pp-DDE	Aldrin	cis-Chlordane	trans-Chlordane	delta-BHC	pp-DDD	pp-DDT	Dieldrin	alpha-Endosulfan	beta-Endosulfan	Endosulfan sulphate	Endrin	Endrin aldehyde	alpha - BHC	beta - BHC	delta- BHC	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor	Azinphos methyl	Bromophos-ethyl	Chlorpyrifos	Diazinon	Dichlorvos	Dimethoate	Fenthion	Ethion	Malathion	Parathion
NSW 2014 General Solid Waste CT1 (No Leaching)[1]	<50	-	-	-	-	-	-	-	-	60	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	250	250	250	250	-
NSW 2014 General Solid Waste SCC1 (Leached)[2]	<50	-	-	-	-	-	-	-	-	108	108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	250	250	250	250	-
NSW 2014 General Solid Waste TCLP1 [3]	NA	-	-	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	-
NSW 2014 Restricted Solid Waste CT2 (No Leaching)[4]	<50	-	-	-	-	-	-	-	-	240	240	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000	1,000	1,000	1,000	1,000	-
NSW 2014 Restricted Solid Waste SCC2 (Leached)[5]	<50	-	-	-	-	-	-	-	-	432	432	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000	1,000	1,000	1,000	1,000	-
NSW 2014 Restricted Solid Waste TCLP2 [6]	NA	-	-	-	-	-	-	-	-	12	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	-

Sample ID	Sample Date	Laboratory report reference	Sample Depth (mBGL)																													
C1	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
C2	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
C3	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
C4	18-01-18	ES1802402	0 - 0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
ALS Practical quantitation limit				**0.1**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.2**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.2**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.20**

Notes:

Bold Sample concentration exceeds the adopted assessment criteria

All results expressed as mg/kg, unless stated otherwise

TCLP1 & TCLP2 unit are mg/L

NA = Not applicable

[1] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - General solid waste CT1

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[3] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - General solid waste - Leachable concentration

[4] Waste Classification Guidelines (NSW EPA 2014) - Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test - Restricted solid waste CT2

[5] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Specific contaminant concentration

[6] Waste Classification Guidelines (NSW EPA 2014) - TCLP and SCC values for classifying waste by chemical assessment - Restricted solid waste - Leachable concentration