

# Lake Cathie Public School Upgrade Construction Environmental Management Plan

LCPSU-AWE-CEMP-001

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A W Edwards Project Manager	Craig McIlveen
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Construction Environmental Management Plan

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3	Legal and Other Requirements	
4	Environmental Incident Response Flow chart	
5	Waste and Spoil Management process flow charts	
6	Fuel and Chemical Spills Emergency Procedure	
7	Wet Weather Action Plan	
8	Construction Waste Management Plan	
9	Construction Noise & Vibration Management Plan	
10	Construction Traffic & Pedestrian Management Plan	
11	Construction Soil & Water Management Plan	
12	Unexpected Finds Protocol (Douglas & Partners)	
13	Community Consultation Strategy	
14	Aboriginal Cultural Heritage Assessment (J. P Collins)	
15	Consent Condition B12 - Implementation Matrix	
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## I OVERVIEW

### I.1. Project Description

A W Edwards are the Principal Contractor for the construction of the Lake Cathie Public School Upgrade

The project is located at 1240 Ocean Drive, Lake Cathie with a broad scope of:

- 17 New permanent teaching spaces.
- Removal of demountable buildings.
- Refurbishment of Block B to accommodate two learning support rooms.
- Refurbishment of Hall to form the Library
- Relocation and re-use of COLA to form new School Hall.
- All works to be completed by November 2020 in readiness for Day 1 Term 1 2021

A drawing of the project identifying key environmental controls and location of environmental sensitive areas will be posted on the Site Noticeboard.

The site office, worker facilities and compound will be located within the construction footprint.

### I.2. Construction Hours of Work

In accordance with Part C4 of the State Significant Development (SSD 9491), unless for an emergency as describe by the SSD or where written approval has been provided, the site construction work hours are restricted to the following:

Monday – Friday	7:00am – 6:00pm
Saturday	7:00am – 6:00pm
Sunday/Public Holidays	No construction work permitted

### I.3. Construction Environmental Management Plan

This Construction Environmental Management Plan (CEMP) describes the environmental strategy, methods, controls, and requirements for the execution of the project, and has been revised in response to the requirements of the planning instrument for the works. Each deliverable item in the State Significant Development application (SSD 9491) will be addressed in this document and its appendices.

This CEMP stands alone as the master document for site environmental activities, and refers to company procedures, defining how the environmental aspects of the project will be run. It complements the Management System and, in some cases, may override it.

A W Edwards Environmental Policy has been included in this CEMP as Appendix I.

This Construction Environmental Management Plan should be read in conjunction with the Project Management Plan and the WHS Management Plan.

A copy of this CEMP will be made available to site workers upon request.

### I.4. Purpose of the Construction Environmental Management Plan

The purpose of this Construction Environmental Management Plan (CEMP) is to:

- Identify the environmental issues (aspects and impacts) for this project;
- Establish, communicate and implement environmental operational controls to reduce any adverse impacts on the environment from the company's activities, products and services.
- Ensure compliance by A W Edwards and its suppliers and subcontractors with all relevant environmental legislation, any applicable licence, approval and permit, regulatory requirements and this CEMP.

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- Ensure that works are managed to reduce adverse impacts on the environment
- Action any outcomes from incidents or accidents, project audits or other identified non-conformances and to continually improve the Environmental Management System.

**1.5. Environmental Objectives**

The objectives for the project are:

Aspect	Objective
Waste	To minimise waste going to landfill
Sediment and Erosion Control	To prevent sediment from entering waterways or stormwater
Water quality	To prevent contamination of water ways
Noise and vibration	To minimise noise and vibration levels for the duration of the Project
Asbestos	To ensure workers and others are not exposed to asbestos
Indigenous, and European Heritage	To ensure that any heritage objects uncovered are reports, and protected.
Dust	To minimise dust levels throughout the Project

**1.6. Key Environmental Issues**

The key environmental issues on the project are:

- Noise and vibration;
  - Adjacent school buildings
- Water management and Stormwater;
  - Water runoff into the existing and adjoining stormwater system
- Erosion and Sediment Control;
- Air Quality;
  - Effect on air quality which has the potential to affect the operation of the adjacent school buildings
- Asbestos, hydrocarbons and other contaminants;
- Flora and Fauna;
  - Only trees within the construction footprint will be removed as – as approved
  - No protected trees are within the Construction or amenities zone
- Traffic and access
  - Increased traffic demand around the site
- Indigenous and European Heritage; and
  - Not expected on the project

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## ■ Waste

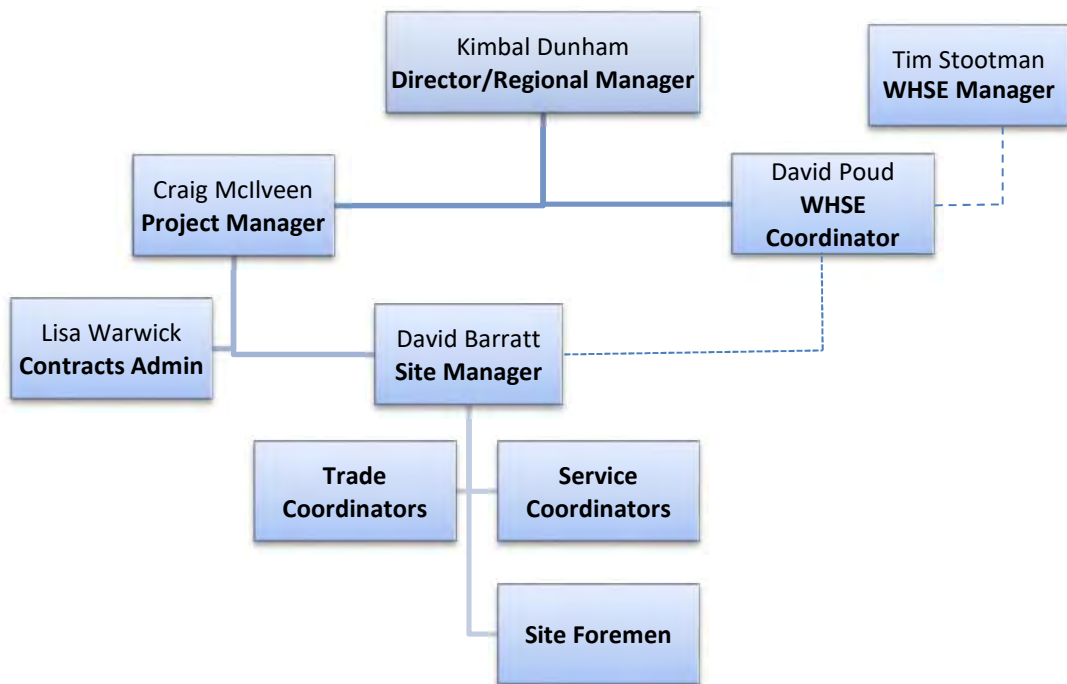
These potential issues will be managed in accordance with this CEMP, Environmental Activity Register, Internal and external audits, site training, site Induction, toolbox talks, compliance inspections, and Hazard and Observation inspections.

**1.7. Key Reference Documents (to be read in conjunction with this CEMP)**

1	A W Edwards Environmental Policy
2	Environmental Activity Register
3	Legal and Other Requirements
4	Environmental Incident Response Flow chart
5	Waste and Spoil Management process flow charts
6	Fuel and Chemical Spills Emergency Procedure
7	Wet Weather Action Plan
8	Construction Waste Management Plan
9	Construction Noise & Vibration Management Plan
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4	Aboriginal Cultural Heritage Assessment (J. P Collins)
15	Consent Condition B12 - Implementation Matrix
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## 2 ENVIRONMENTAL MANAGEMENT STRUCTURE AND RESPONSIBILITY

### 2.1. Project Organisational Chart



### 2.2. Responsibilities and Authorities

#### 2.2.1. Director in Charge:

The Director in Charge is responsible for:

- The overall responsibility for Work Health and Safety, Environmental and Injury Management systems.
- Defining A W Edwards' policies on Work Health & Safety, Injury Management and Environmental Management.
- Developing, implementing and promoting A W Edwards Safety & Environment System in accordance with NSW Government WHS and Environmental legislation.

#### 2.2.2. Regional Manager:

The Regional Manager is responsible for: -

- Allocating sufficient resources, including financial, physical and human;
- To implement the system and verify its effective operation;
- Providing regular reports to the Board of Directors on the operation of the system, including accident and incident statistics, company and site audits, company prohibition, improvement and compliance notices and other safety and environment issues that may arise;

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- Consulting with workers and employees on safety issues on a regular basis.
- Delegating responsibilities for safety and environmental matters; and
- Monitoring appropriate technology and management practices

### **2.2.3. Project Manager:**

The Project Manager is responsible for adapting A W Edwards Safety & Environment System as prescribed by:

- Contractual documents
- Specifications
- Hazardous Chemicals survey
- Permits and approvals
- Legislative requirements
- A W Edwards' policies and procedures
- Contractor's standards

The Project Manager is accountable for the effective implementation of the site-specific Safety & Environment System. This includes:

- Assessing a contractor's ability to carry out the works in a safe and environmentally sound manner.
- Allocating sufficient resources, including financial, physical and human, to implement the system consistent with the nature and complexity of the work.
- Reviewing workplace safety and environmental performance and acting promptly to correct non-compliance.
- Acting to prevent the recurrence of serious accidents and incidents and thoroughly investigated together with appropriate measures taken to prevent a recurrence.
- Promoting safety and environmental awareness in site meetings.
- Consulting with workers and employees on safety issues on a regular basis.
- Ensuring the accuracy and timely delivery of S&E reports
- Ensuring the presence of a decision-maker at Health and Safety Committee meetings either by personal attendance or delegated representation
- Ensuring site staff are competent to implement the system and is accountable for site safety and environmental performance.
- Ensuring Contractor and Supplier compliance with A W Edwards Safety & Environment System.
- Handing over all relevant Safety & Environment System records to the WHSE Manager for collating and filing.

### **2.2.4. Site Manager / Foreman:**

The Site Manager / Foreman is responsible for implementing A W Edwards S&E Management System as determined by the Project Manager in regard to the nature and complexity of the work.

The Site Manager / Foreman is responsible for controlling work practices and managing the risk of accidents that can injure people, damage property and harm the environment. This includes:

- Producing site specific induction training and ensuring its delivery to everyone working on site

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- Producing a site map to illustrate the set out of the site and facilities for parking, amenities, deliveries, storage areas, first aid, sediment control locations, and waste management.
- Assessing the site for the suitability, location and accessibility of emergency equipment. Eg. Portable fire extinguishers.
- Development, documentation and most importantly the communication of Emergency Evacuation procedures, taking into account the method of alerting the site of an emergency (intercom / hooters or other); methods of access and egress; signage; emergency services communication; instruction; leaders; etc.
- Procuring stocks of appropriate PPE and the materials to maintain them
- Promoting safety and environmental awareness through signage, safety talks and noticeboards
- Ensuring the worthiness of all plant and equipment brought on site and subsequent monthly certification is carried out by competent personnel
- Ensuring the safe handling, storage and use of Hazardous Chemicals
- Maintaining accurate and timely records of safety and environment performance
- Conducting hazard inspections accompanied by personnel competent to verify that documented procedures are being followed.
- Securing hazardous work areas, materials and introducing procedures to control access, (ie. identifying quarantine areas).
- Verifying the competency of personnel required to perform hazardous work and their understanding of the work procedures related to the work.
- Providing trained personnel and equipment to respond promptly in the event of an emergency.
- Quarantining unsafe work areas, materials, plant and equipment.
- Investigating all reported accidents, incidents, dangerous occurrences and near misses.
- Acting promptly to eliminate the cause or minimise risk from the source of reported accidents, incidents, dangerous occurrences and near misses.
- Maintaining records of all reported accidents, incidents, dangerous occurrences and near misses.

#### **2.2.5. Work Health, Safety & Environment (WHSE) Coordinator:**

The WHSE Coordinator is responsible for:

- Co-ordinating staff training in the implementation of A W Edwards Safety & Environment System and specific safety topics.
- Assisting the Project Manager in the implementation and monitoring of the project Safety & Environment System.
- Assisting management personnel in meeting their obligations under the relevant Safety and Environment legislation / regulation, Codes of Practice and Australian Standards.
- Informing management personnel of changes in the relevant Safety and Environment legislation / regulations, Codes of Practice and Australian Standards.
- Conducting Safety & Environment audits of A W Edwards sites and reporting the findings to the respective Project Manager and/or Site Manager / Foreman.
- Informing the Regional Manager of changes to legislative requirements affecting company policy.
- Co-ordinating staff training in the use of PPE and other 'toolbox' topics.

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- Ensure that all safety and environmental notices or concerns raised by other parties or authorities eg. SafeWork NSW, Unions, Client's representative(s), Consultants, Neighbours, Councils, EPA etc. are immediately forwarded to the Project Manager and Site Manager for response and/or action.
- Review WHSE information received from 3<sup>rd</sup> parties and incorporate into the safety & environmental system as applicable.
- Reviewing and agreeing actions on reports of workplace incidents / accidents, site audits, prohibition/improvement notices, breaches of non-conformance.
- Collating and reporting on monthly Safety & Environment System records from site.
- Providing Secure document storage for the following:
  - Monthly Site Safety & Environment System report
  - Hazard Inspections
  - SafeWork NSW Accident Report forms
  - Monthly safety and environment talks
  - Non-Conformance forms per safety / environment/ plant / materials / equipment.
- Reporting to Regional Manager on matters of safety and environmental management.
- Collaborating with the HR/IR Manager on the implementation of disciplinary procedures in regard to banned substances, blood borne pathogens and offensive behaviour.
- Collaborate with HR/IR Manager on the implementation of A W Edwards Injury Management policy
- Maintaining staff training and competency profiles

### 2.3. 24 Hour Contact Details

The 24 hour contact for this project is: David Barratt (A W Edwards Site Manager), Tel: 0413 735 662

The contact details of other Key Project Personnel, Stakeholders and Environmental Agencies are included in the WHS Management Plan and on the site contact list.

## 3 Communication and Consultation

### 3.1. Training

Prior to the commencement of project activities, all site construction personnel (including subcontractors) will attend a site induction.

The Site Induction shall include an outline of the requirements of this CEMP and the responsibilities and accountabilities of all site personnel.

Site management personnel listed in the section above with specific environmental duties have received the relevant training to plan, develop and deliver environmental control measures for the project, and in response to a potential environmental incident. Records are maintained in the A W Edwards (cloud based) training records system.

Additional training for site management and on site personnel has been described in the Training Management Plan for the project.

Training records will be kept to verify who has attended any induction and training.



### 3.2. Community Consultation

A community consultation forum was held at the Lake Cathie School on the 9<sup>th</sup> December 2019. The forum included all with stakeholders including the School Principal and 'after-hours' school facility users.

No material issues were identified and stakeholders were keen to see the school upgrade undertaken. The consultation included:

4. Overview and timeline of 3 stage construction process
5. Construction hours
6. A W Edwards key personnel and contacts
7. Buildings/zones affected
8. Construction zones boundaries
9. Changes and impacts to access & egress for public
10. 3D presentation of final campus design
11. Q & A

### 3.3 To Third Parties

A consultative forum will be facilitated by A W Edwards with 3rd parties using school facilities after hours prior to construction to:

- appraise key project stages,
- identify potential impacts
- provide a source of contact

### 3.4. From Third Parties

The Site Manager shall ensure that all safety notices or concerns raised by other parties e.g. SafeWork NSW, Unions, Client's representative, Consultants, Neighbours, Councils, NSW Environment Protection Authority, etc. that are brought to A W Edwards' notice are immediately forwarded to the Project Manager and WHSE Coordinator.

All issues concerning subcontractor performance shall be forwarded to the subcontractor by the Project Manager. The Project Manager shall manage the close out of these issues.

Environmental information received from third parties shall be reviewed and incorporated into A W Edwards' environmental management system as applicable. 3.5

### 3.5 To the Client

The A W Edwards Project Manager shall report on environmental performance to the client/client's representative on a monthly basis. This may be via the PCG Report.

### 3.6 Community Complaints

Community complaints shall be recorded on a 'A W Edwards Complaints Register' form SE7013.

Community complaint must be immediately referred to the Principal's Project Manager (Currie & Brown)

Remedial action must be taken within the timeframe agreed with the Principal's Project Manager.

The Principles Project Manager shall ensure closure and sign off with all relevant parties

Any action taken shall be recorded on the form.

## 4 ENVIRONMENTAL ACTIONS

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### 4.1. Environmental Risks/ Environmental Aspects

Potential environmental obligations and risks associated with the project shall be identified prior to the start of the project by the Project Manager on the A W Edwards Environmental Activity Register.

These obligations will be developed in accordance with the requirements of the SSD and any associated REF.

The Environmental activity Register will identify

- Specific undertakings arising from any formal environmental impact assessment
- Relevant development consent conditions
- Pollution control approvals/licences/permits and any conditions attached to these
- Statutory and contract obligations
- Environmental risks and opportunities with significant impacts with the activities involved
- Environmental objectives, targets and measures (where practical) for the significant impacts, risks and opportunities

The Environmental Activity Register will be provided to subcontractors and suppliers as part of the subcontract and supply contracts.

Significant aspects may impact on the environment positively (eg. recycling) or negatively (eg. pollution).

The Environmental Activity Register is reviewed for currency by the site manager each month. Any changes to this register are communicated with the project team at the subsequent A W Edwards team meeting, and provided to subcontractors and suppliers via email or using the web based communications system.

### 4.2. Environmental Impacts and Controls

#### 4.2.1 Project Construction Environmental Management Plans

The Site Manager/Foreman will ensure that environmental controls are inspected in accordance with this Construction Environmental Management Plan.

#### 4.2.2 Environmental Impacts and Operational Control

The Environmental Activity Register (See Appendix 3), the Project Administration Manual and the A W Edwards S & E Procedures Manual describe operational controls used to manage environmental issues and matters.

The Site Manager will ensure that environmental controls are inspected in accordance with the Environmental Activity Register and the A W Edwards S & E Procedures Manual.

Information on hazardous chemicals/materials to be utilised on the site, including each material's potential impact on the environment and measures to be taken in the event of accidental release will be assessed and managed via the Hazardous Chemicals and Safety Data Sheet Register.

#### 4.2.3 SSD 9491 Consent Condition B12 Supplementary/Sub Plans, Reports & Recommendations

Supplementary Plans required by the contract, REF/SSD or as deemed necessary by the Project Manager will be produced in association with this plan.

Supplementary Plans related to the project are:

- WHS Management Plan;
- Construction Traffic & Pedestrian Management Plan (Refer also: CEMP Sect: 4.13; 4.14; 4.16;)
- Construction Waste Management Plan (Refer also: CEMP Sect 4.7; 4.12; Appendix 5)

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- Construction Noise & Vibration Plan (Refer also: CEMP Sect 3.6; 4.14)
- Construction Soil & Water Management Plan (Refer also: CEMP 4.8; 4.9; 4.12; 4.13 Appendix 4 & 5)

Supplementary Reports & recommendations – significant to this project are:

- Aboriginal & Cultural Assessment (J. P. Collins 2019)
- Aboricultural Assessment Report (MNC Tree Services 2018)
- Biodiversity Development Assessment Report (NARLA 2019) 4

### 4.3 Subcontractors and Suppliers

#### 4.3.1 Engagement

Subcontractors shall be made aware of their responsibilities under the terms of the applicable environmental legislation, by being provided a copy of this Construction Environmental Management Plan and/or the Project Environmental Impact Assessment and by participating in site induction.

Subcontractors and suppliers shall meet the environmental management requirements specified in the Construction Environmental Management Plan and the Project Environmental Impact Assessment.

The A W Edwards Project Manager will determine if subcontractors will be requested to submit Safe Work Method Statements (SWMS), Inspection and Test Plans (ITP) or environmental procedures with details of how they manage any environmental aspects and impacts associated with their activities. The requirements to submit environmental control measures will be detailed in the subcontract or on the Purchase Order.

Consideration of **normal** and **abnormal** operations, along with **emergency** scenarios will be included in ITPs/SWMS as required.

#### 4.3.2 Monitoring Subcontractor Environmental Performance

Subcontractor performance shall be monitored via audits and site inspections by the Site Manager.

Audits will be organised by the WHSE Coordinator.

Should environmental issues be identified by the Site Foreman the environmental issues shall be recorded on the Hazards Observation Sheet (SE6301). The Site Foreman shall manage the close out of the identified issues.

### 4.4. Process for Potential Disruption to School Campus Operations and Services

In aligning with the process for managing any potential disruptions to the school operation, as described in the A W Edwards Interface and Impact Management Plan, the following subsections apply. 4

#### 4.4.1 Approach

A W Edwards have developed a strategic and structured approach to manage the Disruptive Notice (DN) procedure and communication of the same.

The key to successful management of DN through the course of this project will be to:

- Allocate dedicated and experienced resources to the process
- Develop and agree a robust procedure for DN
- Early forecasting and detailed planning of DN
- Strict stakeholder communication process for all concerned.

#### 4.4.2 DN Management Team

Our Project Manager, will oversee the development and submissions of all DN for the course of the works.

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Our Project Manager will provide the single point of contact for DN. The Project Manager will collaborate with all other project teams such as construction, design, services, planning and contract administration.

A W Edwards note that within the scope document issued at time of tender that greater than a 10 day period of notice will be required.

A W Edwards has developed the following targets when submitting DN:

- DN are to be signed off no less than 10 days prior to the actual works commencing on site
- Initial DN to be submitted 15 days in advance of works occurring on site
- For major DN which hinder the performance or business continuity of the submission must be made 20 days prior to works commencing onsite.

These are minimum targets and should be improved upon where possible. For major disruptions the Project Manager will discuss the proposed disruption a month prior to it needing to occur onsite. This will provide sufficient time to develop the DN and submit for approval. DN Procedure

Our proposed DN procedure can be broken down into the following critical steps;

**Step 1 – Works Identified by A W Edwards.**

Works are identified as being required by the A W Edwards Team. The relevant team member/s internally consults with the Project Manager to agree on whether a DN is required to be submitted.

**Step 2 – Pre Planning Stage.**

The works undergo thorough pre-planning. This is done through early consultation between our specialist contractors/consultants, and NSW Schools Infrastructure. This informal step may simply be a meeting onsite to discuss a proposal. This communication is essential to ensuring the submitted DN identifies critical operational requirements or other which may change the methodology proposed.

A W Edwards propose to hold this pre-planning discussion on DN where required. This step may not always be required, however, even a simple phone call to advise of an upcoming issue and asking questions will ensure the site knowledge and phase drawings/diagrams are correct and the DN submitted picks up the critical items that are important to the operations of the school community.

**Step 3 – Produce and Submit the DN to Schools Infrastructure.**

**Step 4 – Review with Schools Infrastructure and Relevant Consultants.**

**Step 5 – Submit to Schools Infrastructure.**

**Step 6 – Works Proceed, are completed and documentation closed.**

#### 4.4.3 DN Mitigation Strategies

The A W Edwards team will always work on possible mitigation of DN in an attempt to remove the disruption altogether.

Mitigation strategies to be employed to minimise the impact during the construction works may include:

- Engineer [disruption] out – this could include carrying out minor changes to layouts (subject to confirmation of flows and use of space) to remove or minimise the disruption.
- Look for alternatives – this could include reticulating services differently rather than the most direct route to minimise disruptions.

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- Working hours – some works may be able to be done during after-hours such as works in main lobbies and temporary works installations.
- Organise additional staff

#### 4.4.3 DN Submission Form and Content

The DN forms will be developed and agreed prior to submission.

From our experience, A W Edwards propose the content to include the following as a minimum:

1. Date and time of disruption
2. Duration
3. Description of works to be carried out
4. Description of disruption
5. Identification of Engineering and Building Services affected by the disruption
6. Location of disruption (department(s), area(s), room(s))
7. Sequence of works to be listed
8. Site Inspection Required
9. A check box for impacts such as:
  - a. Noise
  - b. Dust
  - c. Vibration
  - d. Impacts to traffic flow (pedestrian or vehicular)
  - e. Impacts to patient flow
  - f. External community affected
  - g. Hazardous materials or substances used
  - h. Specialist clinical cleaning required
10. Notification to external bodies such as:
  - a. Fire brigades
  - b. Police
  - c. Ambulance
  - d. Security company
  - e. Insurance company
11. Are additional staff required?
12. A check box for confirming Isolations such as:
  - a. Fire alarm
  - b. Isolate fire brigade dialler (ASE)
  - c. Isolate water systems
  - d. Isolate air-conditioning or ventilation systems
  - e. Security system isolation
13. Contact details for relevant stakeholders involved (e.g. Contractor, Subcontractor)
14. Author of DN from A W Edwards
15. Sign off of DN by A W Edwards senior manager
16. Sign off of DN by Schools Infrastructure
17. Schools Infrastructure comments which form part of the DN approval

Mandatory attachments to the DN will include:

18. Drawings indicating location of works, setting up of hoardings, or areas which will be disrupted
19. Risk analysis for the activities associated with the works
20. Contractor SWMS for the works
21. Work flow methodology such as a highly detailed program with various actions required by the contractors and Schools Infrastructure during the event.

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**4.5. Legal and Other Requirements****4.5.1 Legislative Compliance**

Legislative requirements that apply to the project are detailed in Appendix 4:

Where Development Consents, permits or approvals relate specifically to the project, these issues will also be deemed as “significant” and will be included in the project’s Environmental Activity Register and in environmental procedures.

**4.5.2 Licences and Approvals**

Licences and approvals required for the project are listed below

Licence/Approval	Number
State Significant Development (SSD)	SSD 949 I

**4.6. Contaminated Site Procedure**

Projects undertaken on contaminated sites will undergo a Contaminated Site Assessment (CSA). CSA reports shall be provided as part of planning approvals process of a proposed development.

The CSA and associated approvals shall be reviewed by the Project Manager.

All relevant CSA reports, documents and relevant approvals will be obtained and reviewed prior to site activities commencing. Operational controls will include any specific procedures described in the report or approvals.

Where required, ITPs and/or SWMS will be developed to address requirements of CSAs and to ensure verification of the works being completed as described.

The Site Manager will also ensure that the site workforce is made aware of potential contamination issues associated with the contaminated site development. Advice shall be provided should problems be identified.

The Site Manager will maintain spoil disposal records. 4

**4.7 Waste Management Reduction and Purchasing**

See Construction Waste Management Plan (Appendix 8).

In Summary measures implemented will include:

- Management of wastes during construction in accordance with the NSW Government’s Waste Reduction and Purchasing Policy (WRAPP);
- Preparation of a site specific Construction Waste Management Plan (see appendix 8 of this plan) management of waste in accordance with the waste hierarchy, established under the *Waste Avoidance and Resource Recovery Act 2001*, classification of waste in accordance with the *Waste Classification Guidelines (DECCW 2009)* and treatment, transport and disposal in accordance with EPA guidelines,
- Application of the waste minimisation hierarchy principles of avoid/reduce/re-use/recycle/dispose;
- Disposal of any waste material that is unable to be re-used, re-processed or recycled at a facility approved to receive that type of waste;
- Procedures for classifying waste in accordance with NSW EPA’s Waste Classification Guidelines;

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- Procedures for the recovery of resources from waste where this is beneficial and does not harm the environment or human health, in accordance with the 'resource recovery exemptions' under clause 51 of the Protection of the Environment Operations (Waste) Regulation 2005;
- An Unexpected Finds Protocol has been prepared (see s4.11 of this plan) and relates to the construction and demolition works, including contaminated soils, asbestos, lead-based paint and any other hazardous materials;
- Preparation of a Spoil Management process (see s4.12 of this plan) that includes safeguards for removal, including compliance with relevant codes and guidelines and appropriate disposal at an approved waste disposal facility in accordance with the requirements of the relevant legislation, codes, standards and guidelines;
- Installation of segregated bins for recyclable materials and provision for material to be reused or recycled wherever possible;
- The disposal of chemical, fuel and lubricant containers and solid and liquid wastes in accordance with applicable EPA guidelines; and
- Reporting bi-monthly to the Principal's Representative on the amount of material generated, and the amount recycled as part of the Project.

A target of at least 80% of construction waste generated during site preparation and construction of projects must be diverted from landfill and either recovered, recycled or reused.

### 4.7.1 Waste Identification and Minimisation

All construction areas shall identify waste streams and minimisation methods in the following ways:

- Identify all activities likely to produce waste;
- Identify waste minimisation strategies including staging of activities and the purchase of cut-to-length and pre-fabricated products where practicable;
- Identify type and quantity of waste;
- Separate excavation from demolition and/or construction waste and provide separate storage locations and/or destinations for both; and
- Liaise with suppliers to minimise packaging and product damage.

### 4.7.2 Waste Classification/Validation

See also Appendix 8. Waste and Spoil Management process flow charts

- Hazardous materials surveys completed. Refer to Douglas Partners Site assessment report and Asbestos Register.
- Materials to be removed prior to demolition
- Registers and waste disposal requirements as per SafeWork NSW, NSW EPA requirements for removal, storage, transport and disposal.

### 4.7.3 Disposal

All identified waste streams shall dispose of non-recyclable waste materials in the following ways:

- Make arrangements for waste materials to be disposed of at appropriately licensed waste disposal facilities;
- Provide waste collection facilities at each construction site; and

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Construction Environmental Management Plan

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- Ensure the disposal of chemical, fuel and lubricant containers, solid and liquid wastes in accordance with EPA guidelines.

#### **4.7.4 Recycling Strategy**

All construction areas shall adhere to a recycling strategy where practicable in the following ways:

- Identify all recyclable materials. Items to be considered include, but are not limited to:
  - Spoil
  - Concrete;
  - Vegetation;
  - Timber;
  - Bricks;
  - Metal/glass;
  - Cardboard Packaging/paper.
- Ascertain whether materials can be re-used on-site and provide an appropriate and clearly identified designated area for storing such materials;
- If material cannot be re-used on-site establish a collection service for the recyclable materials; and
- Erect signs within the construction areas to encourage employees to reduce, re-use, and recycle.

Specific strategies for the above-identified materials are as follows:

- Spoil: Any spoil will be disposed of or reused where applicable. A suitable location for temporary storage with appropriate sediment control measures will be sought which is away from waterways and any environmentally sensitive areas, and haulage organized.
- Concrete: Waste concrete shall be disposed of at an appropriately licensed facility where separation and recycling can take place. Surplus concrete and concrete washings shall be transported to an appropriate recycling facility.
- Vegetation: Vegetation shall be reused where possible, either by mulching or composting. Any weed waste generated during works shall be disposed of to landfill.
- Timber: The following procedures shall occur regarding timber wastes:
  - Pallets and other packaging shall be returned to the supplier for reuse where possible;
  - Where practical, wood off-cuts and waste shall be reused;
  - Timber products that are not suitable for reuse, but that may be suitable for recycling, shall be stored in a designated area, and removed to an appropriate recycling facility as required.
- Bricks: Where possible, bricks shall be reused on site. Where a large number of bricks are generated from demolition works, they shall be stored in a designated area and removed to an appropriate facility as required.
- Metal/Glass: The following procedures shall occur regarding metal and glass wastes:
  - Drums and other metallic packaging shall be returned to the supplier for reuse where possible;
  - Reinforcing steel shall be sold to scrap metal merchants for recycling;
  - Metal unsuitable for reuse shall be stored in a designated area and removed to an appropriate facility as required;



## Construction Environmental Management Plan

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- Glass items shall be placed in appropriate recycling bins; and
- Cardboard/paper – cardboard and paper wastes shall be placed in appropriate recycling bins. Should quantities exceed bin capacities, the materials shall be placed in a designated area and removed to an appropriate facility as required. 4

### 4.8 Landforms, Geology and Soils

See Construction Soil & Water Management Plan (Appendix I I)

In Summary:

The proposal has the potential to impact negatively on the surrounding environment due to excavations that may lead to erosion and sediment transfer off site. Minor excavations are required for footings and for service connections to the new temporary training facility.

Possible control measures to be implemented include;

- Develop and implement an erosion and sediment control plan
- Appropriate stockpiling of materials at least 5m away from drainage lines, water ways and drains
- Spill kits and a temporary refuelling bund should be installed and used on site
- Dispose of excavated material in accordance with EPA's waste classification guidelines
- Avoid excavation during heavy periods of rain
- Site rehabilitation of disturbed areas will be undertaken progressively as activities are completed during construction.
- Adequate drainage measures should be provided to control entry of groundwater and prevent ingress of surface water runoff to open excavation trenches.

### 4.9. Water Quality and Hydrology

See Construction Soil & Water Management Plan (Appendix I I)

In Summary the control measures to implement, to prevent contaminated water entering the stormwater system are;

- Install erosion and sediment controls in accordance with the Construction Soil and Water Mgmt. Plan
- Install a concrete wash down area on site that meets the NSW EPA Environmental best management practice guideline for concreting contractors (NSW EPA 2002).
- All chemicals and oils will be stored in accordance with the manufacturer's specification and Safety Data Sheet, within a bunded area that is protected from rain.
- The effectiveness of erosion and sediment controls are to be regularly reviewed
- Erosion and sediment controls are only to be removed once the area they are protecting has been stabilised.
- Plant and equipment must be regularly inspected to check for oil leaks
- Refuelling of vehicles or machinery is to occur within the hardstand area to prevent the escape of spilled substances to the surrounding environment. Spill kits will be maintained with mobile plant.
- Wash down of concrete mixers, concreting equipment and trucks must take place area away from drainage lines and stormwater drains.

A W Edwards monitors the Bureau of Meteorology (BoM) weather forecasts in order to prepare the site and project personnel for any impending adverse weather conditions.

### Construction Environmental Management Plan

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Should the BoM forecast for Lake Cathie indicate that the possibility of rain is 75% or higher, and the expected rainfall exceeds 20mm, or high winds A W Edwards will communicate (via Aconex) with subcontractors and Schools Infrastructure personnel to advise of measures to be taken to prepare for the potential inclement weather (see Appendix 7 – Wet Weather Action Plan).

#### 4.10 Biodiversity

The construction works will comply with all aspects and requirements of the “**Biodiversity Development Assessment Report (BDAR) for Lake Cathie Public School**” prepared by NARLA Environmental June 2019 & the **Aboricultural Assessment** (Mid Nth Coast Tree Services).

In summary for the duration of the construction works:

- street trees must not be trimmed or removed unless it forms a part of this development consent or the prior written approval from Council is obtained or is required in an emergency to avoid the loss of life or damage to property;
- all street trees immediately adjacent to the approved disturbance area must be protected at all times during construction in accordance with Council's tree protection requirements. Any street tree, which is damaged or removed during construction due to an emergency, must be replaced, to the satisfaction of Council;
- a suitably qualified ecological consultant shall inspect all native trees that have been approved for removal before they are felled. If there are any koala or other fauna species in the tree, work in the vicinity is to cease until the animal has moved from the area. If it is likely that hollows are providing habitat for native species, traps shall be set for several nights and any native species found shall be relocated to an appropriate nearby location;
- all trees on the site that are not approved for removal must be suitably protected during construction as per the recommendations of the Aboricultural Assessment Report dated 18 September 2018, prepared by Mid North Coast Tree Services;
- the capacity and effectiveness of tree protection fencing, compliant with AS 4970/2009 Protection of trees on development sites shall be maintained at all times in accordance with the approved management plan until such time as the site is no longer subject to any construction or earthmoving works; and
- if access to the area within any protective barrier is required during the works, it must be carried out under the supervision of a qualified arborist. Alternative tree protection measures must be installed, as required. The removal of tree protection measures, following completion of the works, must be carried out under the supervision of a qualified arborist and must avoid both direct mechanical injury to the structure of the tree and soil compaction within the canopy or the limit of the former protective fencing, whichever is the greater.

#### 4.11 Unexpected Finds Procedure (ACM)

See Unexpected Finds Protocol (Appendix 12)

Per survey and historical reports ACM is not expected at this site. However, the following ACM protocol will be used if ACM occurs.

This procedure has been developed to aid A W Edwards in the event Asbestos Containing Materials (ACM) contamination is unearthed during excavation works to minimise human health and environmental risks from the disturbance of ACM during the works, and to ensure that contaminated material is managed, handled and/or transported appropriately.

The following procedure outlines the necessary actions required of A W Edwards in the event ACM contamination is unearthed on site during excavation or earthworks. This procedure is applicable to all

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personnel and subcontractors if suspected ACM are encountered at any location of the site. The procedure, in the event of ACM contamination being unearthed is as follows:

- (a) Where potential ACM contamination is observed during works, workers are directed to cease work in the immediate area and contact the A W Edwards site manager/foreman.
- (b) A W Edwards site manager/foreman to view and photograph the area where ACM contamination is detected. If more than seven pieces of non-friable (aka. bonded) ACM in an isolated area or suspected friable material is present, the A W Edwards site manager/foreman to contact Occupational Hygienist/Environmental Consultant/Licensed Asbestos Assessor to assess the area. The Occupational Hygienist/Environmental Consultant/Licensed Asbestos Assessor will recommend if an ASA or ASB contractor will be required for removal works. A clearance certificate of removal will be required prior to recommencing of works.
- (c) If less than seven pieces of bonded ACM is present in an isolated area, A W Edwards foreman may direct safe removal of contamination as follows;
  - A W Edwards staff to wear the following Personal Protective Equipment (PPE):
    - Disposable half-face particulate respirator (P1/P2 rated); &
    - Disposable nitrile/latex gloves.
  - ACM bonded fragments should be carefully picked up and placed in heavy duty polythene bags. These bags should be labelled. Bags marked for asbestos waste should not be used for any other purpose.
  - Ensure used gloves and respirators are placed in the waste bag.
  - Bags should be twisted tightly, folded over and the neck secured in the folded position with adhesive tape, or any other effective method.
  - The waste bags should be placed in the designated asbestos waste bin. The bin is to be lined with 200µm or thicker builders plastic. The bin is permitted to remain on site for no longer than six (6) weeks at any one time.
  - Prior to removal, the plastic lining the bin is to be folded over the top of the contents, and taped using duct tape or equivalent. The bin to be photographed prior to leaving the site. The contents of the bin are to be disposed of by licensed asbestos removal contractors appropriately. Ensure waste disposal documents are received.
  - The subcontractor who has discovered the unexpected find is to photograph the find in the location it was found, mark on a plan the location it was found, complete the Unknown Finds register and notify A W Edwards as soon as reasonably practicable by formal means of communication. 4

#### 4.12 Spoil and Materials Management

See also Construction Soil and Water Management Plan (Appendix 11)

In line with s4.16 of A W Edwards *Safety & Environmental Procedures Manual*, and in accordance with the requirements of the planning instrument, and the head contract, A W Edwards site management personnel (and subcontractors) will follow the procedure outlined in the process flow chart attached to this management plan as *Appendix 5 – Waste and Spoil Management process flow charts*.

The outputs of this process identify, track and maintain records for any excavated materials exported from the site. Similarly, any fill materials (including recycled aggregates) to be imported to the site are managed through the implementation of the second of the two flowcharts attached to this plan as *Appendix 5 - Waste and Spoil Management process flow charts*.

If accepting imported fill onto a site, the following must be completed by the Site Manager and/or delegated site supervisor (internal employees or subcontractor);

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- Request documentation from the supplier on the origin of fill. This information, in addition to records of the quantity received and the name and address of the supplier, must be kept with the site records and available for inspection;
- Supervise delivery of all loads onto the site. Inspect the load for potential signs of contamination and the presence of other types of waste including bricks, concrete rubble, steel, timber, asbestos and plastic; and
- Request documentation from transporters delivering fill to the site, to verify the origin.

If importing VENM, and there are doubts as to whether the material is VENM, request that the material is appropriately sampled, and then chemically tested by a NATA accredited laboratory for potential contaminants of concern and sight the certification and laboratory results.

Recovered/recycled aggregates can be imported for the purpose of road making activities, building, landscaping and construction works. When importing recovered aggregate, the following is recommended to be completed by the Site Manager and/or delegated site supervisor (internal employees or subcontractor):

- Obtain a written statement from the supplier stating that the recovered aggregate complies with the conditions of *The Recovered Aggregate Order 2014 (NSW EPA)*. These conditions include, but are not limited to sampling and chemical testing by a NATA accredited laboratory of the recovered aggregate and the implementation of procedures that minimise the potential to receive or process waste containing asbestos and relevant record keeping; and
- Supervise the delivery of all loads onto the worksite.

#### 4.13 Control of Sediment from Vehicles Travelling Off Site

A W Edwards will install a shaker grid at the site exit to mitigate sediment tracking 'off site' on vehicles. Vehicles with heavy sediment build up will be cleaned down on site – within sediment control areas – prior to exit.

#### 4.14 Construction Noise and Vibration

See Construction Noise and Vibration Management Plan (Appendix 9)

In Summary, A W Edwards will ensure that it's programming, planning, work methods, equipment and processes will be prepared to help minimise excessive Construction Noise and Vibration.

In the event that any impacts are predicted to exceed the noise or vibration requirements, A W Edwards will design and implement mitigation measures to ensure that these exceedances do not occur.

In preparing this CEMP, A W Edwards have considered the recommendations and guidance provided by the *Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)*.

The control measures to be implemented to manage the noise and vibration during construction are;

- Attended noise monitoring of the sensitive receivers will be undertaken during construction, where noise levels are predicted to be exceeded.
- Attended noise monitoring will be undertaken during out of hours work.
- Undertake training and toolbox talks on site focusing on noise management so the workers understand the importance of noise and the potential impact on nearby receivers.
- Radios and stereo players are prohibited from use outdoors.
- Avoid shouting, and minimise talking loudly and slamming vehicle doors.

### Construction Environmental Management Plan

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- 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).
- Noise labels are required by NSW legislation for pavement breakers, mobile compressors, chainsaws and mobile garbage compactors. These noise labels can be used to assist in selecting less noisy plant equipment.
- Where Pneumatic equipment is to be used, select super silenced compressors, silenced jackhammers and damped bits.
- Regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.
- Locate site vehicle entrances away from sensitive land uses where possible.
- Carry out noisy fabrication work at another location where practical (for example, within enclosed factory premises) and then transport to site
- Noisy plant items must be positioned any as far as practical from residential receivers.
- The use of plant and equipment will be staged to avoid the simultaneous operation of two or more noisy plant items in close vicinity and adjacent to residential receivers where possible.
- Truck movements must be scheduled to avoid residential streets where possible
- The Site Manager periodically checks the site and nearby residences and other sensitive land uses for noise problems so that solutions can be quickly applied

As the nearest building is located in close proximity to the proposal, it is expected that there may be some vibration transmitted to the adjacent buildings.

As a guide, safe working distances for typical items of vibration intensive plant are listed in Table 1 below. The safe working distances are quoted for both “cosmetic” damage and human comfort. The safe working distances must be complied with at all times, unless otherwise approved by the relevant authority.

The safe working distances presented in Table 1 are indicative only and will vary depending on the particular item of plant and local geotechnical conditions. They apply to cosmetic damage of typical buildings under typical geotechnical conditions.

Table I: Recommended Safe Working Distances for Intensive Activities

Plant Item	Rating/Description	Safe Working Distance	
		Cosmetic Damage (BS 7385)	Human Response (BS 6472)
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2m	7m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7m	23m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22m	73m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	N/A
Jackhammer	Hand held	1 m (nominal)	Avoid contact with structure

Note: More stringent conditions may apply to heritage or other sensitive structures

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#### 4.15 Dust and Air Management

See [AWE Environmental Activities Register SE4133](#)

A W Edwards will take all reasonable steps to minimise dust and air pollution arising from the Project's activities. Given the temporary nature of construction and the proposed control measures, medium to long term air quality impacts from the construction of the proposal would be minimal.

The control measures to be implemented to maintain the ambient air quality are;

- Dust suppression will be carried out on site, using either water (in compliance with water restrictions) or ground cover.
- Machinery and plant kept on site should be serviced according to manufactures specifications.
- Any machines or plant that is producing excessive visual exhaust should be repaired or removed from site.
- Plant or machinery should not be left idling.
- Stockpiles should be maintained and contained to minimise dust.
- Trucks transporting spoil and other waste materials from site should be covered.
- Disturbed areas should be rehabilitated as soon as practicable.
- Traffic movements on any disturbed areas must be limited.
- Work is to be minimised during high wind periods.
- Plant and equipment must be maintained in accordance with manufacturer's specifications to ensure that it is in a proper and efficient condition.
- Plant and equipment must be regularly inspected to ascertain that fitted emission controls are operating efficiently.



## Construction Environmental Management Plan

**4.16 Traffic Management**

See Construction Traffic and Pedestrian Management Plan (Appendix 10)

In summary, the amount of traffic expected to be generated during this enabling works will be minimal. To minimise the effect of construction on the existing road network, the following control measures will be adopted. See also Construction Pedestrian and Traffic Management Sub Plan.

- The traffic management plan will be developed in consultation with the relevant authorities and implemented.
- Any RMS approvals and permits will be obtained prior to construction commencing in this area.
- Limit the impact on the surrounding community by limiting plant and machinery movements to outside peak traffic times.
- Limit or restrict construction vehicles access at student drop off / pick up times between
  - 08:00 to 09:00 &
  - 14:00 to 15:00.
- Traffic management and signage should be established at the site entrance and exit to minimise risks to workers, motorists, cyclists and pedestrians.
- A condition report for the existing road ways will be completed prior to construction commencing and at the conclusion of construction.
- All pavement and road surfaces damaged during construction will be restored when work is finished.
- Contractors will be encouraged (during the site induction process) to use public transport.

**4.17 External Lighting**

The requirement for external flood lighting during construction is not anticipated. Should external lighting be required at any time throughout construction it shall be installed in conformance to AS 4282-2019 and certification submitted to the Certifying Authority.

**4.18 Heritage**

The construction works will comply with all aspects and requirements of;

- Aboriginal Cultural Assessment (J. P. Collins 2019)
- CEMP Appendix 12 Unexpected Finds Protocol

In summary the discovery of heritage items during these works is expected to be unlikely.

- Prior to their on-site involvement, all contractors, subcontractors and their employees engaged for the school redevelopment works will undergo a site induction that provides information on legal obligations with respect to Aboriginal objects, and 'stop-work' conditions applicable in the event that any identified or suspected Aboriginal objects are discovered at any stage.
- A register will be kept of all persons inducted. The register will include dates, names and signatures of those inducted, the name of the person carrying out the induction.
- If any identified or suspected Aboriginal objects are detected at any time, all disturbance work will immediately cease within 10 metres of the find and temporary protective fencing erected around this 'no-go zone' pending further management advice from the Department of Planning and Environment in liaison with the OEH (Planning and Aboriginal Heritage Section, North East Region) and the Registered Aboriginal Parties. In the unlikely event that the find consists of or includes human remains, the NSW Police Department and the OEH Environmental Line (phone 131 555) will also be notified.

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Works may not recommence within the designated 'no-go zone' until formal clearance to do so has been given by the appropriate

- authorities.

### 4.19 Monitoring

The Construction Environmental Management Plan shall be monitored following implementation to ensure that:

Environmental operational controls are being effectively applied;

- Project specific environmental monitoring targets specified in the SSD or other planning permits for air, water and noise are met;
- Unpredicted impacts are identified and remedial action is taken; and
- The project objectives listed above are being met.

Responsibilities for monitoring and compliance requirements are detailed in this Construction Environmental Management Plans and/or the Environmental Activity Register.

Monthly reports are provided to the WHSE Manager for review. The performance of projects against company environmental objectives and targets is reviewed on a quarterly basis.

### 4.20 Emergency Planning and Response

Refer to the Emergency Plan and contacts in the Appendices of the WHS Management Plan.

### 4.21 Incident Investigation and Reporting

#### 4.21.1 Internal Requirements

The Foreman shall ensure that all incidents occurring in or around the site, involving company personnel, subcontractors, visitors or passers-by, are investigated and reported regardless of how minor they appear at the time of the occurrence.

#### 4.21.2 Duty to Notify NSW Environment Protection Authority (EPA) of Pollution Incident

The Project Manager shall notify the NSW Environment Protection Authority of any pollution incident causing or threatening material harm to the environment.

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

Harm to the environment is material if:

- It involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or
- It results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (or such other amount as is prescribed by the regulations), and (loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.
- For the purposes of this part, it does not matter that harm to the environment is caused only in the premises where the pollution incident occurs



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Construction Environmental Management Plan

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**4.22 Non Conformance**

In the event of breach in the requirements of this CEMP, a Notice of Safety & Environmental Breach will be completed and issued to the offending party.

Notice of Safety & Environmental Breach will be recorded and maintained on site.

A copy of the Notice of Safety & Environmental Breach will be forwarded to the Project Manager and the subcontractor, who will implement appropriate corrective action.

**4.23 Audits**

Projects audits shall be scheduled by the WHSE Manager and form part of the company's audit schedule. Refer to Safety & Environmental Procedures Manual

Audits shall address the requirements of ISO9001, ISO14001, AS4801, A W Edwards' Management System and the various Management Plans.

## **5 ENVIRONMENTAL DOCUMENTATION**

**5.1. Quality, WHS&R and Environmental Management System**

A W Edward's Management System has been developed to meet the requirements of ISO9001, ISO14001 and WHS.

The Management System has several levels of documentation:

- Management System Overview/Manual
- Procedures
- Project Plans (various)
- Forms.

**5.2. Document Control**

The Project Manager is responsible for approving this plan and all amendments.

Summary details of amendments shall be recorded on the amendment register in this plan.

**5.3. Changes to the Construction Environmental Management Plan**

The Construction Environmental Management Plan shall be reviewed and amended as required following changes to the risk profile, legislation, scope of works and any incident resulting in death or medical treatment.

The amended Construction Environmental Management Plan shall be approved by the Project Manager.

Copies of the amended Construction Environmental Management Plan shall be re-issued to all Construction Environmental Management Plan recipients.

**5.4. Record Control**

All records are to be kept for a minimum of 10 years unless otherwise stated or required by legislation or for any other legal reason. Records to be kept include:

- Legislative and regulatory requirements;
- Approvals, permits and licences;
- Details of qualifications held by individuals;
- Monitoring/inspection reports on performance;

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- Internal review reports;
- External review reports;
- Reports of environmental incidents, complaints and follow-up action;
- Minutes of environmental management meetings generally;
- Incident and performance analyses and evaluation reports;
- Performance targets and measurements;
- Minutes of management review meetings;
- Reports on and evidence of action taken;
- Induction and training records;
- Contract information; and
- Service provider information

**6 APPENDICES**

1	A W Edwards Environmental Policy	
2	Environmental Activity Register	
3	Legal and Other Requirements	
4	Environmental Incident Response Flow chart	
5	Waste and Spoil Management process flow charts	
6	Fuel and Chemical Spills Emergency Procedure	
7	Wet Weather Action Plan	
8	Construction Waste Management Plan	
9	Construction Noise & Vibration Management Plan	
10	Construction Traffic & Pedestrian Management Plan	
11	Construction Soil & Water Management Plan	
12	Unexpected Finds Protocol (Douglas & Partners)	
13	Community Consultation Strategy	
14	Aboriginal Cultural Heritage Assessment (J. P Collins)	
15	Consent Condition B12 - Implementation Matrix	
16	Site Plan and Environment	

Appendix I – A W Edwards Environmental Policy



**A W EDWARDS**

## ENVIRONMENTAL POLICY

The diverse range of construction projects undertaken by A W Edwards since it was founded in 1921, has enabled the company to develop a comprehensive understanding of how its activities can potentially impact on the environment.

As a responsible corporate entity A W Edwards has had considerable success in eliminating or minimising their environmental impacts while continuing to meet the expectations of its Clients. This has been possible by balancing commercial objectives with protection of the environment.

We have developed this policy to serve as a statement of our commitment to continue to protect the environment while conducting our activities.

To carry out this commitment, we will -

- As a minimum, ensure that our operations and our discharges to air, water and land comply with all regulatory requirements and Codes of Practice,
- Continuously improve our environmental performance where there is an opportunity to do so,
- Implement a structured management system to provide a framework to successfully develop, implement and monitor our environmental management programs,
- Ensure environmental protection is considered during the planning and design stage of new construction projects,
- Ensure appropriate pollution and waste management controls are implemented as a construction site is being established to effectively avoid or minimise pollution, and
- Regularly monitor the effectiveness of pollution controls throughout the entire construction period.
- Ensure our employees whose activities can potentially impact on the environment understand their responsibilities, and are capable of conducting their activities consistent with corporate environmental expectations,
- Expect our contractors and suppliers to meet the same environmental standards we have set for ourselves,
- Conduct open, honest and responsive communications with the community and government groups regarding our environmental management practices.

**GREG D'ARCY**

Chief Executive Officer  
A W Edwards Pty Limited

01/07/2018



**A W EDWARDS**

## ENVIRONMENTAL SUSTAINABILITY POLICY

A W Edwards Pty Limited is committed to excellence, quality and leadership in all of its activities. This includes the implementation of a sustainable approach and commitment to the concept of maintaining a sustainable environment.

A W Edwards demonstrates this commitment to environmental responsibility by:

- Complying with all relevant environmental legislation;
- Setting and communicating meaningful environmental objectives and targets for all aspects of A W Edwards activities, so as to continue to reduce natural resource use, and minimise adverse environmental impacts;
- Incorporating environmental sustainability principles, awareness and understanding into all areas of its work;
- Integrating principles of ecologically sustainable development into all activities;
- Membership and support of key environmental organisations including the GBCA;
- Educating A W Edwards staff so that they are accredited and qualified to oversee the implementation of effective environmentally sensitive initiatives, both in the design of projects and in construction processes; and
- Managing all its construction activities so as to minimise waste, minimise pollution, and optimise the protection of soil, air and water quality.

The following principles underpin the A W Edwards Sustainability Policy in undertaking our commitment towards environmentally sustainable work sites:

- Incorporating sustainability principles into A W Edwards projects where required;
- Identifying alternative and sustainable courses of action to minimise the environmental impact of A W Edwards activities;
- Creating and promoting an environmentally sustainable and responsible culture across the company;
- Identify opportunities for incorporation of sustainability principles into project procurement and
- Committing to continuous improvement of environment performance

**GREG D'ARCY**

Chief Executive Officer  
A W Edwards Pty Limited

01/07/2018

## Appendix 2 Environmental Activity Register

## Environmental Activity Register SE4133

Project No.	628	Project Name	Lake Cathie Public School Upgrade	Site	1459 Ocean Drive, Lake Cathie NSW
Prepared by	C McIlveen D Barratt D. Proud	Position	Project Manager Site Manager WHSE Coordinator	Date	26/11/2019

REVIEW DATE	REVISION (Y/N) IF YES PLEASE STATE REVISION	AUTHORISATION	REVIEW DATE	REVISION (Y/N) IF YES PLEASE STATE REVISION	AUTHORISATION

Environmental Aspect/Impact	Legal Requirements	Risk Rating	Environmental Actions, Controls and Criteria	Residual Risk Rating	Monitoring			
					Type	Frequency	Documentation	Responsibility
Adjoining waterways (dewatering, soil erosion and runoff)  - <i>NIL waterways directly adjacent to the site.</i>	NSW - POEO Act 1997(s 120, 122) NSW - PEO (General) Regulation 1998, cl 55; NSW - Local Government Act 1993, s 638] NSW Department of Housing's Managing Urban Stormwater (2004) ANZECC Water Quality Guidelines	Very High	<ul style="list-style-type: none"> <li>Temporary drainage systems will be established to divert clean waters around the land development areas as appropriate.</li> <li>Erect silt fences, bunds and construct swale drains.</li> <li>Regularly inspect and maintain and/or replace these controls as required.</li> <li>Inspect control measures after a rain event.</li> <li>Street sweepers will be employed on regular basis, as needed</li> <li>Leave as much vegetation to stabilise soils, where possible.</li> <li>Install temporary fences to define 'no go' areas in those areas that are not to be disturbed.</li> <li>Install sediment controls down slope of the site to catch sediment.</li> <li>Where possible, leave or lay a kerbside turf strip (for example, the nature strip) to slow the speed of water flows and to trap sediment.</li> <li>Limit vehicle entry and exit to one point, and lay geotextile and aggregate to stabilise it for all-weather access.</li> <li>Clearly mark the access point and give an access map to all suppliers.</li> <li>Protect all existing stormwater drains.</li> <li>Save the topsoil and stockpile it for use later in revegetation. Never place it around trees as this will kill them.</li> <li>Store all stockpiles and building materials behind sediment fences. Cover them with plastic to prevent erosion by wind.</li> <li>Get council approval before placing stockpiles or other materials on the nature strip or footpath.</li> </ul>	Medium	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman



## Environmental Activity Register SE4133

Environmental Aspect/Impact	Legal Requirements	Risk Rating	Environmental Actions, Controls and Criteria	Residual Risk Rating	Monitoring			
					Type	Frequency	Documentation	Responsibility
			<ul style="list-style-type: none"> <li>Connect downpipes from the guttering to the stormwater drain as soon as possible once the roof sheeting is installed.</li> <li>Surround the wash-out area with a sediment fence that slows down the water flow. Site this area upslope of another sediment control.</li> <li>Fill in all trenches immediately after services have been laid.</li> <li>Spread the topsoil back when the work is finished and revegetate the site as soon as possible to control erosion.</li> <li>Remove the sediment and erosion controls only after this is done.</li> <li>Sweep the road and footpath as needed each day. Washing down is unacceptable.</li> <li>Never place any materials in the gutter or on the road.</li> <li>Filter or settle-out all water pumped off the site. The water must be clear before it enters the stormwater system or creeks. Gypsum or other flocculent can be applied to muddy or turbid water to assist clay particles to settle.</li> </ul>					
Chemicals	NSW - POEO Act (Section 116, 142,) WHS Act and Regulation 2011	Very High	<ul style="list-style-type: none"> <li>Chemicals to be stored in bunded areas (impervious and 110% of largest container) away from stormwater drains and pits.</li> <li>Appropriate chemicals storage is in conformance with:               <ul style="list-style-type: none"> <li>→ AS 1940 The Storage and Handling of Flammable and Combustible Liquids</li> <li>→ SafeWork NSW Code of Practice - Managing Risks of Hazardous Chemicals at Workplaces</li> <li>→ OEH Guidelines for Bunding and Spill Management.</li> </ul> </li> <li>Ponded water within bunds will not be discharged to stormwater.</li> <li>Fuel and hydraulic leaks to be cleaned up immediately.</li> <li>Liquid paints NOT to be poured down drains. Spread on waste cardboard or similar and leave to dry. Paint brushes to be rinsed and paint solids allowed to settle. Container of paint solids to be disposed to liquid waste facility.</li> <li>Construct concrete washout pit for washout, away from stormwater drains. Send back to batch plant where possible.</li> <li>Concrete cuttings to be contained and wet vacuum to prevent runoff into stormwater drains.</li> <li>Storage of bulk fuels (&gt;200L) on site is prohibited. All refuelling shall be undertaken by a mobile facility with appropriate spill control and containment control equipment.</li> </ul>	Medium	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman



## Environmental Activity Register SE4133

Environmental Aspect/Impact	Legal Requirements	Risk Rating	Environmental Actions, Controls and Criteria	Residual Risk Rating	Monitoring			
					Type	Frequency	Documentation	Responsibility
			<ul style="list-style-type: none"> <li>Safety Data Sheets (SDS's) must be provided to the Foreman prior to a chemical being received on site and by subcontractors using chemicals/products.</li> </ul>					
Community Concerns		High	<ul style="list-style-type: none"> <li>Provide information (e.g. Signage, letterbox drops) to community on programmed works</li> <li>Provide contact name for inquiries.</li> <li>Advice locals of "noisy" work.</li> <li>If required in noise sensitive areas and/or in response to complaints, engage consultants to undertake monitoring at nominated receivers.</li> <li>Vehicles will not be permitted to queue outside the site or in residential areas unless a defined area is established which does not adversely impact on neighbours.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Dust Generation Particulate Emissions (General)	NSW - POEO Act (Sections 124-126)	Very High	<ul style="list-style-type: none"> <li>Install shade cloth on perimeter fencing</li> <li>Vehicle corridors will be clearly identified and restricted to control vehicle access onsite.</li> <li>Limit vehicle speed onsite to 10km/hr</li> <li>Fixed and mobile (water tanker) water sprays used to suppress dust emissions</li> <li>Review/reduce work activities (that generate dust) during moderate to high wind velocity periods.</li> <li>Maintain equipment; overly smoky plant to be stopped until repair works completed.</li> <li>Turn off vehicle engines whilst not in use (no long periods of idling)</li> </ul>	Medium	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Dust Generation (Demolition)	NSW - POEO Act (Sections 124-126)	Very High	<ul style="list-style-type: none"> <li>Breakers and crushing equipment to be fitted with dust filtration equipment or water sprays to control dust emissions.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Dust Generation (Construction)	NSW - POEO Act 1997 (s 124-126)	Very High	<ul style="list-style-type: none"> <li>Minimise areas of site disturbed and stage works where possible.</li> <li>Dust suppression strategies to be used, i.e. water sprays, soil binders, hydro-mulching, controlled speed onsite, roadbase vehicle access, and shaker grids.</li> <li>Stockpiled topsoils and rubble will be restricted to 4m high. Stabilise if insitu for &gt;4-6 months.</li> <li>On site drilling or coring operations will be undertaken by equipment fitted with air filtration and/or dust suppression equipment.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman

## Environmental Activity Register SE4133

Environmental Aspect/Impact	Legal Requirements	Risk Rating	Environmental Actions, Controls and Criteria	Residual Risk Rating	Monitoring			
					Type	Frequency	Documentation	Responsibility
Emergency Preparedness		Very High	<ul style="list-style-type: none"> <li>Spill kit available onsite.</li> <li>Spill kit inspected regularly by site management personnel to ensure sufficient resources available at all times.</li> <li>Site management personnel will refer to the SDS (maintained in the site office) for advice and procedures.</li> <li>All spills must be reported to the Site Manager and cleaned up.</li> <li>Site manager to record incidents using AWE SE5101 Incident/Accident Investigation Form.</li> <li>Sediment pond pumped out regularly to maintain capacity in case of emergency</li> <li>Ensure you know where stormwater drains are and have materials to block them in case of a spill or fire</li> </ul>	Medium	Inspection	Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Hazardous materials (Asbestos)  - AWE note that the risk for this is Low, however, should potential ACM be encountered on the project an unexpected finds protocol applies	NSW - POEO Act (Section 142) NSW PEO (Waste) Regulation 2005, cl 42 NSW WHS Regulation 2011, Chapter 8	Low	<ul style="list-style-type: none"> <li>Request and review the asbestos register for any buildings where construction works are expected to be undertaken.</li> </ul> <p>Should potential ACM be encountered during the works, the following unexpected finds process is to be followed;</p> <ul style="list-style-type: none"> <li>Stop work if unexpected potential ACM are encountered.</li> <li>Seek advice from a licensed asbestos assessor (occupational hygienist)</li> </ul> <p>If ACM is identified and the RAP/AMP specifies;</p> <ul style="list-style-type: none"> <li>A licence subcontractor is used to remove, or disturb any ACM.</li> <li>Where required a Remediation Action Plan/Asbestos Management Plan/Asbestos Removal Control Plan will be developed and implemented.</li> <li>A Class B SafeWork NSW asbestos licenced contractor is engaged to remove 10 square metres or more of non-friable (aka 'bonded') asbestos</li> <li>A Class A SafeWork NSW asbestos licenced contractor is engaged to monitor, remove or disturb any friable ACM.</li> <li>Work areas will be signed off by the licensed assessor to validate any clean up works.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Land (contaminated soils, imported fill)	NSW - Contaminated Land Management Act 1997, s 60;	High	<p>The following unexpected finds process is to be followed;</p> <ul style="list-style-type: none"> <li>Stop work if unexpected potentially contaminated soils (eg. ACM, hydrocarbons) are encountered.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman

## Environmental Activity Register SE4133

Environmental Aspect/Impact	Legal Requirements	Risk Rating	Environmental Actions, Controls and Criteria	Residual Risk Rating	Monitoring			
					Type	Frequency	Documentation	Responsibility
	NSW - Contaminated Land Management Regulation 1998, cl 3 Acid Sulfate Soils Management Advisory Committee  NSW - POEO Act (Section 142) NSW PEO (Waste) Regulation 2005, cl 42 NSW WHS Regulation 2011, Chapter 8.		<ul style="list-style-type: none"> <li>Obtain waste classification from consultant in accordance with OEH guidelines <i>Environmental Guidelines: Waste Classification Guidelines (April 2008)</i></li> <li>Where required a Remediation Action Plan will be developed and implemented.</li> <li>Sign off by Site Auditor may be required to validate clean up.</li> <li>Any affected groundwater or ponded rainwater will be tested and classified by consultants prior to disposal.</li> <li>Check geo-tech requirements.</li> </ul> If ACM is identified and the RAP/AMP specifies; <ul style="list-style-type: none"> <li>A licence subcontractor is used to remove, or disturb any ACM.</li> <li>A Class B SafeWork NSW asbestos licenced contractor is engaged to remove 10 square metres or more of non-friable ('bonded') asbestos</li> <li>A Class A SafeWork NSW asbestos licenced contractor is engaged to monitor, remove or disturb any friable ACM.</li> </ul>					
Landfilling	NSW - POEO Act (Section 116, 142)	Medium	<ul style="list-style-type: none"> <li>Reduce, reuse and then dispose</li> <li>Dispose of hard construction wastes for recycled gravels and sands</li> <li>Do not send soil to landfill until alternatives for beneficial reuse have been explored as per consultant's advice.</li> <li>Reuse packaging to protect works</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Noise	NSW - POEO Act (Sections 139, 140)	High	<ul style="list-style-type: none"> <li>Refer to SSD9491 &amp; AWE CEMP for noise restrictions and working hours.</li> <li>Use hoarding, or acoustic mats as required.</li> <li>Situate generators and plant away from sensitive receivers.</li> <li>Turn off plant/machinery when not in use.</li> <li>Maintain equipment and stop noisy plant until repaired.</li> <li>No early or late deliveries outside of working hours (unless by prior arrangement A W Edwards)</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Odour	NSW - (POEO Act 1997 s 142)	High	<ul style="list-style-type: none"> <li>If odorous materials are uncovered, re-cover immediately.</li> <li>Seek advice from consultant regarding soil /materials management.</li> </ul>	Low	Visual	Daily	Hazard & Observation Sheet	Site Manager / Site Foreman
Resources – water, materials, energy		Medium	<ul style="list-style-type: none"> <li>For design and construct jobs, refer to the design specification for Ecologically Sustainable Development (ESD) requirements, where they apply, and product choices.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman

## Environmental Activity Register SE4133

Environmental Aspect/Impact	Legal Requirements	Risk Rating	Environmental Actions, Controls and Criteria	Residual Risk Rating	Monitoring			
					Type	Frequency	Documentation	Responsibility
			<ul style="list-style-type: none"> <li>Buy local wherever possible to reduce impacts of transport on environment.</li> </ul>					
Sewer (Trade waste)	Comply with the conditions of the trade waste consent or permit, or the local council approval, including acceptance standards	Very High	<ul style="list-style-type: none"> <li>No paints or other chemicals to be poured down drains (including sewer).</li> <li>If required, obtain trade waste licence for discharge or local council approval</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Stormwater (Discharge from sedimentation basins, flooding)	NSW - POEO Act (Section 120) ANZECC Water Quality Guidelines NSW Department of Housing's Managing Urban Stormwater (2004)	High	<ul style="list-style-type: none"> <li>Water quality to meet ANZECC Water Quality Guidelines. → pH 6.5- 8.5, Turbidity &lt;50NTU, No visible oil and grease</li> <li>Obtain advice for use of flocculants to settle sediment from water.</li> <li>Where installed, sedimentation pond to be maintained at low levels to ensure capacity during rainfall event.</li> <li>Do not discharge water from ponds if contaminants are suspected. Obtain advice.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Traffic	Local Government Requirements	High	<ul style="list-style-type: none"> <li>Develop and implement traffic management plans, and submit to local council as required.</li> <li>Signage and notices regarding disruptions.</li> <li>Use crushed concrete, mulches etc. along site access roads.</li> <li>Install shakers and wheel wash as required.</li> <li>Organise regular street sweeping.</li> <li>Haulage routes and rules will be provided to subcontractors prior to commencing on site.</li> <li>All loads of soil, demolition wastes, general wastes etc. are to be tarped/covered</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman
Vibration		High	<ul style="list-style-type: none"> <li>Conduct dilapidation report prior to work starting.</li> <li>Consultation with the Currie &amp; Brown &amp; LCPS</li> <li>As far as is reasonably practicable, limit the use of vibratory rollers, rock breakers, impact piling etc. adjacent to buildings (&gt;7m).</li> <li>Obtain advice as required</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman

## Environmental Activity Register SE4133

Environmental Aspect/Impact	Legal Requirements	Risk Rating	Environmental Actions, Controls and Criteria	Residual Risk Rating	Monitoring			
					Type	Frequency	Documentation	Responsibility
Waste Litter	<p>NSW - POEO Act (Section 116, 142), NSW - Waste Avoidance and Resource Recovery Act 2001</p> <p>NSW -PEOA Act 1997, s 143, 144-146</p> <p>NSW Crown Lands Act 1989, s 155</p> <p>NSW Management of Waters and Waterside Lands Regulations - N.S.W., cl 13;</p> <p>NSW - PEO (Waste) Regulation 2005, cl 49</p>	High	<ul style="list-style-type: none"> <li>Registers and waste disposal requirements as per SafeWork NSW and OEHL requirements for removal, storage, transport and disposal.</li> <li>General site wastes – use one bin system, which is then sorted in the waste contractor's yard providing a report of quantities for recycling, reuse, disposal etc.</li> <li>Empty drums are to be taken off-site for disposal. Where possible, and safe to do so, empty drums shall be crushed prior to recycling/disposal.</li> <li>Adequate numbers of waste receptacles (e.g. skips and bins) are provided on site.</li> <li>Do not overfill skip bins. Cover where potential for windblown litter.</li> </ul>	Low	Visual Inspection	Daily Weekly	Hazard & Observation Sheet	Site Manager / Site Foreman

## Environmental Activity Register SE4133

### RISK MATRIX

Any risk classified as being either **EXTREME**, **VERY HIGH** or **HIGH** must be reduced to the lowest level possible by the development and implementation of effective controls. The aim is to eliminate or reduce risks to **MEDIUM** or **LOW** levels for all activities.

### RISK CLASS CALCULATOR (RISK CLASS = LIKELIHOOD X CONSEQUENCE)

Consequence	Likelihood				
	Almost certain	Likely	Possible	Unlikely	Rare
Catastrophic	EXTREME	EXTREME	EXTREME	VERY HIGH	HIGH
Major	EXTREME	EXTREME	VERY HIGH	HIGH	MEDIUM
Moderate	VERY HIGH	HIGH	HIGH	MEDIUM	LOW
Minor	MEDIUM	MEDIUM	MEDIUM	LOW	LOW
Insignificant	MEDIUM	LOW	LOW	LOW	LOW

#### HIERARCHY OF CONTROLS

When deciding on the best way to control a risk, consideration should be given to the Hierarchy of Controls. The Hierarchy of Controls gives an ordered mitigation strategy to remove or reduce the hazard. Start at the top of the hierarchy of controls, check to see if the risk can be eliminated first. This may not be practicable however by changing the way work is done it could reduce or eliminate the hazard. If the risk cannot be eliminated proceed to the next stage and check for any substitutes available and so on.

- **Elimination** - Removing the hazard at source of the risk.
- **Substitution** - Finding and replacing the problem less hazardous one, e.g. replacing solvent based paints with water-based paint.
- **Isolation** - Separation of the process can be by distance from the rest of the workplace or by a physical barrier between the process and any person, e.g. providing a locked cage area for hazardous substances.
- **Engineering** - Protecting the element at risk, usually human, by installing protective barriers or guards. An example would be hand railing on stairs or an automatic shield on a saw.
- **Administration** - Implementing a procedure or business management system when working in a particular fashion or environment.
- **Personal Protective Equipment** - Safety Glasses, earplugs, protective clothing etc.

CONSEQUENCE
<b>Catastrophic</b> -The hazard has the potential to: <ul style="list-style-type: none"> <li>▪ Permanently disable or kill</li> <li>▪ Cause severe damage to the structure</li> <li>▪ Have significant impact on the surrounding population and environment</li> </ul>
<b>Major</b> -The hazard has the potential to: <ul style="list-style-type: none"> <li>▪ Temporarily disable or very serious injury</li> <li>▪ Cause major damage to the structure</li> <li>▪ Serious breach of the site boundary and pollution of the local environment</li> </ul>
<b>Moderate</b> -The hazard has the potential to: <ul style="list-style-type: none"> <li>▪ Temporarily disable or serious injury</li> <li>▪ Cause moderate damage to the structure</li> <li>▪ Breach the site boundary and minor pollution to the local environment</li> </ul>
<b>Minor</b> -The hazard has the potential to: <ul style="list-style-type: none"> <li>▪ Moderate injury</li> <li>▪ Cause minor damage to the structure</li> <li>▪ Be contained within the site boundary</li> </ul>
<b>Insignificant</b> -The hazard has the potential to: <ul style="list-style-type: none"> <li>▪ Cause minor injury (first aid)</li> <li>▪ Insignificant impact contained within the site boundary</li> </ul>

LIKELIHOOD	
Almost Certain 75% - 100%	Expected to occur in most circumstances
Likely 60% - 75%	Will probably occur in most circumstances
Possible 40% - 60%	Might occur at some time in the future
Unlikely 20% - 40%	Could occur but doubtful
Rare 0% - 20%	May occur but only in exceptional circumstances.

RISK CLASS LEGEND	
EXTREME	Extreme Risk; No work to proceed
VERY HIGH	Very High Risk; No work to proceed
HIGH	High Risk; Additional task review required
MEDIUM	Medium Risk; Manage by routine procedures
LOW	Low Risk; Manage by routine procedures

Appendix 3 – Legal and Other Requirements

**LEGAL & OTHER REQUIREMENTS REGISTER**

SE4130

Date	26/11/2017
Project	Lake Cathie Public School Upgrade

**WHS Legislation**

Title	Applies (✓)
Work Health and Safety Act 2011	✓
Work Health and Safety Regulations 2017	✓

**SafeWork NSW Codes of Practice**

Title	Applies (✓)
Confined spaces	✓
Hazardous manual tasks	✓
How to manage and control asbestos in the workplace	✓
How to manage work health and safety risks	✓
Managing the risk of falls at workplaces	✓
How to safely remove asbestos	✓
Labelling of workplace hazardous chemicals	✓
Managing noise and preventing hearing loss at work	✓
Managing the work environment and facilities	✓
Preparation of safety data sheets for hazardous chemicals	✓
Work health and safety consultation, coordination and cooperation	✓
First aid in the workplace	✓
Construction work	✓
Preventing falls in housing construction	
Managing electrical risks at the workplace	✓
Managing risks of hazardous chemicals in the workplace	✓
Managing risks of plant in the workplace	✓
Safe design of structures	✓
Excavation work	✓
Demolition work	✓
Spray painting and powder coating	✓
Abrasive blasting	
Welding processes	✓

**National Codes of Practice**

Other documents that may be relevant to the Project include, but may not be limited to:

Title	Applies (✓)
Code for Management and Control of Asbestos in the Workplace 2005	✓
Code of Practice for the Control of Scheduled Carcinogenic Substances 1995	✓
Induction for Construction Work 2007	✓
National Code of Practice for the Control and Safe Use of Inorganic Lead at Work 1994	
National Code of Practice for the Control of Workplace Hazardous Substances 1994	✓
National Code of Practice for the Storage and Handling of Dangerous Goods 2001	✓
National Code of Practice for Noise Management and Protection of Hearing at Work	✓



**LEGAL & OTHER REQUIREMENTS REGISTER**
**SE4130**

3rd Edition 2004	
National Code of Practice for the Prevention of Musculoskeletal Disorders Caused From Performing Manual Tasks 2007	✓
National Code of Practice for the Prevention of Occupational Overuse Syndrome [NOHSC:2013(1994)] 2013	✓
National Code of Practice for the Safe Handling of Timber Preservatives and Treated Timber 1989	
National Code of Practice for the Safe Use of Synthetic Mineral Fibres 1990	✓
National Exposure Standards for Atmospheric Contaminants in the Occupational Environment 1995	✓
National Occupational Health & Safety Certification Standard for Users and Operators of Industrial Equipment – 3rd Edition 2001	✓
National Standard for Construction Work 2005	✓
National Standard for Licensing Persons Performing High Risk Work 2006	✓
National Standard for Manual Tasks 2007	✓
National Standard for Occupational Noise 2000	✓
National Standard for Plant 1994	
National Standard for Synthetic Mineral Fibres 1990	✓
National Standard for the Control of Inorganic Lead at Work 1994	
National Standards for Storage and Handling of Workplace Dangerous Goods 2001	✓
Precast, Tilt-up and Concrete Elements in Building Construction 2008	✓
Safe Removal of Asbestos 2nd Edition 2005	✓
Safe Working in a Confined Space – AS2865-1995 1994	✓
Workplace Injury & Disease Recording Standard in the Workplace (AS 1885.1) 990	✓
Workplace Injury and Disease Recording Standard - Australian Standard AS 1885.1-1990 1990	✓

**Environmental Legislation**

Title	Applies (✓)
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	✓
Airports Act 1996	
Airports (Environment Protection) Regulations 1997	
Australian Radiation Protection and Nuclear Safety Act 1998	
Australian Radiation Protection and Nuclear Safety Regulations 1999	
Contaminated Land Management Act 1997 NSW	✓
Contaminated Land Management Regulation 1998 NSW	✓
Crown Lands Act 1989 NSW	
Energy Efficiency Opportunities Act 2006	
Energy Efficiency Opportunities Regulations 2006	
Environmental Planning and Assessment Act 1979	✓
Environment Protection and Biodiversity Conservation Act 1999	✓
Environment Protection and Biodiversity Conservation Regulations 2000	✓
Forestry Act 1916	
Hazardous Waste (Regulation of Exports and Imports) Act 1989	
Heritage Act 1977 NSW	✓
Industrial Chemicals (Notification and Assessment) Act 1989	
Local Government Act 1993 NSW	✓
National Environment Protection Council Act 1994	

**LEGAL & OTHER REQUIREMENTS REGISTER**

SE4130

Title	Applies (✓)
National Environment Protection (Air Toxics) Measure	
National Environment Protection (Ambient Air Quality) Measure	✓
National Environment Protection (Assessment of Site Contamination) Measure	
National Environment Protection (Diesel Vehicle Emissions) Measure	
National Environment Protection (Movement of Controlled Waste between States and Territories) Measure	
National Environment Protection (National Pollutant Inventory) Measure	
National Environment Protection (Used Packaging Materials) Measure	
National Environment Protection (Used Packaging Materials) Measure - Application Thresholds	
National Greenhouse and Energy Reporting Act 2007	
National Greenhouse and Energy Reporting (Measurement) Determination 2008	
National Greenhouse and Energy Reporting Regulations 2008	
National Parks and Wildlife Act 1974	
Native Vegetation Act 2003 NSW	✓
Ozone Protection and Synthetic Greenhouse Gas Management Act 1989	
Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995	
Protection of the Environment Operations Act 1997 (POEO Act)	✓
Protection of the Environment Operations (Waste) Regulation 2005 NSW	✓
Renewable Energy (Electricity) Act 2000	
Renewable Energy (Electricity) Regulations 2001	
Road Transport Reform (Dangerous Goods) Regulations 1997	
Telecommunications Act 1997	
Telecommunications Code of Practice 1997	
Threatened Species Conservation Act 1995 NSW	✓
Trade Practices Act 1974	
Waste Avoidance and Resource Recovery Act 2001 NSW	✓

**Other Requirements**

Title	Applies (✓)
Health monitoring for exposure to hazardous chemicals – Guide for PCBU's	✓
NSW Department of Housing's Managing Urban Stormwater (2004)	✓
ANZECC Water Quality Guidelines	✓

Appendix 4 – Environmental Incident Response Flowchart

**Class 1** incident contact

Site Manager  
HSR  
Project Manager  
WHSE Coordinator  
DEH/EPA

Emergency Services / 000  
Act on their instructions

**Class 2 or 3** incident contact:

Head Office  
Site Manager  
HSR  
Project Manager

**Landslip**

- Isolate (turn off) water mains that could discharge into the area;
- Obtain specialist advice BEFORE attempting to rescue people or equipment - zone of the landslip is likely to be unstable;
- Once the source is contained or the discharge has stopped, determine whether clean-up is likely to be required;
- The Site Manager in consultation with the Project Manager, determines the most suitable process for clean-up and disposal of materials.

**Disturbance of Heritage items**

- The method selected must be carefully considered in light of the scale & nature of the problem;
- The Site Manager, in consultation with the Project Manager, determines the most suitable corrective actions.
- Notify OEHL if a heritage item is discovered the Project Manager to be notified firstly who will then notify OEHL etc. appropriately

**Spills / escape of polluted water**

- Contain the spill - ensure that no further escape occurs, especially off-site;
- Determine whether clean-up is likely to be required - recover spilt material;
- The Site Manager, in consultation with the Project Manager, determines the most suitable process for clean-up and disposal of contaminated materials.

**Odours and dust**

- Apply odour / dust suppression agents (including water mists, soil, chemicals);
- Consider carefully which option to select in light of the scale and type of problem;
- The Site Manager in consultation with the Project Manager determines the most suitable corrective actions.

**Incident Class**

When assessing the risk involved with each incident, the following Classes shall be used:

**Class 1**

- People – Causes or has the potential to cause damage which permanently alters the future of the individual (fatality, quadriplegia, amputee, disabled or psychological disturbance).
- Environment – Causes or has the potential to cause permanent environmental damage and results in remediation costs of > \$50,000.
- Plant / Equipment / Property – Causes or has the potential to cause damage to plant / equipment and / or property > \$50,000.

**Class 2**

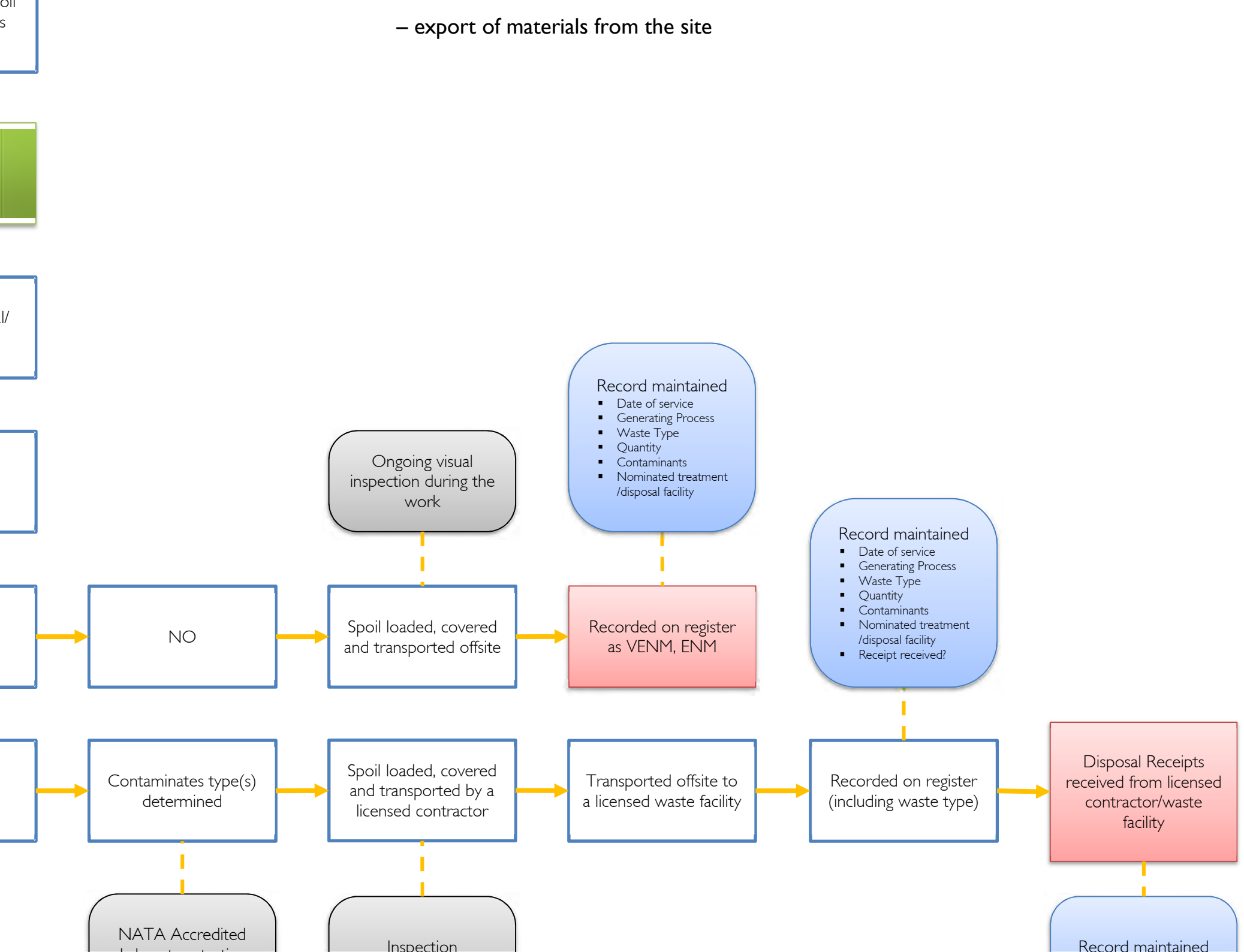
- People – Causes or has the potential to cause an injury or disease resulting in temporary disability or time lost from work of one or more complete days or shifts.
- Environment – Causes or has the potential to cause damage to the environment which can be rectified and results in remediation costs of > \$10,000 and < \$50,000.
- Plant / Equipment / Property – Causes or has the potential to cause damage to plant / equipment and / or property > \$10,000 and < \$50,000.

**Class 3**

- People – Causes or has the potential to cause an injury which inconveniences the individual such as minor cuts or sprains, but allows the person to continue to carry out normal duties.
- Environment – Causes or has the potential to cause damage to the environment which can be easily rectified and results in remediation costs of < \$10,000.
- Plant / Equipment / Property – Causes or has the potential to cause damage to plant / equipment and / or property < \$10,000.

Appendix 5 – Waste and Spoil Management process flow charts

– export of materials from the site



– import of fill/recycled aggregate to the site

Record maintained

- Material Type
- Quantity
- Details of Supplier
- Verified as free of contaminants

If the material is cleared, it may be returned to site

If material suspected of containing contaminant

Sample sent to NATA Accredited Lab to confirm nature of material

If material is confirmed to contain a contaminant, the material is removed from the site; and re-evaluate supply for the project

Record maintained

- Date of service
- Material Type
- Quantity
- Details of Transporter
- Verified as free of contaminants

## Appendix 6 - Fuel & Chemical Spills Emergency Procedure

### FUEL AND CHEMICAL SPILLS EMERGENCY PROCEDURE

1. Immediately cordon off the area and stop work
2. If the material is flammable, ensure that there are no ignition sources in the immediate area
3. Contain the spill as much as possible using an appropriate material, such as absorbent pads, booms, kitty litter, cement dust or hay bales
4. Block all entrances to stormwater drains, to prevent contamination of the stormwater system
5. Clean up the spill using an absorbent medium, ensuring that the material SDS is followed and appropriate PPE is used. This may involve the removal of soil or water from the affected area to ensure that there is no remaining contamination
6. Place the contaminated absorbent medium in an appropriate container and ensure that it is labelled with the contents
7. Arrange for the disposal of the material to an appropriately licensed facility
8. Ensure that disposal receipts are obtained as proof of appropriate disposal
9. Ensure that the EPA is notified as soon as possible if the spill left the bounds of the site or has the potential to cause significant environmental damage
10. Notify the Principal's Representative as soon as practicable, and ensure that incident and corrective/preventive action forms are completed



## Appendix 7 – Wet Weather Action Plan

### RESPONSIBILITY FOR MONITORING THE WEATHER FORECAST/RADAR

A W Edwards monitors the Bureau of Meteorology (BoM) weather forecasts in order to prepare the site and project personnel for any impending adverse weather conditions.

The BoM forecast for Lake Cathie has indicated that;

- the possibility of rain is 75% or higher, and
- the expected rainfall exceeds 20mm, or
- there is a forecast for high winds.

A W Edwards provides this advice such that you can prepare for this potential inclement weather.

### PREPARING THE SITE FOR ADVERSE CONDITIONS

The following procedures must be carried out upon receipt of this impending adverse weather conditions notification:

- Inspect and review the existing sediment control measures (eg. silt fencing and drain wardens)
- Install additional measures to prevent erosion and run off as necessary
- Inspect, cleanout/empty fuel and chemical storage bunds
- As far as is practicable, close up and backfill all excavations
- Barricade/fence off any excavations that cannot be closed or backfilled
- Prepare mobile plant and secure/stow as required
- Check that all stockpiles are adequately covered or stabilised (eg. temporary ground cover), in order to stop potential erosion
- If necessary, extra gravel bags are utilised in preparation for extreme weather conditions
  - Do not use sand bags on the road or in public areas
- During rain events, report any sediment or material run off to A W Edwards site management

After the weather condition has subsided, A W Edwards will further check the state of the controls in place to determine if further actions are required.

Appendix 8 – Construction Waste Management Plan

# LAKE CATHIE PUBLIC SCHOOL UPGRADE

## Construction Waste Management Plan

LCPS-AWE-WMP-001

Date: 28/11/2019  
Author: D. Proud  
Revision: A  
Status: For Approval

Prepared By:  
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Construction Waste Management Plan

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Project No.	628
Project Name	Lake Cathie Public School Upgrade
Client	NSW Schools Infrastructure
Project Location	Lake Cathie Public School 1240 Ocean Drive
Planning Instrument	State Significant Development (SSD 9491)
AWE Project Manager	Craig McIlveen
Phone No.	0403 611 161
Timing of the Works	January 2020 to July 2021

Revision Register:

REV	DATE	STATUS	AUTHOR	APPROVED BY	COMMENTS
A	28/11/2019	Draft	D Proud	C McIlveen	
AI	12-Dec-19	For Approval	D Proud	C McIlveen	
	Date	Status			
	Date	Status			
	Date	Status			
	Date	Status			

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## I INTRODUCTION

### OBJECTIVES

This Construction Waste Management Plan outlines how A W Edwards Pty Limited will manage the waste management on the Lake Cathie Public School Upgrade.

A W Edwards is committed to ensuring appropriate methods of waste minimisation, recycling and disposal and spoil management.

The objective of the Construction Waste Management Plan is to:

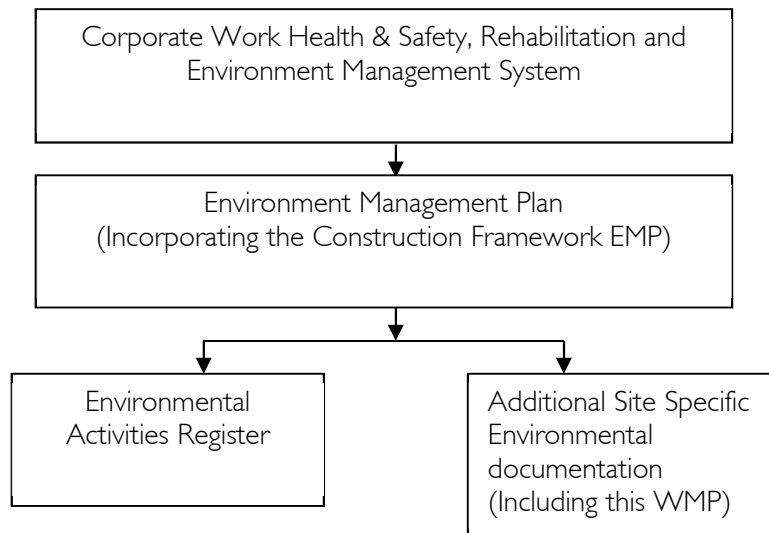
- Ensure that waste generation is avoided as a priority;
- Ensure that environmentally sensitive work practices are followed within waste minimisation programs;
- Ensure that, wherever practicable, waste materials are recycled/re-used;
- Ensure that the disposal of all liquid and non-liquid wastes is in accordance with the EPA regulations;
- Ensure that spoil from sites is managed appropriately to minimise environmental and health risks;
- Ensure that the air quality surrounding sites is appropriately managed;
- Ensure that all spoil is disposed of to prevent contamination of any lands.
- Ensure that biomedical, infectious or toxic wastes & storage of any chemicals/hazardous materials are correctly managed.

Regulating bodies for the environmental aspects of this project are:

- NSW Environmental Protection Authority (EPA);
- Port Macquarie Hastings Council

## 2 SCOPE

This Management Plan has been developed as part of the Lake Cathie Public School Environment Management Plan. The relationship between environmental management documentation can be summarised in the flow chart below:



The scope of this Management Plan is to provide Project information regarding waste management, re-use and spoil management for the Lake Cathie School Upgrade Project.

Further information may be required at site, detailing specific site requirements and mitigation measures.

## 3 STATUTORY REQUIREMENTS

Documents and references relevant to the implementation of the Construction Waste Management Plan include:

- Relevant Contract;
- LCPSU-AWE-EMP-001 –Environmental Management Plan (and appendices);
- A W Edwards Lake Cathie Public School Upgrade construction Documentation;

## 4 RISK ASSESSMENT

The risk assessment process, as detailed in the Section 3 of the Environmental Management Plan, has been applied to the Project, in order to determine the sources and risks associated with waste and spoil production issues. Details of this risk assessment, including mitigation measures, have been included in Risk Management section of the Environmental Management Plan. Specific risks associated with each site are included in the Environmental Management Plan, Environmental Control Plan(s) and associated Environmental Activities Register.

The risk assessment process will be reviewed for this aspect at the following times:

- Through internal and external site audits, and including comments from personnel and subcontractors on site;

## Construction Waste Management Plan

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- Following high monitoring results;
- Following a complaint;
- If new work processes that have not been previously addressed start on site;
- Should new requirements for the project or new legislation take effect;

## 5 MANAGEMENT AND MITIGATION

### WASTE IDENTIFICATION, MINIMISATION AND DISPOSAL

All construction areas shall identify waste streams, minimisation and shall dispose of non-recyclable waste materials in the following ways:

- Hazardous materials surveys completed. Refer to Douglas Partners Site assessment report and Asbestos Register.
- Materials to be removed prior to demolition
- Registers and waste disposal requirements as per SafeWork NSW, NSW EPA requirements for removal, storage, transport and disposal.
- General site wastes –use one bin system and sort in contractor's yard to produce quantities of material for recycling, reuse, disposal etc.
- Empty drums are to be taken off-site for disposal.
- Empty drums shall be crushed prior to recycling/disposal.
- Do not overfill skip bins. Provide plenty for use. Cover where potential for windblown litter.

## 6 RECYCLING STRATEGY

### GOAL

In line with the *NSW Waste and Resource Recovery Strategy 2014 – 21 (NSW EPA 2014)* A W Edwards have a goal to achieve a minimum of 80 per cent of construction and demolition waste (by weight) is diverted from landfill, and either recycled or reused.

### STRATEGY

- All construction areas shall adhere to a recycling strategy where practicable in the following ways:
  - a. Where reasonably practicable, through project planning, actions will be taken to reduce the amount of waste generated, eg. package considerations, and good housekeeping and material storage practices (*Avoid and Reduce Waste*)
  - b. Items to be considered for inclusion, but are not limited to:
    - Spoil;
    - Concrete;
    - Timber;
    - Metal/glass;



## Construction Waste Management Plan

- c. Ascertain whether materials can be re-used on-site and provide a designated area for storing such materials (*Reuse Waste*);
- d. If material cannot be re-used on-site establish a collection service for the recyclable materials (*Recycle Waste*);
- e. Erect signs within the construction areas to encourage employees to reduce, re-use, and recycle.

Specific strategies for the above-identified materials may include but are not limited to;

- Spoil – where possible; any contaminated spoil will be disposed of as waste material. A suitable location for clean spoil will be sought, and haulage organised.
- Concrete – Waste concrete shall be disposed of at an appropriately licensed facility where separation and recycling can take place. Surplus concrete and concrete washings shall be transported to an appropriate recycling facility.
- Any weed waste generated during works shall be disposed of to landfill.
- Timber – The following procedures shall occur regarding timber wastes:
  - Pallets and other packaging shall be returned to the supplier for reuse where possible;
- Metal/Glass - The following procedures shall occur regarding metal and glass wastes:
  - Drums and other metallic packaging shall be returned to the supplier for reuse where possible;
  - Reinforcing steel shall be sold to scrap metal merchants for recycling;

## 7 GENERAL SPOIL MANAGEMENT

Spoil shall be stockpiled on site only where haulage cannot be arranged. Stockpiles will undergo management as detailed in the Environmental Activity Register, including minimising the size and slope gradient, and wetting if required.

Haulage of spoil shall occur within the following hours, and the rate shall not exceed the maximum truck movements per hour, unless otherwise agreed with the Principal's Representative:

Days	Hours of Haulage
Monday to Friday	07:00 - 18:00
Saturday	07:00 - 18:00
Sunday and Public Holidays	No work allowed

Spoil shall be reused where possible. Re-use shall not be limited to the site where the spoil has been extracted, provided the use of material is appropriate and does not contravene any laws.

Prior to disposal from site, spoil shall be classified, as per the NSW EPA Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes, 1999. Spoil will then be disposed appropriately, dependent on the classification. Details of the waste classification shall be passed on to any party reusing the spoil material.

## EXCAVATIONS

Prior to excavation, a Traffic Management Plan will be prepared and incorporated into the site project management plans. The Traffic Management Plan will include consideration for (as a minimum):

## Construction Waste Management Plan

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- Volume and rates of spoil to be removed from the site;
- Stockpile requirements, including the maximum duration;
- Proposed haulage hours;
- Spoil disposal locations and proposed haulage routes;
- Maximisation of use and recycling;
- Measures to minimise dust, sedimentation and noise;
- Measures to minimise impacts on threatened species, populations, ecological communities or their habitats; &
- Procedures for managing contaminated materials.

This Plan will be prepared by an approved traffic management consultant in consultation with A W Edwards and submitted to the Principal's Representative for approval.

## 8 MONITORING AND REPORTING

### DUST CONTROL MEASURES

#### MONITORING

Dust monitoring shall occur as per the provisions of the Environmental Management Plan. Specific spoil management for each site shall be included in the dust provisions of each site project plan.

#### DUST SUPPRESSION

These methods shall be detailed in the Environmental Activity Register. Mitigation methods may include, but are not limited to:

##### Dust Generation: Particulate Emissions (General)

- Install shade cloth on perimeter fencing;
- Vehicle corridors will be clearly identified and restricted to control vehicle access onsite;
- Limit vehicle speed onsite to 10km/hr;
- Fixed and mobile (water tanker) water sprays where required;
- Reduce work activities /stop work during moderate to high wind velocity periods;
- Maintain equipment. Smokey plant to be stopped until repair works completed;
- Turn off vehicle engines whilst not in use (no long periods of idling)

##### Dust Generation (Demolition)

- Breakers and crushing equipment to be fitted with dust filtration equipment or water sprays to control dust emissions.

##### Dust Generation (Construction)

- Minimise areas of site disturbed and stage works where possible;

## Construction Waste Management Plan

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- Dust suppression strategies to be used, i.e. water sprays, soil binders, hydro-mulching, controlled speed onsite, road base & shaker grids;
- Stockpiled topsoils and rubble will be restricted to 4m high. Stabilise if insitu for >4-6months;
- On-site drilling or coring operations will be undertaken by equipment fitted with air filtration equipment.

## 9 TRAINING

A W Edwards Site Management shall be trained to ensure that they meet the requirements of this procedure. Other personnel shall be trained from time to time to ensure that the requirements of this procedure are met.

## 10 MONITORING

In order to ensure that the recycling goal is met at all sites the following will be monitored:

- The amount of waste disposed of will be recorded;
- The amount of disposed waste that has been recycled or reused will be recorded;
- The percentage of waste recycled or reused will be determined in order to ensure that it complies with the recycling goal.

Where required, in order to ensure that there is no wastage of energy used on site, the following should be monitored:

- Energy consumption figures will be recorded/monitored;
- Spikes or overuse shall be identified, and the potential source identified;
- Specific monitoring of individual pieces of equipment or processes shall be considered if areas of high usage cannot be accurately determined.

## 11 RECORDS

Records for this Management Plan, as under the EMP, shall be maintained in accordance with detailed procedures in the A W Edwards Management System.

All documents requiring sign-off shall be forwarded to the Principal's Representative prior to the sign-off being required.

Particular documents required to be maintained in this Management Plan include, but are not limited to:

- Disposal receipts for all waste;
- Monthly waste and recycling reports provided by skip bin company engaged by A W Edwards for the project
- Correspondence with the Principal's Representative and other interested parties regarding waste management control;
- Records of any complaints.

Appendix A of this report provides the record keeping document for the construction phase of the project.

## 13 NON-COMPLIANCE AND COMPLAINTS

The protocol for the handling, recording and reporting of soil and water related complaints will be in accordance with the A W Edwards Environmental Management Plan.

Should it be found that the recycling goal is not met reactive measures will be taken to modify demolition/construction operations and meet the goal. These measures shall include the following:

- An assessment shall be made of sources of waste production during the monitoring period that are likely to be contributing to the higher than acceptable levels
- Controls and/or operational modifications shall be determined that will decrease the levels of waste production from those specific sources, and lean towards recyclable materials. Should the activity have ceased once sampling results are obtained, measures shall be put in place to ensure that similar results are not obtained from the same process at different sites.
- Monitoring results following the reactive measures shall be checked to ensure that actions taken have reduced waste production. Should results still be above the acceptable limits an assessment shall be made as to the appropriateness of the process. If the process cannot be avoided, and further modifications cannot be implemented, the Principal's Representative shall be consulted to determine the most appropriate course of action.

## 14 SUBCONTRACTOR MANAGEMENT

Subcontractor management shall be conducted as per the relevant requirements of the A W Edwards Procedures Manual Safety & Environment to ensure that the requirements of this procedure extend to subcontractor works.

Subcontractors will be audited at periodic intervals to ensure their compliance with A W Edwards' requirements. Auditing shall be random and based on the length of time subcontractors are situated on site. Audits may also be the result of non-compliance of the subcontractor to A W Edwards' requirements.

## 15 WASTE MANAGEMENT AND HAZARDOUS MATERIALS

The following table identifies the removal of hazardous materials and is to be read in conjunction with the projects Construction Environmental Management Plan. The table identifies the method of containment and control of hazardous fibers to the air. The legal requirements are classified as well as highlighting the appropriate disposal measures to an approved waste disposal facility.

Environmental Aspect	Legal Requirement	Environmental Action Controls and Criteria
Hazardous materials (Asbestos)	NSW - POEO Act (Section 142) NSW PEO (Waste) Regulation 2005, cl 42 NSW WHS Regulation 2011, Chapter 8	<ul style="list-style-type: none"> <li>• Request and review the asbestos register for any buildings where construction works are expected to be undertaken. Asbestos register provided in Appendix D of this report.</li> </ul> <p>Should potential ACM be encountered during the works, the following unexpected finds process is to be followed;</p> <ul style="list-style-type: none"> <li>• Stop work if unexpected potential ACM are</li> </ul>

## Environmental Management Plan

		<p>encountered.</p> <ul style="list-style-type: none"> <li>Seek advice from a licensed asbestos assessor (occupational hygienist)</li> </ul> <p>If ACM is identified and the RAP/AMP specifies;</p> <ul style="list-style-type: none"> <li>A licence subcontractor is used to remove, or disturb any ACM.</li> <li>Where required a Remediation Action Plan/Asbestos Management Plan/Asbestos Removal Control Plan will be developed and implemented.</li> <li>A Class B SafeWork NSW asbestos licensed contractor is engaged to remove 10 square metres or more of non-friable (aka 'bonded') asbestos</li> <li>A Class A SafeWork NSW asbestos licensed contractor is engaged to monitor, remove or disturb any friable ACM.</li> <li>Procedures to be put in place to control airborne emissions include, air monitoring, airless sprayers of water, appropriate PPE, exclusion zones and sealed and enclosed work zones in accordance Safe Work NSW guidelines for asbestos removal.</li> <li>Work areas will be signed off by the licensed assessor to validate any clean up works.</li> <li>Removal of hazardous material asbestos must be disposed at an approved licensed facility. The closest licensed facility is the Caincross waste management facility.</li> </ul>
Land (contaminated soils, imported fill)	<p>NSW - Contaminated Land Management Act 1997, s 60; NSW - Contaminated Land Management Regulation 1998, cl 3 Acid Sulfate Soils Management Advisory Committee</p> <p>NSW - POEO Act (Section 142) NSW PEO (Waste) Regulation 2005, cl 42 NSW WHS Regulation 2011, Chapter 8.</p>	<p>The following unexpected finds process is to be followed;</p> <ul style="list-style-type: none"> <li>Stop work if unexpected potentially contaminated soils (eg. ACM, hydrocarbons) are encountered.</li> <li>Obtain waste classification from consultant in accordance with OEH guidelines Environmental Guidelines: Waste Classification Guidelines (April 2008)</li> <li>Where required a Remediation Action Plan will be developed and implemented.</li> <li>Sign off by Site Auditor may be required to validate clean up.</li> <li>Any affected groundwater or ponded rainwater will be tested and classified by consultants prior to disposal.</li> <li>Check geo-tech requirements.</li> <li>Where deemed required by the expert procedures to be put in place to control airborne emissions include, air monitoring, airless sprayers of water, appropriate PPE, exclusion zones and sealed and enclosed work zones in accordance Safe Work NSW guidelines.</li> <li>Any identified hazardous material is to be lawfully disposed at appropriate waste management facility.</li> </ul>

## **15 APPENDICES**

## APPENDIX A – WASTE MANAGEMENT RECORD

## Construction Waste Management Plan

## APPENDIX B – FORECAST WASTE

Scope of CSR commitment	Pages in the reporting protocol	Indicator	Numerator	Unit (Country)			
Circular Economy	52-54	% of non-hazardous waste recovered (not landfilled)	Total quantity of non-hazardous waste recovered (not landfilled): - Recovered waste implies both energy & material recovery (re-employment, re-use, recycling) - Inert materials reused onsite are not to be considered waste - Inert materials sent to a quarry are to be considered recovered - Specific conversion rates apply to convert m3 to T	T	Total quantity of non-hazardous waste collected: - Inert materials reused onsite are not to be considered waste - Specific conversion rates apply to convert m3 to T		
Project Name / Agency Name	Status of waste based on 3 identified categories:	List of waste types (list of examples below)	Quantities				Evidence (to detail)
	- Hazardous - Non-Hazardous - Inert - Non-Hazardous - Non Inert		Recovered waste: - Energy recovery - Material recovery: re-employment, re-use, recycling	Unit	Waste not recovered : - Sent to landfill	Unit	
	Non-Hazardous - Inert	Concrete, rubble, sand, bricks, tiles and ceramics	99	m3	39	m3	Projected waste breakup value 18%
	Non-Hazardous - Non inert	Metals (Steel, Aluminium, Copper, etc.)	55	m3	21	m3	Projected waste breakup value 10%
	Non-Hazardous - Non inert	Timber	44	m3	17	m3	Projected waste breakup value 8%
	Non-Hazardous - Non inert	Mixed construction and/or demolition waste	83	m3	32	m3	Projected waste breakup value 15%
	Non-Hazardous - Non inert	Mixed site facilities/agency waste	44	m3	17	m3	Projected waste breakup value 8%
	Non-Hazardous - Non inert	Soils	17	m3	6	m3	Projected waste breakup value 3%
	Non-Hazardous - Non inert	Gypsum / Plasterboard	110	m3	43	m3	Projected waste breakup value 20%
	Non-Hazardous - Non inert	Paper	6	m3	2	m3	Projected waste breakup value 1%
	Non-Hazardous - Non inert	Plastic	55	m3	21	m3	Projected waste breakup value 10%
	Non-Hazardous - Non inert	Cardboard	28	m3	11	m3	Projected waste breakup value 5%
	Non-Hazardous - Non inert	Polystyrene	11	m3	4	m3	Projected waste breakup value 2%
		Total	551		214		



**APPENDIX C – Geotechnical Report**  
**By Request**

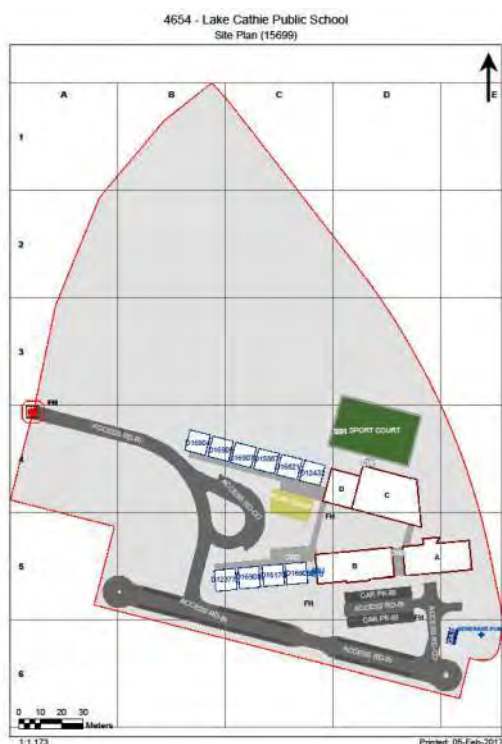
**APPENDIX D – Asbestos Register**

# Asbestos Register

(Hazardous Materials and Risk Assessment)

**School :** Lake Cathie Public School (4654)  
**Region :** North Coast  
**State Electorate :** Port Macquarie  
**Local Government Area :** Port Macquarie-Hastings

**Initial Survey :** :  
**Register Issue Date :** 23 - Mar - 2017



2017

Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
---------	----------------------	--------	--------------------	--------------------	-------------	------------------

Sample No

Test Result

## B00A - Administration - 2014 - Fibre Cement Clad (Fibre Cement Clad)

### Exterior

Ceiling Voids	No Asbestos Found
Underfloor Voids	Requires Inspection

### Interior

#### B00A - R0001 - Clerical/Printing

No Asbestos

#### B00A - R0002 - Entry Vestibule

No Asbestos

#### B00A - R0003 - Principal

No Asbestos

#### B00A - R0004 - Sick Bay

No Asbestos

#### B00A - R0005 - Deputy Principal - Type 1

No Asbestos

#### B00A - R0006 - Interview

No Asbestos

#### B00A - R0007 - Interview

No Asbestos

#### B00A - R0008 - Toilets-Unisex

No Asbestos

#### B00A - R0009 - Toilets-Unisex

No Asbestos

#### B00A - R0010 - Toilets-Unisex

No Asbestos

#### B00A - R0011 - Disabled Toilet

No Asbestos

#### B00A - R0012 - Security Store

No Asbestos

#### B00A - R0013 - Staff Room

No Asbestos

#### B00A - R0014 - Distribution Board

Note: No inspection of live electrical installation.

No Asbestos

#### B00A - R0015 - Plant

No Asbestos

#### B00A - R0016 - Staff Kitchen

No Asbestos

#### B00A - R0017 - External Movement

No Asbestos

#### B00A - R0018 - Movement

No Asbestos

Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
Sample No					Test Result	

**B00B - Library/Pupil Facilities - 2014 - Fibre Cement Clad (Fibre Cement Clad)**

**Exterior**

Ceiling Voids	No Asbestos Found
Underfloor Voids	Requires Inspection

**Interior**

**B00B - R0001 - Reading Area**

No Asbestos

**B00B - R0002 - Library Office/Workroom**

No Asbestos

**B00B - R0003 - K.L.A. Store**

No Asbestos

**B00B - R0004 - Communications Room**

No Asbestos

**B00B - R0005 - Special Programs Room**

No Asbestos

**B00B - R0006 - Special Programs Store**

No Asbestos

**B00B - R0007 - Cleaning Supplies**

No Asbestos

**B00B - R0008 - General Assistant/Bulk Store**

No Asbestos

**B00B - R0009 - Access Shower/Toilet/Change**

No Asbestos

**B00B - R0010 - Toilets - Boys**

No Asbestos

**B00B - R0011 - Toilets - Girls**

No Asbestos

**B00B - R0012 - Distribution Board**

Note: No inspection of live electrical installation.

No Asbestos

**B00B - R0013 - Plant**

No Asbestos

**B00B - R0014 - External Movement**

No Asbestos

2017

Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
	Sample No	Test Result				

**B00C - Communal Facilities - 2014 - Brick/Block (Brick/Block)**

**Exterior**

Ceiling Voids	No Asbestos Found
Underfloor Voids	Requires Inspection

**Interior**

**B00C - R0001 - Garden Store**

No Asbestos

**B00C - R0002 - Access Shower/Toilet/Change**

No Asbestos

**B00C - R0003 - Cleaning Distributed Store**

No Asbestos

**B00C - R0004 - Movement**

No Asbestos

**B00C - R0005 - Movement**

No Asbestos

**B00C - R0006 - Sound Cupboard**

No Asbestos

**B00C - R0007 - Hall Chair Store**

No Asbestos

**B00C - R0008 - P.E. Store**

No Asbestos

**B00C - R0009 - Communal/Performance Store**

No Asbestos

**B00C - R0010 - Sports Store**

No Asbestos

**B00C - R0011 - Movement**

No Asbestos

**B00C - R0012 - Plant**

No Asbestos

**B00C - R0013 - Distribution Board**

Note: No inspection of live electrical installation.

No Asbestos

**B00C - R0014 - Toilets - Girls**

No Asbestos

**B00C - R0015 - Toilets - Boys**

No Asbestos

**B00C - R0016 - Raised Platform**

No Asbestos

**B00C - R0017 - Communal Space**

No Asbestos

**B00C - R0018 - External Movement**

No Asbestos

**B00C - R0019 - Ramp**

No Asbestos

Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
	Sample No	Test Result				

**B00D - Communal Facilities - 2014 - Brick/Block (Brick/Block)****Exterior**

Ceiling Voids	No Asbestos Found
Underfloor Voids	Requires Inspection

**Interior****B00D - R0001 - Canteen**

No Asbestos

**B00D - R0002 - Canteen Office/Store**

No Asbestos

**B00D - R0003 - External Movement**

No Asbestos

**B00D - R0004 - Servery Covered Area**

No Asbestos

**B00D - R0005 - External Movement**

No Asbestos

**B00D - R0006 - Distribution Board**

Note: No inspection of live electrical installation.

No Asbestos

2017

Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
Sample No					Test Result	

**Demountables****Demountable details as per the AMS records as of 15 Feb 2017.****NS 100 - D12377 - Learning Unit - Single Primary/PAA : Placement Date - 8/08/2014****Exterior**

No Asbestos Found.

**Interior****R1 - Home Base**

No Asbestos Found.

**R2 - Practical Activity Area**

No Asbestos Found.

**R3 - Home Base Store**

No Asbestos Found.

**R4 - Entry**

No Asbestos Found.

**NS 100 - D12432 - Learning Unit - Single Primary/PAA : Placement Date - 4/08/2014****Exterior**

No Asbestos Found.

**Interior****R1 - Home Base**

No Asbestos Found.

**R2 - Practical Activity Area**

No Asbestos Found.

**R3 - Home Base Store**

No Asbestos Found.

**R4 - Entry**

No Asbestos Found.

**NS 100 - D15887 - Learning Unit - Single Primary/PAA : Placement Date - 5/08/2014****Exterior**

No Asbestos Found.

**Interior****R1 - Home Base**

No Asbestos Found.

**R2 - Practical Activity Area**

No Asbestos Found.

**R3 - Home Base Store**

No Asbestos Found.

**R4 - Entry**

No Asbestos Found.

**NS 100 - D16170 - Learning Unit - Single Primary/PAA : Placement Date - 7/08/2014****Exterior**

No Asbestos Found.



Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
	Sample No				Test Result	
Interior						
R1 - Home Base						
No Asbestos Found.						
R2 - Practical Activity Area						
No Asbestos Found.						
R3 - Home Base Store						
No Asbestos Found.						
R4 - Entry						
No Asbestos Found.						
NS 100 - D16821 - Learning Unit - Single Primary/PAA : Placement Date - 4/08/2014						
Exterior						
No Asbestos Found.						
Interior						
R1 - Home Base						
No Asbestos Found.						
R2 - Practical Activity Area						
No Asbestos Found.						
R3 - Home Base Store						
No Asbestos Found.						
R4 - Entry						
No Asbestos Found.						
NS 100 - D16904 - Learning Unit - Single Primary/PAA : Placement Date - 6/08/2014						
Exterior						
No Asbestos Found.						
Interior						
R1 - Home Base						
No Asbestos Found.						
R2 - Practical Activity Area						
No Asbestos Found.						
R3 - Home Base Store						
No Asbestos Found.						
R4 - Entry						
No Asbestos Found.						
NS 100 - D16905 - Learning Unit - Single Primary/PAA : Placement Date - 7/08/2014						
Exterior						
No Asbestos Found.						
Interior						
R1 - Home Base						
No Asbestos Found.						
R2 - Practical Activity Area						
No Asbestos Found.						
R3 - Home Base Store						
No Asbestos Found.						
R4 - Entry						
No Asbestos Found.						

Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
Sample No		Test Result				
NS 100 - D16906 - Learning Unit - Single Primary/PAA : Placement Date - 7/08/2014						
Exterior						
No Asbestos Found.						
Interior						
R1 - Home Base						
No Asbestos Found.						
R2 - Practical Activity Area						
No Asbestos Found.						
R3 - Home Base Store						
No Asbestos Found.						
R4 - Entry						
No Asbestos Found.						
NS 100 - D16907 - Learning Unit - Single Primary/PAA : Placement Date - 5/08/2014						
Exterior						
No Asbestos Found.						
Interior						
R1 - Home Base						
No Asbestos Found.						
R2 - Practical Activity Area						
No Asbestos Found.						
R3 - Home Base Store						
No Asbestos Found.						
R4 - Entry						
No Asbestos Found.						
NS 100 - D16908 - Learning Unit - Single Primary/PAA : Placement Date - 6/08/2014						
Exterior						
No Asbestos Found.						
Interior						
R1 - Home Base						
No Asbestos Found.						
R2 - Practical Activity Area						
No Asbestos Found.						
R3 - Home Base Store						
No Asbestos Found.						
R4 - Entry						
No Asbestos Found.						

Product	Material Description	Extent	Location Reference	Material Condition	Risk Status	Control Priority
Sample No					Test Result	

***Listing of Electronic Attachments as of 22/03/2017***

**There are no asbestos related file attachment(s) for this school.**

2017

Appendix 9 – Construction Noise and Vibration Management Plan

# Lake Cathie Public School Upgrade

## Construction Noise & Vibration Management Plan

DOCUMENT NUMBER

**Date:** 3rd December 2019  
**Author:** D. Proud  
**Revision:** 1  
**Status:** For Approval

Prepared By:  
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Construction Noise and Vibration Management Plan

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Project No.	628
Project Name	Lake Cathie Public School
Project Manager	Craig McIlveen
Project Location	Lake Cathie Public School 1240 Ocean Drive
Phone No.	0401 611 161
Client	NSW Schools Infrastructure
Planning Instrument	SSD9491
Timing of the Works	January 2020 to July 2021

Revision	Date		Author	Approved By	Comments
0	3-Dec-19	Draft	D. Proud	C. McIlveen	For review
1	10-Dec-19	For Approval	D. Proud	G Collins (RAPT)	For Submission
	Date	Status			
	Date	Status			
	Date	Status			
	Date	Status			

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# I INTRODUCTION

## I.1 DESCRIPTION OF THE WORKS

A W Edwards are the Principal Contractor for the construction of the Lake Cathie Public School Upgrade

The project is located at 1240 Ocean Drive, Lake Cathie with a broad scope of:

- 17 New permanent teaching spaces.
- Removal of demountable buildings.
- Refurbishment of Block B to accommodate two learning support rooms.
- Refurbishment of Hall to form the Library
- Relocation and re-use of COLA to form new School Hall.
- All works to be completed by November 2020 in readiness for Day 1 Term 1 2021

A drawing of the project identifying key environmental controls and location of environmental sensitive areas will be posted on the Site Noticeboard.

The site office, worker facilities and compound will be located within the construction footprint. In accordance with Part C1 of the State Significant Development (SSD 9491), unless for an emergency as describe by the SSD or where written approval has been provided, the site construction work hours are restricted to the following:

Monday – Friday	7:00am – 6:00pm
Saturday	7:00am – 6:00pm
Sunday/Public Holidays	No construction work permitted

## I.2 PURPOSE OF THIS PLAN

This Construction Noise and Vibration Management Plan (CNVMP) has been prepared in response to a request for tender for the Project. This Plan is one of a number of Plans developed to manage our obligations as part of the project delivery.

This Noise and Vibration Management plan is written with the purpose of communicating to NSW Health Infrastructure our objectives, strategies, methodologies and actions for the management of Noise and Vibration whilst executing the works under the Contract.

This CNVMP should be read in conjunction with the Construction Management Plan and other management plans.

As part of the Tender and Post-Tender process, AWE will provide further detailing or revision of this Plan to meet the Client and stakeholder requirements. After contract award, this Plan will be developed, reviewed and updated on a regular basis to reflect design development, and our developing construction methodology.

This Plan is to ensure all members of the A W Edwards team and other project stakeholders understand the objectives and the procedures and processes in place as necessary for the successful execution of works under the contract.

## Construction Noise and Vibration Management Plan

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### 1.3 OBJECTIVES

The primary objective of this plan is to comply with the noise and vibration requirements of the Contract. A W Edwards is committed to ensuring that no works significantly impact on local background noise and vibration levels at the Lake Cathie Public School Upgrade - Project.

The objective of the Construction Noise & Vibration Management Plan (CNVMP) can be summarised as follows:

- Ensure that construction works do not significantly impact background noise levels around each site, and that applicable guidelines and regulations are met;
- Identification and management of critical locations for noise and vibration levels in neighbouring properties
- Ensure all equipment operates within the applicable noise levels;
- Ensure that construction works do not cause sufficient vibration to damage surrounding buildings, and comply with the applicable guidelines and regulations.
- Cooperative and responsive management principles

### 1.4 IMPACTS

Excessive noise and vibration levels can result in a serious nuisance and loss of amenity for site and surrounding occupants including surrounding residents, site workers and any sensitive fauna populations.

Work health risks to the site workforce include:

- Noise induced hearing loss, tinnitus, etc.
- Communication problems including safety instructions
- Stress

Vibration may also cause damage to the site and surrounding buildings and infrastructure.

### 1.5 REFERENCE DOCUMENTS

- Construction Vibration Management Requirements
- AWE Management System
- Environmental Management Plan
- Construction Management Plan
- Inspection and Test Plans

### 1.6 PRECEDENCE

Where ambiguity is detected between the procedures and requirements in this plan and the A W Edwards Management System, then the procedures nominated in this plan will take precedence.

## 1.7 INTERFACE WITH OTHER PROJECT PLANS AND PROCEDURES

The Environmental Management Plan forms part of an integrated set of Project Management Plans and should be read in conjunction with the Management Plans described in Project Management Plan.

## 1.8 GLOSSARY OF CONSTRUCTION NOISE TERMS

Acoustic Term	Description
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibels [dB]	<p>Abbreviation for 'decibel', which is the standard unit of measurement of sound pressure level</p> <p>0dB      The faintest sound we can hear  20dB     Quiet bedroom at night or recording studio  30dB     Quiet library or quiet location in the country  40dB     Living room  50dB     Typical office space or ambience in the city at night  60dB     Normal conversational speech  70dB     A car passing by  80dB     Kerbside of a busy road  90dB     Truck passing by  100dB    Nightclub  110dB    Rock band or 2m from a jackhammer  120dB    70m from a jet aircraft  130dB    Threshold of pain  140dB    25m from a jet aircraft</p>
dB[A]	The "A" donates that the sound pressure level has been "A-weighted" so that the scale approximates the response of the human ear.
L <sub>A10</sub> (15min)	Noise level in dB (A) of the "Average maximum noise level" during construction activities. This is the main parameter used to assess the construction noise impacts and is measured over a 15 minute period;
L <sub>A90</sub>	Noise level in dB (A) in the absence of construction activities. This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively.

Construction Noise and Vibration Management Plan

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Acoustic Term	Description
	The $L_{A10(15min)}$ construction noise objectives are based on an allowance margin above the $L_{A90}$ background noise levels.
$L_{Aeq}$	Average noise level during a measurement period.
OEHL	Office of Environment and Heritage (formerly DECCW)
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event.
Structure-borne noise	Vibration propagating through solid structures in the form of compressional or bending waves, heard as sound.

## 2 APPROVALS

### 2.1 LICENCES AND PERMITS

No licences or permits are required as part of these work

### 2.2 HOURS OF WORK

As per the Condition of Consent 4, the standard construction hours are:

Working Day	Working Hours
Monday to Friday	0700 to 1800
Saturday	0700 to 1800
Sunday and Public Holidays	Not permitted

Approved construction hours for rock breaking, rock hammering, piling.

*Note: rock breaking is not expected throughout this construction. If required AWE will process through the 'unexpected finds' procedures.*

Working Day	Working Hours
Monday to Friday	09:00 - 12:00 & 14:00 - 17:00
Saturday	09:00 – 12:00
Sunday and Public Holidays	Not permitted

### 2.3 CONDITIONS OF APPROVAL

The conditions of approval related to noise and vibration management have been tabled in the Self verification Checklist in Appendix A. The checklist will reference where in the CNVMP the conditions have been addressed.

## 3 REGULATIONS AND LEGISLATIVE REQUIREMENTS

### 3.1.1 LEGISLATION

Key environmental legislation relating to noise and vibration management includes:

- Protection of the Environment Operations Act (1997)
- Environment Planning and Assessment Act (1979)

## Construction Noise and Vibration Management Plan

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- Local Government Act (1993)
- Protection of the Environment Operations (Noise Control) Regulation 1999 NSW EPA Environmental Noise Control Manual

### 3.1.2 GUIDELINES AND STANDARDS

The key references relevant to noise and vibration management of project include:

- DIN 1999, DIN 4150: Part 3 – 1999 Effects of vibration on structures, DIN, Germany
- EPA Interim Construction Noise Guideline
- DEC 2006, Assessing vibration – a technical guideline, Department of Environment and Conservation, Sydney NSW
- DECC 2009, Interim Construction Noise Guideline, NSW Department of Environment and Climate Change, Sydney NSW
- RTA 2001, Environmental Noise Measurement Manual, Roads and Traffic Authority, Sydney NSW
- NSW Industrial Noise Policy
- AS 1055 Parts 1 to 3 Acoustics: Description and management of environmental noise;
- AS 2659 Sound level metres;
- AS 2659.1 Guide to the use of sound measuring equipment;
- AS 2072 Acoustics: Methods for measurement of traffic noise;

## 4 COMMUNICATION

Following the completion and implementation of an approved Noise and Vibration Management Plan, there are several key measures, which will be undertaken by A W Edwards's site team to ensure effective and positive communication with all affected parties.

### 4.1 ONGOING COOPERATIVE MANAGEMENT

A W Edwards apply a pro-active approach to all aspects of the project to ensure a high level of control is exercised and any potential problems can be identified (and responded to) as early as possible.

Our project team pro-actively manage the project by focusing closely on planning, programming, forecasting and monitoring activities. This focus minimises the potential for problems to occur. We continue to develop contingency plans to address the possibility of problems actually arising. This approach is fundamental to the successful delivery of the project.

Despite the best endeavours of all stakeholders, problems or unforeseen circumstances may arise. We will actively resolve or help to resolve such problems in the most expedient and efficient way possible. Project staff with the experience and skills needed to solve complex problems in projects of this nature will remain committed to this project. In the event that unforeseen problems are encountered, the team will immediately initiate and implement a problem resolution plan to minimise any impacts.

We will encourage and promote a co-operative and harmonious project environment. This applies to relationships between clients, employees, consultants, suppliers, subcontractors, unions and other stakeholders. Our objective will be to eliminate conflict wherever possible and at all levels, as this can be a major impediment to progress and meeting project objectives.

### 4.2 COMMUNITY CONSULTATION

A community consultation forum was held at the Lake Cathie School on the 9<sup>th</sup> December 2019. The forum included all with stakeholders including the School Principal and 'after-hours' school facility users. No material issues were identified and stakeholders were keen to see the school upgrade undertaken. The consultation included:

- Overview and timeline of 3 stage construction process
- Construction hours
- A W Edwards key personnel and contacts
- Buildings/zones affected
- Construction zones boundaries
- Changes and impacts to access & egress for public
- 3D presentation of final campus design
- Q & A

### 4.3 COMMUNITY COMPLAINTS

Community complaints shall be recorded on a 'A W Edwards Complaints Register' form SE7013.

## Construction Noise and Vibration Management Plan

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Community complaint must be immediately referred to the Principal's Project Manager (Currie & Brown) Remedial action must be taken within the timeframe agreed with the Principal's Project Manager. The Principles Project Manager shall ensure closure and sign off with all relevant parties Any action taken shall be recorded on the form.

### 4.4 FORECASTING AND NOTIFICATION

A key communication tool is the provision of ongoing forecasting and early notification of activities to affected parties. Our success on recent projects can be attributed to the provision of adequate forecasting of construction activities to affected parties. This provides early warning of the stages of the projects, provides an opportunity for review and comment by affected parties and helps outside parties generally understand the construction process and why certain activities occur.

Through our recent projects and experience in sensitive projects, we have developed a Noise and Vibration Control Plan, which is used to provide detailed forecasting of construction activities.

By providing this open form of communication we have found that affected parties have a higher level of understanding of our works and it encourages feedback into other party's activities, which may affect our works or change for whatever reason. i.e. a particularly sensitive experiment could be underway which has a stricter noise and vibration limits than our contractual requirements. Through early warning we can assist in re-programming works to suit the requirements of the affected party without affecting the overall construction programme. Early warning and notifications both ways is necessary for the ongoing success of the project.

### 4.5 CONTRACTOR MANAGEMENT

A W Edwards will ensure the noise and vibration management plan will be a contract document for our contractors, notably civil works, and will be further developed and amended in conjunction with our leading contractors. We will listen to their concerns and innovations in accordance the requirements of the contract to ensure an effective balance of community management, environmental management and onsite production.

We will ensure that the noise and vibration requirements and plans are;

- Contract documents for all contractors
- An integral part of individual project site inductions
- Monitored daily through site environmental hazard sheets
- Adequate site management resources throughout all project phases
- An assessment criteria for the selection of contractors
- Are continually updated throughout the course of the works as required

The transfer of knowledge and requirements, while maintaining overall project responsibility, will be integral to ensuring effective site management. We recognise this communication link with site contractors is important to maintaining effective overall management of the project to the satisfaction of all affected parties.



## 5 RISK ASSESSMENT

The risk assessment process, as detailed in the Environmental Management Plan, has been applied to this Project, in order to determine the sources and risks associated with noise and vibration. Details of this risk assessment, including mitigation measures, have been included in Environmental Management Plan.

The risk assessment process will be reviewed at the following times:

- Every six months during a site audit, and including comments from personnel and sub-contractors on site
- Following high monitoring results
- Following a complaint
- If new work processes that have not been previously addressed start on site
- Should new requirements for the project or new legislation take effect

### 5.1 SENSITIVE RECEIVERS

The nearest potentially affected receivers of construction noise and vibration are as follows:

- Lake Cathie Public School (within 50m)
- Single residential receiver to the northeast on Houston Mitchell Drive (approximately 250m);
- Multiple Residential receivers to the east Rainbow Beach Estate (approximately 300m);

### 5.2 POTENTIAL CONTROLS

Predicted worst case noise levels at various potentially affected receivers are presented above. Residential premises surrounding the site will receive noise levels marginally exceeding the noise management level.

Operations ought to generally comply with the noise affected management levels at all times at the residential receivers surrounding the site.

Specific treatments to items of plant will be developed in conjunction with the engaged contractor in an ongoing acoustic review of construction methodology. These reviews will be undertaken regularly and when more detailed planning regarding including possible actual plant locations, actual plant being used, etc are known.

Where practicable, positioning major mobile temporary plant such as concrete crushers, concrete pumps, concrete trucks and the like as far as possible from sensitive receptors. The strategic positioning of these items can result in construction noise levels not exceeding the NAML around the site.

The noise and vibration assessment indicate that exceedances of the noise and vibration management goals would primarily be caused by vibratory rollers and ad hoc jack hammering. Hence these activities should be managed as follows:

- Vibrating compaction rollers should only be undertaken where static rolling is not feasible or reasonable.

## Construction Noise and Vibration Management Plan

- Where vibrating compaction/jack hammering is undertaken it will be performed out of school hours wherever practicable.

Demolition and excavation activities are typically the loudest construction activities on site.

## 6 NOISE AND VIBRATION SOURCES

### 6.1 NOISE SOURCES

Typical noise levels from construction plant equipment most likely to be used during the construction works are provided in Table 1.

Equipment/Process	Sound Power Level bD(A)**
Excavator	114
Skid/Steer	105
Pneumatic Hammer	115*
Concrete Pump	105
Concrete Truck	110
Truck	108
Angle Grinders	118*
Electric Saw	116*
Drilling	94
Site Crane	105
Impact Drill	115
Concrete Float/Vibrators	105

Table 1- Sound Power Levels.

\* Includes 5dB(A) addition for characteristics of noise surrounds

\*\*The noise levels presented in the above table are derived from on-site measurements, Table A1 of AS 2436-2010, and data held by Acoustic Logic and from other similar studies

### 6.2 VIBRATION SOURCES

Typical vibration levels from construction plant equipment most likely to cause significant vibration are presented in Table 2.

Plant	Typical ground vibration
Bulldozers / Excavator	Typical ground vibration levels from bulldozers/ excavators are similar to those from jackhammers. They range from 1 mm/s to 2 mm/s at distances of

## Construction Noise and Vibration Management Plan

	approximately 5 m and at distances greater than 20m, vibration levels are usually below 0.2 mm/s.
Jack Hammers	Typical ground vibrations from jack hammers are generally greater than 5mm/s at distances of 1m and no more than 2mm/s for distances of 5m or more.
Vibratory rollers	Ground vibration caused by vibratory rollers can range up to 1.5mm/s at distances of 25m. The highest levels of vibration usually occur as the roller is brought to rest and the frequency of the centrifugal forces passes through resonance with the natural frequency of the roller/ground/structure. Machinery should therefore not be brought to rest when in the vicinity of susceptible buildings, especially dwellings. Higher levels could occur at closer distances, however, no damage would be expected for any building at distances greater than approximately 12m (for a medium to heavy roller).
Truck traffic	Typical vibration from heavy trucks passing over normal (smooth) road surfaces generate relatively low vibration levels in the range of 0.01 - 0.2mm/s at the footings of buildings located 10 - 20m from a roadway. Very large surface irregularities can cause levels up to five to ten times higher. In general, ground vibration from trucks is usually imperceptible in nearby buildings. The rattling of windows and other loose fittings that is sometimes reported is more likely to be caused by airborne acoustic excitation from very low frequency (infrasonic) noise radiated by truck exhausts and truck bodies. While this may cause concern to the occupants, the phenomenon is no different from the rattling caused by wind or people walking or jumping on the floor and fears of structural damage or even accelerated ageing are usually unfounded.

Table 2- Typical vibration sources

## 7 NOISE AND VIBRATION CRITERIA

### 7.1 NOISE CRITERIA

Noise impacts including impacts from mechanical plant and equipment and operations have been adequately mitigated to not exceed the following noise limits measured at the most effective noise sensitive receiver on Houston Mitchell Drive.

Noise Descriptor	LAeq (15 min)	LAeq (period)	LA (1 minute)
Daytime	47 dB(A)	45 Db(A)	

#### 7.1.1 AIR BORNE NOISE

The *Interim Construction Noise Guideline* produced by OEH setouts out the management levels for noise at residences and how they are to be applied. The noise at residences quantitative assessment in presented in Table 3.

In Table 3 the rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the *NSW Industrial Noise Policy (EPA 2000)*.

As a guide, the difference between the internal noise level and the external noise level is typically 10 dB with windows open for adequate ventilation.

Time of day	Management level LAeq (15 min) *	How to apply
<b>Recommended standard hours:</b> Monday to Friday 7 am to 6 pm Saturday 7 am to 6pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. <ul style="list-style-type: none"> <li>Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>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.</li> </ul>
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction of noise.

## Construction Noise and Vibration Management Plan

Time of day	Management level $L_{Aeq}$ (15 min) *	How to apply
		<ul style="list-style-type: none"> <li>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: <ol style="list-style-type: none"> <li>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)</li> <li>If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.</li> </ol> </li> </ul>
Outside recommended standard hours	Noise affected RBL + 5 dB	<ul style="list-style-type: none"> <li>A strong justification would typically be required for works outside the recommended standard hours.</li> <li>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</li> <li>Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</li> </ul>

Table 3 - Noise at residences using quantitative assessment

\* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Other sensitive land uses, such as schools, typically consider noise from construction to be disruptive when the properties are being used (such as during school times). Table 4 presents management levels for noise at other sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed.

Land use	Management level, $L_{Aeq}$ (15 min) (applies when properties are being used)
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)
Hospital wards and operating theatres	Internal noise level 45 dB(A)
Places of worship	Internal noise level 45 dB(A)

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Land use	Management level, $L_{Aeq}$ (15 min) (applies when properties are being used)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dB(A)
Community centres	Depends on the intended use of the centre.

Table 4 - Noise at sensitive land uses (other than residences) using quantitative assessment

## 7.1.2 GROUND-BORNE NOISE AT RESIDENCES

Ground-borne noise is noise generated by vibration transmitted through the ground into a structure. Ground-borne noise caused, for example, by underground works such as tunnelling can be more noticeable than airborne noise. The following ground-borne noise levels for residences indicate when management actions should be implemented. These levels recognise the temporary nature of construction and are only applicable when ground-borne noise levels are higher than airborne noise levels. The ground-borne noise levels are for evening and night-time periods only, as the objectives are to protect the amenity and sleep of people when they are at home.

Evening (6 pm to 10 pm)  
Internal:  $L_{Aeq}$  (15 min) 40 dB(A)  
Night-time (10 pm to 7 am)  
Internal:  $L_{Aeq}$  (15 min) 35 dB(A)

## 7.1.3 TYPES OF VIBRATION

Vibration in buildings can be caused by many different external sources, including industrial, construction and transportation activities. The vibration may be continuous (with magnitudes varying or remaining constant with time), impulsive (such as in shocks) or intermittent (with the magnitude of each event being either constant or varying with time). Examples of typical types of vibration and their sources are shown in Table 5.

Vibration in buildings may also occur from internal sources (within a building structure), such as a road development forming part of the building structure, or mechanical vibration sources in buildings.

Vibration and its associated effects are usually classified as continuous, impulsive or intermittent as follows:

- **Continuous vibration** continues uninterrupted for a defined period (usually throughout daytime and/or night-time). This type of vibration is assessed on the basis of weighted rms acceleration values presented in Table 6.
- **Impulsive vibration** is a rapid build-up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on frequency and damping). It can also

## Construction Noise and Vibration Management Plan

consist of a sudden application of several cycles at approximately the same amplitude, providing that the duration is short, typically less than 2 seconds. Impulsive vibration (no more than three occurrences in an assessment period) is assessed on the basis of acceleration values presented in Table 8.

- **Intermittent vibration** can be defined as interrupted periods of continuous (e.g. a drill) or repeated periods of impulsive vibration (e.g. a pile driver), or continuous vibration that varies significantly in magnitude. It may originate from impulse sources (e.g. pile drivers and forging presses) or repetitive sources (e.g. pavement breakers), or sources which operate intermittently, but which would produce continuous vibration if operated continuously (for example, intermittent machinery, railway trains and traffic passing by). This type of vibration is assessed on the basis of vibration dose values in Table 8.

Continuous vibration	Impulsive vibration	Intermittent vibration
Machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading. Blasting is assessed using ANZECC (1990).	Trains, nearby intermittent construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer these would be assessed against impulsive vibration criteria.

Table 5 - Examples of types of vibration

The criteria for exposure to continuous vibration are set out in the OEH guideline document Assessing Vibration: A Technical Guideline (2006), as presented in Table 6.

Place	Time	Peak Particle Velocity (mm/s)	
		Preferred	Maximum
Critical working areas (e.g. hospitals, precision laboratories)	Day or night time	0.14	0.28
Residences	Day time	0.28	0.56
	Night time	0.20	0.40
Offices	Day or night time	0.56	1.1
Workshops	Day or night time	1.1	2.2

Table 6 - OEH Criteria for exposure to continuous vibration

The criteria for exposure to impulsive vibration are set out in the OEH guideline document Assessing Vibration: A Technical Guideline (2006), as presented in Table 7.

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Place	Time	Peak Particle Velocity (mm/s)	
		Preferred	Maximum
Critical working areas (e.g. hospitals, precision laboratories)	Day or night time	0.14	0.28
Residences	Day time	8.6	17.0
	Night time	2.8	5.6
Offices	Day or night time	18.0	36.0
Workshops	Day or night time	18.0	36.0

Table 7 – OEH criteria for exposure to impulsive vibration

The criteria for exposure to intermittent vibration are set out in the OEH guideline document Assessing Vibration: A Technical Guideline (2006), as presented in presented in Table 8.

Location	Daytime		Night-time	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical areas	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Office, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Table 8 - Acceptable vibration dose values for intermittent vibration (m/s<sup>1.75</sup>)

### 7.1.4 STRUCTURAL VIBRATION

The effects of ground vibration on buildings near construction sites may be broadly defined by the following three categories:

1. Disturbance to building occupants - Vibration in which the occupants or users of the building are inconvenienced or possibly disturbed
2. Effects on building contents - Vibration where the building contents may be affected
3. Effects on building structures - Vibration in which the integrity of the building or structure itself may be prejudiced.

There is no specific Australian Standard referring to structural vibration in buildings, therefore British Standard BS7385: Evaluation and measurement of vibration in buildings is used to assess the possibility of building damage from vibration from construction activities. BS 7385 uses peak particle velocity to assess vibration, and specifies damage criteria for frequencies from 4Hz to 250Hz, in the range of significance for construction related damage. The levels from the standard are presented in Table 9



## Construction Noise and Vibration Management Plan

Type of Structure	Peak Component Particle Velocity, mm/s		
	4Hz to 15Hz	15Hz to 40Hz	40Hz & above
Reinforced or framed structures, industrial and heavy commercial buildings	50	50	50
Un-reinforced or light framed structures, residential or light commercial type buildings	15 to 20	20 to 50	50

Table 9 - BS 7385 structural vibration criteria

German Standard DIN 4150: Structural Vibration in Buildings - Effects on Structures provides recommended maximum vibration levels that reduce the likelihood of building damage caused by vibration.

These levels are 'safe limits', up to which no damage due to vibration effects have been observed. 'Damage' is defined by DIN 4150 to include even minor non-structural effects such as superficial cracking in cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls. DIN 4150 also states that when vibrations higher than the 'safe limits' are present, it does not necessarily follow that damage will occur. DIN 4150 values are presented in

Type of Structure	Peak Component Particle Velocity, mm/s		
	<10Hz	10Hz to 50Hz	50Hz & above
Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20 to 40	40 to 50
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20
Structures that because of their particular sensitivity to vibration, do not correspond to those listed above, and have intrinsic value (e.g. heritage buildings)	3	3 to 8	8 to 10

Table 10 - DIN4150 structural vibration criteria

## 8 MITIGATION MEASURES

The following noise mitigation measures will be adopted to ensure noise and vibration impacts comply with the Project Objectives. Develop mitigation measures when working in proximity of sensitive receivers.

Action Required	Applies to	Details
<b>Management Measures</b>		
Working Hours	Airborne Noise Ground –borne noise & vibration	Ensure strict compliance with construction hours. This requirement to be communicated to all staff through inductions and toolbox meetings.
Out of Hours Works	Airborne Noise Ground –borne noise & vibration	Where work is required to be conducted outside normal construction hours, the out-of-hours works protocol shall be followed to minimise the impact
Site Induction	Airborne Noise Ground –borne noise & vibration	All employee, contractors and subcontractors are to receive an environmental induction. The induction must at least include: <ul style="list-style-type: none"> <li>• All relevant project specific and standard noise and vibration mitigation measures</li> <li>• Relevant licence and approval conditions</li> <li>• Permissible hours of work</li> <li>• Any limitations on high noise generating activities</li> <li>• Location of nearest sensitive receivers</li> <li>• Construction employee parking areas</li> <li>• Designated loading/unloading areas and procedures</li> <li>• Site opening/closing times</li> <li>• Environmental incident procedures</li> </ul>
Behavioral Practices	Airborne Noise	No swearing or unnecessary shouting or loud radios on site. No dropping of materials from height, throwing of metal items and slamming of doors
Education	Airborne Noise Ground –borne noise & vibration	Provide education of supervisors, operators and sub-contractors on the need to minimise noise through Toolbox meetings and on-site coaching
Noise Monitoring	Airborne Noise Ground –borne noise & vibration	A noise monitoring program is implemented in accordance with this plan any approval and licence conditions
Vibration Monitoring	Vibration	A vibration monitoring program is implemented in accordance with this plan any approval and licence conditions
Consultation	Airborne Noise Ground –borne noise & vibration	Provide information to neighbours before and during construction to advise of expected noisy works, the duration of the works and what is being done to minimise the noise.

## Construction Noise and Vibration Management Plan

Action Required	Applies to	Details
Noise & vibration complaints	Airborne Noise Ground –borne noise & vibration	A protocol will be developed for handling noise and vibration complaints that includes recording, reporting and acting on complaints.
<b>Planning</b>		
Dilapidation Survey	Vibration	Prior to commencement of works, undertake a dilapidation survey to detail the current structural condition of the site and adjoining areas, including all existing fences, adjoining buildings, infrastructure, roads, crossovers etc.
Construction hours and scheduling	Airborne Noise Ground –borne noise & vibration	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods
Maximise Shielding	Airborne Noise	Select hoarding material suitable for noise shielding. Use temporary site buildings and materials stockpiles as noise barriers Where possible, schedule construction of permanent walls so they can be used as early as possible
Equipment selection	Airborne Noise Ground –borne noise & vibration	Use quieter and less vibration emitting construction methods where feasible. Ensure all fixed plant at the work sites is appropriately selected, and where necessary, fitted with silencers, acoustical enclosures and other noise attenuation measures.
Equipment Placement	Airborne Noise Ground –borne noise & vibration	Position noisy plant and equipment as far apart as is practicable from each other and consider whether orientation and location of the plant can reduce noise impacts at sensitive receivers.
Vehicle Movements	Airborne Noise Ground –borne noise & vibration	Arrange work sites to avoid or minimise truck movements, and ensure vehicles enter and exit work sites in a forward direction.
Reversing Alarms	Airborne Noise	Avoid the use of reversing alarms by designing the site layout to avoid reversing. Where possible, install non-tonal and / or automatically adjusting reversing alarms on site equipment
Maximum noise levels	Airborne Noise	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure levels compliant with the criteria set in OEH guidelines.
<b>Construction</b>		
Rock Breaking <i>Note: Not expected on this project</i>	Airborne Noise Ground –borne noise & vibration	Reduce the use of rock-hammering where feasible and use alternative measures such as rock-saws and rippers where possible.
Equipment selection	Airborne Noise Ground –borne noise & vibration	Select appropriate sized equipment for the task, such as vibratory compactors and rock excavation equipment.

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Action Required	Applies to	Details
Equipment Maintenance	Airborne Noise Ground –borne noise & vibration	Regular maintenance and testing of all plant and equipment onsite to ensure they continue to meet the noise and vibration criteria
Equipment Operation	Airborne Noise Ground –borne noise & vibration	Ensure equipment is operated in the correct manner and adequately maintained - including replacement of engine covers, repair of defective silencing equipment, tightening of rattling components, repair of leakages in air lines and shutting down equipment not in use
Work Methods	Airborne Noise Ground –borne noise & vibration	Careful selection of all work methods to be used on the project to ensure they meet the noise and vibration criteria.
Site Entrances	Airborne Noise Ground –borne noise & vibration	The site entry and egress points will be set as far from receivers as practical and will be designed to distribute the movements rather than directing all movements through a single gate.
Relief Periods	Airborne Noise Ground –borne noise & vibration	Provide periods of relief when practical during noise intensive activities such as rock breaking.
Noisy fabrication works	Airborne Noise	Carry out noisy fabrication work at another site (for example, within enclosed factory premises) and then transport to site.
Generators/ compressors	Airborne Noise	Use only silenced generators and compressors
Vehicle queuing	Airborne Noise Ground –borne noise & vibration	Prevent vehicles and plant queuing and idling outside the site, particularly prior to the construction start time.
Vehicle maintenance	Airborne Noise	Ensure that equipment is operated in the correct manner including repair of defective mufflers, tightening/correction of rattling parts and components and repair of leakages in compressed airlines.
<b>Auditing and Monitoring</b>		
Noise Monitoring	Airborne Noise Ground –borne noise & vibration	Where identified, undertake regular monitoring of overall noise levels at sensitive receivers to check for compliance
Vibration Monitoring	Vibration	Undertake vibration monitoring during works at sensitive receivers to check for compliance.
Community Consultation	Airborne Noise Ground –borne noise & vibration	Undertake community consultation and respond to complaints in accordance with project procedures

## 9 SITE SPECIFIC MANAGEMENT AND MITIGATION MEASURES

Through our experience and understanding of the contract documents, we propose the following specific mitigation measures:

### 9.1 MANAGEMENT MEASURES

Management of Noise and Vibration issues rest in the first instance with the Project Manager. Working closely with the Site Manager and his team the Project Manager will ensure resources and support is available to allow the Site Manager to effectively management of all aspects of this Noise and Vibration Plan and its resulting requirements.

### 9.2 PLANNING

Planning for control of Noise and Vibration is the key to successful outcomes. With proper planning in place many potential problems resulting in complaints can be averted thus maintaining confidence with stakeholders that all possible measures are in place.

Where potential problems are anticipated following the planning and risk review process we will communicate outcomes and potential problems to the stakeholders concerned to avoid surprises.

Examples of planning measures are as follows:

- Careful selection of all work methods to be used on the project to ensure they meet the noise and vibration criteria.
- Where practicable, increase the use of offsite manufactured elements in the design to eliminate site manufacturing.
- Create dedicated truck routes for heavy vehicles. It will be important to establish and agree early in the project approved truck routes, not just for close neighbours, but for the community as a whole. Our strategy is to choose a route that minimises disruption to neighbours and the community and enforce it throughout the works.

### 9.3 PLANT AND EQUIPMENT

- Careful selection of all plant and equipment to be used on the project to ensure they meet the noise and vibration criteria.
- Regular maintenance and testing of all plant and equipment onsite to ensure they continue to meet the noise and vibration criteria.
- Where identified, set up anti vibration pads for any vibrating plant and other temporary plant and equipment.

## 9.4 SITE ESTABLISHMENT

Site establishment being the first site impact is particularly important in terms of establishing trust with the stakeholders that Noise and Vibration issues will be well managed. A W Edwards are well aware of this and being experienced in the management of such issues over an extensive period have the skilled teams ready to implement mitigation strategies from day 1. Particularly whilst setting up the site.

## 9.5 MANAGEMENT

In addition to noise and vibration mitigation, we propose to establish an emergency contact point for any complaints, should there be an immediate issue, which requires immediate action.

This will enable school managers and the public to make a direct phone call to the site manager to stop a work area or address a problem should the need arise.

# 10 SUCCESSFUL MANAGEMENT OF NOISE AND VIBRATION

In summary the overall process to be implemented by A W Edwards includes;

- Understand the project and contract requirements
- Identify the specific project risks and sensitive locations and provide a detailed risk assessment for each location in specific relation to noise and vibration requirements
- Set clear criteria and guidelines prior to works commencing
- Further develop the Noise and Vibration Management Plan in conjunction with affected parties throughout the course of the works
- Manage the implementation of the plan through the allocation of appropriate resources and ensuring the requirements of the plan are transferred to all contractors and site workers
- Provide ongoing cooperative management throughout all phases of the project. Understand that it is our obligation, regardless of contractual requirements, to act in a cooperative manner at all times with all affected parties and stakeholders
- Provide adequate response management for any issue.
- Provide adequate contractor management to ensure common guidelines and restrictions with the managing contractor requirements. Actively monitor the contractors on the project in a detailed and regular fashion through site and contractual management
- Allocate sufficient overall site management resources in all facets of the project to ensure issues are understood, allow correct forecasting and planning, allow adequate consultation and communication, comprehensive daily management and adequate response management
- Implement project monitoring and provide constant feedback to monitoring data as required
- Implement comprehensive physical mitigation measures in plant and equipment used and construction techniques
- Draw on our extensive experience on noise and vibration sensitive sites, and our recent experience and methods used in similar confined sites with nearby sensitive receivers.

## Construction Noise and Vibration Management Plan

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- Understand our clear obligations to be cooperative, responsive and constantly adjust our processes to suit affected parties, stakeholders and the greater community

## 11 TRAINING

In addition to other A W Edwards training requirements discussed in the Environmental Management Plan, inductions are required and are to address:

- Sensitivity of the site and proximity to the school and other sensitive receivers
- Awareness of noise and vibration created during construction and the requirement to operate equipment in the quietest possible manner in consideration of surrounding residents / land uses
- Strict adherence to the approved hours of operation
- Delivery hours and locations
- Notification of the AWE project Manager/Site Supervisor of any works likely to cause significantly high vibration / noise emissions

Toolbox talks to be conducted on:

- Working hours allowed, and required procedure for approval of any out of hour's works.
- Results of noise and vibration monitoring

## 12 OUT OF HOURS PROCEDURE

In accordance with the project conditions, approval will be sought from the SINSW to complete any out of hour's works – if required.

## 13 SPECIALIST ADVICE

A W Edwards with specialist seek support where required. Support will include assistance with:

- Project risk assessment (aspects and impacts);
- Environmental documentation;
- Training;
- Construction documentation, construction monitoring and issues management;
- Auditing;
- Reporting; and
- Re-assessment.

## 14 AUDITING

The collaborative audit process established for the Works will be followed when planning audits of the Noise and Vibration Management Plan. Refer to the A W Edwards Management System for details of the audit plans and processes.

The A W Edwards Noise and Vibration Management Plan and A W Edwards' related obligations and actions arising from it are to be audited every 12 months.

## 15 APPENDICES



## APPENDIX A – SELF VERIFICATION CHECKLIST

## Self Verification Checklist

[illegible]

## APPENDIX B – AUTHOR QUALIFICATIONS

# GREG COLLINS



## YEARS EXPERIENCE

22

## AREAS OF EXPERTISE

Acoustics  
Air Quality  
Environmental Management  
Impact Assessment

## LANGUAGES

English

## PROFILE

Greg is a principal environmental scientist who is involved in environmental management, acoustics and air quality studies. His main areas of experience include environmental management, acoustic and air assessments, air and noise modelling, sound intensity measurement, development of air and noise mitigation solutions, impact assessment, and development of environmental monitoring programs.

## EDUCATION

Master of Business Administration, Newcastle University (NSW)	2004
Master of Science, Environmental Science, Washington State University USA	1994

## PROFESSIONAL ASSOCIATIONS

Hunter Environmental Institute: Member	HEI
Clean Air Society of Australia and New Zealand: Member	CASANZ

## PROFESSIONAL EXPERIENCE

### TRANSPORT

- **Airlie Beach Air Quality Assessment, Whitsundays, QLD, Australia (2015): Whitsundays Regional Council, Project manager.** Ambient air quality monitoring assessment, located along Shute Harbour Road, Airlie Beach. The objective of the study was to measure the ambient air for a number of air quality parameters within the Airlie Beach airshed, and advise if the pollutants' were within the recommended air quality advisory goals.
- **Technical Brief for Background Air Quality Monitoring, Brisbane, Qld, Australia (2015): Australian Rail Track Corporation, Project Manager.** Technical Advisor services for the Melbourne to Brisbane Inland Rail (MBIR) project, WSP | Parsons Brinckerhoff was commissioned to prepare a technical brief for background air quality monitoring program (AQMP) for the Gowrie to Kagaru (G2K) section of the alignment, in Queensland.
- **Moorebank Air and Noise Monitoring Programme, Sydney, NSW, Australia (2015): Moorebank Intermodal Company, Study manager.** Ambient air and noise monitoring programme for the Moorebank intermodal facility.
- **Potts Hill Depot Noise Assessment, Sydney, NSW, Australia (2015): Ausgrid, Study manager.** WSP | Parsons Brinckerhoff has been appointed by Ausgrid to undertake a noise impact assessment of the proposed Potts Hill Depot development located on Bruncker Road, Potts Hill, New South Wales.
- **M1 Pacific Hwy Kariong to Somersby Expansion Noise Assessment, Kariong, NSW, Australia (2015): Roads and Maritime Services, Study manager.** Noise assessment for the expansion of the M1 Pacific Highway from Kariong to Somersby.

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- **Rockdale Substation Noise Assessment, Rockdale, NSW, Australia (2014): Ausgrid, Study manager.** Noise and vibration assessment for the Rockdale substation upgrade.
- **Epping to Chatswood Railway Air Quality Assessment, Sydney, NSW, Australia (2014): Transport for NSW, Study manager.** Air quality assessment for the Epping to Chatswood Railway conversion to rapid transit.
- **Belmore Park Substation Noise Management Plan, Belmore Park, NSW, Australia (2014): Ausgrid, Project manager.** Preparation of an operational noise management plan for the Belmore Park Zone Substation.
- **Anzac Parade Noise Assessment, Sydney, NSW, Australia (2014): NSW Roads and Maritime Services, Study manager.** Road traffic noise assessment for the expansion of Anzac Parade at Alison Road and Dacey Avenue.
- **Newport Zone Substation Noise and Vibration Assessment, Newport, NSW, Australia (2014): Ausgrid, Study manager.** Commissioned by Ausgrid to undertake an operational noise impact assessment for the proposed installation of a second consumer load control (CLC) unit at the Newport Zone Substation.
- **Mascot Zone Substation Noise Impact Assessment, Sydney, NSW, Australia (2014): Ausgrid, Study manager.** Commissioned by Ausgrid to undertake an operational noise impact assessment for the existing operation of Mascot Zone Substation following noise complaints from residences.
- **Scone Noise Wall Design, Scone, NSW, Australia (2014): ARTC, Study manager.** In principle design and modelling acoustic effectiveness along the rail line at Scone NSW.
- **Beaconsfield Substation Noise and Vibration Assessment, Alexandria, NSW, Australia (2014): Ausgrid, Study manager.** Construction and operational noise and vibration impact assessment of the proposed refurbishment of the Beaconsfield West 330/132 kV substation.
- **Noise Monitoring and Model Validation, Scone, NSW, Australia (2014): ARTC, Study manager.** Noise monitoring and model validation along the scone rail line to assess acoustic treatment options at residences.
- **Noise and Vibration Assessment Tourle Street Bridge Duplication, Newcastle, NSW, Australia (2014): Roads and Maritime Services, Study manager.** Construction and operational traffic noise and vibration assessment for the proposed Tourle Street Bridge duplication.
- **Air Quality Assessment Tourle Street Bridge Duplication, Newcastle, NSW, Australia (2014): Roads and Maritime Services, Study manager.** Construction and operational air quality assessment for the proposed Tourle Street Bridge duplication.
- **Awaba North Loops Noise and Vibration Assessment, Awaba, NSW, Australia (2014): Transport for New South Wales, Study manager.** Commissioned by Transport for NSW to undertake a noise and vibration assessment impacts associated with the construction of two non-electrified passing loops and associated infrastructure north of Awaba Station and south of Fassifern Station.
- **New England Highway Noise and Vibration Management Plan, Maitland, NSW, Australia (2014): Roads and Maritime Services, Study Manager.** Noise and Vibration Management Sub Plan (NVMP) as part of the

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Construction Environmental Management Plan (CEMP) for the upgrade of HW9 New England Highway Railway Roundabout Upgrade Stage 2, Maitland.

- **Pacific Highway Construction noise and Vibration Assessment, Wyong, NSW, Australia (2013): Roads and Maritime Services, Study Manager.** Construction noise and vibration assessment for the upgrade of the Pacific Highway through Wyong Township which is currently single lane in each direction to two through lanes in each direction.
- **Road traffic noise assessment Flat Road, Largs, NSW, Australia (2012): Roads and Maritime Services, Study Manager.** Noise assessment for the Third Hunter River Crossing included a new two lane road from the intersection of Melbourne Street and Pitnacree Road to the intersection of Paterson Road and Flat Road, a new bridge over the Hunter River and a series of intersection and road upgrades to the local road network.
- **South Gunnedah and Watermark Acoustic Assessment, Gunnedah, NSW, Australia (2012): KMH Environmental, Project director.** Directed the acoustic assessment of the proposed rail loop at South Gunnedah and Watermark.
- **Glenfield Junction Alliance Acoustic Assessment, Sydney, NSW, Australia (2012): Novo Rail, Project director.** Directed the acoustic assessment for the Glenfield Junction Alliance, a major rail project that covers the full design of all elements of the Glenfield Transport Interchange.
- **Hunter Expressway Noise Assessment, Hunter Valley, NSW, Australia (2011–2012): NSW Roads and Maritime, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Review of Australia's National Plan, Various Locations, Australia (2011): Australian Maritime Safety Authority, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Town and Country Horns: Noise-modelling Assessment, Newcastle, NSW, Australia (2009): United Group Rail Ltd., Project director.** Undertook a noise-modelling assessment of the town and country horns fitted to Outer Suburban Cars (OSCARs), which CityRail runs on its outer suburban services.
- **Stingray Creek Bridge Traffic Noise Assessment, Port Macquarie, NSW, Australia (2008): Hastings Council, Project director.** Conducted an acoustic assessment for the reconstruction of Stingray Creek Bridge, defined the acoustic environment, established project-specific noise goals, assessed current and future traffic noise levels with application to NSW Department of Environment and Conservation's Environmental Criteria for Road Traffic Noise, predicted future traffic noise levels using ENM noise prediction software and prepared report.
- **Gold Coast Rapid Transit Noise Monitoring, Gold Coast, Qld, Australia (2008): TransLink, Project director.** Undertook a pre-construction noise-monitoring program to provide information on the existing ambient noise environment in the Gold Coast Rapid Transit study area.
- **Western Arterial Road Upgrade Noise Assessment, Cairns, Qld, Australia (2008): Department of Main Roads, Project director.** Assessed the potential acoustic impact associated with the proposed road upgrade.

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- **Pacific Highway Oxley Highway to Kempsey Noise Assessment, Kempsey, NSW, Australia (2008): Roads and Traffic Authority, Project manager.** Managed the acoustic assessment for the Pacific Highway expansion from the Oxley Highway to Kempsey.
- **Batman Highway Realignment Noise Assessment, Sidmouth, Tas., Australia (2008): Department of Infrastructure, Energy and Resources, Project director.** Directed a traffic noise impact assessment of the proposal to realign Batman Highway to make it the main through-route at Spring Hill Main Road Junction.
- **Traffic Noise Impact Assessment, Molonglo Valley, ACT, Australia (2008): ACT Procurement Solutions, Project director.** Conducted a traffic noise impact assessment for Stage 1 concept design of the proposed Molonglo Valley development.
- **Gosford Railway Station Acoustic Impact Assessment, Gosford, NSW, Australia (2008): RailCorp, Project manager.** As part of the review of environmental factors, assessed the acoustic impact of the proposed stabling project at the existing Gosford railway station.
- **EastLink Tollway Noise Assessment, Melbourne, Vic., Australia (2007): Southern and Eastern Integrated Transport Authority, Project director.** Completed a baseline noise-monitoring assessment at noise-sensitive representative locations along the EastLink Tollway between Nunawading and Seaford.
- **Hexham Rail Grade Separation Noise Assessment, Sandgate, NSW, Australia (2007): Australian Rail Track Corporation, Project director.** Conducted a detailed noise assessment for the proposed Hexham rail grade separation. Provided detailed noise modelling to predict noise levels emanating from passenger, rail and freight movements resulting from the rail flyover upgrade.
- **Welding Facility Independent Review, Brisbane, Qld, Australia (2007): Queensland Rail, Project director.** Provided an independent review of the proposed options for a welding facility at either the Banyo or Yeerongpilly.
- **Wrights Oval Noise and Vibration Assessment, Junee, NSW, Australia (2007): Junee Shire Council, Project manager.** Conducted a qualitative noise and vibration assessment of potential rail-induced noise and ground vibration. The qualitative assessment of the Wrights Oval land area was part of the process of reclassifying this land for potential residential development.
- **Hale Street Link Noise Assessment, Brisbane, Qld, Australia (2006): Brisbane City Council, Project director.** Assessed the potential acoustic impacts associated with the proposed Hale Street Link. The report covered the existing environment and the predicted traffic noise environment near the proposed road.
- **Auburn Proposed Rail Fleet Centre Noise Assessment, Auburn, NSW, Australia (2005): RailCorp, Project manager.** Conducted a prediction assessment of construction and operational noise, and recommended control measures.
- **Warnervale Link Road Noise Assessment, Warnervale, NSW, Australia (2004): Wyong Shire Council, Project manager.** Conducted an acoustic survey for the proposed link road. Assessment included existing noise levels and predicted noise levels using RTA Technologies' ENM noise prediction software and the United Kingdom Department of Environment's Calculation of



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Road Traffic Noise. The assessment and reporting considered the NSW Department of Environment and Conservation's (DEC's) Environmental Criteria for Road Traffic Noise, the RTA Environmental Noise Management Manual and the DEC Environmental Noise Control Manual.

- **Emerald Beach Seniors Living Community Development: Noise Assessment, Coffs Harbour, NSW, Australia (2004): Fleuron Investments, Project director.** Carried out an acoustic assessment for the development application. Produced the traffic noise assessment for the application in accordance with NSW Department of Environment and Conservation's Environmental Criteria for Road Traffic Noise; predicted future traffic noise levels using ENM Noise Prediction Software; and prepared report.
- **Stuart Freight Rail Terminal Noise Assessment, Townsville, Qld, Australia (2004): BM WEBB Industrial Property Developers, Project director.** Provided detailed noise assessment, modelling and mitigation measures for establishment of Stuart Freight Rail Terminal. Included not only rail activities but also several secondary activities, such as freight car movements, facility and locomotive maintenance, that were to be undertaken in dedicated buildings.
- **North Sapphire Beach Living Community Development, Coffs Harbour, NSW, Australia (2004): Sapphire Beach Properties, Project manager.** Undertook an acoustic assessment for the development application. Produced the traffic noise assessment for the application in accordance with NSW Department of Environment and Conservation's Environmental Criteria for Road Traffic Noise; predicted future traffic noise levels using ENM noise prediction software; and prepared report.
- **Bexley Road Upgrade Acoustic Assessment, Sydney, NSW, Australia (2003): Roads and Traffic Authority, Project director.** Defined the acoustic environment, established project-specific noise goals, assessed current and future predicted traffic noise levels against NSW Department of Environment and Conservation's Environmental Criteria for Road Traffic Noise, predicted future traffic noise levels using ENM noise prediction software, and prepared report.
- **Edwin Land Parkway Noise Impact Assessment, Jerrabomberra, NSW, Australia (2003): Queanbeyan City Council, Project manager.** Conducted a noise impact assessment for the construction and operation phases of the proposed parkway.
- **Residential Development Noise Assessment, Mareeba, Qld, Australia (2003): Armbridge Pty Ltd, Project director.** Conducted a noise assessment for proposed development adjoining the Kennedy Highway on the approach to the Mareeba turn-off. The assessment's purpose was to ascertain whether the Kennedy Highway would have an acoustic effect on the amenity of proposed nearby residences.
- **Blackwall and Allfield Roads Acoustical Survey, Woy Woy, NSW, Australia (2003): Roads and Traffic Authority, Project manager.** Conducted an acoustical survey for the proposed traffic lights and crossing intersection at Blackwall and Allfield roads. Assessment included existing noise levels and predicted future noise levels using RTA Technologies' ENM noise prediction software and the United Kingdom Department of Environment's Calculation of Road Traffic Noise. The assessment and reporting were conducted in line with NSW Department of Environment and



# GREG COLLINS

Conservation's Environmental Criteria for Road Traffic Noise and Environmental Noise Control Manual, and the RTA Environmental Noise Management Manual.

## RESOURCES

- **Kookaburra Gully Graphite Mine Air Quality Assessment, Koppio Hills, SA, Australia (2015): Lincoln Minerals Ltd., Study manager.** Assess the potential air quality impacts of the construction and operation of the proposed Kookaburra Gully Graphite Mine.
- **Tarcoola Gold Noise Assessment, Tarcoola, SA, Australia (2015): WPG Resources Pty Ltd., Study manager.** Assess the potential noise impacts of the construction and operation of the Tarcoola Gold Project.
- **Tunkilila Gold Project Air Quality Assessment, Kingoonya, SA, Australia (2015): Tunkillia Gold Pty Ltd., Study manager.** Air quality impact assessment for the potential emissions from the construction and operation of the proposed Tunkillia Gold Mine.
- **Boggabri Coal Operational Noise Assessment, Boggabri, NSW, Australia (2014): Idemitsu Resources, Project manager.** Noise assessment for a proposed water transfer pump on the Boggabri site
- **Boggabri Coal Gap Analysis, Boggabri, NSW, Australia (2015): Idemitsu Resources, Project Manager.** Undertake a gap analysis of Boggabri Coal's compliance with its relevant State and Federal approval conditions and required management plans and strategies.
- **Due diligence assessment of exploration drilling, Tuggerah, NSW, Australia, (2015): Wyong Coal Pty Ltd., Project manager.** Undertake a due diligence assessment of potential environmental impacts associated with the drilling of up to four bore holes which are associated with the Wallarah 2 Coal Project.
- **Construction Noise and Vibration Assessment Alexandria, Alexandria, NSW, Australia (2014): Jemena, Study manager.** Commissioned by Jemena to undertake a construction noise and vibration impact assessment of the proposed installation of a gas main between Alexandria and Darlington, in New South Wales.
- **Chlorine Gas Modelling Assessment, Newman, WA, Australia (2014): BHP Billiton, Study manager.** Engaged by BHP Billiton Iron Ore (BHPBIO) to conduct a study of an uncontrolled accidental release of chlorine (Cl<sub>2</sub>) gas a Water Treatment Plant (WTP) proposed for Area C located northwest of Newman, Western Australia.
- **Carlson Regrade, Hunter Valley, NSW, Australia (2012): Rio Tinto, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Mt Pleasant Permit Project, Hunter Valley, NSW, Australia (2011–2012): Coal & Allied, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Doyles Creek Underground Mine Due Diligence, Doyles Creek, NSW, Australia (2011–2012): NuCoal Resources, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.

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- **Compliance Auditing, Wiluna, WA, Australia (2011–2012): Magellan Metals, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Bengalla Link Road Upgrade Review of Environmental Factors, Muswellbrook, NSW, Australia (2011–2012): Rio Tinto, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Boambee Quarry Part 3A, Boambee, NSW, Australia (2011): Holcim Australia Pty Ltd., Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Terminal Acoustic Impact Assessment, Parkes, NSW, Australia (2008): Terminals Australia, Project manager.** Managed the assessment of acoustic impacts for the construction and operation of an intermodal terminal for the large-scale transport, warehousing, manufacturing and storage of freight.
- **Hail Creek Mine Acoustic Assessment, Hail Creek, Qld, Australia (2007): Rio Tinto, Project manager.** Managed the acoustic assessment, which investigated the feasibility of implementing GHD's integrated acoustic program to manage cabin noise in the mine's Terex MT4400 haul truck fleet.
- **Acoustic Solution, Hunter Valley, NSW, Australia (2006): WesTrac Caterpillar, Project manager.** Managed the design and development of an acoustic solution for Caterpillar D-11R track-type tractors to meet the BHP Billiton Mount Arthur Coal Noise Specification E noise limits. The program encompassed a comprehensive series of sound intensity measurements, detailed analysis and modelling to provide the engineering team with critical information for attenuation design purposes. The engineering approach focused on critical serviceability and functional performance criteria.
- **Port of Townsville Noise-monitoring Program, Townsville, Qld, Australia (2006): Townsville City Council, Project manager.** Conducted noise monitoring for the Port of Townsville.
- **Lake Eildon Dam Expansion, Lake Eildon, Vic., Australia (2006): Eildon Alliance Project, Project manager.** Managed the acoustic assessment for the construction component of the proposed expansion of Lake Eildon Dam.
- **Sound Power Determination, Australia (2005): BHP Billiton and Caterpillar, Project manager.** Responsible for sound testing on three x 789C Caterpillar off-highway trucks. Compared the three noise-attenuated trucks to MAC's Specification E.
- **Airflow and Acoustic Performance Assessment, Muswellbrook, NSW, Australia (2005): Mount Arthur Coal, Project director.** Managed testing to assess the airflow and acoustic performance of Caterpillar 793C haul vehicles fitted with an after-market acoustic louvre. Recommended adjustments to the louvre that would increase airflow with minimal loss of acoustic performance.
- **Antiene Coal Unloader Facility, Hunter Valley, NSW, Australia (2005): Macquarie Generation, Project manager.** Managed the construction of a new rail coal unloader facility at Antiene, north of Lake Liddell in the Hunter Valley.

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- **Mine Acoustical Impact Assessment, Az Zabirah, Saudi Arabia (2004): Ma'aden Aluminium Project, Project manager.** Conducted as part of an environmental impact statement, the project included an acoustical impact assessment and detailed noise modelling of a bauxite mine at Az Zabirah in central Saudi Arabia, and the construction and operation of an alumina refinery (with tailings dam), aluminium smelter, power station, desalination plant and port facilities at Ras az Zawr on the coast of the Arabian Gulf.
- **Sound Power Determination, Muswellbrook, NSW, Australia (2000–2003): Mount Arthur Coal, Project director.** Carried out noise testing to Mount Arthur Coal's Noise Compliance Specification D, ISO 6395, and ISO 4872, and provided a method for determining compliance with noise limits.
- **Mount Arthur Coal Noise Testing, Muswellbrook, NSW, Australia (2000–2002): BHP Billiton, Project manager.** Managed the design and implementation of Mt Arthur Coal's noise-testing facility, a state-of-the-art stationary and dynamic noise-testing pad for measuring heavy mining equipment. Using Brüel and Kjaers 'pulse' technology, the facility is unique to Australia.

### WATER

- **Toukley Sewage Treatment Plant Noise and Vibration Assessment, Toukley, NSW, Australia (2014): Wyong Shire Council, Study manager.** Noise and vibration assessment for the plants sludge handling facility upgrade.
- **Air and water assessment, Sydney, NSW, Australia, (2011), Sydney Water Corporation, Project director.** Responsible for project delivery, provision of strategic advice, high-level review, technical quality, client relationships, budgets and coordination of resources.
- **Beechworth Road Pump Station Noise Assessment, Pymble, NSW, Australia (2009): Sydney Water, Project director.** Provided a noise assessment and barrier design at Beechworth Road.
- **Western Corridor Pump Station Noise Assessment, Brisbane, Qld, Australia (2009): Western Corridor Recycled Water, Project manager.** Conducted a noise and vibration assessment for the Western Corridor Recycled Water Scheme.
- **Mardi to Mangrove Pipeline Project, Wyong, NSW, Australia (2008): Wyong Shire Council, Project manager.** Provided a general noise and vibration assessment for the Mardi to Mangrove pipeline.
- **Melbourne Desalination Plant Noise Assessment, Melbourne, Vic., Australia (2008): Victorian Department of Sustainability and Environment, Project manager.** Provided a general noise assessment for the desalination plant.
- **Woolgoolga Sewage Treatment Plant Noise Assessment, Woolgoolga, NSW, Australia (2003): Coffs Harbour City Council, Project manager.** Conducted an acoustic assessment for the proposed upgrade that accorded with the NSW Department of Environment and Conservation's Environmental Noise Control Manual and Industrial Noise Policy. Included defining the acoustic environment, establishing project-specific noise goals, predicting future noise levels using ENM noise prediction software and preparing a report.

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- **Water Treatment Plant Acoustic Assessment, Coffs Harbour, NSW, Australia (2003): Coffs Harbour Water Treatment Plant, Project manager.** Conducted an acoustic assessment for the construction and operation phase components of a proposed water treatment plant.

### INDUSTRY

- **Bundaberg Plasterboard Plant Noise Assessment, Bundaberg, Qld, Australia (2014): Knauf Plasterboard Australia, Study manager.** Assessment of potential construction and operational noise impacts of the proposed Bundaberg Plasterboard plant, located at the Port of Bundaberg, Queensland, Australia.
- **Environmental Noise Assessment SCE Recycling Facility, Mayfield, NSW, Australia (2013): SCE Recycling, Study Manager.** Undertake an operational noise assessment at its recycling facility to assess the adherence to limit conditions outlined in the site specific NSW EPA Environmental Protection Licence.
- **Sawtell Pipeline Acoustic Impact Assessment, Sawtell, NSW, Australia (2010): Coffs Harbour City Council, Project manager.** Assessed the potential acoustic impacts for the construction phase component of a proposed pipeline in Sawtell.
- **Quarantine Waste Incinerator Acoustic Impact Assessment, Darwin, NT, Australia (2009): Darwin Port Corporation, Project director.** As part of a public environment report, conducted an acoustic impact assessment of the proposed quarantine waste incinerator at East Arm Port.
- **Swanbank Power Station Vibration Assessment, Ipswich, Qld, Australia (2009): CS Energy Ltd., Project manager.** Conducted a vibration assessment to meet due diligence for the demolition of components of the power station.
- **Waste Transfer Station Noise Impact Assessment, Bungendore, NSW, Australia (2009): Palerang Council, Project director.** Carried out a noise impact assessment of the proposed waste transfer station at Tarago Road.
- **Diesel Lift Pump Assessment Forbes, NSW, Australia (2008): June Developments Pty Ltd, Project director.** Carried out a noise impact assessment of two existing diesel lift pumps near Turkey Nest Dam, Delvin Property.
- **Temora to Cowal Transmission Line Noise Monitoring, Temora, NSW, Australia (2008): Bovis Lend Lease, Project manager.** Conducted background noise monitoring and established background noise level for construction noise goals associated with the construction of the Temora–Cowal transmission line.
- **Noise and Vibration Assessment, Bendigo, Vic., Australia (2008): Coliban Water, Project manager.** Managed the noise and vibration assessment undertaken at the booster pump station (BPS) and link pump station (LPS) sites. The BPS and LPS are part of the Goulburn Campaspe Link pipeline project.
- **Noise Impact Assessment, Tomago, NSW, Australia (2008): Atlas Copco Compressors Australia, Project director.** Assessed the potential operational environmental noise impacts resulting from the ZL5300 stationary compressor blower and associated mechanical plant installed at Tomago Aluminium.

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- **Goonyella Road: Acoustic Impact Assessment, Moranbah, Qld, Australia (2008): Dyno Nobel Asia Pacific Limited, Project director.** Assessed the potential acoustic impacts for the construction and operation of a proposed ammonium nitrate facility.
- **Asphalt Plant Upgrade: Noise Impact Assessment, Melbourne, Vic., Australia (2007): Citywide Pty Ltd., Project manager.** Assessed the potential noise impacts on the surrounding environment from the upgrade of the existing plant.
- **Aluminium De-oxidant Puck Facility: Acoustic Impact Assessment, Port Kembla, NSW, Australia (2006): Australian Metal Recovery (AMR) Pty Ltd., Project director.** Assessed the acoustic impact of the proposed facility to be located at the existing AMR site within the recycling area of the BlueScope Steel Port Kembla steelworks.
- **Waste Management Facility: Acoustic Impact Assessment, Moree, NSW, Australia (2006): Moree Plains Shire Council, Project director.** Assessed the potential acoustic impacts for the construction and operation of a proposed waste management facility located at Lot 1, DP 570202, on the Newell Highway.
- **Wagga Wagga Distribution Centre: Noise Assessment, Wagga Wagga, NSW, Australia (2006): ICD Pty Limited, Project director.** Carried out a detailed noise assessment of the centre to enable the storage and filling of liquefied gases.
- **Ford Acoustic Recommendations, Melbourne, Vic., Australia (2005): Ford Australia. Project director.** Made acoustic recommendations for design of the office/control room building adjacent to the proposed environmental wind tunnel/dyno test chamber within the Ford Climatic Test Chamber Shed of the Ford Proving Grounds.
- **Waste Transfer Station Relocation: Noise Assessment, Sydney, NSW, Australia (2005): RailCorp, Project director.** Carried out a noise assessment for the proposed relocation of a waste transfer station. The purpose was to ascertain whether the proposed facility would have an acoustic effect on the amenity of residences near the site during the project's operation phase.
- **Penola Pulp Mill: Noise Impact Assessment, Penola, SA, Australia (2005): Penola Pulp Pty Ltd., Project director.** Assessed potential environmental noise impacts from the proposed pulp mill on surrounding sensitive land uses.
- **Bell Bay Noise Assessment, Bell Bay, Tas., Australia (2005): Gunns Limited, Project director.** Undertook a noise assessment of the potential impacts of the bleached kraft pulp mill proposed for the Bell Bay industrial area.
- **Temple Street Noise Assessment, Ballina, NSW, Australia (2005): Country Energy, Project manager.** Carried out a noise assessment to ascertain the effectiveness of installing a noise barrier at the Temple Street depot.
- **Noise Impact Assessment, Bendigo, Vic., Australia (2005): Tatiara Meat, Project director.** Assessed the potential environmental noise impacts from the proposed meat-processing facility on surrounding sensitive land uses.



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- **Oilseed-processing Facility Noise Assessment, Cootamundra, NSW, Australia (2004): Cootamundra Oilseeds, Project director.** Provided a detailed noise assessment, modelling and mitigation measures as part of an environmental impact statement to enable the construction of a new oilseed-processing facility at Cootamundra. The development involved constructing and installing new plant and machinery to enable the facility to process up to 80,000 t/a of oilseed to extract edible oils.
- **Tumbarumba Mill Acoustical Assessment, Tumbarumba, NSW, Australia (2004): Hyne & Son, Project manager.** Provided an acoustic assessment that defined the acoustic environment, established project-specific noise goals, assessed current and future traffic noise levels against the NSW Department of Environment and Conservation's (DEC's) Environmental Criteria for Road Traffic Noise, and predicted future noise levels using ENM noise prediction software; and prepared a report in accordance with NSW DEC Industrial Noise Policy and Environmental Noise Control Manual.
- **Noise Assessment, Coutts Crossing, NSW, Australia (2004): Tomsy Timber, Project director.** Conducted a noise assessment on the proposed construction and operation of a new timber mill facility on Lot 3, DP 596349, Armidale Road.
- **Waste Transfer Station: Noise Assessment, Katoomba, NSW, Australia (2003): Blue Mountains City Council, Project director.** As part of an environmental impact statement, assessed the potential acoustic impacts of the construction and operation of a proposed waste transfer station.
- **Food-processing Plant Noise Assessment, Palmwoods, Qld, Australia (2003): Gourmet Gardens Ltd., Project director.** Carried out a detailed noise assessment and determined mitigation measures for a proposed new food-processing plant.
- **Green Waste Facility and Light-vehicle Station Noise Assessment, Tamworth, NSW, Australia (2003): Tamworth Regional Council, Project director.** Conducted detailed noise assessment modelling and determined mitigation measures for the proposed green waste processing and composting facility and light-vehicle transfer station.
- **Tip Top Bakery Acoustical Assessment, Chullora, NSW, Australia (2003): George Weston Foods, Project manager.** Conducted an acoustic assessment for the proposed Tip Top Bakery. The assessment took into account the NSW Department of Environment and Conservation's Industrial Noise Policy and environmental criteria for road traffic noise. Established project-specific noise levels and prepared report.
- **Development Application Acoustic Assessment, Toronto, NSW, Australia (2001): Lampsons Cranes, Project manager.** Conducted an acoustic survey and report in accordance with NSW Department of Environment and Conservation's Industrial Noise Policy.
- **Hazardous Waste Program, Richland, Washington, United States (1995): Westinghouse and Hanford Nuclear Reservation, Project manager.** Carried out works for Westinghouse for 219-S liquid waste facility.

### DEFENCE/AVIATION

- **Port Macquarie Airport Upgrade, Port Macquarie, NSW, Australia (2010): Port Macquarie Hastings Council, Project director.** Managed an

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assessment of the potential for noise impact that may be associated with the construction of the proposed upgrade.

- **New Doha International Airport Monitoring Program, Doha, Qatar (2010): Bechtel Incorporated, Project director.** Managed a long-term environmental-monitoring program for the owner and operator of the New Doha International Airport.
- **Department of Defence Noise Assessment, Various Locations, Australia (2009): Department of Defence, Project manager.** Prepared a technical report identifying the works to be undertaken to provide noise attention to the school building to satisfy the requirements of AS 2021-2000 Acoustics – Aircraft Noise Intrusion — Building Siting and Construction.
- **RAAF Base Acoustic Design, Williamtown, NSW, Australia (2009): Spotless, Project director.** The project's purpose was to establish top-secret Defence secure video-teleconferencing environment (DSVE) capability in the Director of Administrative Services room in the Australian Defence Force Warfare Centre. Provided in-principle recommendations the provision of SCEC (Security Construction and Equipment Committee) Endorsed Security Consultant services.
- **Building Isolation Assessment, Holsworthy, NSW, Australia (2008): Hansen Yuncken, Project Manager.** Managed the building isolation assessment of existing buildings at the Lamia Barracks Defence Police Training Centre.
- **Wagga Wagga Environmental Noise Impacts, Wagga Wagga, NSW, Australia (2007): Wagga Wagga Council, Project director.** Managed the assessment of the potential operational environmental noise impacts and required noise attenuation from the operation of REX SAAB 340B aircraft at the proposed engine run-up facility.
- **Environmental Noise Impact Assessment, Australia (2006): REX Airlines, Project manager.** Assessed the potential operational environmental noise impacts resulting from the proposed engine run-up facility and investigated noise attenuation options for conducting engine run-up and maintenance checks.
- **Pearce RAAF Base Noise Assessment, Perth, WA, Australia (2006): Royal Australian Air Force, Project director.** Provided noise attenuation options for an engine run-up pad and noise-insulated cabin for personnel conducting engine run-up and maintenance checks on HAWK (LIF) aircraft.
- **Williamtown Public School Noise Attenuation, Williamtown, NSW, Australia (2004): Department of Defence, Project manager.** Provided noise attenuation to the public school, including noise measurement, assessment of FA-18 military aircraft and their effects on the school. Provided noise attenuation recommendations to architecture team to meet guideline requirements.

### OCCUPATIONAL HEALTH AND SAFETY

- **Review of Construction Guidelines, Newcastle, NSW, Australia, (2009): Australian Rail Track Corporation, Project manager.** Reviewed the draft construction noise guidelines.
- **Vibration Review Report, Sydney, NSW, Australia (2008): GHD, Project manager.** Reviewed the vibration report on the Centrelink building.

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- **Linde Gas Cryogenic Plant Environmental Assessment, Port Kembla, NSW, Australia (2005): CH2M HILL Australia, Project manager.** Assessed the acoustic impact of the proposed nitrogen liquefier unit. The purpose of the assessment was to ascertain whether the proposed facility would have an acoustic effect during construction and operation on the amenity of nearby residences.

### PROPERTY

- **Coramba Environmental Assessment, Coramba, NSW, Australia (2009): Coffs Harbour City Council, Project director.** Managed the noise and vibration impact assessment that was part of an environmental assessment for the proposed ground remediation project.
- **Junee Library Refurbishment (2008), Junee, NSW, Australia, Junee Shire Council. Project director.** Managed the specification detailing the design of the heating, ventilation and air conditioning system for the refurbishment of the Junee Library.
- **Environmental Impact Statement, Glyde Point, NT, Australia (2008): Department of Infrastructure, Planning and Environment, Project manager.** Managed a draft environmental impact statement that assessed the existing background acoustic environment of the proposed gas-related industrial estate.
- **Thornton North Noise Impact Assessment, Thornton, NSW, Australia (2008): Urbis Pty Ltd., Project director.** Conducted a noise impact assessment to determine the capability of the Thornton North Stage 2 Release Area to support urban development.
- **Minmi Road Traffic Noise Assessment, Fletcher, NSW, Australia (2008): Monteath & Powys, Project manager.** Managed the traffic noise intrusion assessment of land situated north of Minmi Road. The assessment accompanied an application to the Department of Planning for rezoning to enable development for residential purposes north of Minmi Road.
- **Noise Assessment, Wagga Wagga, NSW, Australia (2008): Wagga Mill Pty Ltd., Project director.** Assessed noise and vibration for the proposed redevelopment of the Murrumbidgee Flour Mill site and related buildings on Sturt Highway.
- **Mayfield Shopping Centre Noise Assessment, Mayfield, NSW, Australia (2008): McMullin Group, Project manager.** Led an assessment of the potential operational noise associated with the proposed shopping centre development, to be known as Mayfield Place, located at Maitland Road.
- **Ben Hammond Complex Acoustic Design, Woolner, NT, Australia (2008): Northern Territory Power and Water Corporation, Project director.** Made recommendations for in-principle acoustic design of the workshop building in the Stage 2 Ben Hammond Complex.
- **Australian Tropical Science and Innovation Precinct Building Acoustics, Townsville, Qld, Australia (2007): Charles Sturt University, Project director.** Provided building acoustics services for a multistorey educational building, including environmental noise assessment, architectural acoustics, privacy assessment and mechanical plant noise control.
- **Home and Community Care Noise Assessment, Port Macquarie, NSW, Australia (2007): Port Macquarie Hastings Council, Project director.**



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Managed the assessment to ascertain the potential operational noise associated with the proposed Home and Community Care facilities.

- **St Pius X Building Acoustics, Newcastle, NSW, Australia (2007): Australian Technical College, Project director.** Managed the acoustic assessment of the impact of the proposed Hunter College workshops and classrooms, situated on vacant land immediately adjacent to the St Pius X Catholic High School.
- **Eddie de Vere Building Air conditioning Noise, Brisbane, Qld, Australia (2007): Brisbane City Council, Project manager.** Managed the calculation of down-duct and break-out noise as part of the redesign of the air conditioning systems on the second and third floors of the building.
- **Conservatory of Contemporary Music Relocation, Hobart, Tas., Australia (2006): Hobart Council, Project manager.** Performed an acoustic desktop study to assess the suitability of relocating the conservatorium of contemporary music area to the existing Wilmot Street site.
- **Acoustic Quality Review, Hobart, Tas., Australia (2005): GHD, Project director.** Reviewed the proposed design and fit-out, and determined relevant criteria and expected acoustic quality.
- **Building Acoustic Design and Fit-out, Hobart, Tas., Australia (2005): GHD Newcastle, Project director.** Reviewed and proposed design and fit-out, and determined relevant criteria and expected acoustic quality.
- **Acoustic Services, Shoal Bay, NSW, Australia (2005): Shoal Bay Country Club, Project director.** Provided acoustic services encompassing Building Code of Australia compliance, mechanical plant noise, conference and function room acoustic design for five multistorey buildings in Shoal Bay. Services covered the design, construction and commissioning of the development.
- **Energy Australia Stadium Upgrade, Newcastle, NSW, Australia (2003): Cox Richardson, Project manager.** Managed the acoustic assessment for a proposed upgrade of the eastern grandstand at the stadium. Characterised the acoustic environment, assessed current and future predicted crowd and public address system noise levels in accordance with the NSW Department of Environment and Conservation's Environmental Noise Control Manual, predicted future noise levels and provided mitigation recommendations.
- **Fletcher Rezoning Investigations, Fletcher, NSW, Australia (2003): Northwest Residential Pty Ltd., Project director.** Conducted an acoustic assessment to define the acoustic environment, establish project-specific noise goals, and recommend noise mitigation measures for the proposed residential development.
- **Newcastle Landscape Supplies Acoustical Assessment, Wickham, NSW, Australia (2003): Enviropacific Contracting, Project manager.** Conducted an acoustic assessment for the development application for the proposed facility. Assessment accorded with the NSW Department of Environment and Conservation's Industrial Noise Policy and Environmental Noise Control Manual.
- **Bunnings Warehouse Development Application, Taree, NSW, Australia (2003): Kilcor Commercial Pty Ltd., Project manager.** Provided an acoustic assessment; included defining the acoustic environment, establishing project-specific noise goals, assessing current and future traffic noise levels against NSW Department of Environment and Conservation's

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(DEC's) Environmental Criteria for Road Traffic Noise, predicting future noise levels using ENM noise prediction software and preparing a report that considered DEC Industrial Noise Policy and the DEC Environmental Noise Control Manual.

- **Heritage Green Residential Golf Course Noise and Vibration Assessment, Rutherford, NSW, Australia (2003): McCloy's Group, Project manager.** Provided an acoustic assessment for the rezoning application for including residential estates within the golf resort.
- **Chemist Warehouse: Noise Impact Assessment, Brisbane, Qld, Australia (2006): The Ryan Group Qld, Project manager.** Assessed the potential noise impacts of a proposed warehouse facility for a bulk-trading chemist.
- **Acoustic Impact Assessment, Qatar (2003): Qatar Petroleum, Project director.** Assessed the potential acoustic impacts of removing and hauling sand from dunes in Mesaieed Industrial City to use as fill at a nearby industrial area. The assessment ascertained whether the proposed removal operations and associated sand haulage would have an acoustic effect on the noise amenity of nearby sensitive noise receivers, including a coastal resort and residential dwellings located in the Mesaieed residential area.
- **Development Application Acoustical Assessment, Newcastle, NSW, Australia (2000): Experienced Office Furniture, Project manager.** Conducted a noise assessment, in accordance with the NSW Department of Environment and Conservation's Industrial Noise Policy, for the development application for expanding the Experienced Office Furniture premises.

### WATER

#### PROFESSIONAL HISTORY

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WSP   Parsons Brinckerhoff	2010 – 2016
GHD, AUS	2003 – 2010
Metford Laboratories, AUS	1999 – 2003
US Department of Energy	1994 – 1999

#### PUBLICATIONS AND PRESENTATIONS

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##### Publications

Contributing Author – Australian Department of Resources, Energy and Tourism, (2009). Leading Practice: Control of Airborne Contaminants, Noise, and Vibration for the Mining Industry.

- Kirkness, T. J., & Collins, G. T (2007). Mobile Equipment Noise Attenuation In Mines Within The NSW Context And GHD's Achievement Of The "Quietest Caterpillar 789C Haul trucks In The World." *Engineers Australia Regional Convention*, 137–143



18&19 / 10 Kenrick Street  
The Junction, NSW 2291  
December 9, 2019

**David Proud**  
**AW Edwards Pty Ltd**  
**6 / 35 Merrigal Road**  
**Port Macquarie NSW**

### **Lake Cathie Public School Upgrade – Construction Noise and Vibration Management Plan Requirements**

Dear David,

Thank you for contacting me regarding assistance to review and endorse the Lake Cathie Public School Upgrade Construction Noise and Vibration Management Plan (CNVMP).

I can confirm I have over 25 years' experience in a wide range of Acoustics and Air Quality projects. I have previously been the Air and Noise Technical Service line leader and The Global Environmental Technical Sector Leader for international professional service firms and have the appropriate experience to undertake this review of your plan.

SSD Consent Conditions regarding the CNVMP include:

B14. 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
- F. include a complaints management system that would be implemented for the duration of the construction; and
- G. include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the management measures in accordance with Condition B11(d).



B11:

- C. a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria
- D. a program to monitor and report on the:
  - I. impacts and environmental performance of the development;
  - II. effectiveness of the management measures set out pursuant to paragraph (c) above"

I can confirm I have reviewed the CNVMP for the Lake Cathie Public School upgrade and it satisfies the requirements for the CNVMP outlined above.

Should you have any further questions, please do not hesitate to contact Greg Collins on 0488512224 or [greg@raptconsulting.com.au](mailto:greg@raptconsulting.com.au).

Thank you,

A handwritten signature in black ink that reads "Greg Collins".

Greg Collins, Director – RAPT Consulting

## APPENDIX C – CONSULTATION

## Post Approval – Consultation

Consultation needs to be undertaken in accordance with the standard evidence of consultation condition in the consent. Consultation needs to be meaningful, done with courtesy and respect and be well documented. These are people/ organisations that we need to be building meaningful relationships with.

Conditions of all consent can require consultation with a range of stakeholders. Consultation in the post approval world needs to be well documented to satisfy the condition requirements.

Examples include Council, service providers (eg. Electricity gas etc.), consult with local bus provider and TfNSW.

Read each condition carefully, any reference to consult triggers consultation.

Typically on State Significant Development, there will be a specific consultation condition as to how this piece can be appropriately addressed.

If no response has been obtained from the stakeholder, various attempts (minimum of 3 per media) over a reasonable timeframe, have to be documented.

If there is a dispute, , the table needs to be fully completed (details of any matters unresolved and how the applicant has resolved these).

Consultation is not:

- A token gesture
- Done at the end of the piece of work,
- An email to the relevant stakeholder with no response;
- A meeting with the stakeholder with no meeting minutes.

Consultation is:

- Meaningful
- Done prior to the requirement,
- Captures an outcome,
- Identifies matters resolved,
- Identifies matters unresolved,
- Any disagreements are disclosed; and
- How we are going to address unresolved matters?

How to capture all the relevant details on consultation requirements? Any consultation requirement in a condition is required to be accompanied with the following table:

## Post Approval Consultation Record

Identified Party to Consult:	'Out of Hours' Users of School Facilities
Consultation type:	Face to Face Meeting
When is consultation required?	Pre Construction
Why	Ensure all out of hours school facilities users/stakeholders have two way consultation regarding potential impacts.
When was consultation scheduled/held	9 <sup>th</sup> December 2019 18:30 to 18:30 @ Lake Cathie Public School
When was consultation held	9 <sup>th</sup> December 2019 18:30 to 18:15 @ Lake Cathie Public School
Identify persons and positions who were involved	Sherie McGuigan- OOSH Marty Dures – Salt Community Church Dave McDonald – Salt Community Church Tim Baxter – Anglican Church Katrina Shaw/Grant Shaw – Karate Elizabeth Falkh Jock Garvin – School Principal Craig McIlveen - AWE Project Manager David Barratt – AWE Site Supervisor David Proud – AWE WHSE Coordinator
Provide the details of the consultation	<ul style="list-style-type: none"> <li>• Overview and timeline of 3 stage construction process</li> <li>• Construction hours</li> <li>• A W Edwards key personnel and contacts</li> <li>• Buildings/zones affected including noise and vibration</li> <li>• Construction zones boundaries</li> <li>• Changes and impacts to access &amp; egress for public</li> <li>• 3D presentation of final campus design</li> <li>• Q &amp; A</li> </ul>
What specific matters were discussed?	<ul style="list-style-type: none"> <li>- Current stakeholder use. (Hall, Canteen, Library, 1 X demountable &amp; central courtyard).</li> <li>- Planned new road access/bus zone to school campus (Wollum Road yet to be gazetted).</li> <li>- Canteen availability throughout (remains unchanged)</li> <li>- New airconditioned classrooms will be available for use during stage 2</li> <li>- Parking spaces. There may be some intermittent and minimal impact to current parking spaces during construction. 100 new car spaces will be available when the new sporting fields are built.</li> <li>- Acoustic experts have been consulted in design of the new hall. Final A/V specifics to be advised.</li> <li>- There may be short disruption to power supply – more likely to be scheduled for a weekend - if required. The AWE 'Disruption Notice' process will be instigated 10 days prior to any planned works.</li> </ul>



	<ul style="list-style-type: none"><li>- The School Principal commented that storage space will be at a premium – due to the specifics of the design/scope.</li><li>- Existing playground equipment in courtyard will be reused if feasible.</li></ul>
What matters were resolved?	No matters for resolution identified.
What matters are unresolved?	Nil to resolve.
Any remaining points of disagreement?	Nil
How will SINSW address matters not resolved?	Nil



Appendix 10 – Construction Traffic and Pedestrian Management Plan

# LAKE CATHIE PUBLIC SCHOOL

## Construction Traffic & Pedestrian Management Plan

LCPS-AWE-CTPMP

**Date:** 8 January 2020  
**Author:** D. Barratt  
**Revision:** 4  
**Status:** For Construction

Prepared By:  
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Construction Traffic & Pedestrian Management Plan

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Project No.	628
Project Name	Lake Cathie Public School Upgrade
Project Manager	Craig McIlveen
Project Location	Lake Cathie Public School 1240 Ocean Drive Lake Cathie, NSW 2445
Client	School Infrastructure
Timing of the Works	January 2020 to July 2021

## Revision Register:

Revision	Date	Status	Author	Approved By	Comments
1	25-Nov-19	For Construction	D. Barratt	C. McIlveen	
2	29-Nov-19	For Construction	D. Barratt	C. McIlveen	
3	6-Dec-19	For Construction	D. Barratt	C. McIlveen	Review by Men at Work Traffic Services
4	8-Jan-20	For Construction	D. Barratt	C. McIlveen	
5	Date	Status			
	Date	Status			

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# I INTRODUCTION

## I.1 BACKGROUND

AW Edwards have been engaged by School Infrastructure for the Lake Cathie Public School Upgrade project.

The current programme for the project has the Lake Cathie Public School Upgrade commencing in January 2020 and the project completion in July 2021.

## I.2 PURPOSE OF THIS REPORT

This report provides an update as to how stages of the work are proposed to occur and how construction traffic would access the site and be managed including details of the following:

- Proposed excavation and access associated with it;
- Proposed establishment of loading & unloading zones;
- Proposed pedestrian management around construction site;
- Proposed traffic control associated with access from Ocean Drive to and from the site.
- Proposed construction of building structure

## I.3 REFERENCE DOCUMENTS

In preparing this Construction Traffic & Pedestrian Management Plan, reference has been made to a number of background documents, including:

- Programme Construction Sequence, Materials Handling Logistics and Infrastructure Plans
- RMS Traffic Control at Worksites Manual
- An inspection of the site and its surrounds

## I.4 OBJECTIVES

AW Edwards Pty Limited is undertaking the Lake Cathie Public School Upgrade Design & Construction Contract.

Key issues for traffic and pedestrian management during the Contract include:

- Safe operation of buses and other transport services during construction
- Safety of commuters, pedestrians, bicycle riders, students and staff during construction
- Timely and effective implementation of traffic management measures.
- Fulfilling Port Macquarie Hastings Council requirements

## Construction Traffic & Pedestrian Management Plan

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The accompanying “Traffic and Pedestrian Management Plan” showing vehicular access and signage at the worksite are included as Appendix A to this report.

Consultation concerning traffic and pedestrian management at the Lake Cathie Public School Upgrade worksite has occurred. Further consultation will be required throughout the project as per staging milestones.

Any material removed from the Site shall be transported by the Contractor in accordance with government regulations and the requirements of the SafeWork Authority. All off-site truck movements and deliveries shall occur during normal working hours. All trucks/tankers carrying loads off-site shall be licensed to transport the materials in accordance with DECCW requirements and state government regulations.

The Principal Contractor and works contractors shall ensure that all drivers responsible for the transport of Dangerous Goods and contaminated materials from the Site are trained in the procedures to be implemented in the event of any incident involving the escape of Dangerous Goods or contaminated materials from their vehicles.

The Contractor shall ensure that all drivers of vehicles to and from the Site comply with the Site access and security requirements.

The Contractor shall ensure that all drivers of vehicles to and from the Site comply with the environmental control measures specified in the management plan. The contractors shall ensure that all vehicle movements within the Site follow the established Traffic Control Plan and comply with the prevailing traffic regulations, including speed limits.

The Contractor shall track all materials leaving the Site.

Oversize truck movements (predominantly floats) will only occur during RMS approved hours and will not operate during peak traffic.

Traffic peaks will occur in the early morning, and mid-afternoon with school drop off and pickup times.

The goal of contractors’ traffic management planning for the project will be to:

- Ensure maximum safety of on-site personnel, pedestrians, school staff, school students and drivers;
- Ensure that construction activities do not adversely impact or compromise safe traffic flow within the site;
- Minimise environmental nuisance and impact as a result of construction traffic;
- Ensure construction traffic does not interrupt existing traffic flows within the school and on the local road network;
- Ensure designated transport routes for those routes which will be used regularly over the duration of the construction works will be adopted by the contractors and communicated to haulage contractors;
- Establish scheduling of vehicle movements to ensure there are no vehicles waiting off the site within a block radius;
- Have no vehicles arrive at the site outside the site working hours;
- Advise site workers to only park in designated construction parking areas; and

Construction Traffic & Pedestrian Management Plan

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- Aim for trucks to only leave the site when they have reached their capacity loads wherever possible.

## I.5 CONSULTATION

Date	Nature of Consultation	Authorities Involved
20/11/19	Discussion for implementing and design of traffic and pedestrian control measures and signage for stage 1 of the project	<ul style="list-style-type: none"><li>• LCPS</li><li>• Currie &amp; Brown</li></ul>
05/12/19	Review of Construction Traffic & Pedestrian Management Plan for compliance	Men at Work Traffic Services
09/12/19	Community Consultation held at Lake Cathie School with LCPS Principal and all "out of hours" school facility users (stakeholders). The consultation covered: <ul style="list-style-type: none"><li>• Overview and timeline of 3 stage construction process</li><li>• Construction hours</li><li>• A W Edwards key personnel and contacts</li><li>• Buildings/zones affected</li><li>• Construction zones boundaries</li><li>• Changes and impacts to access &amp; egress for public</li><li>• 3D presentation of final campus design</li><li>• Q &amp; A</li></ul>	



## 2 EXISTING CONDITIONS

### 2.1 SUBJECT SITE

The subject site is located at 1240 Ocean Drive, Lake Cathie.

The surrounding properties include a mix of residential land release (Under construction) and future council sporting facilities, with Low pedestrian activity associated with Ocean Drive

The location of the subject site and the surrounding environs is shown in Figure 2.1 below.



Figure 2.1: Subject Site and its Environs.

### 2.2 ROAD NETWORK

#### 2.2.1 ADJOINING ROADS

##### Ocean Drive

Ocean Drive is a two-way road aligned in the North-South direction. Ocean Drive provides the only access into Lake Cathie Public School.

##### Wallum Drive

Wallum Drive is a two-way road aligned in the North/West-South/East direction. Wallum Drive is currently under construction. Wallum Drive is not open for public access.

Construction Traffic & Pedestrian Management Plan

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### 2.2.2 PEDESTRIAN ACTIVITY

The pedestrian movements occur along the council roadway gravel verges around the front area of the site.

The internal road and footpath network within the school provide pedestrian access. The internal roadway pedestrian access appears to be limited on roadways as vehicle/bus drop off & pick-up areas are in use.

All internal pedestrian movements within the school will be managed by exclusion zones and delineated pedestrian access pathways.

## 3 CONSTRUCTION STRATEGY AND TRAFFIC MANAGEMENT PLANS

### 3.1 BACKGROUND

Demolition of the site is scheduled to commence in January 2020 and all construction is to be completed by the end of July 2021.

It is important to note that this report relates to the construction of the Lake Cathie Public School Upgrade project.

### 3.2 TIMEFRAMES AND FREQUENCIES

It is envisaged that the entire project would take approximately 18 months to complete as per programmed milestone staging. Commencement of site work is scheduled for January 2020.

Due to the staging of the project, truck movements can be co-ordinated as smaller deliveries for the duration of the project. Peak times will be during the demolition/excavation stage, formwork delivery/pickup, reinforcement deliveries, structural steel delivery/erection, concrete pours and plasterboard deliveries.

Consideration will need to be given to school morning (8am to 9am) and afternoon (2pm to 3pm) peak times.

### 3.3 CONSTRUCTION TRAFFIC MANAGEMENT PLAN

#### 3.3.1 ACCESS ARRANGEMENTS

##### Demolition & Excavation

All of the demolition, bulk & detailed excavation takes place for the site with ingress and egress via Ocean Drive and school internal road network. Larger demolition & excavation deliveries can be co-ordinated around school peak times.

##### Formwork & Reinforcement

All of the formwork delivery and pickups will ingress and egress from Ocean Drive and school internal road network.

## Construction Traffic & Pedestrian Management Plan

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Formwork is to be securely bundled on site and removed from site with use of forklift, Hi-Ab or crane and loaded onto truck using assistance from traffic control where required. All formwork & reinforcement deliveries can be co-ordinated around school peak times.

### Concrete Pours

All concrete pours will ingress and egress from Ocean Drive and school internal road network. All concrete pours will be completed from within the site boundaries. On larger concrete pours, (main slab areas) school morning peak times may overlap concrete deliveries. The assistance of traffic control will be required on these days to maintain organised traffic movements. Consideration will be given to start concrete pours as early as possible where planning permission allows.

### Structural Steel & Plasterboard

All of the structural steel & plasterboard deliveries will ingress and egress from Ocean Drive and school internal road network.

All structural steel & plasterboard deliveries can be co-ordinated around school peak times.

## 3.3.2 VEHICLE MOVEMENT PLAN

The proposed vehicle movement plan has been prepared on the basis that allows construction vehicles to reach direct access to the main road network to minimise vehicle movements in residential areas.

The proposed vehicle movements plan for the construction is indicated in Appendix A & C.

## 3.3.3 TRUCK QUEUING LOCATION/S

It is not anticipated any truck queuing would be required. If required, a suitable truck queuing location will be determined with consultation of Port Macquarie Hastings Council & RMS.

All queuing trucks would be instructed to not have their engines idling whilst in this holding location. The queuing location would be used as the truck marshalling area to allow trucks to enter the site in manageable groups rather than all at the same time.

## 3.4 TRAFFIC CONTROL PLANS

### Truck Ingress/Egress from Ocean Drive

The level of traffic on Ocean Drive is low which should mean that the construction traffic would have minimal impact on vehicles using this street. However access to the school internal road network should still not be impeded.

It is also important to maintain construction vehicle movements to prevent any queuing and blocking of Ocean Drive.

Manual stop/go traffic control may also be employed around the Ocean Drive & school internal road network connection, where required, to control heavy traffic movement e.g. Concrete pours.

## 4 CONDITIONS OF TRAFFIC AND PEDESTRIAN PLAN

AW Edwards have individually addressed the following points to ensure all safeguards and measures for the Lake Cathie Public School Upgrade can be achieved.

### 4.1 ACCESS TO CONSTRUCTION SITES AND SITE COMPOUNDS

Construction worker (light) vehicles will park in designated construction vehicle parking areas at the Lake Cathie Public School Upgrade Building site. The timing of the Works will commence from January 2020.

Access to the worksite will see heavy vehicles:

- Access the worksite from Ocean Drive, Refer to Appendix A – Haulage Movement Plan and Appendix B– Truck Turning Path.
- Staging for trucks will be coordinated in order to ensure the surrounding area is not congested with trucks parked on the surrounding roads, restricting traffic movement and causing WHS issues for pedestrians.

### 4.2 CHANGES TO LANE WIDTHS

- Ocean Drive. No changes.

### 4.3 NEED FOR RESTRICTIONS ON TRUCK MOVEMENTS

As trucks are the only means by which materials and equipment can be moved to and from the project, strict monitoring of road speed limits will be enforced.

### 4.4 NEED FOR CHANGES TO EXISTING SIGNPOSTED SPEEDS

There would be no requirement for any changes to the current signposted speed limits along Ocean Drive. However, relevant signage will be placed along Ocean Drive to ensure all vehicles are aware of construction vehicles entry & exit from site.

### 4.5 IMPACTS FROM RELOCATION OF EXISTING FACILITIES

Temporary fencing, staff and student pedestrian access measures and signage is required to facilitate movement of existing facilities around the site.

Temporary fencing will be installed to assist minimise staff and student movements into construction activity areas.

Construction Traffic & Pedestrian Management Plan

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## 4.6 TRUCK INGRESS AND EGRESS ROUTES

The site ingress and egress routes for construction traffic are as detailed in Traffic and Pedestrian Management Plan depicted in Appendix A.

## 4.7 ENTRY / EXIT LOCATIONS

Refer to Appendix A.

## 4.8 NATURE OF LOADS AND MATERIALS

Main Deliveries to the site will primarily consist of:

- Formwork, Reinforcement, Concrete, Structural Steel
- Fitout materials
- Plant and Equipment
- Services Equipment i.e. Pipework, Lift etc.

## 4.9 TEMPORARY TRAFFIC ARRANGEMENTS

Alternative traffic routes are not anticipated at the Lake Cathie Public School Upgrade worksite. Appropriate truck warning signage approved by the RMS will be installed at the worksite prior to the commencement of demolition works and will be maintained throughout construction works phase, in accordance with the RMS guidelines for traffic control at worksites.

## 4.10 HEAVY VEHICLE QUEUING ARRANGEMENTS.

No heavy vehicle queuing along public roads will be permitted at the worksite. For the site:

- Lake Cathie Public School Upgrade – Truck staging will be coordinated.
- Heavy Vehicle Turning paths are depicted in Appendix B.

## 4.11 PROVISION OF BARRIERS

Site fencing and barriers between working and external pedestrian and trafficked areas will be provided as indicated on the approved Traffic and Pedestrian Management Plan. The site will be fenced to prevent unauthorised access in accordance with the SafeWork guidelines. This will be maintained until the end of all Works.

Refer to Appendix A.

## 4.12 IMPACT ON GENERAL TRAFFIC, CYCLISTS, BUS SERVICES AND PEDESTRIAN FACILITIES

The works have no anticipated impacts on the general traffic, cyclists and bus services during the school peak hours. There are no temporary traffic arrangements or changes to lane widths or changes to the current signage along Ocean Drive. However, As detailed there will be additional sign postage for construction access only. The temporary signage is detailed within appendix A.

## Construction Traffic & Pedestrian Management Plan

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There are no dedicated existing pedestrian footpaths along all streets surrounding the School site. Pedestrian safety will remain at its current standard.

All internal pedestrian movements within the school will be managed by exclusion zones and delineated pedestrian access pathways.

### 4.13 METHODS FOR IMPLEMENTING THE CTPMP

It will be the responsibility of the AW Edwards and the sub-contractors to ensure that the provisions of this CTPMP is implemented and complied with prior to the commencement of Substantial Works. AW Edwards will be monitoring this process closely.

### 4.14 ACCESS TO SIDE STREETS

- Houston Mitchell Drive – will not be affected

### 4.15 ACCESS TO ADJOINING PROPERTIES

Vehicular access and parking on surrounding streets will not be affected by the operation of the Lake Cathie Public School Upgrade work site.

- Ocean Drive – No disruption is envisaged

### 4.16 IMPACTS AND CHANGES TO ON AND OFF STREET PARKING

There will be no impact to on street parking as a result of the operation of the worksite and workers using street parking.

All vehicles associated with the construction site will park in on-site designated construction vehicle parking areas.

### 4.17 COMMUNICATION AND LIAISON METHODS

This CTPMP worksite report has been developed to satisfy Lake Cathie Public School and Port Macquarie Hastings Council.

During construction, the AW Edwards WHSE Manager will provide reporting in accordance with AW Edwards Management System to confirm the practical operation of the CTPMP worksite and CTPMP reports. The primary means of this reporting will be via the project safety and incident management response plans whereby actions taken in response to identified traffic incidents will be documented together with an overall summary of any required changes or updates to the relevant worksite traffic management report.



## Construction Traffic &amp; Pedestrian Management Plan

## 4.18 METHODS FOR COMMUNICATING TRAFFIC CHANGES

The commencement of works at the site will be communicated to the School in accordance with the programmed milestone staging procedures.

In general, further consultation will take place with Port Macquarie Hastings Council and the RMS should any change to worksite traffic operations become necessary.

## 4.19 CONSTRUCTION EMPLOYEE TRAFFIC GENERATION

It is envisaged that there would be a maximum of 30 people on site during the Lake Cathie Public School construction from January 2020, as shown in Table 5.2.1. Most of these persons would drive cars to and from the worksite each day.

In accordance with Condition C9 of the SSD949, sufficient car parking is allocated in the nominated contractor compound that is located wholly on the site and will be made available to all site personnel. Traffic movements will generally not coincide with peak periods on the adjoining internal road network, which are 8–9:00 am and 2–3:00 pm.

There is no requirement for an on street work zone.

Table 4.19.1 Site Workforce Details

AW Edwards site workforce and contractors					MHR Site	
Year	Staff Day	Staff Night	Labour Day	Labour Night	Total Day*	Total Night*
2020-2021	5	-	25	-	30	-

\* Note: Monday – Friday Day-shift work hours are 7:00 am – 6:00 pm.  
 Saturday shift work hours are 7:00 am – 6:00 pm.  
 No work to be carried out on Sunday or public holidays.

## 4.20 THE USE OF MOBILE CRANES ON PUBLIC ROADS

If a mobile crane is required and needs to be set up on a public road, the relevant applications and approvals will be lodged with Port Macquarie Hastings Council.

## 4.21 DELIVERIES TO CONSTRUCTION SITES AND SITE COMPOUND

Access to the site will be via Ocean Drive.

A truck operator & delivery driver induction code of conduct is to be completed by all delivery vehicles entering the site. Refer Appendix E

All vehicles entering the site must make reasonable steps to minimise dust generation as required in condition C19 and C20. Refer to the environmental activity register that details the procedure and controls to minimise dust generation and maintain air quality.

## **4.22 RESPONSE PLANS**

In the event of an AW Edwards related construction traffic incident on the public road network the School or RMS will be notified in accordance with the procedures set down in AW Edwards Management System.

## **4.23 APPROPRIATE FEEDBACK, MONITORING, REVIEW AND AMENDMENT MECHANISMS**

A quarterly review of this CTPMP will be undertaken in order to determine any potential need for future amendments to the report. A verification review of the report would be conducted on a half yearly basis.

AW Edwards acknowledge that notwithstanding the Council and School satisfaction with this Traffic Management Report, the Council and School reserve the right to call for future amendments to the Report in the event of unforeseen circumstances or impacts on the network.



## 5 CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis and discussions presented within this report, the following conclusions and recommendations are made:

- The Lake Cathie Public School Upgrade is proposed to be completed by the end of July 2021 with the main site access being via Ocean Drive;
- Traffic control assistance may be required in the structure phases of the project.

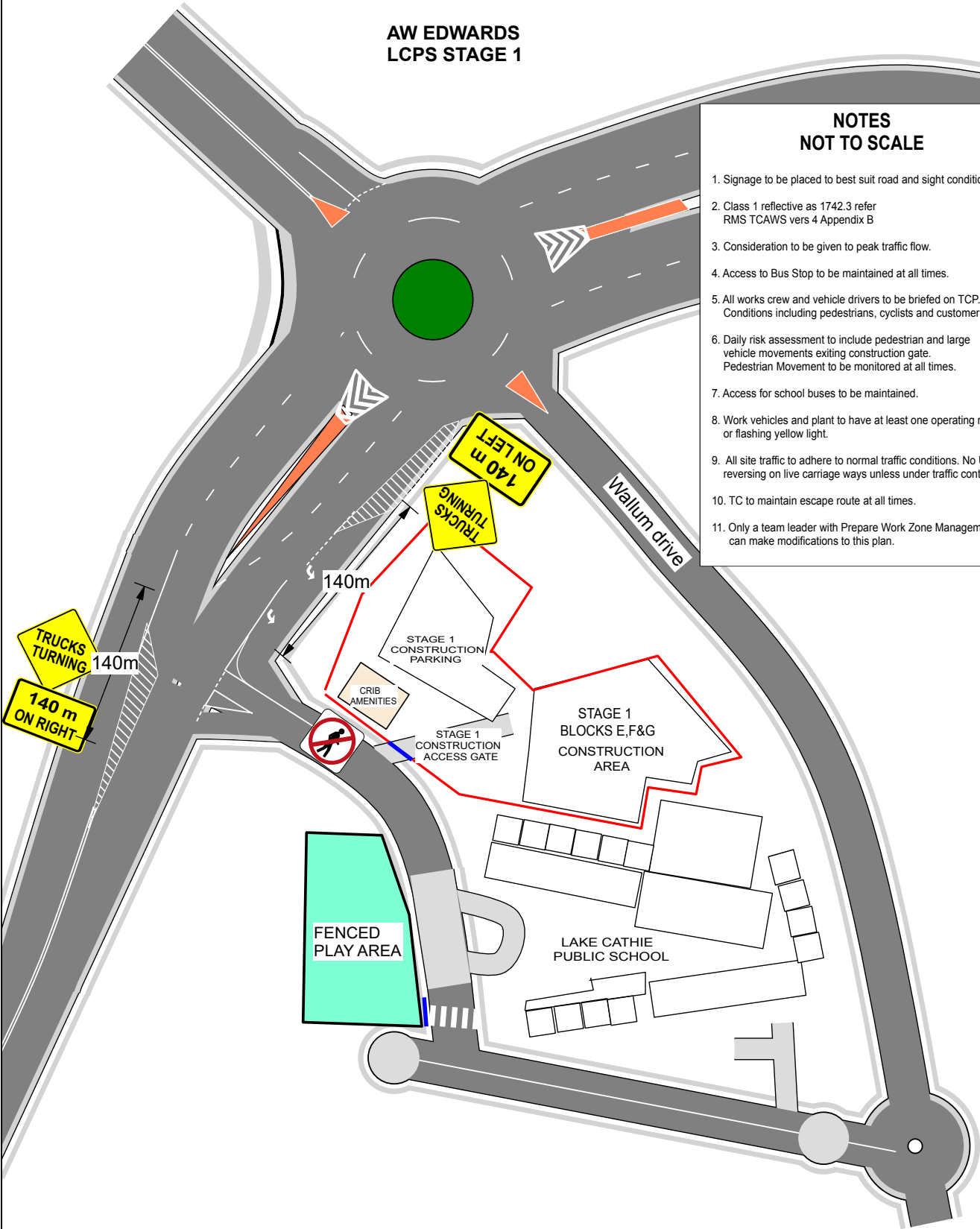
## 6 APPENDICES

## APPENDIX A – TRAFFIC MANAGEMENT PLAN

AW EDWARDS  
LCPS STAGE 1

NOTES  
NOT TO SCALE

- 1. Signage to be placed to best suit road and sight conditions.
- 2. Class 1 reflective as 1742.3 refer RMS TCAWS vers 4 Appendix B
- 3. Consideration to be given to peak traffic flow.
- 4. Access to Bus Stop to be maintained at all times.
- 5. All works crew and vehicle drivers to be briefed on TCP. Conditions including pedestrians, cyclists and customer access.
- 6. Daily risk assessment to include pedestrian and large vehicle movements exiting construction gate. Pedestrian Movement to be monitored at all times.
- 7. Access for school buses to be maintained.
- 8. Work vehicles and plant to have at least one operating rotating or flashing yellow light.
- 9. All site traffic to adhere to normal traffic conditions. No U-Turn or reversing on live carriage ways unless under traffic control.
- 10. TC to maintain escape route at all times.
- 11. Only a team leader with Prepare Work Zone Management Plan Card can make modifications to this plan.



Date: 09/12/2019 Author: Stephen Crabtree 0023297320 Project: AW Edwards Lake Cathie Public School

Comments:  
TCP for Stage 1 Construction

DATE MODIFIED: / /

NAME:

CARD NO:

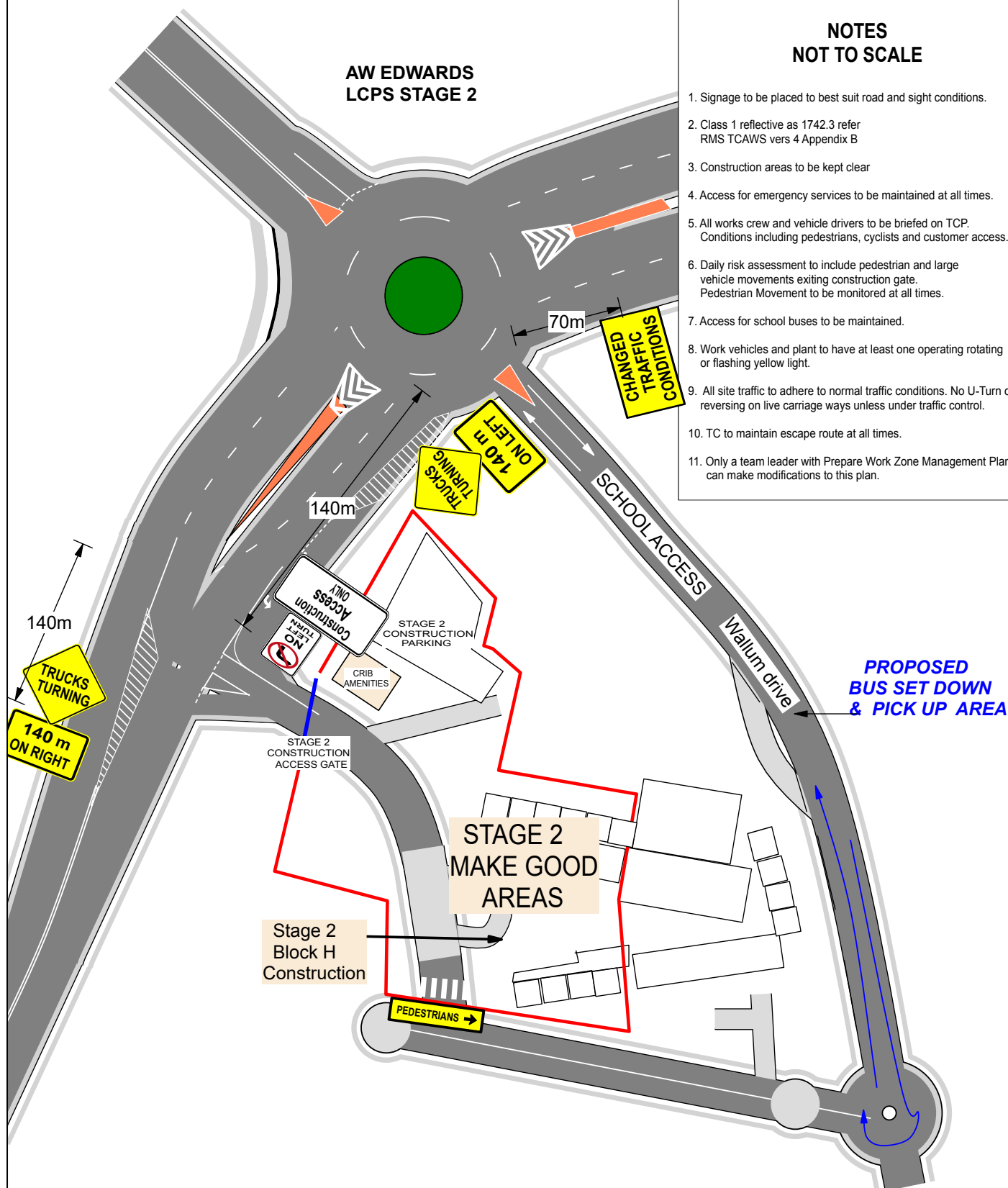
SIGNATURE:



## AW EDWARDS LCPS STAGE 2

### NOTES NOT TO SCALE

1. Signage to be placed to best suit road and sight conditions.
2. Class 1 reflective as 1742.3 refer RMS TCAWS vers 4 Appendix B
3. Construction areas to be kept clear
4. Access for emergency services to be maintained at all times.
5. All works crew and vehicle drivers to be briefed on TCP. Conditions including pedestrians, cyclists and customer access.
6. Daily risk assessment to include pedestrian and large vehicle movements exiting construction gate. Pedestrian Movement to be monitored at all times.
7. Access for school buses to be maintained.
8. Work vehicles and plant to have at least one operating rotating or flashing yellow light.
9. All site traffic to adhere to normal traffic conditions. No U-Turn or reversing on live carriage ways unless under traffic control.
10. TC to maintain escape route at all times.
11. Only a team leader with Prepare Work Zone Management Plan Card can make modifications to this plan.



Date: 09/12/2019 Author: Stephen Crabtree 0023297320 Project: AW Edwards Lake Cathie Public School

#### Comments:

TCP for Stage 2 Construction

DATE MODIFIED: / /

NAME:

CARD NO:

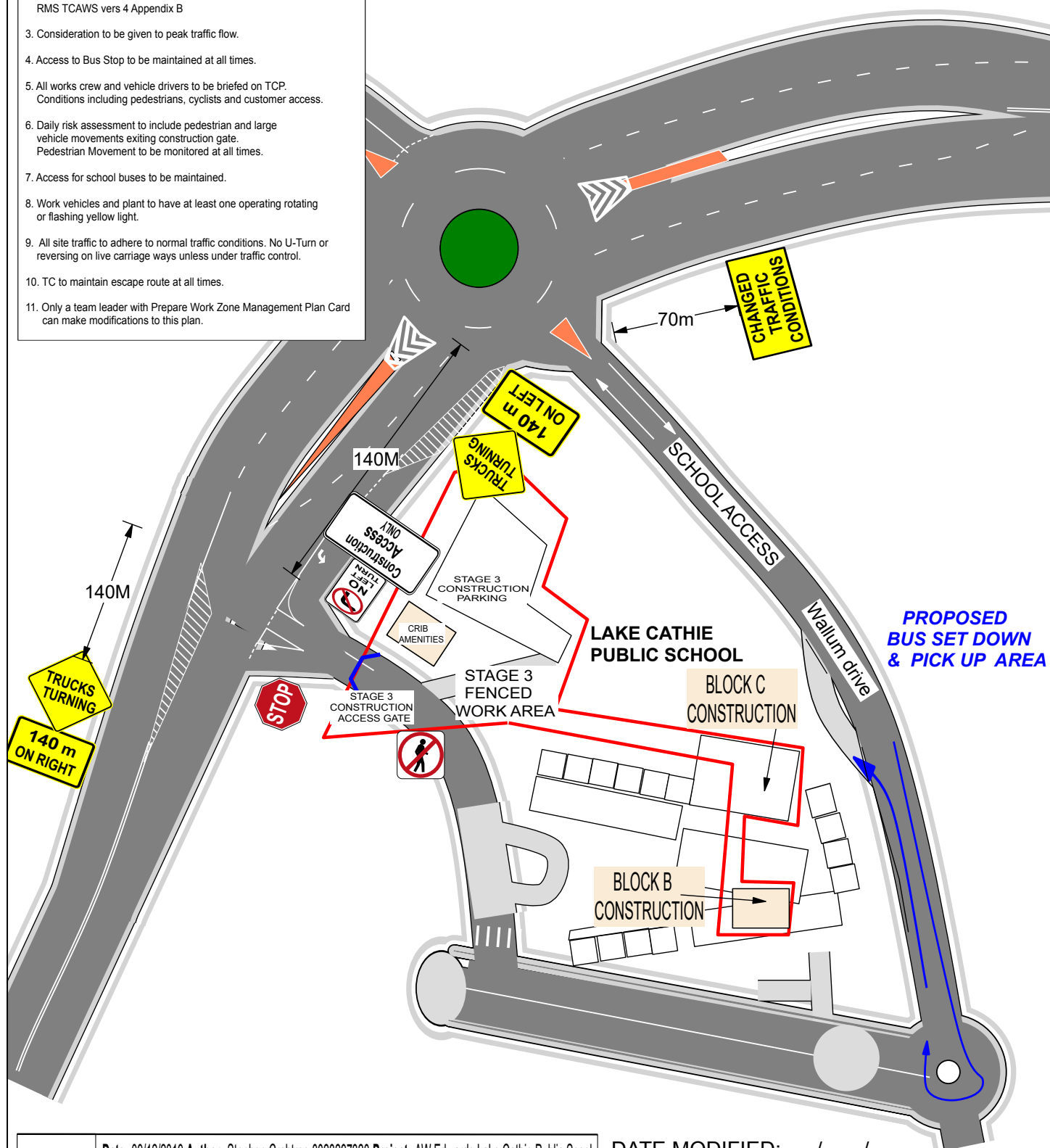
SIGNATURE:



## NOTES NOT TO SCALE

1. Signage to be placed to best suit road and sight conditions.
2. Class 1 reflective as 1742.3 refer RMS TCAWS vers 4 Appendix B
3. Consideration to be given to peak traffic flow.
4. Access to Bus Stop to be maintained at all times.
5. All works crew and vehicle drivers to be briefed on TCP. Conditions including pedestrians, cyclists and customer access.
6. Daily risk assessment to include pedestrian and large vehicle movements exiting construction gate. Pedestrian Movement to be monitored at all times.
7. Access for school buses to be maintained.
8. Work vehicles and plant to have at least one operating rotating or flashing yellow light.
9. All site traffic to adhere to normal traffic conditions. No U-Turn or reversing on live carriage ways unless under traffic control.
10. TC to maintain escape route at all times.
11. Only a team leader with Prepare Work Zone Management Plan Card can make modifications to this plan.

## AW EDWARDS LCPS STAGE 3



Date: 09/12/2019 Author: Stephen Crabtree 0023297320 Project: AW Edwards Lake Cathie Public School

### Comments:

TCP for Stage3  
Construction Access



DATE MODIFIED: / /

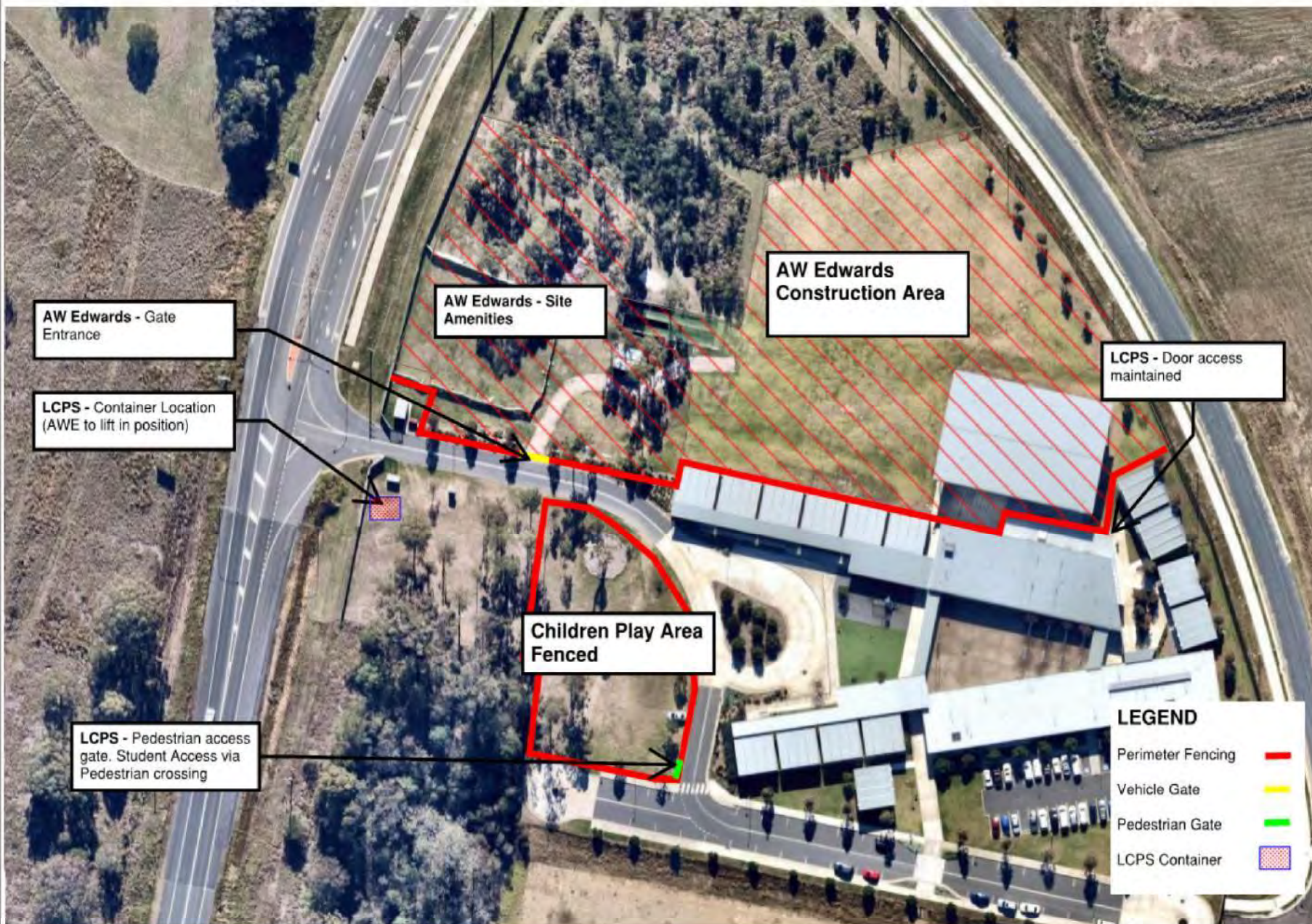
NAME:

CARD NO:

SIGNATURE:



PRELIMINARY ISSUE  
NOT FOR CONSTRUCTION



REV	DESCRIPTION	DATE
-----	-------------	------

TRADE CONTRACTORS TO CHECK ALL  
DIMENSIONS ON SITE BEFORE COMMENCING  
ANY WORK OR PREPARING ANY SHOP  
DRAWINGS.


DO NOT SCALE DRAWINGS USE FIGURED  
DIMENSIONS ONLY.

**AW EDWARDS**

131 Sailors Bay Road Tel: +61 2 9958 1474  
Northbridge, NSW 2063 Fax: +61 2 9958 6208

PROJECT  
Lake Cathie Public School

TITLE	Traffic Management Plan
-------	-------------------------

	DRAWN	APPROV
	D Barratt	
	PRINT DATE	SCALE

FILE:			
-------	--	--	--

PROJECT No.	REV. No.
628	

DRAWING No.  
ST1 001

The graph shows a step function  $f(x)$  on the interval  $[0, 10]$ . The function is defined as  $f(x) = 1 - \lfloor x/2 \rfloor$ . It starts at  $y=1$  for  $x \in [0, 1)$ , drops to  $y=0$  for  $x \in [1, 2)$ , jumps back to  $y=1$  for  $x \in [2, 5)$ , and drops to  $y=0$  for  $x \in [5, 10]$ . The x-axis is labeled with 0, 1, 2, 5, and 10. The y-axis is labeled with 0 and 1.

## APPENDIX B – VEHICLE TURNING CIRCLES







## APPENDIX C – VEHICLE ROUTES







## APPENDIX D – PEDESTRIAN MANAGEMENT PLANS







## APPENDIX E – TRUCK DRIVER / DELIVERY DRIVER INDUCTION & CODE OF CONDUCT

## TRUCK OPERATOR / DELIVERY DRIVER INDUCTION & CODE of CONDUCT

LAKE CATHIE PUBLIC SCHOOL UPGRADE	
Supervisor/Traffic Controller:	Date:
Vehicle Registration No:	
Drivers Name:	Signature:
<b>Important Site Safety Information and Operating Procedures for Truck &amp; Delivery Drivers</b>	(Initial to Acknowledge)
<p>As far as practicable I will remain inside the cabin of my vehicles while on-site. If I leave the cabin, I will <u>wear</u> the minimum mandatory PPE including:</p> <ul style="list-style-type: none"> <li>Steel toe capped footwear</li> <li>High-visibility clothing</li> <li>Hard hat</li> <li>Safety glasses</li> <li>Gloves appropriate to the task</li> </ul>	
I will maintain a minimum of 3 metres clearance from all <u>mobile plant</u> whilst it is operating to load or unload materials/goods from my vehicle.	
I can confirm warning lights on my vehicle are operational and the reversing alarm is working.	
I can confirm that my vehicle is registered and roadworthy.	
I can confirm no unauthorised persons are travelling within the vehicle (i.e. children)	
<p>I will comply with all site traffic signage;</p> <ul style="list-style-type: none"> <li>including speed limits</li> <li>no stopping/parking zones</li> <li>traffic flow indicators</li> <li>and/or as directed by the site supervisor/traffic controller.</li> </ul>	
<p>(For Heavy Vehicles) For every delivery or despatch I am involved for this project - I confirm that my vehicle <u>shall</u> be within NSW Heavy Vehicle 'Chain of Responsibility' (legal) requirements for:</p> <ul style="list-style-type: none"> <li>Dimension</li> <li>Mass</li> <li>Load Restraint</li> <li>Driver fatigue</li> </ul>	
<p>I will comply in minimising traffic noise by:</p> <ul style="list-style-type: none"> <li>No early or late deliveries outside of working hours.</li> <li>Turning vehicle off when not in use</li> <li>Maintain equipment and stop noisy plant until repaired</li> </ul>	
I have familiarised myself with the vehicle specified routes detailed in appendix B and C of the Traffic Management Plan. I understand that my vehicle is only permitted on the specified vehicle route.	
<p>Where there is the potential of tracking material (dirt/mud etc) onto the road:</p> <ul style="list-style-type: none"> <li>I will ensure my vehicle is cleaned prior to exiting the site.</li> </ul>	
The driver is to not enter into any arrangement or participate in any activity that would conflict illegally with other road users. In the event of any conflict or community complaint the driver must notify AW Edwards.	

## APPENDIX F – QUALIFICATIONS



## David Barratt

---

**From:** Stephen Crabtree <Stephen@menatwork.net.au>  
**Sent:** Monday, 9 December 2019 11:45 AM  
**To:** David Barratt  
**Subject:** LCPS  
**Attachments:** AW Edwards Lake Cathie Stage 1.pdf; AW Edwards Lake Cathie Stage 2.pdf; AW Edwards Lake Cathie Stage 3.pdf

Hi Dave

Attached plans, as discussed

These will form attachments to the developed Pedestrian & TMP produced for Lake Cathie Public School in consultation with Men at Work

Regards

Stephen Crabtree

Traffic Manager



T: 02 6581 4600 | M: 0407 764 016 | F: 02 6581 4154 | E: [stephen@menatwork.net.au](mailto:stephen@menatwork.net.au)

W: [www.menatwork.net.au](http://www.menatwork.net.au) |

Mail: PO Box 2101, Port Macquarie, NSW 2444 | Office: 4/6 Belah Road Port Macquarie, NSW

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#####

## Craig McIlveen

---

**From:** Stephen Crabtree <Stephen@menatwork.net.au>  
**Sent:** Wednesday, 8 January 2020 2:25 PM  
**To:** Craig McIlveen  
**Cc:** David Barratt; David Proud  
**Subject:** RE: Lake Cathie Public School - Traffic Management Plan

Hi Craig

I have acknowledged and noted changes to the TMP developed for Lake Cathie Public School.  
There will be no requirements to change the TGS attachments.  
Regards

Stephen Crabtree



T: 02 6581 4600 | M: 0407 764 016 | F: 02 6581 4154 | E: [stephen@menatwork.net.au](mailto:stephen@menatwork.net.au)

W: [www.menatwork.net.au](http://www.menatwork.net.au) |

Mail: PO Box 2101, Port Macquarie, NSW 2444 | Office: 4/6 Belah Road Port Macquarie, NSW

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#####



Transport  
Roads & Maritime  
Services

Prepare a Work Zone  
Traffic Management Plan  
Card No. 0051809144

This qualification enables you to prepare Traffic Management Plans and  
conduct inspections on Traffic Management Plans.

STEPHEN  
CRABTREE

Expiry Date:  
14/09/2021





Transport  
Roads & Maritime  
Services

## Implement Traffic Control Plans

Card No. 0051863994

This qualification enables you to implement Traffic Guidance Schemes/Traffic Control Plans in accordance with approved Traffic Management Plans.

DAVID  
BARRATT

Expiry Date:  
12/11/2021



This card is not a proof of identity.



Transport  
Roads & Maritime  
Services

Traffic Controller

Card No. 0051863990

This qualification enables you to direct traffic with a stop/slow bat or similar control device through or past a roadwork site.

DAVID  
BARRATT

Expiry Date:  
12/11/2021



This card is not a proof of identity.

## APPENDIX G – CONSULTATION



## Post Approval – Consultation

Consultation needs to be undertaken in accordance with the standard evidence of consultation condition in the consent. Consultation needs to be meaningful, done with courtesy and respect and be well documented. These are people/ organisations that we need to be building meaningful relationships with.

Conditions of all consent can require consultation with a range of stakeholders. Consultation in the post approval world needs to be well documented to satisfy the condition requirements.

Examples include Council, service providers (eg. Electricity gas etc.), consult with local bus provider and TfNSW.

Read each condition carefully, any reference to consult triggers consultation.

Typically on State Significant Development, there will be a specific consultation condition as to how this piece can be appropriately addressed.

If no response has been obtained from the stakeholder, various attempts (minimum of 3 per media) over a reasonable timeframe, have to be documented.

If there is a dispute, , the table needs to be fully completed (details of any matters unresolved and how the applicant has resolved these).

Consultation is not:

- A token gesture
- Done at the end of the piece of work,
- An email to the relevant stakeholder with no response;
- A meeting with the stakeholder with no meeting minutes.

Consultation is:

- Meaningful
- Done prior to the requirement,
- Captures an outcome,
- Identifies matters resolved,
- Identifies matters unresolved,
- Any disagreements are disclosed; and
- How we are going to address unresolved matters?

How to capture all the relevant details on consultation requirements? Any consultation requirement in a condition is required to be accompanied with the following table:



### Post Approval Consultation Record

Identified Party to Consult:	Port Macquarie Hasting Council / TfNSW
Consultation type:	Email Correspondence
When is consultation required?	Pre Construction
Why	Consultation
When was consultation scheduled/held	Email Correspondence: Wednesday 8 <sup>th</sup> of January 2020 4:28 pm
When was consultation held	Email response: Thursday 9 <sup>th</sup> January 2020 7:08 AM Friday 6 <sup>th</sup> March 2020 2:09PM
Identify persons and positions who were involved	Grant Burge (Engineering Development Coordinator
Provide the details of the consultation	<ul style="list-style-type: none"> <li>Email correspondence for consultation on the lake Cathie Public School – Construction Traffic Pedestrian Management Plan</li> </ul>
What specific matters were discussed?	- Email correspondence provided in trailing document.
What matters were resolved?	No matters for resolution identified.
What matters are unresolved?	Nil to resolve.
Any remaining points of disagreement?	Nil
How will SINSW address matters not resolved?	Nil

---

**From:** Grant Burge <[grant.burge@pmhc.nsw.gov.au](mailto:grant.burge@pmhc.nsw.gov.au)>  
**Sent:** Thursday, 9 January 2020 7:08 AM  
**To:** Craig McIlveen <[cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)>  
**Cc:** David Barratt <[dbarratt@awedwards.com.au](mailto:dbarratt@awedwards.com.au)>; David Proud <[dproud@awedwards.com.au](mailto:dproud@awedwards.com.au)>  
**Subject:** RE: Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Craig,

I have taken a look over the TMP and it looks to be in order and acceptable to us, I can't refer it to RMS until the development is approved, but they have been involved in the SSD process so they are aware of the site. I will send it on to them once we receive the word from the department that it is approved.

Regards,  
Grant

**Grant Burge**

Development Engineer  
Port Macquarie-Hastings Council



p (02) 6581 8071



---

**From:** Craig McIlveen <[cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)>  
**Sent:** Wednesday, 8 January 2020 4:28 PM  
**To:** Grant Burge <[grant.burge@pmhc.nsw.gov.au](mailto:grant.burge@pmhc.nsw.gov.au)>  
**Cc:** David Barratt <[dbarratt@awedwards.com.au](mailto:dbarratt@awedwards.com.au)>; David Proud <[dproud@awedwards.com.au](mailto:dproud@awedwards.com.au)>  
**Subject:** Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Grant,

Thank you for the return phone call today regarding Lake Cathie Public School.

As discussed, AW Edwards are the building contractor engaged by School Infrastructure to undertake these works.

In accordance with SSD conditions. AW Edwards are to prepare in consultation with Council and RMS a project specific Construction Traffic and Pedestrian Management Plan.

Please refer to the attached document jointly prepared with traffic consultant Men at Work (qualification provided). This has been issued as preliminary for review and consultation with Hastings Council and the RMS prior to a final.

If required, we would be happy to meet up and discuss the traffic methodology further to ensure no effect on the safety and minimal effect on efficiency of the road network.

You mentioned earlier today that you would be able to assist with contacting RMS on this item. That help would be appreciated. Alternatively, if you could advise an appropriate contact I would be happy to coordinate.

Thanks for your time.

Kind regards,

Craig McIlveen

## Craig McIlveen

---

**From:** Grant Burge <grant.burge@pmhc.nsw.gov.au>  
**Sent:** Friday, 6 March 2020 2:09 PM  
**To:** Craig McIlveen  
**Subject:** RE: Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Craig,

I was just about to call you, just got your message. I haven't heard anything back from RMS yet but I will let you know as soon as I have. I have put a copy of your dilapidation report on our file.

Regards,  
Grant

### Grant Burge

Engineering Development Coordinator (acting)  
Port Macquarie-Hastings Council



p (02) 6581 8071



---

**From:** Craig McIlveen <cmcilveen@awedwards.com.au>  
**Sent:** Friday, 6 March 2020 2:04 PM  
**To:** Grant Burge <grant.burge@pmhc.nsw.gov.au>  
**Subject:** RE: Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Grant,

Further to the trailing correspondence and our previous discussion.

Have you received feedback from RMS on the consultation with the traffic management plan. If you recall a requirement of the state significant development was the submission of the traffic management plan. If we have issued with no response that's ok also.

Grateful if you could confirm submission of the construction traffic management plan.

Thanks for your assistance.

Kind regards,

Craig McIlveen  
Project Manager

A W Edwards Pty Limited  
Port Macquarie Office  
6/35 Merrigal Rd, Port Macquarie NSW 2444  
P: 02 6581 5755 | D: 02 8036 7388  
M: 0403 611 161 | E: [cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



---

**From:** Craig McIlveen  
**Sent:** Tuesday, 4 February 2020 4:00 PM  
**To:** Grant Burge <[grant.burge@pmhc.nsw.gov.au](mailto:grant.burge@pmhc.nsw.gov.au)>  
**Subject:** RE: Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Grant,

Please see attached the Lake Cathie Public School SSD conditions. Speaking with my client they were happy for AW Edwards to issue this consent.

Items specific with council commence from B39.

Regards,

Craig McIlveen  
Project Manager

A W Edwards Pty Limited  
Port Macquarie Office  
6/35 Merrigal Rd, Port Macquarie NSW 2444  
P: 02 6581 5755 | D: 02 8036 7388  
M: 0403 611 161 | E: [cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



---

**From:** Grant Burge <[grant.burge@pmhc.nsw.gov.au](mailto:grant.burge@pmhc.nsw.gov.au)>  
**Sent:** Tuesday, 4 February 2020 3:38 PM  
**To:** Craig McIlveen <[cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)>  
**Subject:** RE: Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Craig,

We still haven't received anything from the department yet, I have followed up with my Director and we have not received an approval or response to our initial concerns. I will let you know as soon as it is received. I will do the referral to RMS as part of the S138 application to avoid duplication of referrals.

Regards,  
Grant

**Grant Burge**  
Engineering Development Coordinator (acting)  
Port Macquarie-Hastings Council



p (02) 6581 8071



---

**From:** Craig McIlveen <[cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)>  
**Sent:** Tuesday, 4 February 2020 11:25 AM  
**To:** Grant Burge <[grant.burge@pmhc.nsw.gov.au](mailto:grant.burge@pmhc.nsw.gov.au)>  
**Subject:** RE: Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Grant,

Further to the below AW Edwards received a copy of the SSD approval yesterday for lake Cathie Public School. If possible, are you able to please still assist with Transport NSW consultation on the traffic control plan. Alternatively, if you could advise an appropriate contact I would be happy to coordinate.

Appreciate you help.

Kind regards,

Craig McIlveen  
Project Manager

A W Edwards Pty Limited  
Port Macquarie Office  
6/35 Merrigal Rd, Port Macquarie NSW 2444  
P: 02 6581 5755 | D: 02 8036 7388  
M: 0403 611 161 | E: [cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)

[www.awedwards.com.au](http://www.awedwards.com.au)



---

**From:** Craig McIlveen  
**Sent:** Thursday, 9 January 2020 7:52 AM  
**To:** Grant Burge <[grant.burge@pmhc.nsw.gov.au](mailto:grant.burge@pmhc.nsw.gov.au)>  
**Subject:** RE: Lake Cathie Public School - Construction Traffic Pedestrian Management Plan

Hi Grant,

Thanks for the prompt response and assistance with the RMS once approval is received.

Kind regards,

Craig McIlveen  
Project Manager

A W Edwards Pty Limited  
Port Macquarie Office  
6/35 Merrigal Rd, Port Macquarie NSW 2444  
P: 02 6581 5755 | D: 02 8036 7388  
M: 0403 611 161 | E: [cmcilveen@awedwards.com.au](mailto:cmcilveen@awedwards.com.au)

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Appendix I I – Construction Soil and Water Management Plan

# Lake Cathie Public School Upgrade 124 Ocean Drive, Lake Cathie

## Construction Soil and Water Management Report (Including Water Sensitive Urban Design)

Project: Lake Cathie Public School Upgrade

Prepared for: AW Edwards

---

*Reference:* 5058

---

*Document prepared by:* M+G Consulting  
Level 3, 50 Berry St  
North Sydney, NSW 2060  
T: +61 2 8666 7888

---

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER





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Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
 Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
 Associates: Andrew Poles, BE, CPEng, NER  
 Paul Kenny, BE, MEngSc, CPEng, NER



# 1 Introduction and Description

M+G Consulting has been commissioned by AW Edwards to provide a Construction Soil and Water Management Report for the construction of the proposed school upgrade project at Lake Cathie Public School.

The site is located at Ocean Drive Lake Cathie, which is part of the Port Macquarie-Hastings Council Local Government Authority. The site has an approximate overall crossfall of a 4m over 200m falling from the north to the south. The proposed development is detailed on the architectural drawings by Shac Architects. Refer to the site plan in Appendix A.

The project involves construction of new school building and alterations and additions to existing school buildings currently found of the site. The following engineering works for part of these upgrade works:

- Earthworks for the site compound and temporary sediment basin to be used during the construction of the works.
- Earthworks for building platforms for the new buildings, associated pathways, road works settling/frog pond and overland flow drainage channel.
- Maintaining the natural gradient of the site and overland flow path through the development site.
- Modifications to existing internal roadways.
- New bus bay to Ocean Drive.
- New school buildings and alterations and addition to some of the existing buildings.
- New stormwater drainage and water quality measures for the new works to comply with the design requirements contained in Council's stormwater drainage guidelines and requirements. The new stormwater drainage connects into the existing school drainage systems.

This report provides a summary of the measures incorporated into the design and to be adopted during the construction works to manage stormwater and water quality on the site both during construction and throughout the life of the school.

---

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER



## 2 Stormwater Management

### 2.1 Port Macquarie-Hastings Council Development Plans

The stormwater drainage for the proposed development has been designed to comply with the following Port Macquarie-Hastings (PMH) Council's Development Plans, Australian Standards and Guidelines:

- Port Macquarie-Hastings Council Development Design Specification D5 "Stormwater Drainage Design" and D7 "Stormwater Management".
- Australian Rainfall and Runoff.
- Australian Standard *AS3500.3 – 2018 Stormwater Drainage*.

### 2.2 Stormwater Drainage (SWD) System

The SWD system has been design in accordance with the above documents and is detailed on the Stormwater Drainage Plans contained in Appendix B.

The stormwater drainage system has been analysed using the "DRAINS" software to assess the performance of the site stormwater system.

The site contains overland flow paths that run through the site. A rock lined swale is also proposed to divert any stormwater entering the site from overland flows from properties to the north of the school.

The piped drainage system for the project has been designed for the one in twenty (1:20) year Average Recurrence Interval (ARI) rainfall events. The new piped drainage system connects to the existing trunk drainage system located on the school site and to existing street stormwater drainage located on Ocean Drive.

All roof water for the new buildings is collected and piped to rainwater tanks for re-use. The rainwater tank overflows into the new piped drainage system.

An assessment of the pre-development stormwater discharge rate and post-development stormwater discharge rates was undertaken. No increase in the post-development discharge rates was deemed to be likely as a result of these school upgrade works.

---

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER



## 2.3 On Site Detention (OSD)

The post development stormwater discharge rates for the proposed works does not exceed the current, pre-development rates. As a result, based on the requirements contained in PMH Council design specification D5, no OSD is required for this project.

## 2.4 Rainwater Tanks

Aboveground rainwater storage tanks for the new buildings is to be provided. Roof rainwater is piped into these tanks for re-used in the development. Refer to the BASIX report for further details.

The rainwater tanks are detailed on the Stormwater Drainage Plans contained in Appendix B.

## 2.5 Maintenance

Refer to section 3.2.5 for proposed maintenance schedule for the stormwater drainage system.

# 3 Water Sensitive Urban Design

## 3.1 Port Macquarie-Hastings Council Development Plans

The Water Sensitive Urban Design (WSUD) for the proposed development has been designed to comply with the following Control Plans, Australian Standards, Report and Guidelines:

- Port Macquarie-Hastings Council Development Design Specification D7 "Stormwater Management".
- Australian Rainfall and Runoff.
- Provisional Acid Sulfate Soil (ASS) Management Plan by Douglas Partners (Ref 89691.02 dated December 2019).

The ASS Management Plan is to be referred to for all matters pertaining with dealing with potential Acid Sulfate Soils encountered on site.

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER



## 3.2 Water Quality Management

### 3.2.1 Water Quality Objective

PMH Council aims to achieve the following targets in relation to stormwater quality:

- Average annual gross pollutant (>5mm) load reduction objectives of 100%
- Average annual total suspended solids (SS) load reduction objectives of 80%
- Average annual total phosphorus (TP) load reduction objectives of 45%
- Average annual total nitrogen (TN) load reduction objectives of 45%

To demonstrate compliance with these objectives, treatment removal loads were analysed from pre to post development scenarios using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Version 6.3 software.

### 3.2.2 Proposed Soil and Water Treatment Measures

To achieve the required pollutant reductions to satisfy PMH Council's requirements the following measures are to be implemented into the stormwater drainage works.

- Ecosol litter baskets with RFM pillows (8 of total) are to be installed in the stormwater drainage inlet pits, and
- Humes "HumeGard" gross pollutant tanks (GPT) located at the stormwater discharge locations (2 of) for the project.

Details of these measures are shown on the Stormwater Drainage Plans contained in Appendix B.

### 3.2.3 Water Quality Modelling – MUSIC Model

The water quality modelling tool, MUSIC was utilised to simulate urban stormwater systems operating at a range of temporal and spatial scales. MUSIC models the total amounts of gross pollutants and nutrients produced within various types of catchments. It allows the user to simulate the removal rates expected when implementing removal filters to reduce the increased gross pollutant and nutrient levels created by the proposed development. A diagram of the MUSIC model is below.

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER





Figure: MUSIC Model

### 3.2.4 MUSIC Modelling Results

The following results were achieved within the model:

#### Comparison of MUSIC Results

Pollutant	Post-Development with no WSUD Measures (kg/yr)	Post-Development with WSUD Measures (kg/yr)	Removal Rate (%)	Target Removal Rate* (%)
Suspended Solids	5430	705	87	80
Phosphorus	11.7	2.73	77	45
Nitrogen	88.2	42.5	52	45
Gross Pollutants	574	0	100	100

The results of the MUSIC modelling indicate that the proposed water consisting of the litter baskets and GPT tanks can satisfy PMH Council's requirements for water quality.

### 3.2.5 Maintenance

Regular routine maintenance of the litter baskets, GPT tanks and stormwater drainage system will be required to ensure that these water quality measures continue to perform as intended.

The following indicative maintenance schedule is proposed:

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER



<b>Stormwater and Water Quality Maintenance Schedule</b>			
<b>Maintenance Action</b>	<b>Maintenance Requirements</b>	<b>Frequency</b>	<b>Responsibility</b>
<b>Stormwater Drainage System</b>			
Inside of Pits	Remove grate and inspect condition of pit. Repair and replace as required. Remove any silt/sediment/debris build-up	Every 6 months	Maintenance Contractor
Outside of Pits	Clean grate and remove any silt/sediment/debris build-up	Every 4 months or after significant rainfall event	Maintenance Contractor
<b>Stormwater Drainage System</b>			
General inspection of pipes	Condition inspection stormwater pipes. Undertake any repairs as necessary	Every 6 months	Maintenance Contractor
Rock-lined Swale Condition	Condition inspection of swale. Remove any silt/sediment/debris/litter build-up. Replace &/or rearrange any rocks that may have moved or been removed.	Every 6 months or after significant rainfall event	Maintenance Contractor
<b>Rainwater Tanks</b>			
First Flush Device and Litter/leaf Screen	Clean device for any debris, clogging or blockages	Monthly	Maintenance Contractor
Sediment Build-up	Check inside of tanks for sediment build-up. Clean and remove as required	Every 2 years	Maintenance Contractor
<b>Frog Pond</b>			
Embankment Repair	Condition inspection of earth embankments. Replace &/or repair any earth that may have eroded.	Every 6 months or after significant rainfall event	Maintenance Contractor
Sediment Control	Clean pond for any debris and/or sediment build-up	Every 6 months or after significant rainfall event	Maintenance Contractor
<b>Litter Baskets</b>			
Routine Maintenance	As per manufacturer's requirements (refer to Appendix C)	As per manufacturer's requirements (refer to Appendix C)	Maintenance Contractor
<b>GPT Tanks</b>			
Routine Maintenance	As per manufacturer's requirements (refer to Appendix C)	As per manufacturer's requirements (refer to Appendix C)	Maintenance Contractor
<b>Landscaped Areas</b>			
Erosion/loss of vegetation	Inspect turfed and landscaped for areas of exposed earth/rutting. Install mulch/turf/planting as required to rectify.	Every 6 months or after significant rainfall event	Maintenance Contractor
Weed Control	Remove weeds from root-ball. And replace effected areas with mulch/turf/planting as required to rectify	Every month	Maintenance Contractor

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
 Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
 Associates: Andrew Poles, BE, CPEng, NER  
 Paul Kenny, BE, MEngSc, CPEng, NER





## 4 Construction Soil and Water Management

### 4.1 Erosion and Sediment Control Measures during Construction Works

Prior to any earthworks commencing on site, soil and water management control measures will need to be put in place generally in accordance with Managing Urban Stormwater: Soils and Construction 4th Edition, March 2004.

These measures include:

- Installation of geo-textile filter fabric to the perimeter of the work site area, where required;
- The use of sediment diverting methods to minimise sediment in Council's / RMS' stormwater drainage system using sandbags around kerb inlet pits and geo-textile filter fabric around drop inlet pits;
- The provision of a rock-lined earth swale and sediment basin towards the southern end of the works area for which stormwater runoff shall be channelled and treated during construction;
- The provisions of a temporary truck wash down facility to service vehicles exiting the site during the construction stage.

Refer to drawings 628-CV-DRG-0010 to 012 contained in Appendix A for further details.

The contractor will be responsible to attain all necessary licences, permits or approvals prior to the commencement of the works.

The contractor will be responsible for the implementation and maintenance of the Erosion and Sediment Control measure used during construction of the works.

### 4.2 Soil and Water Management During Wet Weather Works

The following soil and water management measures are to be incorporated into the construction works during wet weather construction works:

- All plant and equipment are to be relocated away from edges of batters and edges of excavations.

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Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER



- Construct temporary earth V-drains to direct surface water away from top of batters, edges of excavations batters and temporary shoring
- Inspect all batters and temporary shoring and undertake remedial works as required.
- Inspect all erosion and sediment control measures and repair as necessary.
- Check to ensure that sufficient supply of flocculant is on site for water treatment prior to discharge from site.
- Ensure all vehicle access tracks are in good condition. Undertake repairs and top with gravel/ballast as required.

### 4.3 Acid Sulfate Soil (ASS) Management

A review of the NSW Department of Planning, Industry and Environment website of their Acid Sulfate Soil Risk Maps. Based on this review, this site is in a "Low probability of ASS occurrence" area.

An Acid and Sulfate Soil Management Plan has been prepared by Douglas Partners. This report is contained in Appendix D.

The report provides recommendation and procedures to manage acid sulfate soils should they be encountered on site during the excavation works.

Based on the site investigations undertaken, it is considered that acid sulfate soils are unlikely to be disturbed/excavation as part of the works. However, should any natural soils that are disturbed/excavated as part of the works are to be segregated and stockpiles for further assessment and testing by the project geotechnical engineer.

All recommendations and protection measures contained in the report are to be followed to ensure that any acid sulfate soils are suitably managed and treated during the works.

### 4.4 Maintenance

The following inspection frequency and corrective action, to be undertaken by the main contractor, for the soil and water management measures during the construction works and during periods of wet weather is recommended:

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Principals:	Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas
Associates:	Andrew Poles, BE, CPEng, NER Paul Kenny, BE, MEngSc, CPEng, NER



Construction Soil and Water Quality Maintenance Schedule			
Maintenance Action	Maintenance Requirements	Frequency	Responsibility
<b>Sediment Fences</b>			
Sediment build-up	Remove any excessive silt/sediment/debris build-up	Weekly or after significant rainfall event	Main Contractor
Damage	Repair and/or replace damaged fences	Weekly or after significant rainfall event	Main Contractor
<b>Mesh and Gravel Inlet Filters</b>			
Sediment build-up	Remove any excessive silt/sediment/debris build-up. Ensure filters are positioned around pit inlets	Weekly or after significant rainfall event	Main Contractor
<b>Geotextile and Straw Bale Filters</b>			
Sediment build-up	Remove any excessive silt/sediment/debris build-up. Ensure filters are positioned around pit inlets	Weekly or after significant rainfall event	Main Contractor
<b>Stabilised Site Entry and Roadways</b>			
Sediment build-up/Debris/Mud	Clean site entry grate and remove all debris build-up. Replace water in tyre wash bay. Clean and sweep roads.	Daily and after rainfall events	Main Contractor
<b>Sediment Pond</b>			
Sediment Build-up	Remove any excessive silt/sediment/debris build-up. Ensure filters are positioned around pit inlets	Every 2 months	Main Contractor
Flocculation and Water Testing	Ensure water in sediment pond is flocculated and water quality tested prior to discharging from site	After and during rainfall events	Main Contractor
<b>Rock-Lined Swale</b>			
Rock-lined Swale Condition	Condition inspection of swale. Remove any silt/sediment/debris/litter build-up. Replace &/or rearrange any rocks that may have moved or been removed.	Every month or after significant rainfall event	Main Contractor
General			
Spills	All spills are to be cleaned up immediately	After spills	Main Contractor
Mud or Sediment	All cumulated sediment/mud built-up is to be removed on a regular basis.	Daily	Main Contractor
Mud/sediment tracked onto public roadways	Any mud or sediment which is tracked onto public roadways is to be removed immediately	Always	Main Contractor
Erosion and Sediment Control Measures	Inspect and maintain all erosion and sediment control measures to ensure that they are maintained and in good-working condition	Daily and with 24 hrs of expected rain and within 18 hours of a rainfall event	Main Contractor

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
 Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
 Associates: Andrew Poles, BE, CPEng, NER  
 Paul Kenny, BE, MEngSc, CPEng, NER



The details and recommendations contained on this report, if followed, provides strategies and practices for the control of Soil and Water Management during and after the construction works.

Report Prepared by:

Andrew Poles  
BE, CPEng, NER  
M+G Consulting

Report Reviewed by:

Simon Matthews  
BE, MEngSc, CPEng, NER, RQEQ  
M+G Consulting

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER



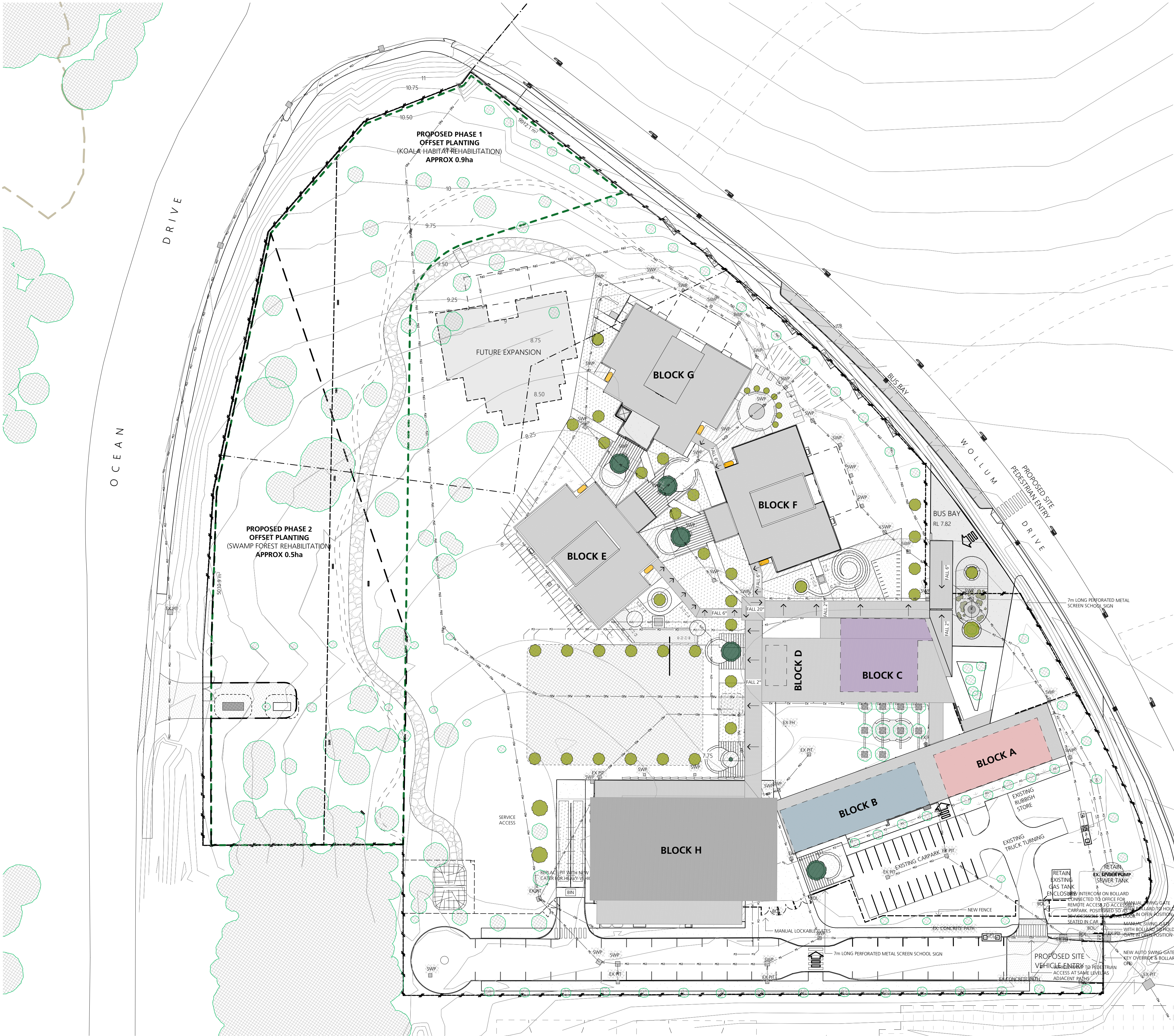
## Appendix A – Site Plan

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Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER







LEGEND & NOTES BUSHFIRE:

BUSHFIRE STANDARD EXCERPTS & NOTES PER AS 3959-2 REFER TO THE STANDARD IN CONJUNCTION WITH THESE NOTES:

CONSTRUCTION FOR BUSHFIRE CONDITIONS SHALL COMPLY WITH THE BCA & AS3959-2009 AND SUBSEQUENT AMENDMENTS 1, 2 & 3, AND THE ASSIGNED BAL RATING NOMINATED IN LETTER 'B' BY NSW RURAL FIRE SERVICE IN RELATION TO DA number here AND RFS REF: number here.

- ALL SARKING SHALL HAVE A FLAMMABILITY INDEX OF NOT MORE THAN 5 WHEN TESTED TO AS 1530.2.
- GAPS, GREATER THAN 3mm IN WIDTH, BETWEEN DOORS & THE DOOR JAMBS, HEADS OR SILLS (THRESHOLDS) SHALL BE PROTECTED BY DRAUGHT EXCLUDERS.
- THE EXPOSED COMPONENTS OF EXTERNAL WALLS SHALL BE NON-COMBUSTIBLE MATERIAL WITH A MINIMUM OF 6mm THICKNESS FIXED OVER NON-COMBUSTIBLE SARKING ON A TIMBER OR METAL STRUCTURE OF 90mm MINIMUM THICKNESS.
- ALL JOINTS IN THE EXTERNAL SURFACE MATERIAL OF WALLS SHALL BE COVERED, SEALED, OVERLAPPED, BACKED OR BUTT-JOINTED TO PREVENT GAPS GREATER THAN 3 mm.
- VENTS & WEEPHOLES IN EXTERNAL WALLS SHALL BE SCREENED WITH A MESH WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION-RESISTANT STEEL, BRONZE OR ALUMINIUM, EXCEPT WHERE THE VENTS & WEEPHOLES HAVE AN APERTURE LESS THAN 3mm (SEE CLAUSE 3.6), OR ARE LOCATED IN AN EXTERNAL WALL OF A SUBFLOOR SPACE.
- WHERE FITTED, SCREENS FOR WINDOWS & DOORS SHALL HAVE A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm MADE OF CORROSION-RESISTANT STEEL, BRONZE OR ALUMINIUM. GAPS BETWEEN THE PERIMETER OF THE SCREEN ASSEMBLY & THE BUILDING ELEMENT TO WHICH IT IS FITTED SHALL NOT EXCEED 3mm.
- GLAZING IN WINDOWS & DOORS EXCEPT SLIDING DOORS - REFER POINT BELOW) SHALL BE TOUGHENED GLASS MINIMUM 5mm THICK.
- GLAZING IN SLIDING DOORS SHALL BE TOUGHENED GLASS MINIMUM 6mm THICK & SLIDING DOORS SHALL BE TIGHT-FITTING IN FRAMES.
- VEHICLE GARAGE DOORS SHALL BE NON-COMBUSTIBLE MATERIAL & SHALL BE FITTED WITH SUITABLE WEATHER STRIPS, DRAUGHT EXCLUDERS, DRAUGHT SEALS OR GUIDE TRACKS, AS APPROPRIATE TO THE DOOR TYPE, WITH A MAXIMUM GAP NO GREATER THAN 3mm. GARAGE DOORS SHALL NOT HAVE VENTILATION SLOTS.
- ROOFWALL JUNCTION SHALL BE SEALED TO PREVENT OPENINGS GREATER THAN 3mm, EITHER BY THE USE OF FASCIA & EAVES LININGS OR BY SEALING BETWEEN THE TOP OF THE WALL & BETWEEN THE RAFTERS AT THE LINE OF THE WALL WITH NON-COMBUSTIBLE SEALANT.
- ROOF VENTILATION OPENINGS, SUCH AS GABLE & ROOF VENTS, SHALL BE FITTED WITH EMBER GUARDS MADE OF NON-COMBUSTIBLE MATERIAL OR A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION-RESISTANT STEEL, BRONZE OR ALUMINIUM.
- A PIPE OR CONDUIT THAT PENETRATES THE ROOF COVERING SHALL BE NON-COMBUSTIBLE.
- ROOF SHEETS & ROOF-COVERING ACCESSORIES SHALL BE NON-COMBUSTIBLE & SHALL BE FULLY SARKED IN ACCORDANCE WITH CLAUSE 7.6.2, EXCEPT THAT FOIL-BACKED INSULATION BLANKETS MAY BE INSTALLED OVER ROOF BATTENS. ANY GAPS GREATER THAN 3mm (SUCH AS UNDER CORRUGATIONS OR RIBS OF SHEET ROOFING & BETWEEN ROOF COMPONENTS) SHALL BE SEALED AT THE FASCIA OR WALL LINE & AT VALLEYS, HIPs & RIDGES BY:  
(i) A MESH OR PERFORATED SHEET WITH A MAXIMUM APERTURE OF 2mm, MADE OF CORROSION-RESISTANT STEEL, BRONZE OR ALUMINIUM; OR  
(ii) MINERAL WOOL; OR  
(iii) OTHER NON-COMBUSTIBLE MATERIAL; OR  
(iv) A COMBINATION OF ANY OF ITEMS (i), (ii) OR (iii) ABOVE.
- THE ENTRY AVENUE ROOFS SEPARATED FROM THE MAIN ROOF SPACE BY AN EXTERNAL WALL SHALL HAVE A NON-COMBUSTIBLE ROOF COVERING & THE SUPPORT STRUCTURE SHALL BE TIMBER RAFTERS LINED ON THE UNDERSIDE WITH FIBRE-CEMENT SHEETING A MINIMUM OF 6mm IN THICKNESS, OR WITH MATERIAL COMPLYING WITH AS 1530.8.1
- ROOF PENETRATIONS INCLUDING ROOF VENTILATORS, AERIALS, VENT PIPES & SUPPORTS FOR SOLAR COLLECTORS, SHALL BE ADEQUATELY SEALED AT THE ROOF TO PREVENT GAPS GREATER THAN 3mm. THE MATERIAL USED TO SEAL THE PENETRATION SHALL BE NON-COMBUSTIBLE.
- EAVES LININGS, FASCIAS & GABLES FASCIAS & BARGEBOARDS SHALL WHERE MADE FROM METAL & BE FIXED AT 450mm CENTRES.
- EAVES LININGS SHALL BE MINIMUM 4.5mm THICK FIBRE-CEMENT SHEET.
- ALL ABOVE-GROUND EXPOSED WATER & GAS SUPPLY PIPES SHALL BE COPPER OR STEEL WITH A MINIMUM WALL THICKNESS OF 0.9mm OR THE MINIMUM SET OUT IN GAS REGULATIONS, WHICH EVER IS GREATER.
- THE ABOVE NOTES MAY BE SUPERSED IF EFSG PERFORMANCE REQUIREMENTS EXCEED BAL REQUIREMENTS.

SITE ESTABLISHMENT NOTES

- PROVIDE NECESSARY MEASURES TO PROTECT ALL EXISTING WORKS TO BE RETAINED.
- REPAIR / REINSTATE / MAKE GOOD ANY DAMAGE TO WORKS TO BE RETAINED.
- UNDERTAKE ALL SERVICES SEARCHES IN ACCORDANCE WITH AUTHORITIES REQUIREMENTS & ISSUE TO SUPERINTENDENT FOR APPROVAL RELEVANT TO EXCAVATION, HOT WORKS & SERVICES ISOLATION PERMITS PRIOR TO COMMENCING WORKS.
- BUILDER TO PREPARE A CONSTRUCTION MANAGEMENT PLAN (CMP) IN ACCORDANCE WITH DA CONDITIONS. CONTRACTORS METHOD OF WORK PLAN (MOWP) TO CLEARLY INDICATE DETAILS & PROPOSED SETOUT FOR ALL FENCING AROUND THE SITE. DUE CONSIDERATION TO BE GIVEN STAGING, SCHOOL TRAFFIC, SCHOOL CHILDREN, PEDESTRIANS, & VEHICULAR MANAGEMENT & PRESENTATION. SUBMIT MOWP TO SUPERINTENDENT FOR APPROVAL PRIOR TO COMMENCING WORKS.
- REFER TO STRUCTURAL, CIVIL, ELECTRICAL, HYDRAULIC & MECHANICAL CONTRACTORS DOCUMENTS / REQ'S / ALLOWANCES FOR DETAILS OF ALL RELATED ITEMS.
- REINSTATE AND REPAIR FINISHES TO FOOTPATHS, RETAINING WALLS AND FENCES (ESPECIALLY SCHOOL FENCES) WHERE DEMOLISHED WORK ABUTS EXISTING TO BE RETAINED.
- REFER TO STRUCTURAL DOCUMENTS FOR ALL STRUCTURAL CONSIDERATIONS.
- DISPOSE OF ALL DEMOLISHED MATERIALS NOT FOR RE-USE IN ACCORDANCE WITH AUTHORITIES REQUIREMENTS.
- REPORT ANY HAZARDOUS SUBSTANCES OR MATERIALS FOUND & SEEK INSTRUCTION FROM SUPERINTENDANT.
- REPORT ANY ARCHAEOLOGICAL ITEMS FOUND & SEEK INSTRUCTION FROM SUPERINTENDANT.
- REMOVE ALL REDUNDANT SERVICES, FOOTINGS, SLABS IN-GROUND SYSTEMS & FILL AS REQ'D.
- CAP OFF ALL OLD SERVICES THAT ARE NO LONGER REQUIRED TO SERVICE PROVIDERS REQUIREMENT & RELATED ENGINEERS INSTRUCTIONS.
- CONTRACTOR TO MAKE THEMSELVES AWARE OF ALL IN-GROUND & OVERHEAD SERVICES & PROVIDE PROTECTION TO ALL ITEMS IN ACCORDANCE WITH SERVICE PROVIDERS RECOMMENDATIONS.
- CONTRACTOR TO KEEP PHOTOGRAPHIC RECORD OF EXISTING BUILDINGS AROUND NEW WORKS (IE NEIGHBOURING DWELLING AND ASSOCIATED LANDSCAPE WALLS, POOLS FENCES ETC) BEFORE CONSTRUCTION COMMENCES, & THEN PERIODICALLY DURING CONSTRUCTION.
- PROVIDE FLASHINGS, CAPPINGS & NON-COMBUSTIBLE SEALS TO ALL ROOF PENETRATIONS TO SUIT ROOF SHEET TYPE AND PROFILE & IN ACCORDANCE WITH AS3959 TAKING INTO ACCOUNT THE PROXIMITY OF THE OCEAN.
- PROVIDE NON-COMBUSTIBLE CLOSED CELL FOAM FILLER STRIP TO UNDERSIDE OF ROOF SHEET ENDS & AT ALL CAPPINGS, FLASHINGS, GUTTERS, RIDGES & VALLEYS.
- ALL ROOF SHEETING SYSTEMS MUST COMPLY WITH RELEVANT TERRAIN CATEGORY WIND & STORM CONDITIONS FOR THE SITE.
- EXTERNAL BUILDING ENVELOPE (ROOFS, WALLS, WINDOWS, DOORS ETC.) TO MEET THERMAL REQUIREMENTS OF SECTION J & BCA REQUIREMENTS & BUSHFIRE CONSTRUCTION REQUIREMENTS.
- ALL MASONRY (BLOCK & BRICK) COURSING SHOWN THROUGHOUT DRAWINGS IS INDICATIVE ONLY & SHOULD BE CONFIRMED BY RELEVANT CONTRACTOR.
- ANY STUD FRAMING SHOWN THROUGHOUT DRAWINGS IS INDICATIVE ONLY & SHOULD BE CONFIRMED BY FRAMING CONTRACTOR.
- PROVIDE AND MAINTAIN SITE SECURITY AT ALL TIMES INCLUDING AFTER WORKING HOURS.
- THE HEAD CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SECURITY OF THE SITE & ANY DAMAGE OR LOSS RESULTING FROM BREACH OF SECURITY.
- SATISFY ALL RELEVANT DA CONDITIONS LISTED IN COUNCIL'S NOTICE OF DETERMINATION.
- THIS SITE IS BUSHFIRE PRONE - REFER BUSHFIRE NOTES THIS SHEET.
- DOWN PIPE DISCHARGING INTO RAIN WATER TANKS TO HAVE FIRST FLUSH DEVICE, LEAF SCREEN, INSECT/VERMIN CONTROL, & TO BE CHEMICALLY WELDED. BACKFLOW PREVENTION DEVICE TO BE INSTALLED TO TANK OVERFLOW - AS PER NCC REQUIREMENTS.
- REFER TO LANDSCAPE PLANS IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS FOR REMOVAL OF TREES, RETENTION OF TREES & LANDSCAPE WORKS.

CONSULTANTS

**SHAC**  
ARCHITECTURAL  
SHAC Architects  
T 02 4961 5888

**M+G Consulting**  
STRUCTURAL + CIVIL  
M + G Consulting  
T 02 8666 7888

**ELECTRICAL PROJECTS INSTITUTE Pty Limited**  
ELECTRICAL  
Electrical Projects Australia  
T 02 4967 5999

**McCALLUM PFA**  
HYDRAULIC  
McCallum PFA  
T 02 4946 2653

**EVC**  
MECHANICAL  
EV Consulting Engineers  
T 02 4929 2461

**terras**  
LANDSCAPE ARCHITECT  
Terras  
T 02 4929 4926

**PCB CONSULTANT**  
PCB CONSULTANT  
Navacert  
T 02 4966 1127

**AW EDWARDS**  
CONTRACTOR  
A W Edwards  
T 02 8036 7200

AMENDMENTS				
No	Dr	Chk	Date	Comment
C	AHD		28.08.18	180818 - PRG07
D	RT	AHD	30.08.18	For information - civil
E	RT	AHD	18.09.06	NWC & Landscape Issue
F	RT	AHD	20.09.18	Consultant & Stakeholder Issue
G	RT	AHD	05.10.18	Draft 66% Schematic Design + SSD
H	RT	AHD	21.10.19	For information
I	RT	AHD	29.10.19	75% ISSUE
J	RT	AHD	02.12.19	95% ISSUE
K	RT	AHD	06.12.19	95% ISSUE

- NOTES
- Dimensions are in millimetres unless otherwise shown.
  - Work to given dimensions. Do not scale from drawing.
  - Check all dimensions on site prior to construction and fabrication.
  - Bring any discrepancies to the attention of the proprietor & architect.

PROJECT NAME AND ADDRESS  
Lake Cathie Public School Upgrade  
1240 Ocean Drive

**NSW GOVERNMENT**  
Education  
School Infrastructure

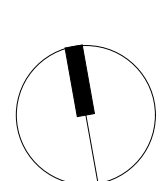
SCALE  
0m 5 10 15 20 25 30 41  
DISCIPLINE  
Architectural

DRAWN  
RT

APPROVED  
AHD

STATUS  
95% Issue  
Not for Construction  
DRAWING TITLE  
Proposed Site Plan

PROJECT NO.  
3928  
DRAWING NO.  
WA1002  
REV.  
K



**SHAC**

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E info@shac.com.au  
224 Maitland Road  
Maitland NSW 2226  
Australia  
Nominated Architect  
Justin Hamilton (6160)  
ABN 32 131 584 946



## Appendix B – M+G Stormwater Drainage Plans

Principals: Simon Matthews, BE, MEngSc, CPEng, NER, RPEQ  
Zlatko Gashi, BE, CPEng, NER, RPEQ, BPBVic, BPTas  
Associates: Andrew Poles, BE, CPEng, NER  
Paul Kenny, BE, MEngSc, CPEng, NER

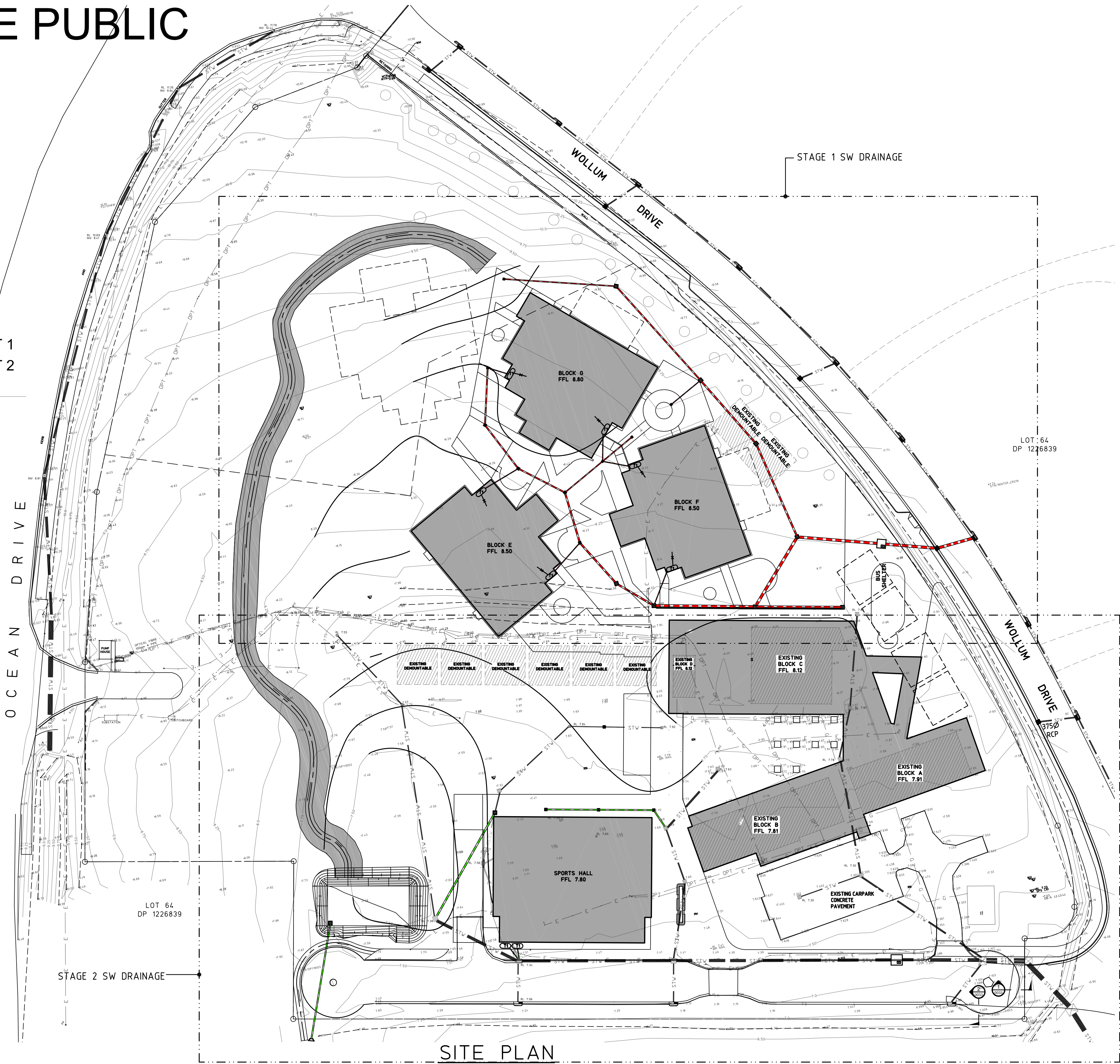




# PROPOSED LAKE CATHIE PUBLIC SCHOOL UPGRADE AT; LOT 2, DP 1193553, No.1240 OCEAN DRIVE, LAKE CATHIE

## CIVIL DRAWING INDEX

- 628-CV-DRG-0001 - COVER SHEET, SITE PLAN AND DRAWING INDEX
- 628-CV-DRG-0010 - SEDIMENTATION AND EROSION CONTROL PLAN SHEET 1
- 628-CV-DRG-0011 - SEDIMENTATION AND EROSION CONTROL PLAN SHEET 2
- 628-CV-DRG-0012 - SEDIMENTATION AND EROSION CONTROL DETAILS
- 628-CV-DRG-0020 - STORMWATER CATCHMENT PLAN
- 628-CV-DRG-0021 - STORMWATER PLAN SHEET 1
- 628-CV-DRG-0022 - STORMWATER PLAN SHEET 2
- 628-CV-DRG-0023 - STORMWATER DETAILS
- 628-CV-DRG-0024 - STORMWATER LONG SECTIONS
- 628-CV-DRG-0030 - EXTERNAL WORKS PLAN SHEET 1
- 628-CV-DRG-0031 - EXTERNAL WORKS PLAN SHEET 2
- 628-CV-DRG-0032 - EXTERNAL WORKS DETAILS SHEET 1
- 628-CV-DRG-0033 - EXTERNAL WORKS DETAILS SHEET 2



NOT FOR CONSTRUCTION

SITE PLAN  
SCALE 1:500

CONSULTANTS									
SHAC	M+G Consulting	ELECTRICAL PROJECTS AUSTRALIA Pty Limited	McCALLUM PECA	EVC	terras	NEWCOFT	AW EDWARDS		
ARCHITECTURAL SHAC Architects T. 02 4961 5888	STRUCTURAL + CIVIL M + G Consulting T. 02 8666 7888	ELECTRICAL Electrical Projects Australia T. 02 4967 5889	HYDRAULIC McCallum PECA T. 02 4940 2633	MECHANICAL EV Consulting Engineers T. 02 4929 2461	LANDSCAPE ARCHITECT Terras T. 02 4929 4926	PCA CONSULTANT NewCort T. 02 4966 1127	CONTRACTOR A W Edwards T. 02 9558 1474		

AMENDMENTS				
No.	REVISION	DATE	No.	REVISION
1	ISSUED FOR COORDINATION	26-12-19		

NOTES

1. Dimensions are in millimetres unless otherwise shown.
2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and installation.
4. Bring any discrepancies to the attention of the proprietor & architect.

PROJECT NAME AND ADDRESS  
Lake Cathie Public School Upgrade  
1240 Ocean Drive

SCALE  
1:500

DISCIPLINE  
Civil

DRAWN  
JDW

APPROVED  
AP

STATUS  
COORDINATION  
NOT FOR CONSTRUCTION

DRAWING TITLE  
COVER SHEET, SITE PLAN  
AND DRAWING INDEX

PROJECT NO. DRAWING NO.  
628-CV-DRG-0001 A

### M+G Consulting

M & G CONSULTING ENGINEERS PTY LTD ABN 65 094 064 990  
Tel: +61 2 8666 7888  
L3, 50 Berry Street  
North Sydney NSW, 2060  
(PO Box 1606, NSW 2060)



## LEGEND

- DENOTES CATCHMENT ZONES
- DENOTES SURFACE FLOW DIRECTION
- DENOTES EARTH BANK ONLY, REFER TO DETAIL SD5-5
- DENOTES EARTH BANK (LOW FLOW WITH CHANNEL), REFER TO DETAIL SD5-5. PROVIDE ROCK CHECK DAMS ALONG BANK TO SUIT DETAIL SD5-4 (NOMINAL 10m CTRS)
- ⇒ DENOTES EARTH BANK (HIGH FLOW), REFER TO DETAIL SD5-6. PROVIDE ROCK CHECK DAMS ALONG BANK TO SUIT DETAIL SD5-4 (NOMINAL 2m CTRS)
- DENOTES GEOTEXTILE INLET FILTER, REFER TO DETAIL SD6-12
- DENOTES SEDIMENT FENCE, REFER TO DETAIL SD6-8
- ▨ DENOTES STABILISED SITE ACCESS, REFER TO DETAIL SD6-14
- ▩ DENOTES ENERGY DISSIPATER, IN ACCORDANCE WITH DETAIL SD5-8
- ⊠ DENOTES STABILISED OUTLET/OVERFLOW (NOMINAL 2mx2m) - PLACED NEEDLE-PUNCHED TEXTILE AT BASE AND COVER WITH AGGREGATE (75mm MIN), 200mm MIN DEPTH PLUS ROCK CHECK DAM TO DETAIL SD5-4
- ⊡ DENOTES STABILISED OUTLET/OVERFLOW (2m WIDE) - PLACED NEEDLE-PUNCHED TEXTILE AT BASE AND COVER WITH AGGREGATE (75mm MIN), 200mm MIN DEPTH
- ▽ DENOTES EXISTING UNDISTURBED AREA
- ▤ DENOTES ALLOWABLE AREA FOR TEMPORARY STOCKPILING OF CUT SOIL MATERIAL, REFER TO DETAIL SD4-1

NOTE  
CONTRACTOR TO READ THESE PLANS IN CONJUNCTION WITH THE DETAILED STORMWATER PLANS ACCOUNTING FOR ALL STORMWATER PITS, PIPES AND GROSS POLLUTANT TRAPS. REFER CIVIL DOCUMENTS OUTLINED ON DRAWINGS 0021/0022 RELEVANT SPECIFICATIONS OUTLINED ON DRAWING 0023.

NOTE  
AT THE TIME OF INSTALLATION OF ANY STORMWATER PITS, THE CONTRACTOR IS TO ENSURE THAT INLET FILTERS ARE INSTALLED IN ACCORDANCE WITH DETAIL SD6-12 ON DRAWING 0012.

NOTE  
AIDED FLOCCULATION IS REQUIRED IN ALL BASINS IN ACCORDANCE WITH THE DEPARTMENT OF HOUSING PUBLICATION, "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION", 4TH EDITION.

## SOIL AND WATER MANAGEMENT PLAN (STAGE 1)

SCALE 1:250

## SEDIMENTATION AND EROSION CONTROL NOTES

1. SELECTIVE CLEARING OF VEGETATION TO BE RESTRICTED TO NOMINATED AREAS WITH CLEARED VEGETATION WIND ROWED ON THE CONTOUR.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSTALLED PRIOR TO SITE DISTURBANCE.
3. TOPSOIL FROM ALL AREAS THAT WILL BE DISTURBED TO BE STRIPPED AND STOCKPILED AT THE NOMINATED SITE.
4. NO MORE THAN 150m OF TRENCH TO BE OPEN AT ANY ONE TIME.
5. CUT AND FILL BATTER GRADIENTS OF 1:2 (MAXIMUM).
6. A STRIP OF TURF 450mm WIDE IS TO BE PLACED IMMEDIATELY BEHIND THE KERB ON ALL NEW ROAD TO ACT AS A FILTER TRAP. REFER TO DETAIL SD6-13.
7. ALL SEDIMENT CONTROL STRUCTURES TO BE INSPECTED BY SITE SUPERVISOR AFTER EACH RAINFALL EVENT FOR STRUCTURAL DAMAGE AND ALL TRAPPED SEDIMENT TO BE REMOVED TO A NOMINATED STOCKPILE SITE.
8. THE PROJECT MANAGER TO INFORM ALL CONTRACTORS AND SUB-CONTRACTORS OF THEIR OBLIGATIONS UNDER THE EROSION AND SEDIMENT CONTROL PLAN.
9. NO DISTURBED AREA IS TO REMAIN DENUDED LONGER THAN 14 DAYS.
10. ALL FILLS ARE TO BE LEFT WITH A LIP AT THE TOP OF THE SLOPE AT THE END OF EACH DAY'S OPERATION.
11. THE CONTRACTOR MUST ENSURE THE SUITABILITY AND INTEGRITY OF ALL WORKS AT THE END OF EACH DAY'S WORK.
12. ORANGE BARRIER TAPE TO BE AFFIXED TO TOP OF SEDIMENT CONTROL BARRIER TO IDENTIFY WORK AREA.
13. ALL SEDIMENTATION & EROSION CONTROL MEASURES ARE TO STRICTLY COMPLY WITH THE GUIDELINES DETAILED IN THE DEPARTMENT OF HOUSING PUBLICATION, "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION", 4TH EDITION.
14. WATER TRUCKS TO BE USED AS REQUIRED TO PREVENT WIND EROSION.
15. SUBGRADE MATERIAL TO BE CONSTRUCTED IMMEDIATELY FOLLOWING FILL.
16. REFER TO DRAWING 0012 FOR SEDIMENTATION AND EROSION CONTROL DETAILS.

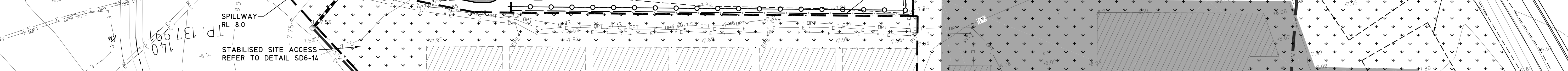
NOT FOR CONSTRUCTION

## SEDIMENTATION BASIN DESIGN DATA AND VOLUMES

DESIGN DATA	BASIN No.1
DESIGN CATCHMENT AREA (Ha)	0.582
SOIL TYPE	D
DESIGN RAINFALL DEPTH (days)	2
DESIGN RAINFALL DEPTH (percentile)	85
X-DAY, Y-PERCENTILE RAINFALL EVENT	29.2
RAINFALL INTENSITY: 2-YEAR, 6-HOUR STORM	13.9
RAINFALL EROSIVITY (R-FACTOR)	4220
VOLUMETRIC RUNOFF COEFFICIENT (Cv)	0.42

**BASIN No.1**  
SETTLING ZONE = 73m<sup>3</sup>  
STORAGE ZONE = 36m<sup>3</sup>  
TOTAL STORAGE = 109m<sup>3</sup>  
ACTUAL BASIN VOLUME = APPROX. 160m<sup>3</sup>  
REFER EARTH BASIN DETAIL SD6-4  
CONTRACTOR IS TO ADJUST THE BASIN SIZE AND SHAPE AS REQUIRED TO SUIT THE STATED BASIN VOLUMES AND SPECIFIED DETAILS. BATTER SHOWN INDICATIVELY ONLY

NOTE  
EARTH BASIN DISCHARGE SURFACE PUMP LINE.  
REFER TO DETAIL SD6-4  
BASIN TO BE DISCHARGED TO EXISTING STORMWATER PITS. BASIN CAPACITY TO BE RESTORED WITHIN 2 DAYS OF A RAIN EVENT.  
PRIOR TO DISCHARGING THE BASIN, THE WATER QUALITY MUST BE:  
• pH: 6.5-8.5  
• TSS: <50mg/L  
• OIL AND GREASE: NONE VISIBLE

MATCH  
LINE A

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AW EDWARDS

CONTRACTOR  
A W Edwards  
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## AMENDMENTS

No.	REVISION	DATE	No.	REVISION	DATE
1	ISSUED FOR COORDINATION	06-12-19			

## NOTES

1. Dimensions are in millimetres unless otherwise shown.
2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and installation.
4. Bring any discrepancies to the attention of the proprietor & architect.

## PROJECT NAME AND ADDRESS

Lake Cathie Public School Upgrade  
1240 Ocean Drive



Education  
School Infrastructure

## SCALE

1:250

## DISCIPLINE

Civil

DRAWN  
JDW

## STATUS

COORDINATION  
NOT FOR CONSTRUCTION

## DRAWING TITLE

SEDIMENTATION AND  
EROSION CONTROL PLAN SHEET 1

PROJECT NO.

DRAWING NO.

REV.

628-CV-DRG-0010

A

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CONSULT AUSTRALIA

AUSTRALIAN CIVIL ENGINEERS

ACI



SOIL AND WATER  
MANAGEMENT PLAN  
(STAGE 2)

SCALE 1:250

SEDIMENTATION AND EROSION CONTROL NOTES  
1. REFER TO DRAWING 0010 FOR SEDIMENTATION  
AND EROSION CONTROL NOTES.  
2. REFER TO DRAWING 0012 FOR SEDIMENTATION  
AND EROSION CONTROL DETAILS.  
3. REFER TO DRAWING 0010 FOR SEDIMENT AND  
CONTROL LEGEND.

MATCH  
LINE A

WOLLUM  
DRIVE

CATCHMENT 2  
(STAGE 1)

BASIN No.1  
RL 7.0

CATCHMENT 3  
(STAGE 2)

NOTE  
UNDISTURBED AREA  
ALL STAGED SEDIMENTATION AND EROSION CONTROL  
SYSTEMS ARE TO BE DETERMINED BY THE  
CONTRACTOR WITH REGARD TO THEIR STAGING OF  
CONSTRUCTION WORKS. ALL WORKS ARE TO BE IN  
ACCORDANCE WITH THE DEPARTMENT OF HOUSING  
PUBLICATION, "MANAGING URBAN STORMWATER -  
SOILS AND CONSTRUCTION", 4TH EDITION.

NOTE  
CONTRACTOR TO READ THESE PLANS IN CONJUNCTION WITH  
THE DETAILED STORMWATER PLANS ACCOUNTING FOR ALL  
STORMWATER PITS, PIPES AND GROSS POLLUTANT TRAPS.  
REFER CIVIL DOCUMENTS OUTLINED ON DRAWING S01.00 AND  
RELEVANT SPECIFICATIONS OUTLINED ON DRAWING S02.00.

NOTE  
AT THE TIME OF INSTALLATION OF ANY STORMWATER PITS,  
THE CONTRACTOR IS TO ENSURE THAT INLET FILTERS  
ARE INSTALLED IN ACCORDANCE WITH SD6-12 AND THE  
DETAILS ON DRAWING C02.50.

NOTE  
AIDED FLOCCULATION IS REQUIRED IN ALL BASINS IN  
ACCORDANCE WITH THE DEPARTMENT OF HOUSING  
PUBLICATION, "MANAGING URBAN STORMWATER -  
SOILS AND CONSTRUCTION", 4TH EDITION.

NOT FOR CONSTRUCTION

AMENDMENTS							
No.	REVISION	DATE	No.	REVISION	DATE		
1	ISSUED FOR COORDINATION	06-12-19					

NOTES  
1. Dimensions are in millimetres unless otherwise shown.  
2. Work to given dimensions. Do not scale from drawing.  
3. Check all dimensions on site prior to construction and  
redesign.  
4. Bring any discrepancies to the attention of the proprietor &  
architect.

PROJECT NAME AND ADDRESS  
Lake Cathie Public School Upgrade  
1240 Ocean Drive

SCALE  
1:250  
DISCIPLINE  
Civil  
DRAWN  
JDW  
APPROVED  
AP

STATUS  
COORDINATION  
NOT FOR CONSTRUCTION  
DRAWING TITLE  
SEDIMENTATION AND  
EROSION CONTROL PLAN SHEET 2  
PROJECT NO. DRAWING NO. REV.  
628-CV-DRG-0011 A



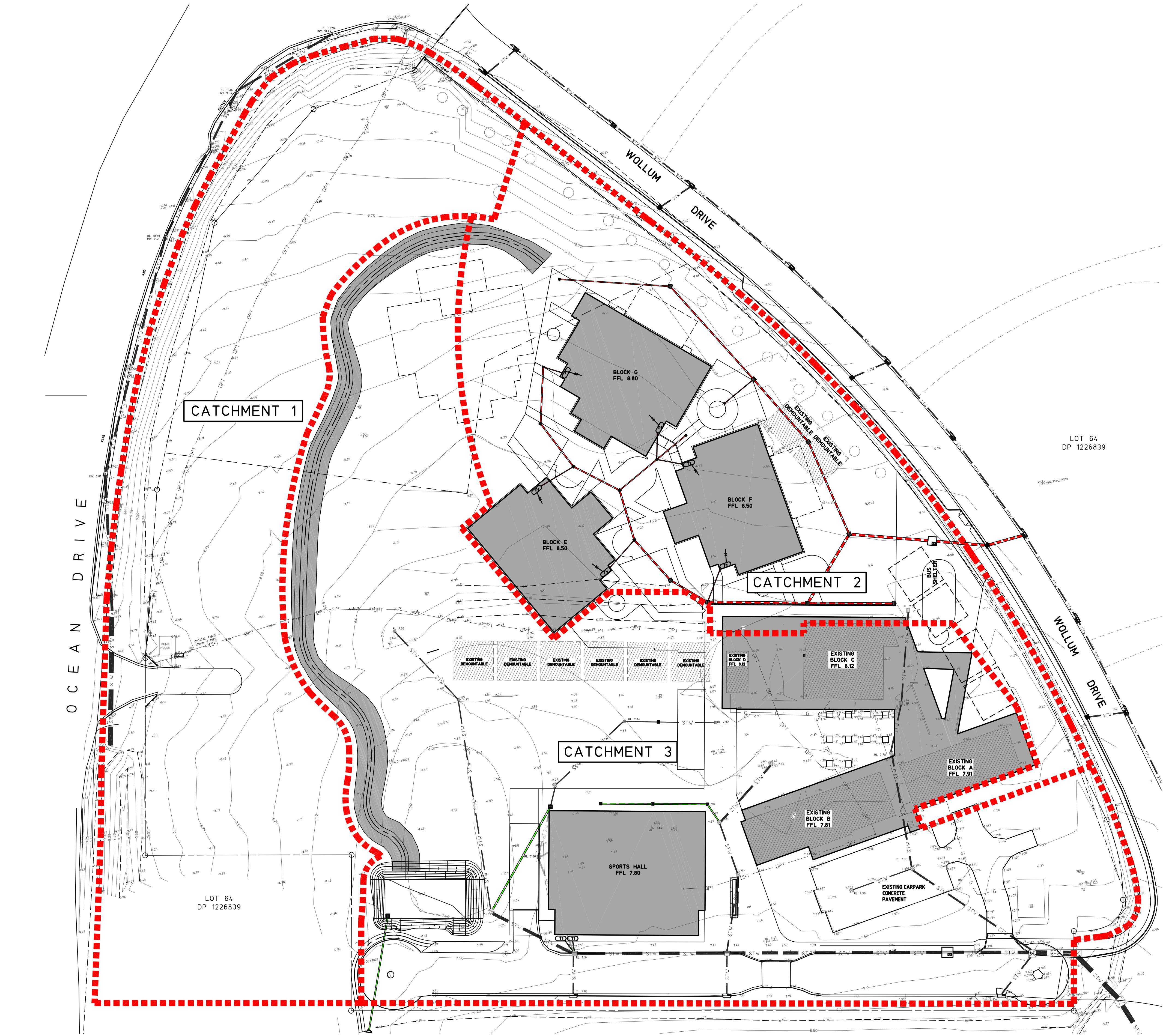




STORMWATER CATCHMENT PLAN

SCALE 1:500

SUBCATCHMENT AREAS		
CATCHMENT No.	AREA (ha)	% IMP
1	1.30	0%
2	0.99	45%
3	2.0	31%



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AMENDMENTS		REVISION		DATE	
No.	REVISION	No.	REVISION	No.	DATE
1	ISSUED FOR COORDINATION	1		15-12-19	

- NOTES
- Dimensions are in millimetres unless otherwise shown.
  - Work to given dimensions. Do not scale from drawing.
  - Check all dimensions on site prior to construction and installation.
  - Bring any discrepancies to the attention of the proprietor & architect.

PROJECT NAME AND ADDRESS  
Lake Cathie Public School Upgrade  
1240 Ocean Drive

SCALE

1:500

DISCIPLINE

Civil

STATUS  
COORDINATION  
NOT FOR CONSTRUCTION

DRAWING TITLE  
STORMWATER CATCHMENT PLAN

DRAWN

JDW

APPROVED

AP

PROJECT NO. | DRAWING NO.

628-CV-DRG-0020

REV.

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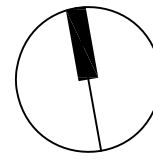
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NewCent  
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AW EDWARDS

CONTRACTOR  
A W Edwards  
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Education  
School Infrastructure



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**LEGEND**

- DENOTES STAGE 1 STORMWATER PIPE
- DENOTES STAGE 2 STORMWATER PIPE
- DENOTES EXISTING STORMWATER PIPE
- DENOTES EXISTING STORMWATER REMOVED
- DENOTES EXISTING CONTOUR
- 8.00 DENOTES DESIGN CONTOUR
- DENOTES EXISTING LEVELS
- DENOTES DESIGN SPOT LEVELS
- K1 DENOTES 150 HIGH KERB U.N.O.
- DEB DENOTES DROPPED EDGE BEAM TO BUILDING SLAB OR PAVEMENT
- DENOTES 3400 WIDE x 300 MIN DEEP ROCK LINED SWALE, 0.5% MIN FALL, UNO
- DENOTES DIRECTION OF SURFACE FLOWS
- ==> DENOTES BLOCKED SYSTEM OVERLAND FLOW DIRECTION
- (T1) DENOTES 5000 LITRE WATER STORAGE TANK STORING ROOF RAINWATER TO MANUFACTURERS SPECIFICATION. TANK SHALL BE FITTED WITH A FIRST FLUSH SYSTEM, PUMP TO SUPPLY TOILETS AND A DIVERSION SWITCH TO MAINS SUPPLY ON TANK BEING EMPTY. BACK FLOW PREVENTION TO MAINS WATER SHALL BE PROVIDED. TANK TO OVERFLOW TO STORMWATER SYSTEM.
- \* DENOTES PITS TO BE INSTALLED WITH ECOSOL LITTER BASKETS COMPLETE WITH RFM PILLOW. REFER PLANS FOR LOCATION.

**STORMWATER DRAINAGE NOTES:**  
FOR STORMWATER DRAINAGE NOTES REFER DWG. 628-CV-DRG-0023.

EXISTING STORMWATER PLAN - PIT SCHEDULE					
LINE No.	PIT No.	SIZE	TYPE	SURFACE LEVEL S.L.	INVERT LEVEL I.L.
EXISTING	EP1/2	900x900	EXISTING PIT	7.55	6.45 *
	EP1/4	900x900	EXISTING PIT	7.20	6.24 *
	EP1/5	900x900	EXISTING PIT	7.15	6.27 *
	EP1/6	900x900	EXISTING PIT	6.80	5.96 *
	EP1/6A	1800x1800	EXISTING PIT	T.B.C	5.78 *
	EP1/7	1800x1800	EXISTING PIT	6.80	5.75 *
	EP1/8	1800 LINTEL	EXISTING KERB PIT	6.76 Δ	5.69 Δ
	EP2/1	900x900	EXISTING PIT	7.80	6.63
	EP2/2	900x900	EXISTING PIT	7.97	6.48
	EP2/3	900x900	EXISTING PIT	7.78	6.41
	EP2/4	900x900	EXISTING PIT	7.30	6.11
	EP3/1	600x600	EXISTING PIT	7.75	6.70
	EP3/2	600x600	EXISTING PIT	7.92	7.02 *
	EP4/1	900x900	EXISTING PIT	7.30	6.29
	EP5/1	900x900	EXISTING PIT	7.63	6.80 *
	EP6/1	1200x1200	EXISTING PIT	7.38	6.30
	EP6/2	600x600	EXISTING PIT	7.60	6.55 *
	EP6/3	600x600	EXISTING PIT	7.55	6.75 *

\* DENOTES DESIGN LEVEL FROM NORTHROP DRAWINGS C08A AND C08B (TO BE CONFIRMED)  
Δ DENOTES DESIGN LEVEL FROM CARDNO DRAWING NA89913011-CC01-1063, (TO BE CONFIRMED)  
\* DENOTES NEW DESIGN SURFACE LEVEL FOR EXISTING PIT BY M+G.

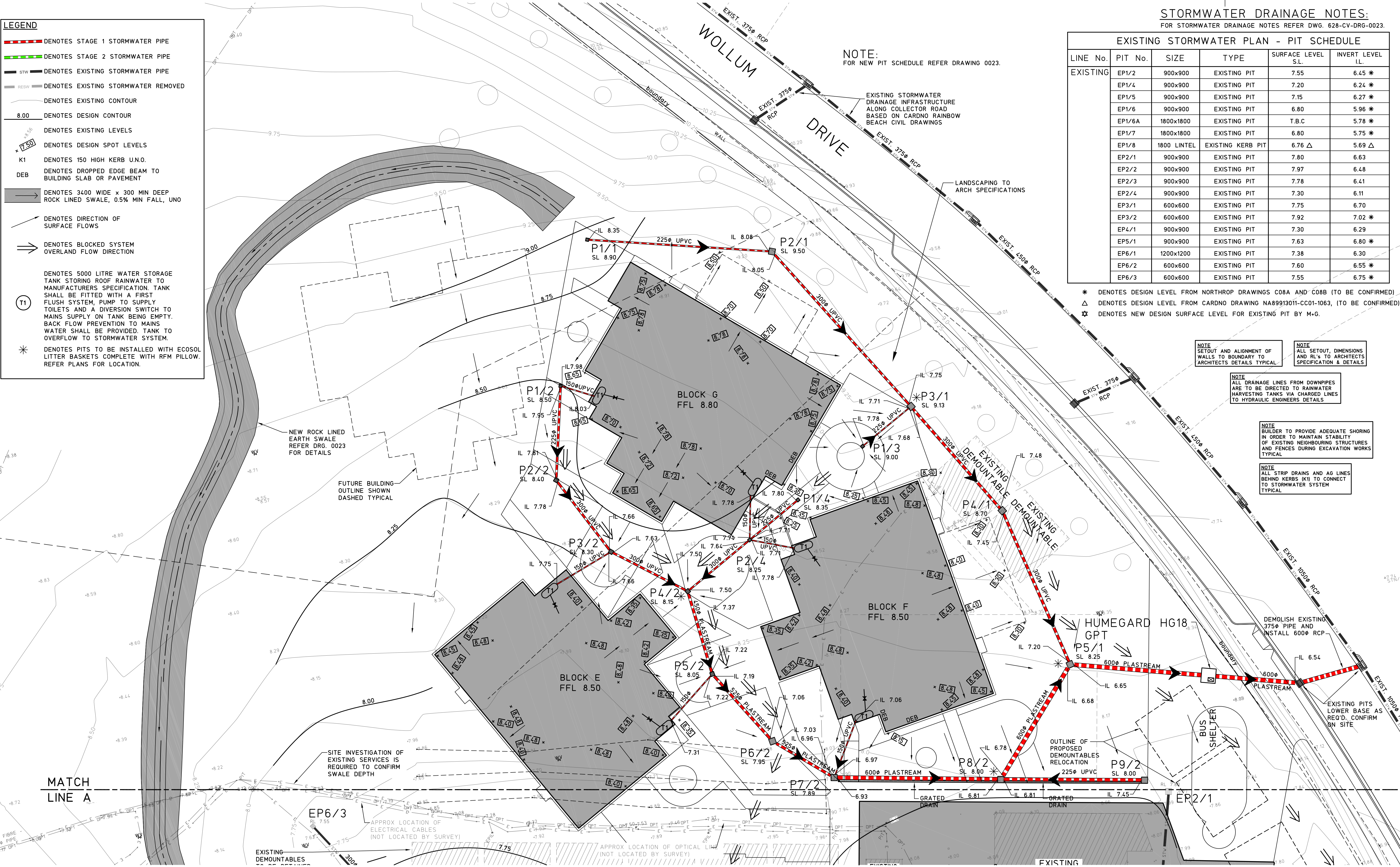
NOTE  
SETOUT AND ALIGNMENT OF WALLS TO BOUNDARY TO ARCHITECTS DETAILS TYPICAL

NOTE  
ALL SETOUT, DIMENSIONS AND RL'S TO ARCHITECTS SPECIFICATION & DETAILS

NOTE  
ALL DRAINAGE LINES FROM DOWNPIPES ARE TO BE DIRECTED TO RAINWATER HARVESTING TANKS VIA CHARGED LINES TO HYDRAULIC ENGINEERS DETAILS

NOTE  
BUILDER TO PROVIDE ADEQUATE SHORING IN ORDER TO MAINTAIN STABILITY OF EXISTING NEIGHBOURING STRUCTURES AND FENCES DURING EXCAVATION WORKS TYPICAL

NOTE  
ALL STRIP DRAINS AND AG LINES BEHIND KERBS IK11 TO CONNECT TO STORMWATER SYSTEM TYPICAL



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--	--	---	--	---	---	---	---

AMENDMENTS		REVISION		DATE	
No.	REVISION	DATE	No.	REVISION	DATE
1	ISSUED FOR COORDINATION	16-12-19			

NOTES

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PROJECT NAME AND ADDRESS  
Lake Cathie Public School Upgrade  
1240 Ocean Drive



SCALE  
1:250

DISCIPLINE  
Civil

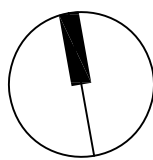
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AP

STATUS  
COORDINATION  
NOT FOR CONSTRUCTION

DRAWING TITLE  
STORMWATER PLAN  
SHEET 1

PROJECT NO. | DRAWING NO. | REV.  
628-CV-DRG-0021 | A



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CONSENT AUTHORITY  
Municipal Council  
Department of Planning and Infrastructure



SCALE 1:250

STORMWATER NOTES

1. REFER TO DRAWING 0023 FOR STORMWATER NOTES.
2. REFER TO DRAWING 0021 FOR STORMWATER LEGEND.
3. REFER TO DRAWING 0021 FOR EXISTING PIT SCHEDULE.
4. REFER TO DRAWING 0023 FOR NEW PIT SCHEDULE AND STORMWATER DETAILS.

[illegible]

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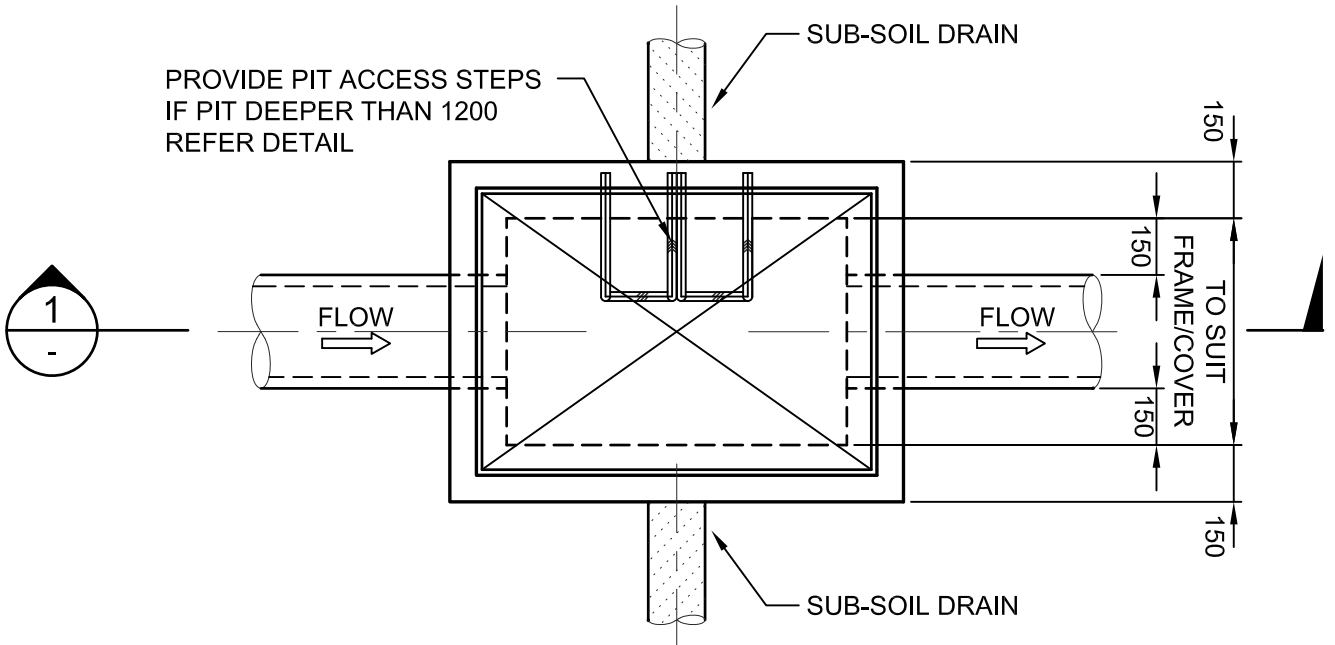
DRAINAGE NOTES

1. ALL STORMWATER DRAINAGE WORK SHALL BE IN ACCORDANCE AS-NZS3500.3 & PORT MACQUARIE-HASTINGS COUNCIL'S DEVELOPMENT DESIGN SPECIFICATION D5 "STORMWATER DRAINAGE DESIGN".
2. ALL PIPES TO BE CLASS SEWER GRADE SN4 (SEWER GRADE SN6 FOR 900) UPVC TO AS1254 WITH SOLVENT WELDED JOINTS UNO.
3. ALL PIPES TO BE 225Ø UNO
4. ALL CONCRETE PIPES TO BE 225Ø CLASS 4 RRJ REINF CONC PIPES UNO
5. ALL CONCRETE PIPES SHALL HAVE TYPE HS2 BEDDING.
6. ALL PIPES TO LAID AT A MINIMUM FALL OF 1% U.N.O.
7. ALL PIPES SHALL BE LAID IN SUCH A MANNER THAT THEIR BARRELS BEAR FIRMLY AND EVENLY ON THE BEDDING MATERIAL. THE BACKFILL SHALL CONSIST OF APPROVED FILLING FREE FROM ROCK OR HARD SUBSTANCES. PIPES ARE TO BE COMPACTED TO AT LEAST 2/3 OF THEIR DIAMETER WITH COMPACTED SAND OR CRUSHER RUN. ALL BACKFILL SHALL BE PLACED IN 300MM MAX COMPACTED LAYERS AND MUST NOT TO DAMAGE THE PIPE. ALL PIPES LAID UNDER FLOOR SLABS OR PAVING SHALL BE BACKFILLED WITH COMPACTED SAND OR CRUSHER RUN. REPLACE BATTER WITH NATURAL MATERIAL COMPACTED TO 98% STANDARD MAXIMUM DRY DENSITY.
8. CONNECT STORMWATER DRAINAGE TO THE EXISTING STORMWATER DRAINAGE WHERE SHOWN ON THE DRAWINGS TO THE REQUIREMENTS OF THE RELEVANT AUTHORITIES.
9. ALL PITS TO HAVE CONCRETE BENCHING TO FACILITATE THE SMOOTH FLOW OF WATER THROUGH THE PIT.
10. THE CONTRACTOR SHALL CHECK THE LOCATIONS OF EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF WORK AND ACCEPT FULL RESPONSIBILITY FOR THE COST OF REPAIRS AND CONSEQUENCES OF ANY DAMAGE WHICH MAY OCCUR TO THESE SERVICES AS A RESULT OF THE CONSTRUCTION WORKS.
11. ALL DISTURBED AREAS BEYOND THE AREA OF THE WORKS SHALL BE REINSTATED TO THE EXISTING CONDITION BY THE CONTRACTOR AT THE COMPLETION OF THE WORKS.
12. ALL PIPES TO HAVE A MINIMUM OF 25mm THICKNESS OF OVERLAY BETWEEN TOP OF PIPE AND UNDERSIDE OF SLAB.
13. SUB-SOIL PIPES TO BE LAID IN 20mm CRUSHED AGGREGATE (0.1m<sup>3</sup> PER METRE OF PIPE), A SOCK OF APPROVED SYNTHETIC GEOTEXTILE SHALL BE LAID AROUND THE SUB-SOIL PIPE. WRAP A LAYER OF BIDIUM U14 GEOFABRIC (OR EQUIVALENT) AROUND AGGREGATE FILTER WITH 200mm OVERLAP AT JOINTS.
14. ALL HIGH POINTS OF THE SUB-SOIL DRAIN SHALL BE RAISED ABOVE THE FLOOR OR GROUND LEVEL. PLACE A CAST IRON INSPECTION COVER OVER EXPOSED PIPE AND SURROUND IN CONCRETE UNO.
15. PROVIDE ADDITIONAL SUB-SOIL DRAINAGE AS DIRECTED TO SUIT SITE CONDITIONS AND GROUNDWATER PRESENCE.
16. PROVIDE SUBSOIL DRAINAGE AT BASE OF RETAINING WALLS AND CONNECT TO STORMWATER DRAINAGE SYSTEMS.
17. REFERENCE SHOULD BE MADE TO SITE SURVEY. BY LAND DYNAMICS AUSTRALIA REF DWG 20180525\_7728\_DETAIL SURVEY PAPER PLAN DATED 25 MAY 2019.
18. CONTRACTOR TO PROVIDE WORK AS EXECUTED PLAN BY A REGISTERD SURVEYOR AND PROVIDE CERTIFICATION THAT THE STORMWATER DRAINAGE HAS BEN INSTALLED AS PER THE APPROVED DESIGN DRAWINGS.

NEW STORMWATER PIT SCHEDULE		
PIT No.	SIZE	LID TYPE (TO AS.3996)
P1/1, P1/2, P1/3, P1/4, P2/4, P9/2	450 x 450	CLASS B
P2/2, P3/2, P4/2, P5/2, P1/5, P1/6, P2/6, P3/6	600 x 600	CLASS B
P2/1, P3/1, P4/1, P5/1, P6/2, P7/2, P8/2, P2/5	900 x 900	CLASS B

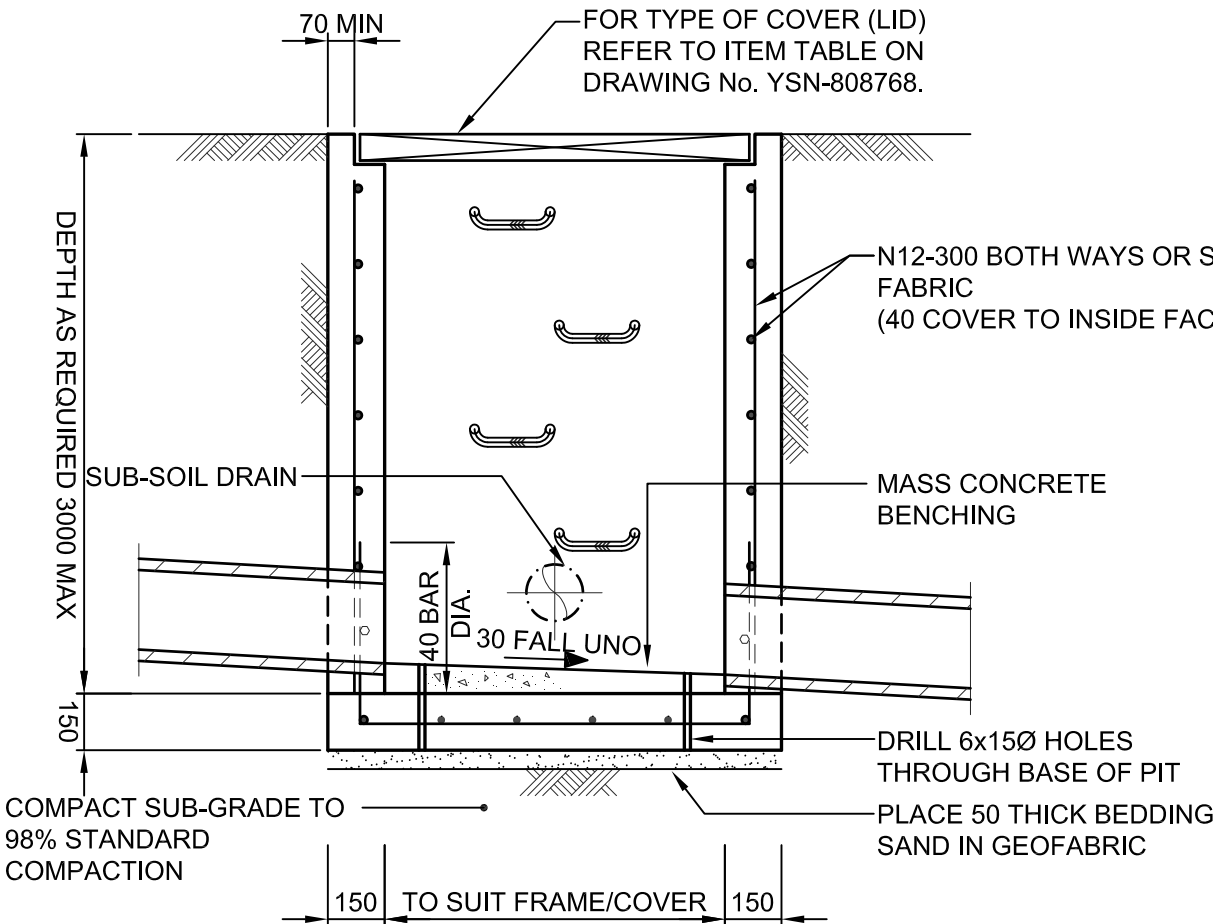
PIT NOTES:

1. PITS DEEPER THAN 1200 TO HAVE STEP IRONS IN ACCORDANCE WITH AS-NZS 3500.3.
2. ALL GRATES TO BE CAST INTO NEW SLABS.
3. ALL PITS, GRATES & LIDS TO BE IN ACCORDANCE WITH AS 3996.
4. PROVIDE 100Ø SUBSOIL PIPE EACH SIDE OF INLET & OUTLET PIPES CONNECTING INTO STORMWATER PITS.
5. ALL GRATED TRENCH DRAINS TO BE 250mm (W) x 150mm (D) MIN (CLEAR DIMENSIONS) & HAVE A STEEL TROWELLED FINISH.
6. CAST IN SITU PITS SHALL BE CONSTRUCTED TO THE DETAILS SHOWN. ALL PRECAST PITS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION. ALL GRATES AND FRAMES TO BE ACCORDANCE WITH AS-NZS 3500.3 AND AS3996.



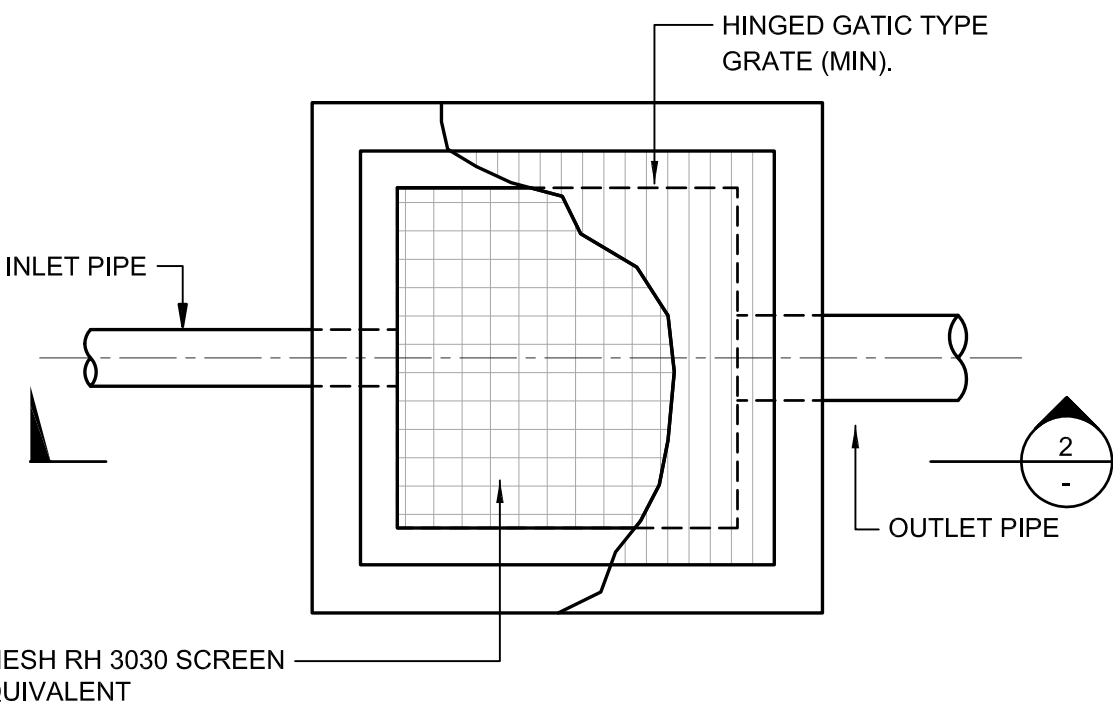
TYPICAL PIT - PLAN

SCALE 1:20



SECTION 1

SCALE 1:20

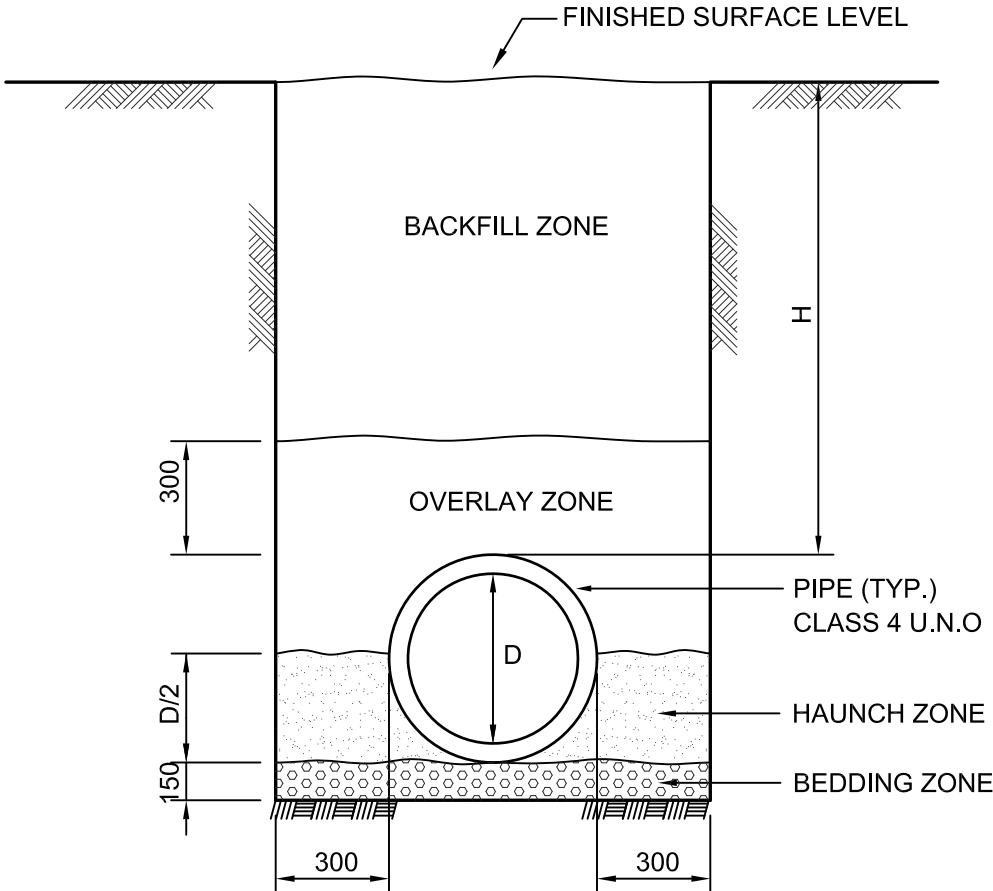


TYPICAL PIT WITH ECOSOL LITTER BASKET INSERT DETAIL

SCALE 1:20

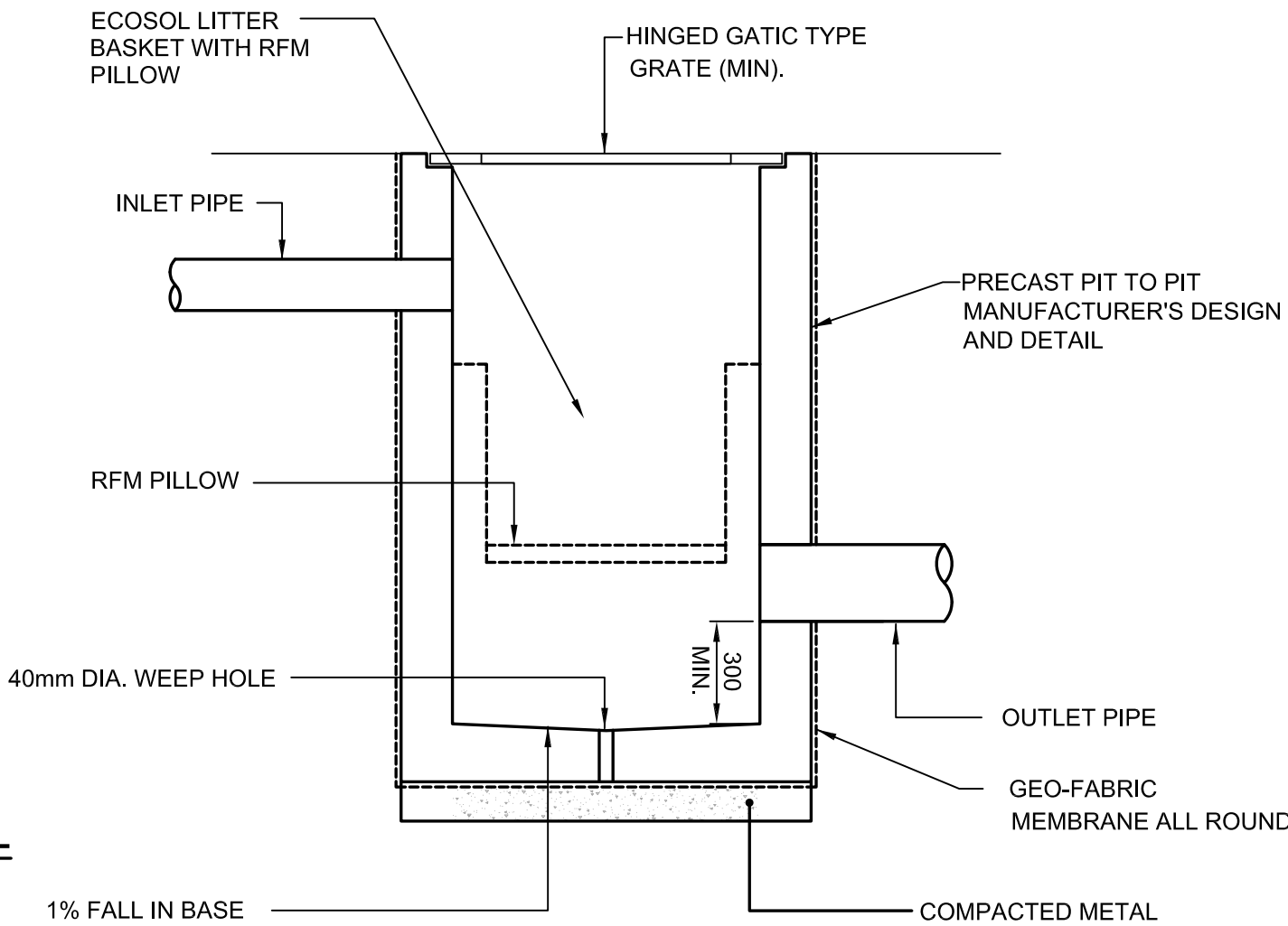
NOTES:

1. PITS TO BE CONSTRUCTED IN THE FOLLOWING MANNER:
- 1.1 PRECAST
- 1.2 BRICKS WITH CEMENT RENDER.
2. OUTLET PIPES TO BE PLACED AT 90° TO THE INLET PIPELINE (AS SHOWN IN THE PLAN).
3. INLET TO BE ABOVE THE SCREEN AND THE OUTLET TO BE BELOW THE SCREEN.
4. ALL WORK TO BE TO THE SATISFACTION OF THE DIRECTOR OF TECHNICAL SERVICES.
5. ORIFICE PLATES ARE NOT TO BE USED.
6. FOR CONNECTION TO COUNCIL'S DRAINAGE SYSTEM:
- 6.1 CONNECTION TO BE MADE INTO TOP ONE THIRD OF COUNCIL'S PIPE AT 45° TO FLOW.
- 6.2 ON PIPE PROTRUSION ALLOWED INTO COUNCIL'S PIPELINE.
- 6.3 INSPECTION TO BE MADE BY COUNCIL'S ENGINEER PRIOR TO THE SEALING OF THE JOINT.



PIPE TRENCH DETAIL

N.T.S.



SECTION 2

SCALE 1 : 20

	Sources	Residual Load	% Reduction
Flow (ML/yr)	31.5	31.5	0
Total Suspended Solids (kg/yr)	5430	705	87
Total Phosphorus (kg/yr)	11.7	2.73	76.7
Total Nitrogen (kg/yr)	88.2	42.5	51.9
Gross Pollutants (kg/yr)	574	0	100

STORMWATER QUALITY CONTROL

(MUSIC MODEL OUTPUT)

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CONTRACTOR  
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AMENDMENTS					
No.	REVISION	DATE	No.	REVISION	DATE
1	ISSUED FOR COORDINATION	26-12-19			

NOTES

1. Dimensions are in millimetres unless otherwise shown.

2. Work to given dimensions. Do not scale from drawing.

3. Check all dimensions on site prior to construction and verification.

4. Bring any discrepancies to the attention of the proprietor & architect.

PROJECT NAME AND ADDRESS

Lake Cathie Public School Upgrade  
1240 Ocean Drive

Education  
School Infrastructure

SCALE

1:20

DISCIPLINE

Civil

DRAWN

JDW

APPROVED

AP

STATUS

COORDINATION  
NOT FOR CONSTRUCTION

DRAWING TITLE

STORMWATER DETAILS

PROJECT NO.

628-CV-DRG-0023

DRAWING NO.

REV.

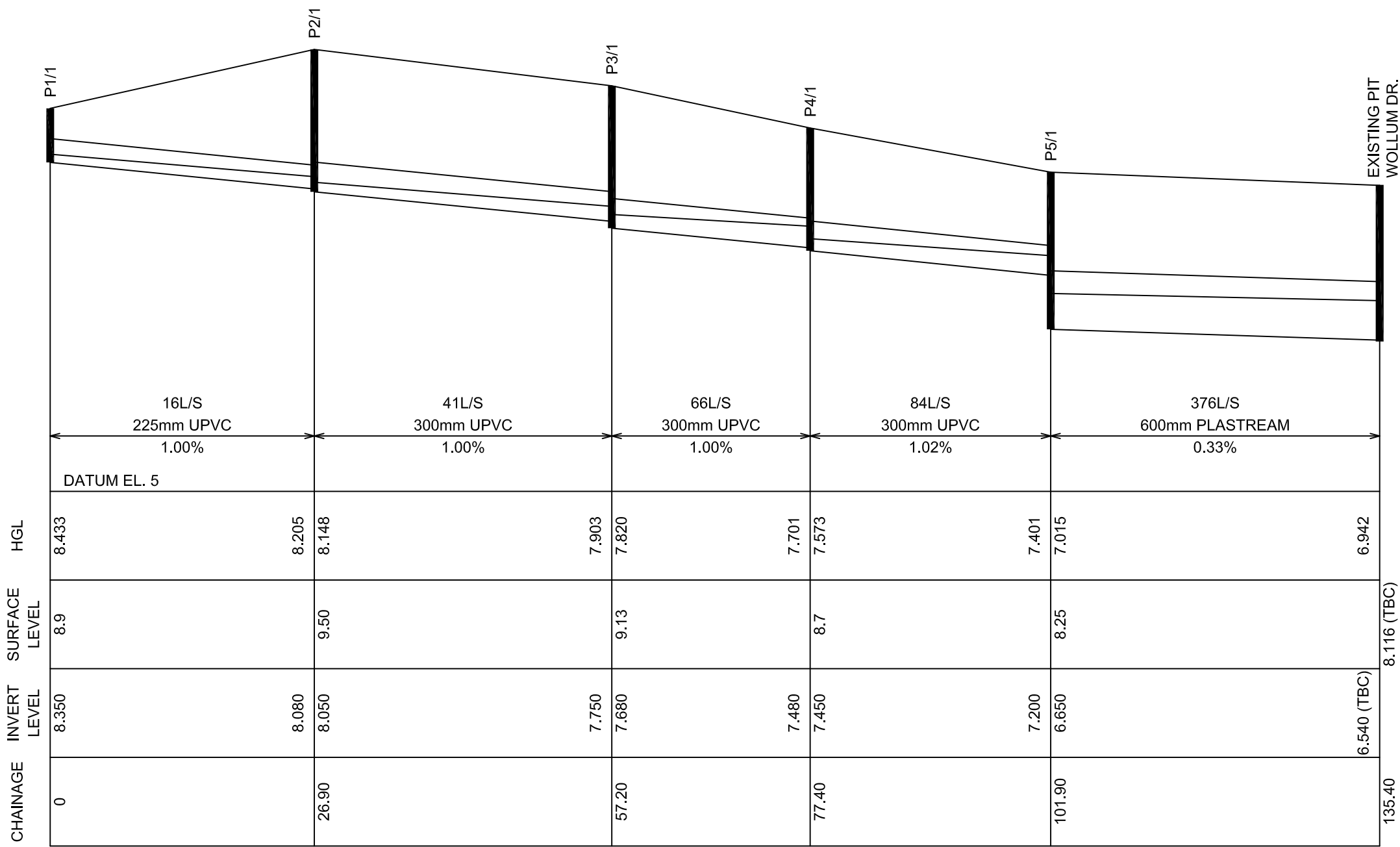
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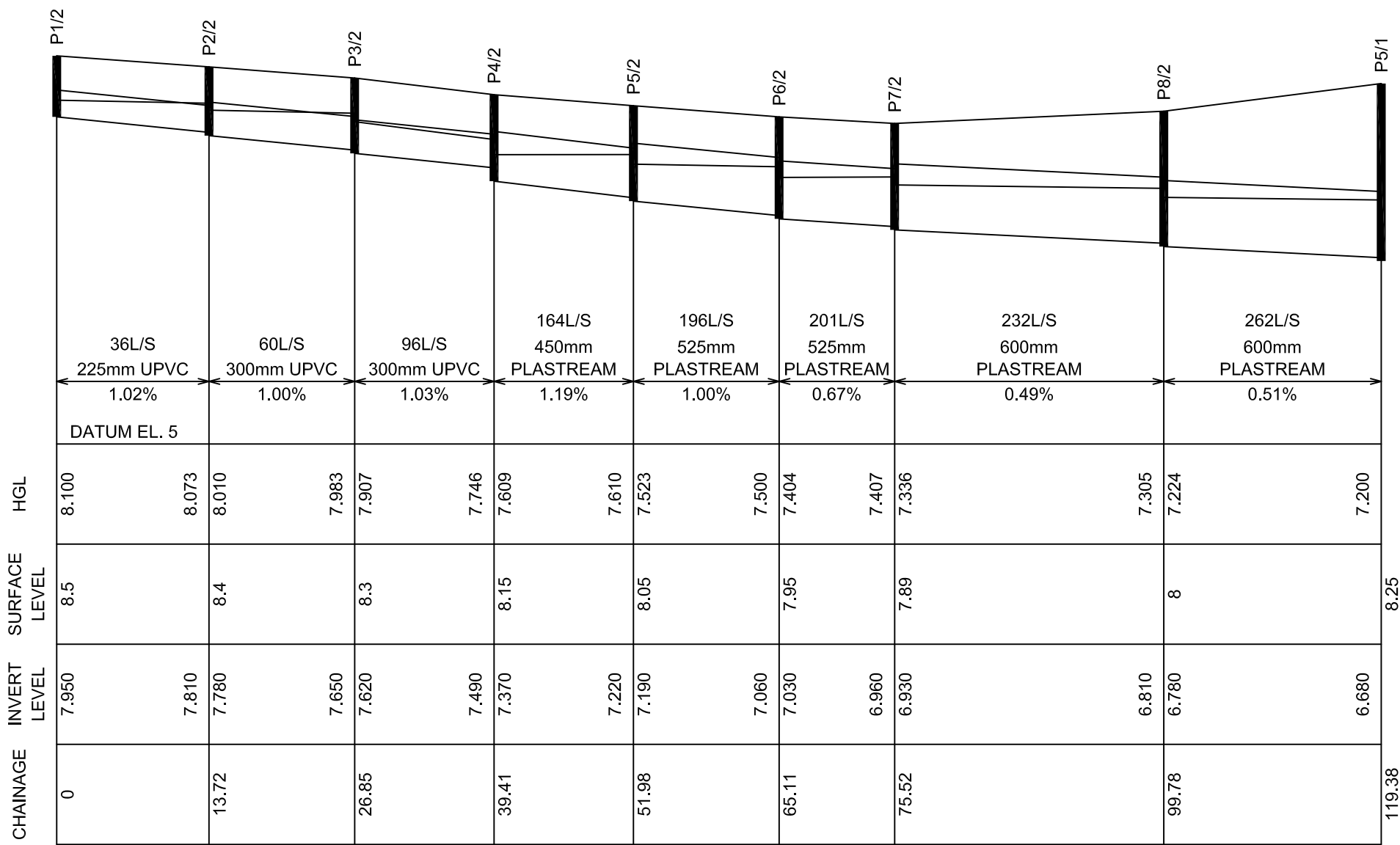
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North Sydney NSW 2060  
(PO Box 1050, NSW 2060)





LONGITUDINAL SECTION - PIT P1/1 TO WOLLUM DRIVE  
SCALE 1:500



LONGITUDINAL SECTION - PIT P1/2 TO PIT P5/1  
SCALE 1:500

NOT FOR CONSTRUCTION

AMENDMENTS					
No.	REVISION	DATE	No.	REVISION	DATE
1	ISSUED FOR COORDINATION	26-12-15			

NOTES

- Dimensions are in millimetres unless otherwise shown.
- Work to given dimensions. Do not scale from drawing.
- Check all dimensions on site prior to construction and verification.
- Bring any discrepancies to the attention of the proprietor & architect.

PROJECT NAME AND ADDRESS  
Lake Cathie Public School Upgrade  
1240 Ocean Drive

SCALE  
1:500

DISCIPLINE  
Civil

DRAWN  
JDW

APPROVED  
AP

STATUS  
COORDINATION  
NOT FOR CONSTRUCTION

DRAWING TITLE  
STORMWATER LONG SECTIONS

PROJECT NO. | DRAWING NO. | REV.  
628-CV-DRG-0024 | A

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## Appendix C – Litter Basket and GPT Tank Information

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# HumeGard® GPT Technical manual

Issue 4



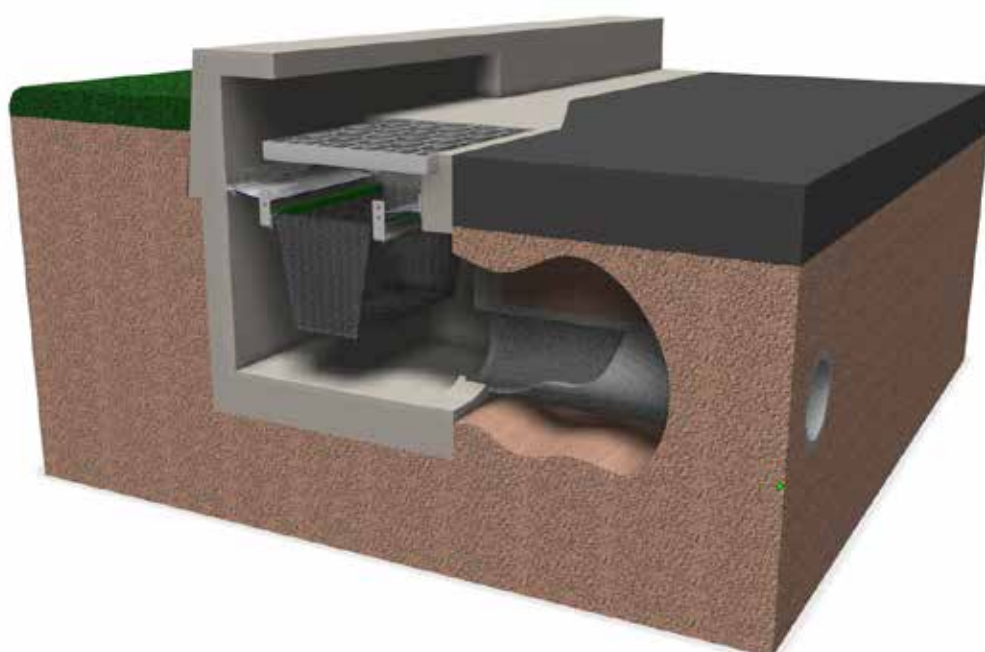


# HumeGard® GPT Inspection and maintenance guide

Issue 1

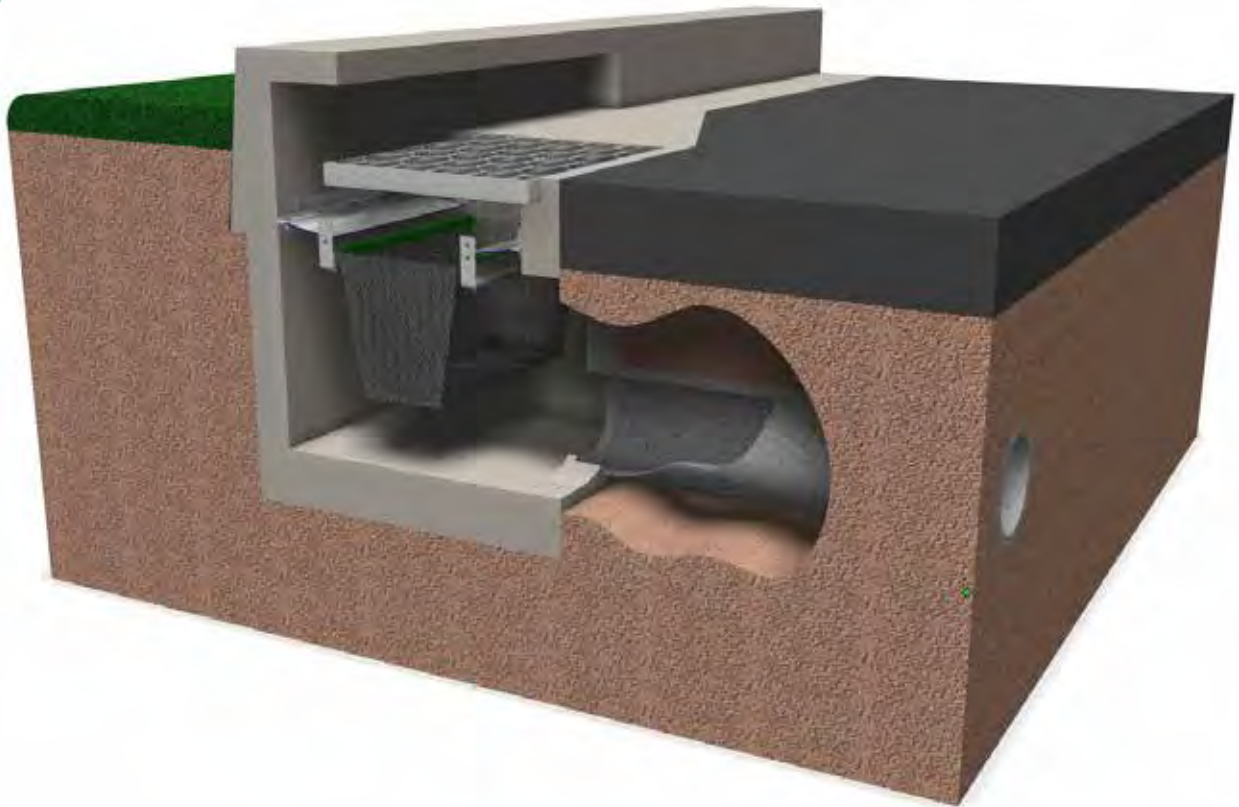


# Ecosol™ Litter Basket Technical Specification



environmentally engineered  
for a better future

# Ecosol™ Litter Basket Maintenance Guide



environmentally engineered  
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## Appendix D – Report on Acid and Sulfate Soil Management Plan

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**Douglas Partners**  
Geotechnics | Environment | Groundwater

Report on  
Provisional Acid Sulfate Soil Management Plan

Lake Cathie Public School Upgrade  
1240 Ocean Drive, Lake Cathie

Prepared for  
AW Edwards Pty Ltd

Project 89691.02  
December 2019

Integrated Practical Solutions



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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		19 December 2019
Reviewer		19 December 2019



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## **Report on Provisional Acid Sulfate Soil Management Plan**

### **Lake Cathie Public School Upgrade**

### **1240 Ocean Drive, Lake Cathie**

---

## **1. Introduction**

This report presents a Provisional Acid Sulfate Soil Management Plan (ASSMP) for the potential excavation of acid sulfate soils in connection with Lake Cathie Public School Upgrade at 1240 Ocean Drive, Lake Cathie. This provisional ASSMP was commissioned in an email dated 10 December 2019 by Craig McIlveen of AW Edwards Pty Ltd and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal PMQ190073.P.002.Rev0 dated 10 December 2019

The proposed development is understood to include 18 new teaching spaces which may include the construction of one and two-storey structures as well as associated access roads and paved / concrete areas. The site covers an area of approximately 3.73 ha and the proposed excavation depths are expected to be minimal (i.e. that required for shallow footings and installation of in-ground services). Excavation of natural soils is not expected. Refer to Drawing 1 in Appendix B.

Douglas Partners Pty Ltd (DP) has previously prepared the following reports for the site:

- *Report on Geotechnical Investigation, Lake Cathie Primary School Expansion, 1240 Ocean Drive, Lake Cathie*, dated August 2018 (DP, 2018) (DP Ref. 89691.00.R.001.Rev1);
- *Report on Preliminary Site Investigation (PSI) for Contamination, Lake Cathie Primary School Expansion, 1240 Ocean Drive, Lake Cathie*, dated February 2019 (DP, 2019a) (DP Ref. 89691.01.R.001.Rev1); and
- *Report on Geotechnical Assessment, Lake Cathie Primary School Expansion, 1240 Ocean Drive, Lake Cathie*, dated February 2019 (DP, 2019b) (DP Ref. 89691.02.R.001.Rev0).

An acid sulfate soil assessment has not been completed at the site. The purpose of this document is to provide a provisional plan for the management and treatment of acid sulfate soils that may be unexpectedly disturbed at the site during the proposed works. This management plan has been prepared with reference to Stone et al (1998), Ahern et al (2004) and Dear et al (2014).

It is recommended that an acid sulfate soil assessment (ASSA) be completed at the site. Depending on the findings of the ASSA, it is possible that this management plan may not be required; however, it has been prepared as a contingency measure in the event that acid sulfate soils are disturbed at the site.



## 2. Site Information

### 2.1 Site Description

The school allotment is identified as 1240 Ocean Drive, Lake Cathie, described as Lot 2 DP1193553. The lot covers 3.73 ha and is an irregular shape, with the existing school infrastructure in the south-east half of the lot. The location of the proposed school expansion ('the site') is generally located in the central and eastern part of the overall school allotment as shown in Drawing 1, Appendix B. It is understood that the western portion of Lot 2 will not be affected except for removal of the existing access road.

The property is located on the eastern side of Ocean Drive and is bounded by a new collector road to the north and east and a new district sporting field development to the south.

At the time of the PSI (January 2019), a general fill pad had been constructed at the school property prior to construction of the existing school structures. It is understood that the fill was sourced from a local quarry. Observations made during the inspection (January 2019) are summarised below.

- The southern part of the school property had existing school buildings, vehicle pavements and concreted spaces. Landscaped gardens were also present adjacent to the vehicle pavements;
- The remaining parts of the school property generally had a good covering of mown grass within the central part and south western part of the site;
- The northern part of the site had over grown grass and semi mature trees, with the outside perimeter mown around the boundary of the school site. This area was fenced off from the remainder of the school site;
- A number of semi mature trees were planted along the western boundary
- An area north of the COLA near the western boundary had been recently turfed with grass, which is likely to be associated with the removal of the previous building;
- There were a number of small areas (less than 0.5 m in diameter) which appeared to have been recently topsoiled with the grass removed;

Surface soils where exposed comprised light brown / brown silty clay. No obvious signs of gross contamination (i.e. staining or odours) were observed during the inspection.

The existing area of the allotment to be further developed ('the site') is at approximate RL 9.5 m AHD in the north falling to RL 7.5 m AHD to the south, as shown on Drawing 1 in Appendix B.

An aerial image showing the existing structures at Lake Cathie Public School and the surrounding infrastructure is shown below in **Figure 1**. Small to medium trees have been planted around the north-east perimeter of the school and in the area of the existing car parks and access roads.

The site is currently zoned "R1 General Residential" under the current 2011 LEP.



**Figure 1: Aerial image of Lake Cathie Public School and surrounds (Nearmap Image dated 23 October 2018)**

## 2.2 Regional Geology and Acid Sulfate Soil Mapping

Reference to the 1:250,000 scale New South Wales state wide geology sheet indicates that the school allotment is underlain by Quaternary alluvium which consists of channel and floodplain alluvium deposits typically comprising gravel, sand, silt and clay. Karikeree Metadolerite is also mapped within the northern elevated parts of which typically comprises massive cleaved metadolerite.

Reference to the NSW Government “Mapping of naturally occurring asbestos in NSW – Known and potential for occurrence” indicates that the site is in close proximity to an area of “Geological units with Low asbestos potential”.

Reference to the Acid Sulfate Soil Risk Map published by the Department of Land and Water Conservation indicates that there is a low probability of occurrence of acid sulfate soils for soils at the depth of greater than 3 m below the natural ground surface within the alluvial sediments situated in the southern portion of the school property.

## 2.3 Hydrogeology

Groundwater at the site is expected to flow in a south easterly direction towards Duchess Gully and then towards the Pacific Ocean. Duchess Gully is considered to be the nearest environmentally sensitive receptor.

Review of available survey data for the site indicates that the ground surface at the site ranges from RL 9.5 m AHD in the north falling to RL 7.5 m AHD in the south.

## 2.4 Subsurface Conditions

A summary of the subsurface conditions encountered within the site are as follows. Logs are presented in Appendix C.

- **Fill:** Encountered in all bores (except Bore 104), from the surface to depths greater than 0.5 m and 1.9 m depth. Generally comprised silty clay fill (topsoil) over cobbly silty clay / cobbly clay fill with some gravel in the current investigation;
- **Natural Soil:** Encountered in Bores 101 and 104 beneath the fill to the bore terminations at 2.5 m and 1.6 m depth respectively except for Bore 104 as below. Generally comprising clay; and
- **Weathered Siltstone:** Encountered in Bore 104 from 1.5 m to bore termination at depth of 1.6 m.

The fill material appeared to be a quarry-based overburden material which is consistent with the site history information provided by the school site. Subject to confirmation during excavation activities, the fill has been provisionally assessed as not being an acid sulfate soil. Therefore, subject to successful segregation from the underlying natural soils, the *in situ* fill materials do not require management for acid sulfate soil conditions.

Groundwater was not encountered in the bores during drilling. It should be noted that groundwater depths and ground moisture conditions are affected by factors such as climatic conditions and soil permeability and therefore vary with time. It is noted that the previous investigation completed in 2013 encountered groundwater at depths of 1.3 m to greater than 2.5 m.

## 3. Provisional Acid Sulfate Management Plan

### 3.1 Overview

Given the results of the previous investigation (DP, 2019b) and that natural soils are unlikely to be disturbed, acid sulfate soils are unlikely to be disturbed as part of the proposed development. However, if natural soils are disturbed / excavated, they should be segregated and stockpiled separately for *ex situ* assessment.

Subject to the results of the *ex situ* ASSA, it is understood that spoil generated from the excavations may be either reused on-site as backfill or disposed of to a licenced landfill. The following options for excavated acid sulfate soils have been considered:

- Following treatment, acid sulfate soils could be placed back *in situ* below 0.3 m of non-acid sulfate soil; or
- Disposal of treated acid sulfate soils to a licenced landfill in accordance with Waste Classification Guidelines (NSW EPA, 2014).

Where practicable, the *in situ* fill (i.e. non-ASS) materials should be segregated from the underlying natural site-sourced (i.e. presumed ASS) soils. Subject to confirmation during excavation activities, the fill materials can be managed on-site in accordance with the construction management plan and do not require specific management for ASS conditions.

The natural site-sourced (i.e. presumed ASS) soils should be placed within a temporary treatment area for assessment neutralisation and validation prior to reburial or disposal.

Disturbance of acid sulfate soils must be managed to avoid the release of acidity into the environment. It is essential that the acid sulfate soils be managed to ensure that there is no impact to the surrounding environment.

### 3.2 Risk Categorisation

Dear et al (2014) relates environmental risk from ASS by the treatment level and tonnage of disturbance of ASS. This document assumes that the proposed disturbance of the natural soils would be minimal (i.e. less than 1000 tonnes) is likely to be considered “Category L” or low level of treatment.

Dear et al (2014) confirms that the following practices (at a minimum) are to be included in the ASSMP:

- Soils are treated with an amount of neutralising agent that will counter their existing plus potential acidity;
- The neutralising agent is thoroughly mixed with the soil; and
- Management of site run-on, run-off and infiltration.

The following have also been included in this ASSMP:

- Dewatering and monitoring of any accumulated waters within the construction area;
- Verification testing;
- Provide a construction environmental management plan; and
- Preparation of a simple closure report commenting on ASS management activities and final placement / use of disturbed soils.

### 3.3 Liming Rates

The liming rate would be based on the results of the *ex situ* ASSA. However, a nominal liming rate of approximately 10 kg of Ag should be applied per tonne of soil requiring treatment.

### 3.4 Soil Treatment and Neutralisation Rates

Neutralisation of ASS should be carried out as follows:

- Excavation and stockpiling of soils to be managed within a “designated stockpile area”, or similar. The stockpiling of soils should be managed in accordance with the contractors Construction Environmental Management Plan (CEMP); however, appropriate management of site run-on, runoff and infiltration should be incorporated into the plan.
- The neutralising agent and acid sulfate soil should be thoroughly mixed within the designated stockpile area, using the bucket of an excavator and / or rotary plough. The actual liming rate may need to change due to the natural variations in the pyritic components in the soil and may require adjustment based on monitoring results obtained during the treatment process. Additional lime will be required if monitoring results indicate that appropriate neutralisation has not been achieved. Grade 1 Agricultural Lime should be placed and mixed into the disturbed soils at a rate based on the results of the ASSA.
- For off-site disposal, temporary stockpiling / management would be required until waste classification assessment has been completed. The waste classified spoil can then be loaded into trucks for transport to the appropriately licensed facility for disposal.

### 3.5 Placement of a Guard Layer

Following completion of excavation activities, and where there are exposed ASS remaining in the work area (i.e. not below the water level) then a guard layer of agricultural lime should be placed at a rate of 1 kg / m<sup>2</sup>. This is to counteract the generation of acidic leachate due to the soils being exposed to air during the construction period.

Where possible, the excavation area should then be completed with a geomembrane or layer of non-ASS and then revegetated (if appropriate) to minimise the potential for the release of acidity into the environment following completion of construction works.

### 3.6 Neutralising Materials

Agricultural lime (‘ag’ lime) should be used as the preferred neutralisation material for the management of ASS as it is usually the cheapest and most readily available product for soil neutralisation. This material is strongly alkaline (pH of 8.5 to 9.5), it is of low solubility, and does not present any handling problems. The ‘ag’ lime comprises calcium carbonate, typically made from limestone that has been finely ground and sieved to a fine powder.

The ‘ag’ lime purity should preferably be 95% or better, (i.e. NV >95, where NV is the neutralising value, a term used to rate the neutralising power of different forms of materials relative to pure, fine calcium carbonate which is designated NV = 100). ‘Ag’ lime is typically sold at an NV of 95% to 98%. There could be economic justification for using a less pure grade of ag lime; however, under these circumstances, the individual lime dosing rates should be increased by a factor of 100/NV.



Due to its low solubility in water, 'ag' lime is not suitable for the neutralisation of leachate, which requires a product with a very quick reaction and high solubility. The most suitable neutralising agent for leachate and retained drainage water is slaked lime or quicklime (calcium hydroxide). This is made by treating burnt lime (calcium oxide) with water (slaking) and comes as a fine white powder. It has a typical NV of about 135. Due to its very strong alkalinity (pH of about 12.5 to 13), slaked lime or quicklime should not be allowed to come into contact with the skin or be inhaled.

### 3.7 Dewatering

If groundwater is encountered during the proposed works, then it should be managed using a water treatment system that enables management of water pH and turbidity levels. A number of propriety systems are available for use.

The following procedure is recommended in order to minimise potential adverse impacts resulting from excavation and dewatering of ASS during construction:

- Minimise the dewatering depth required for excavation;
- Minimise the time and volume of exposed ASS (i.e. staged dewatering and excavation over relatively short durations);
- Extracted groundwater should be discharged through a water treatment system that enables management of water pH and turbidity levels; and
- The pH of the extracted water should be monitored prior to discharge. Neutralisation should be undertaken if discharge water pH falls below natural groundwater levels or regulatory requirements.

The amount of neutraliser required to be added to the leachate or discharged groundwater can be calculated from the equation below:

$$\text{Alkali Material Required (kg)} = \frac{M_{\text{Alkali}} \times 10^{-\text{pH initial}}}{2 \times 10^3} \times V$$

Where:  $\text{pH initial}$  = initial pH of leachate  
 $V$  = volume of leachate or collected water (litres)  
 $M_{\text{Alkali}}$  = molecular weight of alkali material (g/mole)

**Note:** molecular weight of calcined magnesite ( $M_{\text{MgO}}$ ) = 40 g/mole.

The alkali should be added to the leachate / discharged groundwater water as a slurry. Mixing of the slurry is best achieved using an agitator.

Whilst agricultural lime is well suited to the treatment of acid sulfate soils, it does not dissolve readily in water; hence it should not be used for adjusting the pH of water which requires a product with a very quick reaction and high solubility. The most suitable neutralising agent for leachate and retained water is slaked lime or quicklime (calcium hydroxide). This is made by treating burnt lime (calcium oxide) with water (slaking) and comes as a fine white powder. It has a typical NV of about 135.

Due to its very strong alkalinity (pH of about 12.5 to 13), slaked lime or quicklime should not be allowed to come into contact with the skin or be inhaled. Furthermore, it should be added incrementally with care and thoroughly mixed to prevent overshooting the desired pH.

As a guide, the approximate quantities of hydrated lime would be required to neutralise acidic water to pH 7 are provided in Table 1.

**Table 1: Recommended Approximate Liming Rates for Water**

Water pH	Water Extraction Rate		
	2 m <sup>3</sup> /hr	5 m <sup>3</sup> /hr	10 m <sup>3</sup> /hr
2	0.74	1.85	3.7
3	0.074	0.185	0.37
4	0.0074	0.0185	0.037
5	0.00074	0.00185	0.0037
6	0.000074	0.000185	0.00037

Notes: Liming rates are for hydrated lime (kg of  $\text{Ca(OH)}_2$ )

It should be recognised that portable holding and treatment tanks will be required to allow on-site neutralisation of water generated by dewatering activities prior to on-site infiltration or discharge.

### 3.8 Verification Testing

Verification testing of the soil and any collected water to be disposed is required to be conducted after the addition of lime to assess whether or not mixing has been adequate, and to reduce the risk of acidic water being returned to the environment.

Based on the absence of testing to-date and the expected quantity of soil to be treated, it is recommended that verification testing should comprise regular field pH screening at a rate of approximately one sample per 50 tonnes of soil disturbed and a minimum of five samples collected per verification testing event and include further  $S_{CR}$  suite testing on one representative sample from the stockpile materials. The samples should be spread across the full depth and area of the stockpile.

The pH of all collected water around the confines of the managed stockpiles or during dewatering should be measured daily and results assessed against the criteria provided in Table 2. The soil and water contained within the bunded areas should not be removed until the target values presented in Table 2 below have been achieved.

**Table 2: Target Levels of Neutralised Soil and Water**

Test	Component	Target Level
Monitoring of water	pH	$6.5 < \text{pH} < 8.5$
	Turbidity	To comply with either values determined in consultation with the Authority or less than local background levels (baseline monitoring required).
	Aluminium (Al) and Iron (Fe)	Establish local water quality data prior to site disturbance and ensure that these values are not exceeded.
	Dissolved Oxygen	To comply with either values determined in consultation with the Authority or less than local background levels (baseline monitoring required).
Field screening of soil	$\text{pH}_F$	$5.5 < \text{pH}_F \leq 8.5$
Acid based accounting of soil (Chromium Suite test method)*	Net acidity (using appropriate fine factor)	Zero or negative
	$\text{pH}_{\text{KCL}}$	$\text{pH}_{\text{KCL}} \geq 6.5$
	TAA	Zero

\* Based on Section 3.6 of Chapter A (Overview) of the Ahern et al (2004)

It should be noted that chromium suite tests will require at least four days turnaround, possibly longer, and hence sufficient time should be allowed in the treatment programme for such verification testing. Only appropriately skilled staff, such as available through DP, should collect and test verification samples. In addition to normal daily supervision of the soil management process, it is suggested that regular formal inspections be undertaken.

### 3.9 Emergency Response Procedures (Contingency Plan)

Construction activities which may cause potential environmental threats are summarised in Table 3 below together with recommendations for “Emergency Response Procedures”.

**Table 3: Emergency Response Procedures**

<b>Construction Activity</b>	<b>Potential Environmental Threat</b>	<b>Emergency Response</b>
Excavations	Flooding of open excavation causing adjacent groundwater levels to rise, leading to potential acid leachate once the excavation is drained	<ul style="list-style-type: none"> <li>• Inform site foreman and project manager/ environmental officer;</li> <li>• Determine pH of groundwater / floodwater in excavation;</li> <li>• Correct groundwater / floodwater pH by application of slaked lime to bring pH in range of 6.5 to 8.5;</li> <li>• Drain pit to tanks for water quality assessment prior to discharge.</li> </ul>
Stockpiling / Neutralisation	Stockpile washes or slips outside of contained area	<ul style="list-style-type: none"> <li>• Inform site foreman and project manager/ environmental officer;</li> <li>• Estimate volume of material breaching bund;</li> <li>• Conduct pH analysis of adjacent watercourses (if any);</li> <li>• Remove breached soil into a bunded limed pad;</li> <li>• Over-excavate contaminated area to 0.2m depth, apply and mix lime at rate as for guard layers (1 kg lime per m<sup>2</sup> of surface).</li> </ul>
	Breach in stockpile containment bund	<ul style="list-style-type: none"> <li>• Inform site foreman and project manager/ environmental officer;</li> <li>• Close breach in bund;</li> <li>• Conduct pH analysis of adjacent watercourses (if any);</li> <li>• Correct pH in any adjacent watercourse (if required).</li> </ul>

For all construction activity incidents which pose an environmental threat, an incident report must be completed in order that:

- The cause of the incident may be determined; determine how the incident occurred;
- Additional control measures may be implemented; and
- Work procedures may be modified to reduce the likelihood of the incident re-occurring.

### 3.10 Reporting

A record of treatment of acid sulfate soils should be maintained by the contractor and should include the following details:

- Date;
- Location / area;
- Time of excavation;
- Neutralisation process undertaken;
- Lime rate utilised;
- Results of monitoring;
- Disposal location; and
- Tonnages and landfill dockets (if applicable).

A record should also be maintained confirming contingency measures and additional treatment if undertaken. A final report should be issued upon completion of the works presenting the monitoring regime and results, and confirming that adverse environmental impact has not occurred during the works.

## 4. Conclusions

This provisional acid sulfate soil management plan provides proposed procedures for the management and treatment of acid sulfate soils which may be encountered during the proposed works. These procedures should be reviewed when the results of the *ex situ* acid sulfate soils assessment are available.

## 5. References

Stone, Y, Ahern C R, and Blunder B (1998), *Acid Sulfate Soil Manual*, Acid Sulfate Advisory Committee, Wollongbar, NSW, Australia.

Ahern CR, Ahern MR and Powell, B (1998), *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland*, Queensland Department of Natural Resources, Resource Sciences Centre, Indooroopilly, Queensland Australia.

Ahern CR, McElnea AE, Sullivan LA (2004), *Acid Sulfate Soils Laboratory Methods Guidelines*. Queensland Department of Natural Resources, Mines and Energy, Indooroopilly, Queensland, Australia.

Dear, S-E., Ahern, C. R., O'Brien, L. E., Dobos, S. K., McElnea, A. E., Moore, N. G. & Watling, K. M., (2014). *Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines*. Brisbane: Department of Science, Information Technology, Innovation and the Arts, Queensland Government.

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Douglas Partners Pty Ltd (DP, 2019a), Report on Preliminary Site Investigation (PSI) for Contamination, Lake Cathie Primary School Expansion, 1240 Ocean Drive, Lake Cathie, dated February 2019.

Douglas Partners Pty Ltd (DP, 2019b), Report on Geotechnical Assessment, Lake Cathie Primary School Expansion, 1240 Ocean Drive, Lake Cathie, dated February 2019.

NSW EPA (NSW EPA, 2014), *Waste Classification Guidelines, Part 1 – Classifying Waste, 2014*.

## 6. Limitations

Douglas Partners (DP) has prepared this Provisional Acid Sulfate Soil Assessment for the proposed upgrade at Lake Cathie Public School at 1240 Ocean Drive, Lake Cathie with reference to DP's proposal PMQ190073.P.002.Rev0 dated 10 December 2019 and acceptance received from Craig McIlveen of AW Edwards Pty Ltd dated 10 December 2019. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of AW Edwards Pty Ltd and Schreiber Hamilton Architecture Pty Ltd for this project only and for the purposes as described in the report.

It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and / or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site during previous investigations only at the specific sampling and / or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during previous investigations. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and / or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the

hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

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**Douglas Partners Pty Ltd**

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## Appendix A

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About This Report

Notes on Descriptive Terms

# About this Report

## Douglas Partners



### Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

### Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

### Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

### Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

### Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

# *About this Report*

## **Site Anomalies**

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

## **Information for Contractual Purposes**

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

## **Site Inspection**

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.





### Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

### Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

### Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

### Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

### Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

### Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

### Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:  
4,6,7  
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:  
15, 30/40 mm

# *Sampling Methods*

The results of the SPT tests can be related empirically to the engineering properties of the soils.

## **Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests**

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



## Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

## Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

## Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

## Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 - 5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

# *Soil Descriptions*

## **Soil Origin**

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.



### Rock Strength

Rock strength is defined by the Point Load Strength Index ( $Is_{(50)}$ ) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 2007. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

\* Assumes a ratio of 20:1 for UCS to  $Is_{(50)}$ . It should be noted that the UCS to  $Is_{(50)}$  ratio varies significantly for different rock types and specific ratios should be determined for each site.

### Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

### Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000 mm



# Rock Descriptions

## Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

## Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

# Symbols & Abbreviations

## Douglas Partners



### Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

### Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

### Water

▷	Water seep
▽	Water level

### Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U <sub>50</sub>	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

### Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

### Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

### Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

### Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

### Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

### Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

### Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

### Other

fg	fragmented
bnd	band
qtz	quartz

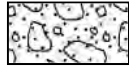
# Symbols & Abbreviations

## Graphic Symbols for Soil and Rock

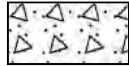
### General



Asphalt



Road base



Concrete



Filling

### Soils



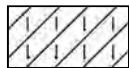
Topsoil



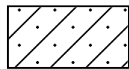
Peat



Clay



Silty clay



Sandy clay



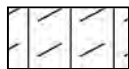
Gravelly clay



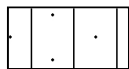
Shaly clay



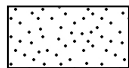
Silt



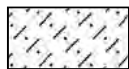
Clayey silt



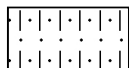
Sandy silt



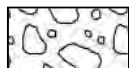
Sand



Clayey sand



Silty sand



Gravel



Sandy gravel



Cobbles, boulders



Talus

### Sedimentary Rocks



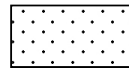
Boulder conglomerate



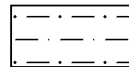
Conglomerate



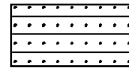
Conglomeratic sandstone



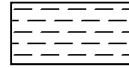
Sandstone



Siltstone



Laminite



Mudstone, claystone, shale



Coal

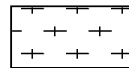


Limestone

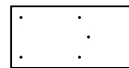
### Metamorphic Rocks



Slate, phyllite, schist

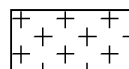


Gneiss

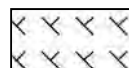


Quartzite

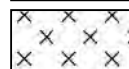
### Igneous Rocks



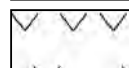
Granite



Dolerite, basalt, andesite



Dacite, epidote



Tuff, breccia



Porphyry

Appendix 12 – Unexpected Finds Protocol



**Douglas Partners**  
*Geotechnics | Environment | Groundwater*

Report on  
Unexpected Finds Protocol

Lake Cathie Public School Upgrade  
1240 Ocean Drive, Lake Cathie

Prepared for  
AW Edwards Pty Ltd

Project 89691.02  
December 2019

Integrated Practical Solutions





## Document History

### Document details

Project No.	89691.02	Document No.	R.003.Rev0
Document title	Report on Unexpected Finds Protocol Lake Cathie Public School Upgrade		
Site address	1240 Ocean Drive, Lake Cathie		
Report prepared for	AW Edwards Pty Ltd		
File name	89691.02.R.003.Rev0.Unexpected Finds Protocol		



### Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Jessica Paulsen	Brent Kerry	16 December 2019

### Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Craig McIlveen, AW Edwards Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		16 December 2019
Reviewer		16 December 2019



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## **Report on Unexpected Finds Protocol**

### **Lake Cathie Public School Upgrade**

### **1240 Ocean Drive, Lake Cathie**

---

## **1. Introduction**

This unexpected finds protocol (UFP) is for the Proposed Lake Cathie Public School Upgrade at 1240 Ocean Drive, Lake Cathie. The UFP was commissioned in an email dated 10 December 2019 by Craig McIlveen of AW Edwards Pty Ltd and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal PMQ190073.P.002.Rev0 dated 10 December 2019.

DP has previously prepared a report entitled *Report on Preliminary Site Investigation (PSI) for Contamination, Lake Cathie Primary School Expansion, 1240 Ocean Drive, Lake Cathie*, dated February 2019 (DP, 2019).

The PSI report (DP, 2019) concluded:

*Based on the results of the preliminary investigation the site is considered to be suitable for the proposed development from a contamination perspective subject to the following being conducted:*

- *Additional targeted testing of natural Serpentinite rock and associated residual soils is conducted to confirm the presence / absence of elevated chromium concentrations. Requirements for remediation / management (if any) would be confirmed following the additional investigation;*
- *Incorporation of unexpected finds protocols into the Construction Environmental Management Plan (CEMP) for the development given the presence of widespread fill of unknown origin; and*
- *If additional investigation identifies the presence of contamination requiring remediation / management, remediation and validation of the site would be required in accordance with a site specific remediation action plan (RAP) to be prepared for the site.*

This UFP is based on the results of the PSI (DP, 2019) and provides methods and strategies to manage unexpected finds of potential contamination, including serpentinite rock, during excavation and / or construction works.

## **2. Proposed Development**

It is understood that the proposed development is to include 18 new teaching spaces which may include the construction of one and two storey structures as well as associated access roads and paved / concrete areas.

The site covers an area of approximately 3.73 ha and the proposed excavation depths are expected to be minimal for that required for shallow footings and installation of in-ground services.

Refer to Drawing 1 in Appendix B.

### 3. Site Information

#### 3.1 Site Description

The school allotment is identified as 1240 Ocean Drive, Lake Cathie, described as Lot 2 DP1193553. The lot covers 3.73 ha and is an irregular shape, with the existing school infrastructure in the south-east half of the lot. The location of the proposed school expansion ('the site') is generally located in the central and eastern part of the overall school allotment as shown in Drawing 1, Appendix B. It is understood that the western portion of Lot 2 will not be affected except for removal of the existing access road.

The property is located on the eastern side of Ocean Drive and is bounded by a new collector road to the north and east and a new district sporting field development to the south.

At the time of the PSI (January 2019), a general fill pad had been constructed at the school property prior to construction of the existing school structures. It is understood that the fill was sourced from a local quarry. Observations made during the inspection (January 2019) are summarised below.

- The southern part of the school property had existing school buildings, vehicle pavements and concreted spaces. Landscaped gardens were also present adjacent to the vehicle pavements;
- The remaining parts of the school property generally had a good covering of mown grass within the central part and south western part of the site;
- The northern part of the site had over grown grass and semi mature trees, with the outside perimeter mown around the boundary of the school site. This area was fenced off from the remainder of the school site;
- A number of semi mature trees were planted along the western boundary
- An area north of the COLA near the western boundary had been recently turfed with grass, which is likely to be associated with the removal of the previous building;
- There were a number of small areas (less than 0.5 m in diameter) which appeared to have been recently topsoiled with the grass removed;

Surface soils where exposed comprised light brown / brown silty clay. No obvious signs of gross contamination (i.e. staining or odours) were observed during the inspection.

The existing area of the allotment to be further developed ('the site') is at approximate RL 9.5 m AHD in the north falling to RL 7.5 m AHD to the south, as shown on Drawing 1 in Appendix B.

An aerial image showing the existing structures at Lake Cathie Public School and the surrounding infrastructure is shown below in **Figure 1**. Small to medium trees have been planted around the north-east perimeter of the school and in the area of the existing car parks and access roads.

The site is currently zoned "R1 General Residential" under the current 2011 LEP.



**Figure 1: Aerial image of Lake Cathie Public School and surrounds (Nearmap Image dated 23 October 2018)**

### **3.2 Regional Geology and Acid Sulfate Soil Mapping**

Reference to the 1:250,000 scale New South Wales state wide geology sheet indicates that the school allotment is underlain by Quaternary alluvium which consists of channel and floodplain alluvium deposits typically comprising gravel, sand, silt and clay. Karikeree Metadolerite is also mapped within the northern elevated parts of which typically comprises massive cleaved metadolerite.

Reference to the NSW Government “Mapping of naturally occurring asbestos in NSW – Known and potential for occurrence” indicates that the site is in close proximity to an area of “Geological units with Low asbestos potential”.

Reference to the Acid Sulfate Soil Risk Map published by the Department of Land and Water Conservation indicates that there is a low probability of occurrence of acid sulfate soils for soils at the depth of greater than 3 m below the natural ground surface within the alluvial sediments situated in the southern portion of the school property.

### **3.3 Hydrogeology**

Groundwater at the site is expected to flow in a south easterly direction towards Duchess Gully and then towards the Pacific Ocean. Duchess Gully is considered to be the nearest environmentally sensitive receptor.



Review of available survey data for the site indicates that the ground surface at the site ranges from RL 9.5 m AHD in the north falling to RL 7.5 m AHD in the south.

### 3.4 Historical Review

The site history review completed as part of the PSI (DP, 2019) indicated the following:

- The majority of the site had been used for agricultural purposes since 1914 including potential market garden since 1956;
- Ocean Drive appeared similar to the current alignment in 1979;
- Construction of school buildings commenced in 2014;
- The Asbestos Register for the school indicated that asbestos was not used in construction of the school buildings.

## 4. Results of Previous Investigation

### 4.1 Scope

The scope of work completed for the PSI (DP, 2019) comprised a review of historical information for the site and a site walkover followed by drilling four boreholes. Selected soil samples were analysed. Results from previous investigations were also included in the PSI report (DP, 2019).

### 4.2 Results

A summary of the subsurface conditions encountered within the site are as follows. Logs are presented in Appendix C.

- **Fill:** Encountered in all bores (except Bore 104), from the surface to depths greater than 0.5 m and 1.9 m depth. Generally comprised silty clay fill (topsoil) over cobbly silty clay / cobbly clay fill with some gravel in the current investigation;
- **Residual Soil:** Encountered in Bores 101 and 104 beneath the fill to the bore terminations at 2.5 m and 1.6 m depth respectively except for Bore 104 as below. Generally comprising clay; and
- **Weathered Siltstone:** Encountered in Bore 104 from 1.5 m to bore termination at depth of 1.6 m.

The fill material appeared to be a quarry based overburden material which is consistent with the site history information provided for the school site.

Groundwater was not encountered in the bores during drilling. It should be noted that groundwater depths and ground moisture conditions are affected by factors such as climatic conditions and soil permeability and therefore vary with time. It is noted that the previous investigation completed in 2013 encountered groundwater at depths of 1.3 m to greater than 2.5 m.

There were no obvious indications of gross contamination within the exposed soils in the test locations (i.e. no obvious staining or odours).

The results of PID screening on soil samples are shown on the logs in Appendix C. PID screening indicated the absence of gross volatile hydrocarbon impact (PID <1 ppm) in the samples screened.

There was no visual or olfactory evidence (i.e. staining or odours) to suggest the presence of gross contamination within the soils investigated to the depths investigated (i.e. <2 m depth).

## **4.3 Conclusions**

### **4.3.1 Contamination Status**

The results of the site history review indicated the general absence of contaminating land uses for the site, other than historical use of the site for agricultural purposes, the presence of widespread fill and the potential for naturally occurring asbestos and elevated chromium within natural Serpentine and associated residual soils.

All samples tested for the PSI and other previous investigations were below the relevant criteria for the health investigation and screening levels, and environmental investigation and screening levels for the adopted primary school land use.

All samples tested for the current investigation and previous investigation returned contaminant concentrations below the total petroleum hydrocarbon management limits.

It is noted that only limited testing of natural soils for asbestos has been conducted to date. In addition, Serpentine was not identified during the current investigation, precluding asbestos identification testing. While the NSW Government naturally occurring asbestos website suggests the risk of naturally occurring asbestos on the site is considered to be low and limited testing of natural soils and Serpentine on the school site to date indicate the absence of asbestos at laboratory reporting limits, it is therefore considered that the weathered bedrock investigated onsite does not contain naturally occurring asbestos.

No assessment of groundwater was undertaken for the PSI.

Based on the results of the preliminary investigation the site is considered to be suitable for the proposed development from a contamination perspective subject to the following being conducted:

- Additional targeted testing of natural Serpentine rock and associated residual soils is conducted to confirm the presence / absence of elevated chromium concentrations. Requirements for remediation / management (if any) would be confirmed following the additional investigation;
- Incorporation of unexpected finds protocols into the Construction Environmental Management Plan (CEMP) for the development given the presence of widespread fill of unknown origin;
- If additional investigation identifies the presence of contamination requiring remediation / management, remediation and validation of the site would be required in accordance with a site specific remediation action plan (RAP) to be prepared for the site.

### **4.3.2 Preliminary Waste Classification**

Based on the site historical information, site investigations and preliminary laboratory testing conducted for the previous investigations, the following waste classifications comments are provided:

#### **4.3.2.1 Existing Fill**

All of the samples tested within the site for the current and previous investigation returned contaminant concentrations below the maximum permissible concentrations to be classified as General Solid Waste (GSW) with reference to NSW EPA Waste Classification guidelines. The materials tested are also preliminary classified as 'General Solid Waste (non-putrescible)' for disposal to an appropriately licensed landfill, if required.

During excavation, it is recommended that appropriate inspections are conducted and if any materials are encountered that are different to the materials sampled and tested or exhibit signs of contamination (e.g. anthropogenic inclusions, fibro fragments, staining or odours), these should be appropriately segregated for further assessment. The handling, transport and disposal / re-use of the materials should be conducted in accordance with regulatory and statutory requirements.

#### **4.3.2.2 Natural Soils**

The contaminant concentrations within these samples of natural materials were below the maximum permissible concentrations for general solid waste. Only limited testing has been carried out on natural soils

Serpentine rock has been previously encountered at the site and within nearby investigations. The site is mapped within an area comprising a "Low asbestos potential". There is a possibility that the serpentine rock could be a potential source of naturally occurring asbestos and elevated chromium based on previous experience with these materials. Further investigation of the bedrock and associated residual soils to confirm the absence of asbestos and elevated chromium will be required if it is likely to be exposed during expansion activities.

Natural material won from site excavations (silty clay, clay) would likely satisfy the criteria for Virgin Excavated Natural Material (VENM). VENM materials can be re-used on another site in accordance with EPA guidelines.

Acid sulfate soil testing was not carried due to the "Low Risk of acid sulfate soils at depths greater than 3 m", however, further testing would be required to confirm the absence of acid sulfate soils (ASS) prior to removing from site.

Natural soils classified as ASS cannot be classified as VENM. In addition soils containing asbestos cannot be classified as VENM. As such further testing of natural bedrock and associated residual soils will be important if off-site disposal of natural soils / bedrock is required.

It is noted that the scope of testing was intended to provide a preliminary indication of contaminant concentrations and waste classification at nominated test locations.

## 5. Unexpected Finds Protocol

Given the site's history and the presence of fill and the potential for serpentinite rock to be present, there is a potential for unexpected contamination to be encountered in soil during construction works. The following protocol provides guidance on management of contamination not anticipated or known prior to commencement that may be encountered during construction works:

- Excavation, handling loading and transport of contaminated materials must be undertaken by a licensed contractor in accordance with the appropriate regulatory approvals and legislative requirements;
- The progress of site excavations during construction must be regularly inspected by the contractor and supervising environmental consultant during earthworks to confirm that soils exposed are consistent with those encountered in the PSI (DP, 2019). Potential soil contamination may include stained soils, odorous soils and soils containing anthropogenic materials such as asbestos containing materials (ACM) and naturally occurring asbestos (serpentinite);
- If potentially contaminated soils are identified (i.e. visual or olfactory indication of contamination), excavation of fill must cease immediately. The site foreman is to be promptly notified and the affected area closed off by the use of barrier fencing or tape and appropriate warning sign, without delay. . Warning signs shall be specific to the contamination encountered (where appropriate) and must comply with the Australian Standard 1319-1994 – Safety Signs for the Occupational Environment;
- The supervising environmental consultant is to assess the presence of contamination and determine the extent of investigation / remediation works to be undertaken (with reference to the relevant contaminated site guidelines). A report detailing this information must be compiled by the supervising environmental consultant and provided to the construction manager;
- The identified contamination must be managed / remediated as advised by the supervising environmental consultant. This may include segregation and removal of the impacted materials, and validation of the area;
- If the assessment of impacted materials indicates that the materials are not suitable to remain on-site, the materials must be classified by the supervising environmental consultant for disposal to an appropriately licensed landfill with reference to NSW EPA (2014). The preliminary waste classification provided in the PSI (DP, 2019) should be confirmed prior to off-site disposal;
- The licensed contractor is to load classified materials directly into appropriate trucks for transport and disposal to a licensed facility;
- All works should be undertaken by a contractor holding the appropriate licence and permits for the works in accordance with statutory and regulatory requirements;
- Documentary evidence, such as weighbridge dockets, of correct disposal is to be provided to the construction manager;
- Excavation / construction in the affected area cannot recommence until validation indicates the absence of contamination or appropriate management of contamination has occurred, based on the advice of the supervising environmental consultant. A written validation report is to be provided by the supervising environmental consultant that the area is safe to be accessed and worked; and
- Details of the incident are to be recorded in the site record system.

## 5.1 Reporting Requirements

A record of each unexpected find and remediation / management conducted must be maintained by the contractor and must include, but not be limited to the following details:

- Date;
- Location;
- Assessment and confirmation of the contamination status of soils (including results of testing);
- Assessment of remediation / management options;
- Record of remediation / management undertaken to address the identified contamination;
- Final report upon completion of validation presenting the results of the assessment and remediation / management conducted.

## 6. References

DP (2019), *Report on Preliminary Site Investigation (PSI) for Contamination, Lake Cathie Primary School Expansion, 1240 Ocean Drive, Lake Cathie*, dated February 2019, Douglas Partners Pty Ltd (DP, 2019) DP Ref.89691.01.R.001.Rev1.

NSW EPA (NSW EPA, 2014), *Waste Classification Guidelines, Part 1 – Classifying Waste, 2014*.

## 7. Limitations

Douglas Partners (DP) has prepared this Unexpected Finds Protocol report for the proposed upgrade at Lake Cathie Public School at 1240 Ocean Drive, Lake Cathie with reference to DP's proposal PMQ190073.P.002.Rev0 dated 10 December 2019 and acceptance received from Craig McIlveen of AW Edwards Pty Ltd dated 10 December 2019. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of AW Edwards Pty Ltd and Schreiber Hamilton Architecture Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and / or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site during previous investigations only at the specific sampling and / or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during previous investigations. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground



conditions across the site between and beyond the sampling and / or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the site, or in fill materials at the test locations sampled and analysed. Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

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**Douglas Partners Pty Ltd**

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## Appendix A

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About This Report

# About this Report

## Douglas Partners



### Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

### Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

### Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

### Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

### Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

# *About this Report*

## **Site Anomalies**

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

## **Information for Contractual Purposes**

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

## **Site Inspection**

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

## Appendix 13 – Community Consultation Strategy



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School Infrastructure NSW

# Community Communication Strategy

**Lake Cathie Public School**

# Contents

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# Document Purpose

This Community Communication Strategy (CCS) has been developed to:

- Successfully consider and manage stakeholder and community expectations as integral to the successful delivery of the project.
- Outline interfaces with other disciplines, including safety, construction, design and environment, to ensure all activities are co-ordinated and drive best practice project outcomes.
- Inform affected stakeholders, such as the local community or road users about construction activities.
- Provide a delivery strategy which enables the open and proactive management of issues and communications.
- Highlight supporting procedures and tools to enable the team to deliver this plan effectively.
- Provide support for the broader communications objectives of School Infrastructure NSW (SINSW), including the promotion of the project and its benefits.

This Community Consultation Strategy (CCS) will be implemented through the design and construction phase of the project, and for 12 months following construction completion.

## Plan review

The CCS will be revised regularly to address any changes in the project management process, comments and feedback by relevant stakeholders, and any changes identified as a result of continuous improvement undertakings. This will be done in close consultation with the SINSW Senior Project Director, appointed Project Management Company and/or Contractor and SINSW Community Engagement Manager.

## Approval

The CCS is reviewed and approved by the SINSW Senior Project Director, in close consultation with Schools Operations and Performance, with final endorsement from the SINSW Community Engagement Senior Manager before being submitted to the Planning Secretary for approval.

**Table 1: List of SSD requirements and where they are addressed**

State Significant Development 9491, Condition B7	The Community Communications Strategy addresses this in section
Identify people to be consulted during the design and construction phase	<ul style="list-style-type: none"><li>▪ Section 4</li><li>▪ Section 5</li></ul>
Set out procedures and mechanisms for the regular distribution of accessible information about or relevant to the development	<ul style="list-style-type: none"><li>▪ Section 6</li><li>▪ Section 7</li><li>▪ Section 8.4</li></ul>
Provide for the formation of community-based forums, if required, that focus on key environmental management issues for the development	<ul style="list-style-type: none"><li>▪ Section 4</li></ul>
Set out procedures and mechanisms: <ul style="list-style-type: none"><li>▪ Through which the community can discuss or provide feedback to the Applicant</li></ul>	<ul style="list-style-type: none"><li>▪ Section 4, PRG</li><li>▪ Section 6</li><li>▪ Section 8.5</li></ul>
Set out procedures and mechanisms: <ul style="list-style-type: none"><li>▪ Through which the Applicant will respond to enquiries or feedback from the community; and</li></ul>	<ul style="list-style-type: none"><li>▪ Section 8.5</li></ul>
Set out procedures and mechanisms: <ul style="list-style-type: none"><li>▪ To resolve any issues and mediate any disputes that may arise in relation to construction and operation of the development, including disputes regarding rectification or compensation</li></ul>	<ul style="list-style-type: none"><li>▪ Section 8.5</li></ul>

State Significant Development 9491, Condition B7	The Community Communications Strategy addresses this in section
Include any specific requirements around traffic, noise and vibration, visual amenity, flora and fauna, soil and water, contamination	Section 3

## 1. Context

The NSW Government is investing \$6.7 billion over the next four years to deliver more than 190 new and upgraded schools to support communities across NSW. In addition, a record \$1.3 billion is being spent on school maintenance over five years. This is the largest investment in public education infrastructure in the history of NSW.

The upgrade of Lake Cathie Public School will deliver:

- 17 new flexible learning spaces, including two support unit classrooms.
- a new school hall
- a new bus bay
- refurbishment of the existing school hall into a new library and a special programs unit
- landscaping works.

The Lake Cathie Public School upgrade is classified as a state significant development, and has been assessed by the Department of Planning, Industry and Environment (DPIE). Consent was provided on 31/01/2019.

DPIE's web page on the project is [here](#).



## **2. Community Engagement Objectives**

SINSW's mission is to provide school infrastructure solutions by working collaboratively with all our stakeholders to create learning environments across NSW that serve our future needs and make us all proud.

This CCS has been developed to achieve the following community engagement objectives:

- Promote the benefits of the project
- Build key school community stakeholder relationships and maintain goodwill with impacted communities
- Manage community expectations and build trust by delivering on our commitments
- Provide timely information to impacted stakeholders, schools and broader communities
- Address and correct misinformation in the public domain
- Reduce the risk of project delays caused by negative third party intervention
- Leave a positive legacy in each community.

### **3. Key Messages**

Through each phase of the project, the key messages and means of engagement will be regularly reviewed, refined and updated. Information that is currently in the public domain is outlined below.

#### **3.1. High level messaging**

The NSW Government is investing \$6.7 billion over the next four years to deliver more than 190 new and upgraded schools to support communities across NSW. In addition, a record \$1.3 billion is being spent on school maintenance over four years. This is the largest investment in public education infrastructure in the history of NSW.

#### **3.2. Project messaging**

##### **3.2.1. Project status**

The State Significant Development Application has been assessed by the Department of Planning, Industry and Environment and consent has been granted.

##### **3.2.2. Project benefits**

The upgrade of Lake Cathie Public School will deliver:

- 17 new flexible learning spaces, including two support unit classrooms.
- a new school hall
- a new bus bay
- refurbishment of the existing school hall into a new library and a special programs unit
- landscaping works.

##### **3.2.3. High-quality learning environment**

The project will provide flexible learning spaces that make use of the latest technology to enhance the learning experience for the next generation of students. Furthermore, the contemporary and sustainable facilities will provide an outstanding working environment for school staff.

Flexible learning spaces are adaptable to accommodate small or large groups and facilitate students use of modern technology, while working independently and collaboratively.

##### **3.2.4. Environmental benefits**

The new school will be built in accordance with current sustainability principles. School Infrastructure NSW is committed to environmentally conscious construction and maintenance practices.

#### **3.3. Construction phase**

##### **3.3.1. Safety**

School Infrastructure NSW is committed to ensuring that work is completed safely and efficiently and with minimal impact to the local community. Prior to construction starting, any hazardous material is required to be removed from the site. This work will be carried out in accordance with regulatory requirements including the provisions of SafeWork NSW.

##### **3.3.2. Traffic Management**

The construction contractor has developed a Traffic Management Plan to ensure that vehicle movements are managed with minimal disruption to the local community. All construction vehicles (excluding worker vehicles) are to be contained wholly within the site, except if located in an approved on-street work zone, and vehicles must enter the site before stopping.

##### **3.3.3. Noise, vibration and dust**

Any activity that could exceed approved construction noise management levels will be managed in strict accordance with the Protection of the Environment Operations Act 1997.

Mitigation measures will be in place to manage noise and dust levels, including hoarding to minimise the effects of noise and dust and hosing down as required to ensure the safety of the school and local community.

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

- (a) between 7am and 6pm, Mondays to Fridays inclusive; and
- (b) between 7am and 6pm, Saturdays
- (c) No work may be carried out on Sundays or public holidays.

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

- (a) by the Police or a public authority for the delivery of vehicles, plant or materials; or
- (b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or
- (c) where the works are inaudible at the nearest sensitive receivers; or
- (d) where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works.

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

High noise generating activities including rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

- (a) 9am to 12pm, Monday to Friday;
- (b) 2pm to 5pm Monday to Friday; and
- (c) 9am to 12pm, Saturday.

#### **3.3.4. Flora and fauna**

School Infrastructure NSW is committed to ensuring construction work has a minimal impact upon flora and fauna.

School Infrastructure NSW will comply with all Development Consent Conditions relating to the protection of flora and fauna, and will comply with all relevant mitigation measures listed in the Environmental Impact Statement (EIS).

Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared to govern the completion of all construction works. The CEMP will detail measures to be taken for the protection and management of flora and fauna, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the Department of Planning, Industry and Environment (DPIE).

School Infrastructure NSW recognises there is a significant koala habitat program in the Port Macquarie area and the school and local community expect to have koala conservation addressed or acknowledged in planning and communications about the project.

The ongoing management, mitigation measures and activities outlined in the Vegetation Management Plan & Koala Plan of Management dated January 2020, prepared by Narla Environmental, will be maintained and implemented.

A suitably qualified and experienced consultant(s) will be commissioned to:

- undertake an extensive pre-clearing survey to delineate areas of vegetation permitted to be cleared, and to identify the presence of fauna habitat
- undertake required targeted searches for threatened flora prior to vegetation clearing
- supervise vegetation clearing to capture, treat and/or relocate any displaced fauna
- undertake any threatened species habitat augmentation or translocation
- undertake removal of priority weeds and replacement planting of locally indigenous native species
- oversee vegetation restoration.

Trees will not be trimmed or removed without appropriate statutory approval. A qualified and experienced arborist will complete all vegetation removal and trimming.

All trees on site that are not approved for removal will be protected in accordance with *AS 4970-2009 – Protection of Trees on Development Sites*.

#### **3.3.5. Soil and water**

School Infrastructure NSW is committed to the appropriate management of soil and water on the construction site.

School Infrastructure NSW will comply with all Development Consent Conditions relating to soil and water management, and will comply with all relevant mitigation measures listed in the Environmental Impact Statement (EIS).

Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared to govern the completion of all construction works. The CEMP will detail measures for the management of soil and water, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the Department of Planning, Industry and Environment (DPIE).

A suitably qualified and experienced consultant will prepare a Construction Soil and Water Management Sub-Plan (CSWMSP), which will form part of the CEMP. The CSWMSP will:

- describe erosion and sediment control measures to be implemented during construction
- provide a plan of how construction works will be managed in wet-weather events
- detail flows from the site to surrounding area
- include an Acid Sulfate Soils Management Plan (if required).

Erosion and sediment controls will be installed and maintained in accordance with the “Blue Book” – *Managing Urban Stormwater: Soils and Construction (4<sup>th</sup> edition)*. These controls will be implemented prior to the commencement of any other site disturbance works.

Sediment and polluted runoff water will be prevented from entering the existing adjacent watercourse.

The CEMP will describe the measures to be taken to manage stormwater and flood flows for small and large sized events.

A rainwater harvesting system will be installed on-site and used on-site during construction.

#### **3.3.6. Visual amenity**

Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared to govern the completion of all construction works. The CEMP will detail measures to maintain visual amenity, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the Department of Planning, Industry and Environment (DPIE).

The CEMP will include provisions for the management of outdoor lighting. The installation and operation of outdoor lighting will comply with both AS 4282-2019 – Control of the Obtrusive Effects of Outdoor Lighting and AS 1158.3.1-2005 – Lighting for Roads and Public Spaces – Part 3.1: Pedestrian Area (Category P) Lighting.

Impacts to general visual amenity will be limited via the installation of appropriate site fencing and adherence to site housekeeping procedures.

#### **3.3.7. Contamination**

Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared to govern the completion of all construction works. The CEMP will detail contamination management measures, will be prepared in accordance with relevant guidelines and performance indicators, and will be prepared to the satisfaction of the Department of Planning, Industry and Environment (DPIE).

The project site has been tested for contamination and is considered to be safe and suitable for the school upgrade.

To comply with the Development Consent Conditions, some additional testing will be completed. In the event that this testing identifies the presence of contamination requiring management, a Remediation Action Plan (RAP) will be developed, and form part of the CEMP.

The CEMP will include protocols for the management of unexpected contamination discovered during the course of construction works.

#### **3.3.8. Disruptive works**

Construction work for the upgrade to Lake Cathie Public School is underway. The following activities are planned for the upcoming weeks (*works will be outlined*). You can contact School Infrastructure NSW directly using the details below to discuss any aspect of this work.

### **3.3.9. Get involved**

School Infrastructure NSW is committed to working together with our school communities and other stakeholders to deliver the best possible learning facilities for students. Your feedback is important. For more information contact School Infrastructure NSW via the details below.

- Email: [schoolinfrastructure@det.nsw.edu.au](mailto:schoolinfrastructure@det.nsw.edu.au)
- Website: [schoolinfrastructure.nsw.gov.au](http://schoolinfrastructure.nsw.gov.au)
- Phone: 1300 482 651

### **3.4. Handover phase**

#### **3.4.1. Traffic and access**

Construction work on the upgrade to Lake Cathie Public School has been completed. School Infrastructure NSW are now in a position to confirm access provisions for the new school, including school entries and pick-up and drop-off arrangements.

### **3.5. Official school opening**

An upgrade to Lake Cathie Public School was completed today, and delivered brand new facilities.

Thank you for your patience during construction. School Infrastructure NSW are thrilled to deliver this project for the school community.



## 4. Project Governance

### 4.1. Project Reference Group

The Department's engagement process strives to engage with key stakeholders from the school community. As part of this process, a Project Reference Group (PRG) is established early in the project with nominated representatives from the school community to ensure input from, and consultation with, impacted stakeholders.

The PRG provides key information from an operational, educational, change and logistics perspective into the planning, through the design and construction phases of the project.

The PRG will receive project briefings and key progress updates on project progress to support its responsibilities in assisting to communicate updates to school staff, parents and stakeholders in the wider local community.

The Project Reference Group will be conducted as two separate groups during the development and delivery of all projects:

#### (a) Project Reference Group – Planning

A nominated group (limited to 10) will participate in workshops to develop the Educational Principles and Education Rationale which will inform the Functional Design Brief. These workshops are chaired by the SINSW Senior Project Director (or delegate) and may be facilitated by an Education Consultant. This activity will inform the development of the building design.

#### (b) Project Reference Group – Delivery

The purpose of the group is to seek input and inform design processes and provide operational requirements and information to help minimise the impact of the project on school operations. These workshops are chaired by the Senior Project Director (or delegate) and may be facilitated by the appointed architectural consultant, as required. The PRG will provide key information from an operational and logistics perspective to assist project delivery.

Specifically to communications and engagement related matters, the PRG will also:

- Provide a forum for discussion and exchange of information relating to the planning and delivery of the project
- Identify local issues and concerns to assist the project team with the development of mitigation strategies – to manage and minimise construction and environmental impacts to the school community and local residents
- Provide feedback to the communications and community engagement team on key messages and communications and engagement strategies
- Provide advice on school engagement activities
- Assist to disseminate communications to the school community and other stakeholders.

As per all department led delivery projects, the PRG acts as a consultative forum and not a decision-making forum for the planning and delivery of this school infrastructure.

**Figure 1: Project Reference Group (PRG)**

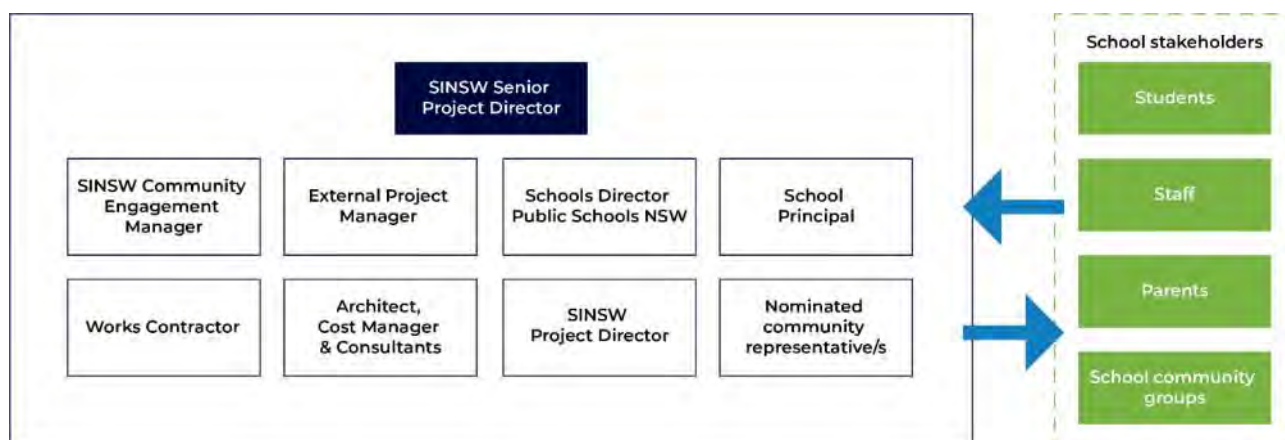
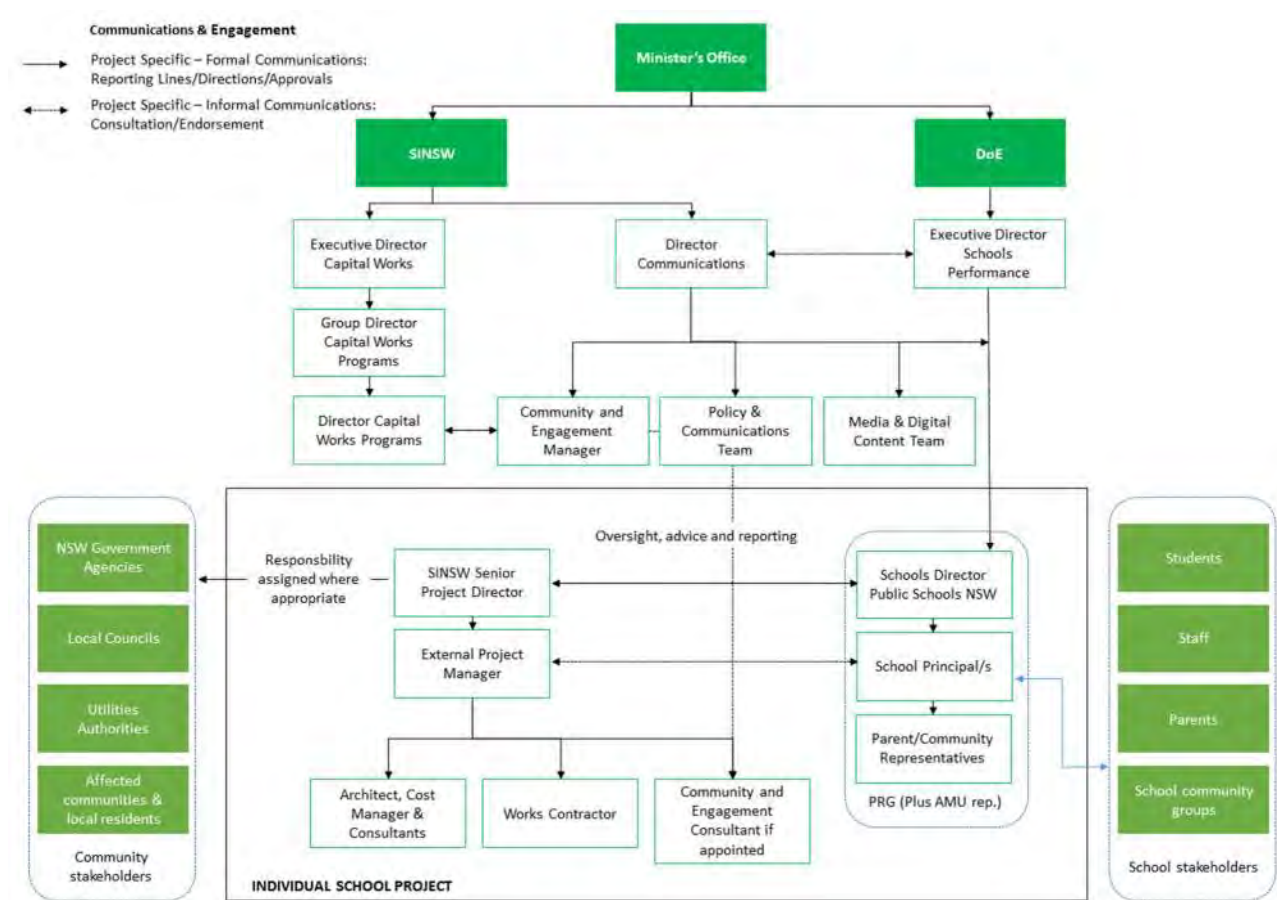


Figure 2 below maps how the department and SINSW will communicate both internally and externally.

**Figure 2: SINSW Project Governance**



## 5. Stakeholders

The stakeholder list below summarises who will be consulted during the design and construction phase via ongoing face to face meetings, communications collateral and digital engagement methods.

**Table 2: Stakeholders**

Stakeholders	Interest and involvement
<b>Local Members of Parliament:</b> <ul style="list-style-type: none"> <li>Local Member for Port Macquarie, Leslie Williams, Liberal</li> <li>Federal Member for Lyne, Dr David Gillespe, Nationals</li> </ul>	<ul style="list-style-type: none"> <li>Meeting the economic, social and environmental objectives of state and federal governments</li> <li>Delivering increased public education capacity on time</li> <li>Delivering infrastructure which meets expectations</li> <li>Addressing local issues such as traffic, congestion and public transport solutions</li> </ul>
<b>Government agencies and peak bodies:</b> <ul style="list-style-type: none"> <li>Transport for NSW</li> <li>Roads and Maritime Services NSW</li> <li>Fire and Rescue NSW</li> <li>NSW Department of Education</li> <li>NSW Department of Planning, Industry and Environment</li> <li>NSW Environmental Protection Authority</li> <li>NSW Rural Fire Service</li> <li>Sydney Water</li> <li>NSW Heritage Council</li> <li>NSW Office of Environment and Heritage</li> <li>NSW Department of Premier and Cabinet</li> </ul>	<ul style="list-style-type: none"> <li>Traffic and congestion on the local road system</li> <li>Adequate public transport options, including Green Travel Options, and school access</li> <li>Ensuring new infrastructure meets standard requirements for safety and fire evacuation</li> <li>Ensuring the development is compliant</li> <li>Ensuring the development does not impact heritage items</li> <li>Easing overcrowding in local schools</li> </ul>
<b>Local Council – Port Macquarie – Hastings Council</b> <ul style="list-style-type: none"> <li>Councillors</li> <li>Bureaucrats</li> <li>Mayor</li> <li>General Manager</li> </ul>	<ul style="list-style-type: none"> <li>Schedule for construction and opening of school</li> <li>Plans for enrolled students during the operation of the existing school</li> <li>Impacts to the local community including noise, congestion and traffic</li> <li>Shared use of community spaces</li> <li>Providing amenities to meet increase population density</li> </ul>
<b>School community</b> <ul style="list-style-type: none"> <li>Principal</li> <li>Teachers</li> <li>Staff</li> <li>Parents and carers</li> <li>Students</li> </ul>	<ul style="list-style-type: none"> <li>Safe pedestrian and traffic access to the temporary school during construction</li> <li>Construction impacts and how these will be minimised</li> <li>Quality of infrastructure and resources upon project completion</li> <li>How to access the new school once completed</li> <li>Reduced play space for students during construction</li> </ul>

Stakeholders	Interest and involvement
	<ul style="list-style-type: none"> <li>Changes to road accessways (Collector Road) during construction</li> </ul>
<b>Local community</b> <ul style="list-style-type: none"> <li>Ocean Street, to the North and West of the school</li> <li>Residents at Bonny Hills</li> <li>Residents between South Atlantic Drive and Whiting Way to the north of the school</li> <li>Forest Parkway</li> <li>Springhill Place</li> </ul>	<ul style="list-style-type: none"> <li>Noise and truck movements during construction</li> <li>Impacts on visual amenity</li> <li>Increased dust and vibration during construction to nearby streets</li> <li>Increased traffic and congestion on nearby streets</li> <li>Local traffic and pedestrian safety</li> <li>Changed traffic conditions during pick-up and drop-off</li> <li>Shared use of school facilities and amenities</li> </ul>
<b>Nearby public schools</b> <ul style="list-style-type: none"> <li>North Haven Public School</li> <li>Hérons Creek Public School</li> <li>Huntington Public School</li> <li>Wauhope Public School</li> </ul>	<ul style="list-style-type: none"> <li>Impact on school resources</li> <li>Impact on current students</li> <li>Implications for teaching staff</li> <li>Possible impacts on enrolments</li> <li>Opportunities to view the new facilities</li> <li>Opportunities for shared use of facilities</li> </ul>
<b>Adjoining affected landowners and businesses</b> <ul style="list-style-type: none"> <li>Cowarra Park Preschool and Long Day care, 25 Forest Parkway, Lake Cathie, NSW, 2445</li> <li>Ocean Club resort for over 50s living, Ocean Club Resort, 1333 Ocean Drive, Lake Cathie, NSW, 2445</li> <li>Surfside Resort Motel, 1379 Ocean Drive, Lake Cathie, NSW 2445 Elanora at Rainbow Beach, Land registry office, Crn Ocean Drive and Houston Mitchell Drive, Lake Cathie, NSW 2445</li> <li>1175 and 1191 Ocean Drive</li> <li>19 Houston Mitchell Drive</li> </ul>	<ul style="list-style-type: none"> <li>Noise and truck movements during construction</li> <li>Increased traffic and congestion on nearby streets</li> <li>Local traffic and pedestrian safety</li> <li>Changed traffic conditions during pick-up and drop-off</li> <li>Shared use of school facilities and amenities</li> <li>Environmental impacts during construction</li> <li>Change to parking zones</li> </ul>
<b>Community groups</b> <ul style="list-style-type: none"> <li>WIRES Australian Wildlife Rescue Organisation</li> <li>Lions Club Koala Smart School Program</li> <li>Port Macquarie Koala Hospital</li> </ul>	<ul style="list-style-type: none"> <li>Environmental impacts and habitat management during construction</li> <li>Tree removals or works undertaken near Port Macquarie koala habitat</li> </ul>

## 6. Engagement Approach

The key consideration in delivering successful outcomes for this project is to make it as easy as possible for anyone with an interest to find out what is going on. In practice, the communications approach across all levels of engagement will involve:

- Using uncomplicated language
- Taking an energetic approach to engagement
- Encouraging and educating whenever necessary
- Engaging broadly including with individuals and groups that fall into harder to reach categories
- Providing a range of opportunities and methods for engagement
- Being transparent
- Explaining the objectives and outcomes of planning and engagement processes.

In addition to engagement with Government Departments and Agencies and Council, two distinct streams of engagement will continue for the project as follows:

- School community for existing schools being upgraded, or surrounding schools for new schools, and
- Broader local community.

This allows:

- School-centric involvement from school communities (including students, parents/caregivers, teachers, admin staff) unencumbered by broader community issues, and
- Broad community involvement unencumbered by school community wants and needs. Broad community stakeholders include local residents, neighbours and local action groups.

### 6.1. General community input

Members of the general public impacted by the construction phase are able to enquire and complain about environmental impacts via the following channels:

- Information booths and information sessions held at the school or local community meeting place, and advertised at least 7 days before in local newspapers, on our website and via letterbox drops
- 1300 number that is published on all communications material, including project site signage
- School Infrastructure NSW email address that is published on all communications material, including project site signage

Refer to Section 8.5 of this document for detail on our enquiries and complaints process.

A number of tools and techniques will be used to keep stakeholders and the local community involved as summarised in table 3 below.

For reference, project high level milestones during the delivery phase include:

- Site establishment/early works
- Commencement of main works construction
- Term prior to project completion
- Project completion
- First day of school following project completion
- Official opening



**Table 3: School Infrastructure NSW Communications Tools**

Communications Tool	Description of Activity	Frequency
1300 community information line	<p>The free call 1300 482 651 number is published on all communication materials and is manned by SINSW.</p> <p>All enquiries that are received are referred to the appointed C&amp;E Manager and/or Senior Project Director as required and logged in our CRM.</p> <p>Once resolved, a summary of the conversation is updated in the CRM.</p>	Throughout the life of the project and accessible for 12 months post completion
Advertising (print)	Advertising in local newspapers is undertaken with at least 7 days' notice of significant construction activities, major disruptions and opportunities to meet the project team or find out more at a face to face event.	At project milestones or periods of disruption
Community contact cards	<p>These are business card size with all the SINSW contact information.</p> <p>The project team/ contractors are instructed to hand out contact cards to stakeholders and community members enquiring about the project. Cards are offered to school administration offices as appropriate.</p> <p>Directs all enquiries, comments and complaints through to our 1300 number and School Infrastructure NSW email address.</p>	Throughout the life of the project and available 12 months post completion
CRM database	<p>All projects are created in SINSW's Customer Relationship Management system – Darzin - at project inception.</p> <p>Interactions, decisions and feedback from stakeholders are captured, and monthly reports generated.</p> <p>Any enquiries and complaints are to be raised in the CRM and immediately notified to the Senior Project Director, Project Director and Community Engagement Manager.</p>	Throughout the life of the project and updated for 12 months post completion
Display boards	A0 size full colour information boards to use at info sessions or to be permanently displayed in appropriate places (school admin office for example).	As required
Door knocks	<p>Provide timely notification to nearby residents of upcoming construction works, changes to pedestrian movements, temporary bus stops, expected impacts and proposed mitigation.</p> <p>Provide written information of construction activity and contact details.</p>	As required prior to periods of construction impacts
Face-to-face meetings/briefings	Activities include meeting, briefings and "walking the site" to engage directly with key stakeholders, directly impacted residents and business owners and the wider community.	As required
FAQs	Set of internally approved answers provided in response to frequently asked questions. Used as part of relevant stakeholder and community communication tools. These are	Throughout the life of the project

Communications Tool	Description of Activity	Frequency
	updated as required, and included on the website if appropriate.	
Information booths	<p>Information booths are held locally and staffed by a project team member to answer any questions, concerns or complaints on the project.</p> <p>Info booths are scheduled from the early stages of project delivery through to project completion.</p> <p>Information booths are to be held both at the school/ neighbouring school, as well for the broad community:</p> <ul style="list-style-type: none"> <li>▪ School information booths are held at school locations at times that suit parents and caregivers, with frequency to be aligned with project milestones and as required.</li> <li>▪ Community information booths are usually held at local shopping centres, community centres and places that are easily accessed by the community. They are held at convenient times, such as out of work hours on weekdays and Saturday's.</li> </ul> <p>Collateral to be provided include community contact cards, latest project notification or update, with internal FAQs prepared.</p> <p>All liaison to be summarised and loaded in the CRM.</p> <p>Notice of at least 7 days to be provided.</p>	At project milestones and as required
Information sessions (drop in)	<p>Information sessions are a bigger event than an info booth, held at a key milestone or contentious period. We have more information on the project available on display boards/ screens and an information pack handout – including project scope, planning approvals, any impacts on the school community or residents, project timeline, FAQs.</p> <p>Members from the project and communications team will be available to answer questions about the project.</p> <p>These events occur after school hours on a week day (from 3pm – 7pm to cover working parents).</p> <p>All liaison summarised and loaded on the CRM.</p>	As required
Information pack	<p>A 4 page A4 colour, fold out flyer that can include:</p> <ul style="list-style-type: none"> <li>▪ Project scope</li> <li>▪ Project update</li> <li>▪ FAQs</li> <li>▪ Contact information</li> <li>▪ Project timeline</li> </ul> <p>To be distributed at info sessions or at other bigger events/ milestones in hard copy and also made available electronically.</p>	As required

Communications Tool	Description of Activity	Frequency
Media releases/events	<p>Media releases are distributed upon media milestones. They promote major project milestones and activities and generate broader community awareness.</p>	<p>Media milestones:</p> <ul style="list-style-type: none"> <li>Project announcement</li> <li>Concept design completed</li> <li>Planning approval lodged</li> <li>Planning approval granted</li> <li>Construction contract tendered</li> <li>Construction contract awarded</li> <li>SOD turning opportunity</li> <li>Handover</li> <li>Official opening</li> </ul>
Notifications	<p>A4, single or double sided, printed in colour that can include FAQs if required</p> <p>Notifications are distributed under varying templates with different headings to suit different purposes:</p> <ul style="list-style-type: none"> <li><b>Works notification</b> are used to communicate specific information/ impacts about a project to a more targeted section of the community. This template doesn't have an image so it can be more appropriately targeted for matters like hazardous material.</li> <li><b>Project update</b> is used when communicating milestones and higher level information to the wider community i.e. project announcement, concept design/DA lodgement, construction award, completion. Always includes the project summary, information booths/ sessions if scheduled, progress summary and contact info.</li> </ul>	<p>As required according to the construction program.</p> <p>Distributed via letterbox drop to local residents and via the school community at least 5-7 days prior to construction activities or other milestones throughout the life of the project. Specific timings indicated in table 5 – Section 8.</p>
Photography, time-lapse photography and videography	<p>Captures progress of construction works and chronicles particular construction activities. Images to be used in notifications, newsletters and report, on the website and Social Media channels, at information sessions and in presentations.</p> <p>Once the project is complete, SINSW will organise photography of external and internal spaces to be used for a range of communications purposes.</p>	<p>Project completion (actual photography and video of completed project)</p> <p>Prior to project completion - artist impressions, flythrough, site plans and construction progress images are used</p>
Presentations	<p>Details project information for presentations to stakeholder and community groups.</p>	<p>As required</p>

Communications Tool	Description of Activity	Frequency
Priority correspondence	Ministerial (and other) correspondence that is subject to strict response timeframes. Includes correspondence to the Premier, Minister, SINSW and other key stakeholders. SINSW is responsible for drafting responses as requested within the required timeframes.	As required
Project Reference Group	SINSW facilitated Project Reference Group sessions providing information on the design solution, construction activities, project timeframes, key issues and communication and engagement strategies.	Meets every month or as required  More information on the PRG is detailed in Section 4
Project signage	A0 sized, durable aluminium signage has been installed at Lake Cathie Public School.  Provides high level information including project scope, project image and SINSW contact information.  Fixed to external fencing/ entrances etc. that are visible and is updated if any damage occurs.	Throughout the life of the project and installed for 12 months post completion
Project updates	Available in hard copy and electronic format. A quarterly project update providing updated information on project scope, benefits, construction progress, achievement of project milestones and other project related issues of interest.  Similar to an info pack in content, but used as a regular high level update for the community.	As required, related to high level project milestones
Site visits	Demonstrate project works and progress and facilitate a maintained level of interest in the project. Includes media visits to promote the reporting of construction progress.	As required
School Infrastructure NSW email address	Provide stakeholders and the community an email address linking direct to the Community Engagement team. Email address (schoolinfrastructure@det.nsw.edu.au) is published on all communications materials.	Throughout the life of the project
School Infrastructure NSW hotline scripts	High level, project overview information provided to external organisations who may receive telephone calls enquiring about the project, most namely stakeholder councils.	Throughout the project when specific events occur or issues are raised by stakeholders
School Infrastructure NSW website	A dedicated project page for Lake Cathie Public School is located on the SINSW website - <a href="https://www.schoolinfrastructure.nsw.gov.au/projects//lake-cathie-public-school.html">https://www.schoolinfrastructure.nsw.gov.au/projects//lake-cathie-public-school.html</a>	Updated at least monthly and is live for at least 12 months post completion of the project
Welcome pack/ thank you pack	At project completion the following flyers are utilised: <ul style="list-style-type: none"> <li><b>Welcome pack</b> – project completion for school community - A 2 to 4 page A4 flyer which is provided to the school community on the first day/week they are returning to school when new facilities are opening, or attending a new school. Includes project overview, map outlining access to</li> </ul>	Project completion only

Communications Tool	Description of Activity	Frequency
	<p>the school and key locations, FAQs, contact information.</p> <ul style="list-style-type: none"> <li>▪ <b>Thank you pack</b> – A 2 to 4 page A4 flyer tailored to the local residents to thank them for their patience and support of the project.</li> </ul>	



## 7. Engagement Delivery Timeline

The following engagement delivery timeline maps tailored communications tools and activities by key milestone.

**Table 4: Engagement timeline**

Project Phase / milestone	Target Audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
Site establishment	School community Local community Local Council Local MP	Media release Project update Works notifications as per Table 5 Advertising as required Website update FAQs updated	Early 2020
Main Construction works, including but not limited to: <ul style="list-style-type: none"> <li>Asbestos removal and remediation</li> <li>Works commenced</li> <li>Key impact periods – noise, dust, traffic, vibration</li> </ul>	School community Local community Local Council Local MPs	Media release Information session: <ul style="list-style-type: none"> <li>Information pack</li> <li>Display boards</li> </ul> Notifications as per timelines in Table 5 Advertising as required Website update FAQs updated	Early 2020  (at key construction events as required, as per our notification process in Table 5)
Term prior to project completion	School community Local community Local MP	Info session - <ul style="list-style-type: none"> <li>Information pack</li> <li>Display boards</li> </ul> Notifications as per timelines in Table 5	Indicative Term 2, 2021
Handover and welcome to new school	All	Media release Welcome pack Thank you pack Photography/ videography	Day 1 Term 1, 2022
Opening	All	Media release Official opening ceremony	Early 2022
Post-opening	All	Website remains live Project signage remains installed 1300 phone and email still active, and CRM still	Early 2023 (at least 12 months post construction completion)

Project Phase / milestone	Target Audiences	Proposed communication tools / activities / purpose as per Table 3	Timing / implementation
		maintained for complaints and enquiries.	

## 8. Protocols

### 8.1. Media engagement

SINSW manages all media relations activities, and is responsible for:

- Responding to all media enquiries and instigating all proactive media contact.
- Media interviews and delegation to SINSW media spokespeople who are authorised to speak to the media on behalf of the project
- Informing the Minister's Office and SINSW project team members and communications representatives of all media relations activities in advance and providing the opportunity to participate in events where possible.

### 8.2. Site visits

SINSW in partnership with Schools Operations and Performance organises and hosts guided project site tours and media briefings as required by the Minister's Office. The Project Team will ensure the required visitor site inductions are undertaken and that all required Personal Protective Equipment (PPE) is worn.

For media site visits and events, SINSW creates, or contributes to, the production of an event pack. This will include an event brief, media release, speaking notes and Q&As.

### 8.3. Social, online and digital media

SINSW initiates and maintains all social and online media channels. These channels can include Facebook, Twitter, LinkedIn and the website. The SINSW Online Content Team upload to the SINSW website.

### 8.4. Notification process

Notifications (titled works notifications or project updates as per Table 3) are SINSW's prescribed notification requirement and are the primary mechanism to inform the community and key stakeholders about the impact of school construction on the local area. Notifications provide advance warning of activities and planned disruptions, as per the notice periods in Table 5 below, allowing stakeholders and community members to plan for the impacts and make alternative arrangements where required. Notifications are distributed in person via door knocks, via letterbox drop, via the school and electronically via email.

The C&E Manager advises the project team of the relevant notification requirements and timeframes to be met. The team obtains the information necessary to meet these timeframes by:

- Having oversight of the project delivery program
- Visiting site as required
- Attending and participating in construction meetings, planning meetings, and Risk and Opportunity workshops.

**Table 5: Notifications periods**

Works activity	Minimum community notification period
Notification to communities following major incident	Same day
Emergency works/unforeseen events	Same day
Contamination management and notification	Within 48 hours
Upcoming works notification (minimum disruption)	5- 7 days
Invitation/notification of community event (e.g. info booth)	5 – 7 days
Notifications regarding traffic changes, parking impacts, road closures, major detours	10 – 14 days
Pedestrian route changes and other impacts	10 – 14 days

Works activity	Minimum community notification period
Notifications regarding operational changes for the school community (school drop-off points, entry and exit points)	10 - 14 days
Major construction impacts (out of hours/ significant noise/ demolition)	10 – 14 days
Major impacts to school community e.g. relocation to temporary school	6 months

### 8.5. Enquiries and complaints management

SINSW manages enquiries (*called interactions in our CRM, Darzin*), and complaints in a timely and responsive manner.

Prior to project delivery, a complaint could be related to lack of community consultation, design of the project, lack of project progress, etc.

During project delivery, a complaint is defined as in regards to construction impacts – *such as* – safety, dust, noise, traffic, congestion, loss of parking, contamination, loss of amenity, hours of work, property damage, property access, service disruption, conduct or behaviour of construction workers, other environmental impacts, unplanned or uncommunicated disruption to the school.

If a phone call, email or face- to- face complaint is received during construction, they must be logged in our CRM, actively managed, closed out and resolved by SINSW within 24-48 hours.

As per our planning approval conditions, a complaints register is updated monthly and is publicly available on the project's website page on the SINSW website.

If the complainant is not satisfied with SINSW response, and they approach SINSW for rectification, the process will involve a secondary review of their complaint as per the outlined process.

Complaints will be escalated when:

- An activity generates three complaints within a 24-hour period (separate complainants).
- Any construction site receives three different complaints within a 24-hour period.
- A single complainant reports three or more complaints within a three day period.
- A complainant threatens to escalate their issue to the media or government representative.
- The complaint was avoidable
- The complaint relates to a compliance matter.

Complaints will be first escalated to the Senior Manager, Community and Engagement or Director of Communications for SINSW as the designated complaints handling management representatives for our projects. Further escalation will be made to the Executive Director, Office of the Chief Executive to mediate if required.

If a complaint still cannot be resolved by SINSW to the satisfaction of the complainant, we will advise them to contact the NSW Ombudsman - <https://www.ombo.nsw.gov.au/complaints>.

The below table summarises timeframes for responding to enquiries and complaints, through each correspondence method:

**Table 6: Complaint and enquiry response time**

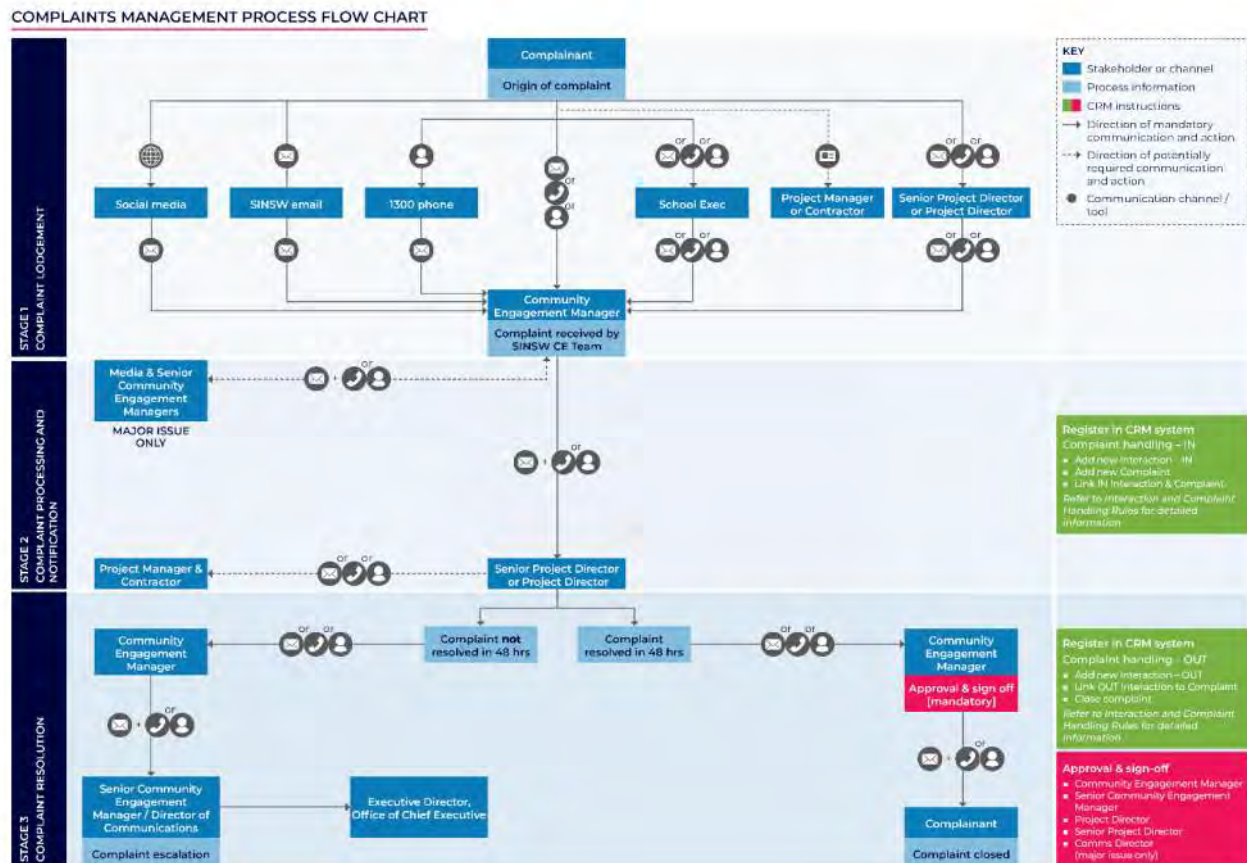
Complaint	Acknowledgement times	Response times
Phone call during business hours	At time of call – and agree with caller estimated timeframe for resolution.	Complaint to be closed out within 48 hours.  If not possible, continue contact, escalate as required and resolve within 7 business days.
Phone call after hours*	Within two (2) hours of receiving message upon returning to office.	Following acknowledgement, complaint to be closed out within 48 hours. If not possible, continue contact,

Complaint	Acknowledgement times	Response times
		escalate as required and resolve within 7 business days.
Email during business hours	At time of email (automatic response)	Complaint to be closed out within 48 hours. If not possible, continue contact, escalate internally as required and resolve within 7 business days.
Email outside of business hours	At time of email (automatic response)	Complaint to be closed out within 48 hours (once return to business hours). If not possible, continue contact, escalate internally as required and resolve within 7 business days.
Interaction/ Enquiry		
Phone call during business hours	At time of call – and agree with caller estimated timeframe for response.	Interaction to be logged and closed out within 7 business days.
Phone call after hours	Within two (2) hours of receiving message upon returning to office.	Interaction to be logged and closed out within 7 business days.
Email during business hours	At time of email (automatic response)	Interaction to be logged and closed out within 7 business days.
Email outside of business hours	At time of email (automatic response)	Interaction to be logged and closed out within 7 business days.
Letter	N/A	Interaction to be logged and closed out within 10 business days following receipt.

The below diagram outlines our internal process for managing complaints.



**Figure 3 - Internal Complaints Process**



### 8.5.1. Disputes involving compensation and rectification

School Infrastructure NSW is committed to working with the school and broader community to address concerns as they arise. Where disputes arise that involve compensation or rectification, the process for resolving community enquiries and complaints will be followed to investigate the dispute. Depending upon the results of the investigation, School Infrastructure NSW may seek legal advice before proceeding.

## 8.6. Incident management

An incident is an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. Material harm is harm that:

- (a) involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or
- (b) results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment).

### 8.6.1. Roles and responsibilities following an incident

In the event of an incident, once emergency services are contacted, the incident must be immediately reported to the SINSW Senior Project Director who will inform:

- SINSW Executive Director
- SINSW C&E Manager
- SINSW Senior Manager, C&E
- SINSW Communications Director

SINSW Communications Director will:

- Lead and manage all communications with the Minister's office in the event of an incident, with assistance as required

- Direct all communications with media to the SINSW Media Manager in the first instance for management
- Notify all other key project stakeholders of an incident.

The school and local community will be notified within 24 hours in the event of an incident, as per our notification timelines in Table 5.

The SINSW Senior Project Director will issue a written incident notification to Department of Planning, Industry & Environment (DPIE) ([compliance@planning.nsw.gov.au](mailto:compliance@planning.nsw.gov.au)) and Local Council immediately following the incident to set out the location and nature of the incident.

This must be followed within seven days following the incident of a written notification to the Department of Planning, Industry and Environment (DPIE) ([compliance@planning.nsw.gov.au](mailto:compliance@planning.nsw.gov.au)) that:

- identifies the development and application number;
- provides details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- identifies how the incident was detected;
- identifies when SINSW became aware of the incident;
- identify any actual or potential non-compliance with conditions of consent;
- describes what immediate steps were taken in relation to the incident;
- identifies further action(s) that will be taken in relation to the incident; and
- provides the contact information for further communication regarding the incident (the Senior Project Director).

Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, SINSW will provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below:

- a summary of the incident;
- outcomes of an incident investigation, including identification of the cause of the incident;
- details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
- details of any communication with other stakeholders regarding the incident.

### **8.7. Reporting process**

Throughout the project, data will be recorded on participation levels both face to face and online, a record of engagement tools and activities carried out in addition to queries received and feedback against emerging themes.

Stakeholder and community sentiment will be evaluated throughout to ensure effectiveness of the engagement strategy and to inform future activities.

Reporting will include but not be limited to:

- Stakeholder engagement reporting – numbers of forums, participation levels and a summary of the outcomes  
Community sentiment reporting – outputs of all community engagement activities, including numbers in attendance at events, participation levels and feedback received against broad themes
- Online activity – through the project website and via social media
- Media monitoring – as part of the proactive media campaign
- Engagement risk register - to be updated regularly.

Appendix I4 – Heritage Assessment

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Adise Pty Ltd  
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PO Box 6  
LAURIETON NSW 2443

LAKE CATHIE PUBLIC SCHOOL REDEVELOPMENT  
1240 OCEAN DRIVE, LAKE CATHIE NSW,  
PORT MACQUARIE HASTINGS LGA

Aboriginal Cultural Heritage Assessment

March 2019

Prepared for:

SHAC  
224 Maitland Road  
ISLINGTON NSW 2296



## EXECUTIVE SUMMARY

---

This Aboriginal Cultural Heritage Assessment was commissioned by SHAC on behalf the NSW Department of Education, and provides supporting information for an Environmental Impact Statement (EIS) and associated State Significant Development application (SSD #9491) to be submitted to the Minister for Planning and Environment seeking approval for redevelopment of the Lake Cathie Public School. The assessment fulfils the requirements of Key Issue 9 (Aboriginal Heritage) of the Secretary's Environmental Assessment Requirements (SEARs) for the EIS.

Lake Cathie Public School is situated within the Port Macquarie Hastings LGA, around 6 km south of Port Macquarie and 1.5 km inland of Rainbow Beach on the NSW mid-north coast. The school allotment has an area of 3.96 ha, legally described as Lot 2 DP 1193553 ('the project area'). The topography is relatively flat and encompasses a small part of the terminal toe of a ridge that defines the northern limit of the Duchess Gully basin. The allotment has been cleared of all but three mature trees and modified/disturbed by development and maintenance of the existing school, such that approximately 1.53 ha is presently covered by a combination of buildings, concrete/asphalt pavement and constructed gardens. Due to the clear and observable changes to the land's surface that have taken place, the project area constitutes 'disturbed land' as defined under the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*.

Searches of the World Heritage List, Commonwealth Heritage List, National Heritage List, the Australian Heritage Database, NSW State Heritage Register, Schedule 5 (Environmental Heritage) of Port Macquarie Hastings LEP 2011, and the OEH Aboriginal Heritage Information Management System (AHIMS) revealed no listed or registered Aboriginal sites/places within or near the project area, the closest being an isolated stone artefact registered on AHIMS on an alluvial flat 470 m to the south-east.

Implementation of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* resulted in the identification of two Registered Aboriginal Parties (RAPs)- the Birpai Local Aboriginal Land Council (LALC) and the Birpai Traditional Owners Indigenous Corporation. As the sole nominated representative, Birpai LALC Sites Officer and Birpai Traditional Owners Chairperson Jason Holten was consulted and involved in the field survey. Jason Holten advised that owing to the presence of traditional campsites and evidence of related off-site domestic activities, as well as significant mythological/ceremonial sites/places, the project area sits within a wider cultural landscape of on-going general heritage value. However, in line with past information given by Birpai elder (the late) William Holten and his son (the late) Lindsay Moran, Jason Holten disclosed that the project area itself is not known to contain or impinge upon sites/places of traditional ceremonial, mythological or other spiritual significance; camping places; or sites, places or resources of historic or special contemporary socio-cultural value/attachment (whether tangible or intangible), and expressed no objection to the proposed school redevelopment.

Archaeological field survey of the project area undertaken by the consultant and Jason Holten achieved an estimated effective coverage of 7.9% of the total surface area not currently masked by built school infrastructure. No Aboriginal cultural heritage materials or potential archaeological deposits (PADs) were detected, nor did any of the three remaining mature trees show signs of possible Aboriginal modification. This result is consistent with the nil findings of three previous surveys that have included the project area, including that conducted for a 2018 due diligence assessment of the current project proposal.

A considerable number of other archaeological surveys have been completed in the project locality, the results of which demonstrate that the coastal foredune and well-drained rises on the degraded inner sand barrier were preferred for traditional occupation. Camps were sometimes established on bedrock-soil footslopes, but these are likewise found within 500 m of the beach, in the proximity of Duchess Gully. Evidence of Aboriginal landuse off the productive coastal margins is restricted to a very low-density background scatter of stone artefacts lost or discarded, probably by small groups ranging out from the coastal camps in search of food and material resources. Even if undiscovered isolated stone artefacts have survived the land surface modification and disturbance caused by past vegetation clearing and the existing school development within the project area, there is virtually no chance that these would be in a primary depositional context or that they could be detected by either further archaeological investigation or development earthworks monitoring.

Taking all information into account, it is concluded that the project area has a low level of Aboriginal cultural heritage sensitivity and that redevelopment of Lake Cathie Public School should be allowed to proceed without further cultural heritage constraints, providing the following management recommendations are adhered to. These recommendations have been endorsed by the Birpai LALC and the Birpai Traditional Owners Indigenous Corporation.

- 1) Prior to on-site involvement, all contractors, subcontractors and their employees engaged for the school redevelopment works should undergo a site induction that provides information on legal obligations with respect to Aboriginal objects, and 'stop-work' conditions applicable in the event that any identified or suspected Aboriginal objects are discovered at any stage (see Recommendation 2). The proponent should consider engaging a representative of the Birpai LALC/Birpai Traditional Owners Indigenous Corporation to develop and deliver the heritage component of the site induction.

A register should be kept of all persons inducted. The register should include dates, names and signatures of those inducted, the name of the person carrying out the induction, and an acknowledgement that Aboriginal cultural heritage requirements have been explained and understood.

- 2) If any identified or suspected Aboriginal objects are detected at any time, all disturbance work should immediately cease within 10 metres of the find and temporary protective fencing erected around this 'no-go zone' pending further management advice from the Department of Planning and Environment in liaison with the OEH (Planning and Aboriginal Heritage Section, North East Region) and the Registered Aboriginal Parties. In the unlikely event that the find consists of or includes human remains, the NSW Police Department and the OEH Environmental Line (phone 131 555) should also be notified as soon as practicable.



Works may not recommence within the designated 'no-go zone' until formal clearance to do so has been given by the appropriate authorities.

- 3) In a further effort to mitigate potential Aboriginal cultural heritage impacts, Recommendation 1 and the unexpected finds procedure outlined in Recommendation 2 should be written into the Construction Management Plan or equivalent documentation.
- 4) As demonstrated by its Birpai language 'house' names, the Lake Cathie Public School community is committed to promoting a student awareness and appreciation of Birpai culture. As a means of adding to this awareness and appreciation, the proponent should consider applying Birpai language names to the new hall and COLAs. The Birpai LALC and Birpai Traditional Owners Indigenous Corporation must be invited to assist with any related naming to ensure that it is accurate and suitable.

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## ACRONYMS AND ABBREVIATIONS

AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BP	Years before present, 'present' being the 1 <sup>st</sup> of January 1950
COLA	Covered outdoor learning area
CRs	Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010
DECCW	NSW Department of Climate Change and Water (former)
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
EPA Act	Environmental Planning and Assessment Act 1979
ha	Hectares
km	Kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
m	Metres
NPW Act	National Parks and Wildlife Act 1974, as amended
NTS Corp	Native Title Services Corporation NSW
OEHS	NSW Office of Environment and Heritage
PAD	Potential archaeological deposit
RAP	Registered Aboriginal Party
SEARs	Secretary's Environmental Assessment Requirements, NSW Department of Planning and Environment
SHAC	Schreiber Hamilton Architecture Pty Ltd
SSD	State Significant Development

## 1 INTRODUCTION

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### 1.1 Assessment purpose and background

The NSW Department of Education proposes to redevelop the Lake Cathie Public School to cater for projected student population growth in the Lake Cathie-Bonny Hills area, within the Port Macquarie Hastings LGA on the NSW mid-north coast ('the project').

This Aboriginal Cultural Heritage Assessment was commissioned by SHAC on behalf the Department of Education and provides supporting information for an Environmental Impact Statement (EIS) and associated State Significant Development application (SSD #9491) to be submitted to the Minister for Planning and Environment seeking project approval. The assessment addresses Key Issue 9 (Aboriginal Heritage) of the Secretary's Environmental Assessment Requirements (SEARs) for the EIS, dated 15<sup>th</sup> of August 2018, which requires the following tasks:

- *"Address Aboriginal Cultural Heritage (ACH) in accordance with the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011) and Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW).*
- *The EIS must demonstrate attempts to avoid any impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the EIS must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH."*

An Aboriginal archaeological due diligence assessment was prepared for the project in September 2018 (Virgin 2018). The due diligence assessment comprised a search of the OEH Aboriginal Heritage Information Management System (AHIMS), background literature review, consideration of landscape character/disturbance, and a field inspection. On the basis of the due diligence findings Virgin (2018:18) concluded that "there is a low likelihood that the proposed (school redevelopment) works will result in harm to Aboriginal objects". While fully consistent with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010c), the 2018 assessment did not involve Aboriginal consultation or any identification of cultural heritage values that might endure despite the apparent absence of archaeological materials. An OEH review found that the due diligence assessment did not comply with the SEARs (correspondence from OEH to the Department of Planning and Environment, 19<sup>th</sup> December 2018). SHAC subsequently engaged the consultant (Adise Pty Ltd, t/a J.P. Collins Consultant Archaeologist) to undertake consultation in line with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a) and produce a compliant Aboriginal Cultural Heritage Assessment report.

### 1.2 Project area location and proposal

The Lake Cathie Public School is situated at 1240 Ocean Drive, Lake Cathie, approximately 16 km south of Port Macquarie (Figure 1). The school allotment has an area of 3.96 ha, legally described as Lot 2 DP 1193553 ('the project area'). Lot 2 DP 1193553 sits a minimum of 1.5 km inland of Rainbow Beach between the towns of Lake Cathie and Bonny Hills, and is bounded to the north and west by Ocean Drive, to the east by 'the proposed collector road' (under construction) and a soon to be developed residential subdivision, and to the south by future sporting fields (under construction).

As shown on Figure 2, the existing school buildings are confined to the south-eastern half of the allotment. The proposed redevelopment (Figure 3) would include:

- Removal of 14 demountable classrooms and the existing covered outdoor learning area (COLA);
- Construction of 17 additional teaching spaces;
- Construction of a community-focused hall;
- Construction of three COLAs;
- Removal of the current access road from Ocean Drive and relocation of the main entrance and carparks to connect with the collector road now under construction adjacent to the eastern boundary;
- Construction of a new entry plaza, drop-off and bus bay adjacent to the collector road;
- Construction of new outdoor learning spaces and formalised active play space;
- Adjustment of the 'SEPP 44 Koala Habitat Remediation Management Zone' and 'Swamp Forest Rehabilitation' areas;
- Construction of a rain garden swale supporting site ground and water flow; and
- Ancillary landscaping, signage, services and stormwater drainage.

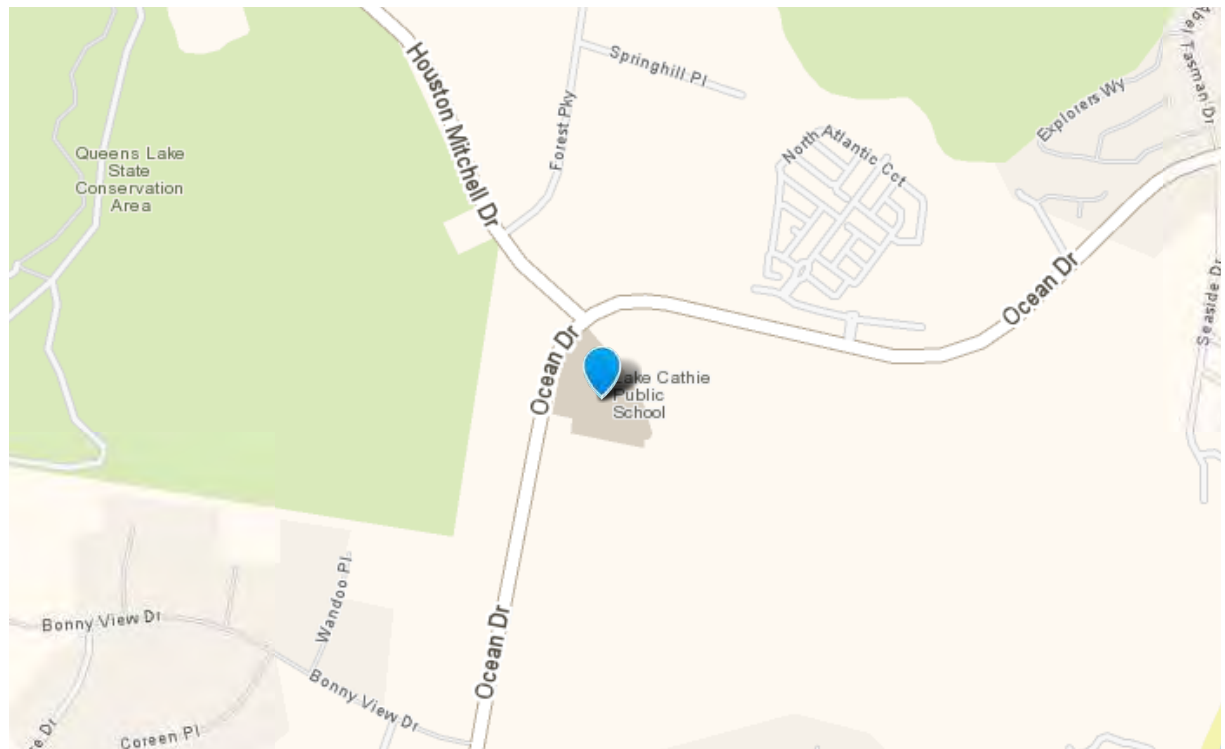


Figure 1. General location of the Lake Cathie Public School (Source: whereis.com)



Figure 2. The existing school buildings and proposed collector road (under construction) (Source: SHAC 2019)



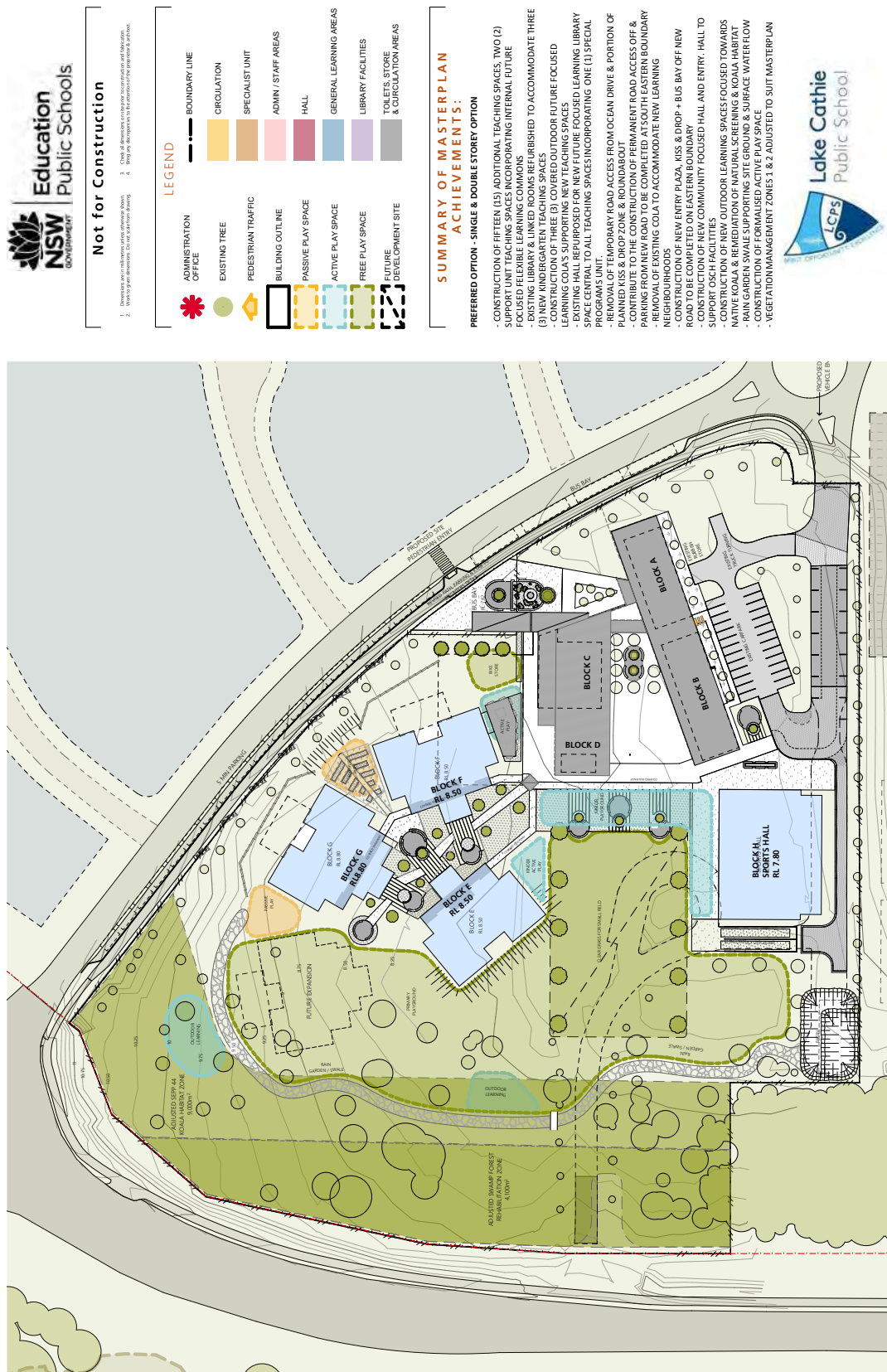


Figure 3. Plan of the proposed school redevelopment (Source: SHAC 2019)

### 1.3 Assessment personnel

Background research, field survey and assessment were conducted by qualified cultural heritage consultant/archaeologist Jacqueline Collins (MAACAI), assisted and informed by Birpai Local Aboriginal Land Council (LALC) Sites Officer and Birpai Traditional Owners Indigenous Corporation Chairperson Jason Holten. The report was written by Jacqueline Collins and was reviewed by the Birpai LALC and Birpai Traditional Owners Indigenous Corporation prior to finalisation.

## 2 LEGISLATIVE CONTEXT AND COMPLIANCE

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### 2.1 Environmental Planning and Assessment Act 1979

The EPA Act requires that environmental impacts, including impacts upon Aboriginal cultural heritage, are duly considered in landuse planning. Part 4 of the Act governs the manner in which consent authorities determine development applications and outlines those that require an EIS.

Under Part 4, Division 4.1 of the EPA Act, a development may be declared a State Significant Development (SSD) if it meets certain criteria. The consent authority for SSD is the Minister for Planning and Environment (DPE), but the Minister may delegate consent authority function to the Planning Assessment Commission, the DPE Secretary, or another public authority. An Aboriginal Heritage Impact Permit (AHIP) under section 90 the *National Parks and Wildlife Act 1974* (NPW Act) is not required for SSD that is authorised by a development consent. Even so, an EIS that fulfills the SEARs needs to be submitted along with the development application. Prior to issuing a development consent, the DPE will consult with other relevant departments, including the Office of Environment and Heritage (OEH). The management of Aboriginal cultural heritage would then follow conditions of approval to ensure the proper care, conservation and preservation of both tangible and intangible heritage values.

As outlined in Section 1.1, the proposed school redevelopment constitutes SSD and SEARs for the EIS have been issued. Consistent with the SEARs, this report presents information in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (DECCW 2011), including a record and details of Aboriginal consultation as per the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a). Cultural heritage values have been identified and measures to mitigate project impacts recommended as warranted.

### 2.2 National Parks and Wildlife Act 1974

The NPW Act (as amended) is administered by the OEH, and forms the primary basis for the statutory protection and management of Aboriginal cultural heritage in NSW. Part 6 of the Act provides specific protection for Aboriginal objects and declared Aboriginal places by making it an offence to harm them unless authorised by a duly approved Aboriginal Heritage Impact Permit (AHIP).

The NPW Act defines an 'Aboriginal object' as-

"Any deposit, object or material evidence (that is not a handicraft made for sale) relating to Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains)."

The provisions of the Act apply to all Aboriginal objects, regardless of whether or not they have been registered with the OEH, or whether they occur on private or public land. Except where destruction of an Aboriginal object is or will be demonstrably unavoidable it is OEH policy to require conservation in its original location and context.

Places in the landscape of significance to Aboriginal people, which may be devoid of Aboriginal objects, can only be protected under the Act (section 84) via declaration as an Aboriginal place. For the purposes of the Act, an 'Aboriginal place' is defined as a place that-

"in the opinion of the Minister, is or was of special significance with respect to Aboriginal culture."

Under section 85A of the Act, the Director General of the Department of Premier and Cabinet may transfer Aboriginal objects to a person or organisation for safekeeping. The subject person or organisation must enter into a formal care agreement with the OEH, which sets out the obligations of the OEH and the person/organisation for the long-term safekeeping of the transferred object(s).

Whilst an AHIP is not required to authorise impacts to Aboriginal objects and places for projects approved under Part 4 of the EPA Act (including the SSD subject of this report), there are other sections of the NPW Act that remain valid. These include the need to obtain a Care

Agreement for salvaged objects (section 85A), and the need to report the location of Aboriginal objects to the OEH (section 89A). However, this assessment has not resulted in the identification of Aboriginal objects. No artefact salvage/Care Agreement or site registration is thus necessary unless unexpected finds are intercepted during the course of the redevelopment works.

## 2.3 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Act 1999* is the federal government's central piece of environmental legislation, and protects heritage places of national significance as well as those under commonwealth ownership. This Act also offers protection to properties included on the World Heritage List. More recent amendments created the Commonwealth Heritage List and National Heritage List. Any actions likely to have a significant impact upon any listed items must be referred to the Department of Sustainability, Environment, Water, Population and Communities for consideration.

On-line searches undertaken on the 25<sup>th</sup> of January 2019 revealed that the project area does not contain or encroach upon sites, places or land on the World Heritage List, Commonwealth Heritage List or the National Heritage List.

## 3 COMPLIANCE WITH THE ABORIGINAL CULTURAL HERITAGE CONSULTATION REQUIREMENTS FOR PROPONENTS 2010

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As required by the SEARs, the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010a; the CRs) were implemented for this assessment. A record of consultation undertaken in compliance with the CRs is presented in Appendix A.

### 3.1 Stage 1 – Notification of the project proposal and registration of interest

In accordance with Stage 1, Step 4.1.2 of the CRs (DECCW 2010a:10), letters and/or a search request were sent to the following organisations, requesting the names and contact details of any known Aboriginal parties who may have an interest in the project locality, and hold knowledge relevant to determining the cultural significance of Aboriginal objects and/or places that might occur (Appendix B):

- Office of Environment and Heritage (OEH)
- Birpai Local Aboriginal Land Council (LALC)
- The Registrar, *Aboriginal Land Rights Act 1983*
- National Native Title Tribunal
- Native Title Services Corporation Ltd (NTS Corp)
- Port Macquarie Hastings Council

Responses/search results are reproduced in Appendix C.

In the absence of any relevant entries in relation to Native Title or any Registered Aboriginal Owners pursuant to Division 3 of the *Aboriginal Land Rights Act 1983*, letters inviting registration of interest, including all required project information (as per Stage 1, Step 4.1.3 of the CRs), were mailed to the following potential knowledge-holders advised by the OEH (and Port Macquarie Hastings Council) (Appendix D):

- Birpai LALC
- Saltwater Tribal Council
- Ghinni Ghinni Youth and Culture Aboriginal Corporation
- Bindi Aboriginal Heritage and Culture Centre Inc.
- Birpai Traditional Owners Indigenous Corporation
- Lakkari NTCG
- Norm Archibald
- Yanggaay

On the 23<sup>rd</sup> of January 2019, a newspaper notice was published in the *Port Macquarie Express* and the *Camden Haven Courier*, inviting interested Aboriginal parties with cultural knowledge of Lake Cathie-Bonny Hills to contact the consultant to formally register their interest in the assessment, to be received by the 6<sup>th</sup> of February 2019 (Appendix D).

Expressions of interest (Appendix E) were received from:

- Birpai LALC
- Birpai Traditional Owners Indigenous Corporation ('the Birpai Traditional Owners')

These two organisations represent the Registered Aboriginal Parties involved in this assessment.

### 3.2 Stage 2 – Presentation of information about the proposed project

Upon their registration of interest, letters presenting project details and the purpose, scope and draft methodology of this assessment were emailed to the Birpai LALC and the Birpai Traditional Owners (Appendix F).

### 3.3 Stage 3 – Gathering information about cultural significance

The draft methodology for this assessment was emailed to the Birpai LALC (29<sup>th</sup> of January 2019) and the Birpai Traditional Owners (8<sup>th</sup> of February 2019), requesting feedback on its adequacy (Appendix F). As attached at Appendix G, the Birpai LALC was satisfied with the methodology. The Birpai Traditional Owners did not provide written comment but advised by phone that no amendment of the methodology was required (Jason Holten pers comm 19/2/2019).

In addition to a field inspection with Jason Holten (Birpai LALC Sites Officer and Chairperson of the Birpai Traditional Owners) for the purpose of recording Aboriginal objects, Jason Holten was consulted to determine:

- whether any sites/places of special attachment or cultural heritage value occur in or near the project area;
- the level of socio-cultural significance attributed to any identified sites/places;
- whether the divulged cultural information is suitable for general public access. If not, what aspects of this information should be withheld, and/or not shared with other Aboriginal parties, administrative authorities/others; and
- appropriate management strategies in relation to the proposed school redevelopment.

Jason Holten advised that the cultural information disclosed in Sections 5.1 and 5.2 of this report is not sensitive or private, nor should it be flagged for restricted public access.

### 3.4 Stage 4 – Review of draft cultural heritage assessment report

Draft copies of this report were provided to the Birpai LALC and the Birpai Traditional Owners Indigenous Corporation for review and comment. As per correspondence attached at Appendix H, both RAPs were satisfied with the report and no amendments were called for.

## 4 ENVIRONMENT AND LANDUSE EFFECTS

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### 4.1 General setting

The eastern part of the Port Macquarie Hastings LGA experiences a humid sub-tropical climate, characterised by relatively high summer and low winter/spring rainfalls. Average daily temperatures range from a maximum of 25.8° to a minimum of 17.0° Celsius in summer, and 17.8° to 7.1° Celsius in winter (ERM Mitchell McCotter 1999). Despite climatic fluctuations, Lake Cathie-Bonny Hills would have been conducive to year-round Aboriginal occupation throughout the Holocene period, although landuse was no doubt constrained by the inundation of very low-lying coastal terrain during the last sea highstand (+1.0 to +1.5m), which lasted until sometime after 2,000 years ago (Lewis *et al* 2008; Lewis *et al* 2012). Data collected from Valla Headland further north suggests that the sea may have only fallen to its present level since 1,780 BP (Flood and Frankel 1989).

The project area sits within the Duchess Gully drainage basin. This small basin is defined by a series of low undulating hills and ridges that stretch seaward from the Jolly Nose escarpment, situated approximately 4 km inland of fronting Rainbow Beach. The broad northern ridge is followed by Ocean Drive east of its intersection with Houston Mitchell Drive, and separates the Duchess Gully catchment from the Lake Cathie estuarine system. The ridge crest is fringed by low gradient slopes that fall gradually south to meet an extensive alluvial flat sandwiched between Ocean Drive and the northern outskirts of Bonny Hills. The hills and ridges are based on metamorphic bedrock comprising schist, phyllite, greywacke and slate (Tamworth-Hastings 1:250,000 metallogenic map). These same materials along with siltstone, chert, jasper, quartz and assorted volcanics are represented in inter-tidal pebble beds along Rainbow Beach. The Rainbow Beach pebble beds are believed to have been the source of raw stone materials used for the manufacture of Aboriginal stone tools recorded in the locality (Collins 2007:22).

Duchess Gully is a narrow permanent watercourse that rises on the alluvial flat around 1 km east of the project area. The gully runs south behind and across degraded inner barrier dunes to discharge into the ocean at Bonny Hills, on the southern end of Rainbow Beach. Although tidal towards Bonny Hills, the upper reach of Duchess Gully is fresh. In addition to two intermittent creeks that traverse the alluvial flat south of the project area, artificial drainage channels and lakes now divert rain run-off into Duchess Gully. Before this intervention, much of the flat may well have been covered in seasonal swamp.

## 4.2 The project area

The project area encompasses a small part of the terminal toe of the broad ridge that defines the northern limit of the Duchess Gully basin. The topography is relatively flat, ranging in elevation from 10.75 m AHD in the north to 8 m AHD on the southern boundary. Boreholes dug by JK Geotechnics show the soil profile to generally consist of a 10-50 cm deep topsoil layer of dark grey and dark brown silty clay of medium plasticity, overlying stiff silty clay (JK Geotechnics 2013, cited in Virgin 2018:4). Orange clay material appears to have been imported to form the foundation of the existing 14 demountable classrooms. No rock outcrops that might have been used for Aboriginal occupation, art production, the construction of stone arrangements, tool grinding or quarrying occur.

The project area seems to have been initially cleared to make way for a wider-area sports resort development, which commenced but did not eventuate (cf. Happ and Bowdler 1983; Staniland Mounser 1994; Collins 2009:8). The area was afterward used for cattle grazing up until the Lake Cathie Public School was built in 2014. The existing school development has added further substantial landscape modification/disturbance through the construction of buildings, roads, carparks and levelled play areas, as well as landscaping, drainage and the installation of underground services (e.g. Plates 1 and 2). Approximately 1.53 ha (38.6%) of the school allotment is presently covered by a combination of buildings, concrete/asphalt pavement and gardens.

Prior to clearing, the natural vegetation likely comprised Forest Red Gums with a mixed Swamp Oak forest understorey (Darkheart Eco Consultancy 2013, cited in Virgin 2018:4). Apart from three mature eucalypt trees (one a standing dead trunk) in the south-western corner, vegetation is now restricted to open (mown) grassland, cultivated gardens, and planted (juvenile) trees and shrubs (Plates 2 and 3). The plantings include a dense vegetation buffer (Swamp forest rehabilitation zone) that extends close to the Ocean Drive boundary north of the school entrance (Plate 4).

Due to the clear and observable changes to the land's surface that have taken place, the project area constitutes 'disturbed land' as defined under the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010c:7-8).



Plate 1. View west to existing COLA and demountable classrooms





Plate 2. General view of the school grounds south of the Ocean Drive entrance (SU-1)



Plate 3. General view of the school grounds north of the Ocean Drive entrance (SU-2)



Plate 4. Swamp forest rehabilitation zone on western school boundary, north of the Ocean Drive entrance (SU-7)

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## 5 ABORIGINAL CULTURAL HERITAGE CONTEXT

### 5.1 Ethno-history

At the time of first European contact, the Lake Cathie-Bonny Hills Aboriginal people belonged to the Birpai 'tribe' and spoke a closely related variant of the Kattang language (Holmer 1966:1-2). Dialect groups composed of interlinked extended families (clans) owned and inhabited distinct estates within the wider Kattang language association. On the resource-rich coast, clans with at least 100 members laid claim to relatively small territories, the boundaries of which were defined and generally known. Alliances with other clans, dialect and broader language groups were maintained through a system of regulated movement for ceremonial, ritual, and social/secular purposes (Breton 1833; Howitt 1904; Fitzpatrick 1941:61,124).

During the course of everyday life, resource exploitation seems to have been undertaken by a number of separate family bands that would gather and then disperse as conditions demanded (Henderson 1851; Godwin 1990:97). As told by Birpai elder the late William (Goolah) Holten, a seasonal landuse system was generally followed, with hinterland hunting through spring and summer and movement to the coast for autumn and winter fishing (Collins 1996a:11). One of the seasonal base camps was reportedly situated in the Rainbow Beach locality (Collins 1996a:18).

The first written account of the Birpai comes from the journal of Surveyor-General John Oxley, whose exploration party traversed the Hastings River valley from the west in 1818. Oxley (1820:307-328) noted that "the natives in the vicinity (of now Port Macquarie) appeared very numerous", where "a great many natives' canoes were seen on the river". Oxley's party travelled south along the coast from Port Macquarie and camped near a freshwater spring at Bonny Hills, but no mention is made of encountering either Aboriginal people or evidence of their camps here or anywhere else between the Hastings and Camden Haven rivers. Upon skirting the northern shore of Queens Lake (part of the Camden Haven River estuarine system, 5.4 km south of the project area) Oxley (1820:328) "disturbed a large party of natives, some of whom were busily employed in preparing bark for a new canoe". These people were residing in a lakeside encampment comprising "guniahs or bark huts" and possessed "arms and utensils of every description". There were "many large canoes on the lake ... one of which was sufficiently large to hold nine men, and resembled a boat" (Oxley 1820:332-333). The discovery of this occupied campsite in the mid-spring of 1818 suggests that the margins of resource-rich estuaries may have been used on a semi-permanent basis despite the usual seasonal round followed elsewhere.



The frontier of European settlement moved north from Newcastle upon the 1821 establishment of a penal station at Port Macquarie. Little is known about Lake Cathie-Bonny Hills between the 1821 and 1860, and this area it is thought to have remained an isolated outpost of Port Macquarie, visited by limeburners, cedar cutters, escaped convicts and graziers in search of free pasture (Camden Haven Learning Exchange 1987:6). Limeburners were operating on the Camden Haven by 1828, burning the then prolific oyster beds available in Queens Lake (see Ogburn *et al* 2007:276) and probably also destroying Aboriginal shell middens on the shoreline.

While historical information suggests that the Birpai in and around Lake Cathie-Bonny Hills could have maintained a traditional lifestyle with minimal disruption up until the 1870s, their population is likely to have already been decimated by measles and smallpox, which reached Port Macquarie as early as 1831 (Campbell 1985:337). In addition to these introduced afflictions, some of the local Aboriginal people are believed to have been massacred by early European settlers near Greenhills Gully in Bonny Hills (Collins 2003a:10). Around six Aboriginal families nevertheless camped for an extended period beside Greenhills Gully during the late 1930s while the men mustered cattle for a local landowner (Bartlett 1991).

## 5.2 Cultural information disclosed for this assessment

As disclosed by Jason Holten, the project area lies within a wider cultural landscape of on-going general heritage value owing to the presence of traditional campsites and evidence of related off-site domestic activities, plus significant mythological/ceremonial sites/places (e.g. North Brother Mountain [Dooragan] and Jolly Nose Hill [Googic]).

However, in line with information given by Birpai elder (the late) William (Goolah) Holten and his son (the late) Lindsay Moran (Collins 1996a:18, 2006:3), Jason Holten advised that the project area itself is not known to contain or impinge upon sites/places of traditional ceremonial, mythological or other spiritual significance; camping places; or sites, places or resources of historic or special contemporary socio-cultural value/attachment (whether tangible or intangible). As such, Jason Holten did not express a concern with the proposed school redevelopment.

## 5.3 Registered Aboriginal sites and places

### 5.3.1 OEH Aboriginal Heritage Information Management System (AHIMS)

An extensive search of the AHIMS database performed on the 15<sup>th</sup> of January 2019 (Client Service 392550) revealed 20 registered Aboriginal sites within 3 km of the project area (Appendix I). The registered sites include scarred trees and a shell midden, but are overwhelmingly dominated by stone artefact occurrences (Table 1). None of the registered sites are within the project area, the closest being an isolated find (#30-6-0114; a greywacke flake) on the alluvial flat some 470 m to the south-east.

Table 1. Types of Aboriginal sites registered on AHIMS within 3 km of the project area

Site type	Site Features	Frequency	% of total
Shell midden	Shell, stone artefacts, pebbles	1	5
Open camp	Stone artefact scatter	11	55
Isolated artefact	Stone artefact	5	25
Scarred tree	Bark/wood removal scar on trunk	3	15
Total		20	100

As evident from Table 2 and Figure 4, the registered AHIMS sites are concentrated near Duchess Gully, where they occur on the foredune, inner barrier sands, the alluvial flat, and bedrock-soil footslopes. Away from the immediate coastal zone, registered sites are restricted to isolated stone artefacts and a scarred tree. The map grid reference for the latter scarred tree (#30-3-0252) does not accord with the location description given on its site recording card. The site description instead places the tree in Bril Bril State Forest some 38 km inland of Wauchope, showing that this site is nowhere near the project area. The AHIMS Site Registrar has been advised of this database error.

### 5.3.2 Other heritage registers

On-line searches of the Australian Heritage Database, NSW State Heritage Register and Schedule 5 (Environmental Heritage) of Port Macquarie Hastings LEP 2011, performed on the 28<sup>th</sup> of January 2019, revealed no registered/listed Aboriginal sites/places at Lake Cathie-Bonny Hills.

Table 2. Details of Aboriginal sites registered on AHIMS within 3 km of the project area

AHIMS ID	Site name	Site type	Local landform	# identified artefacts
30-6-0235	Lake Cathie/Lake Side Way	Scarred tree	Bank of Cathie Creek estuary	
30-6-0130	99-2 trail #2	Isolated artefact	Subcoastal ridge crest	1
30-6-0094	SATM 2	Isolated artefact	Subcoastal spur footslope	1
30-6-0128	Point Rd #1	Isolated artefact	Subcoastal spur crest	1
30-3-0252	Dam Trail #1	Scarred tree	Inland ridge slope	
30-6-0114	M9	Isolated artefact	Alluvial flat	1
30-6-0116	M11	Open artefact scatter	Coastal ridge footslope	150 (approx.)
30-6-0184	M12	Open artefact scatter	Coastal knoll footslope	11
30-6-0109	M4	Open artefact scatter	Sand rise and sand footslope	115
30-6-0115	M10	Open artefact scatter	Sand rise near Duchess Gully	40; 26 from test excavations
30-6-0111	M6	Open artefact scatter	Alluvial flat near Duchess Gully	2
30-6-0112	M7	Open artefact scatter	Alluvial flat near Duchess Gully	2
30-6-0012	Lake Cathie Beach	Shell midden	Rainbow Beach foredune	>10
30-6-0032	Duchess Creek	Open artefact scatter	Bed and bank of Duchess Gully tributary	4
30-6-0108	M3	Open artefact scatter	Sand and alluvial flat near Duchess Gully	12; 1 from test excavations
30-6-0106	M1	Open artefact scatter	Sand rise near Duchess Gully	20
30-6-0113	M8	Open artefact scatter	Spur footslope above Duchess Gully	3
30-6-0107	M2	Open artefact scatter	Sand rise near Duchess Gully	5
30-6-0110	M5	Isolated artefact	Alluvial flat	1
30-6-0162	1B1	Scarred tree	Sand flat	

## 5.4 Past archaeological assessments and investigations

### 5.4.1 The project area

As reviewed below, the project area has been inspected for archaeological evidence on three different occasions, none of which have succeeded in detecting Aboriginal objects within the project area.

#### *Happ and Bowdler 1983*

In 1983, Happ and Bowdler surveyed a 225 ha property east of Ocean Drive proposed for development of an 'international sports and leisure village'. The property included the present project area. The survey resulted in the detection of three silcrete artefacts on a lag of pebbles, ochre nodules and sand in the bed of a small tributary of Duchess Gully around 1.3 km south-east of the project area, and a silcrete flake in a spill of sand on the nearby tributary bank (together registered as AHIMS site #30-6-0032). Although no other archaeological evidence was found, the survey was hampered by vegetation cover.

#### *Collins 1996*

Survey of a 130 ha proposed residential subdivision that encompassed the northern half of the land parcel inspected by Happ and Bowdler (1983), including the present project area, was undertaken by Collins in 1996 and resulted in the recording of 11 Aboriginal sites within and near the survey boundaries. The sites comprised nine scatters of stone artefacts (open campsites) and two isolated artefact finds (M1 to M11 listed on Table 2). Apart from one isolated artefact (M9; #30-6-0014) on the alluvial flat 470 m south-east of the project area, the recorded sites were situated on inner barrier sands, the alluvial flat and bedrock-soil footslopes near Duchess Gully, within 500 m or less of the coastline.

The artefact assemblage included flakes, flaked pieces, cores, split pebbles, pebble and flake tools made on a range of raw stone materials, primarily siltstone, quartz and chert. Almost half of the identified artefacts featured pebble cortex, suggesting that their constituent stones were most likely collected from Rainbow Beach.



Figure 4. AHIMS registered sites in the Lake Cathie-Bonny Hills locality

(Base map source: Grants Head 9434-1N 1:25,000 topographic map [Land and Property Information 2011])



#### Virgin 2018

A more recent field inspection was conducted in 2018 as part of an archaeological due diligence assessment of the project area (Virgin 2018). The inspection included all accessible ground surface exposures and the trunks of mature trees. No Aboriginal objects were detected. It was concluded that the area is "relatively unlikely to have been a preferred location for occupation by Aboriginal people in the past" (Virgin 2018:10).

#### 5.4.2 The nearby locality

In addition to those reviewed in Section 5.4.1, a number of other field surveys and investigations have been completed for development planning purposes in the Rainbow Beach locality. The results of these surveys/investigations are summarised in Table 3 and serve to further inform expectations with respect to the potential archaeological record of the project area.

Table 3. Summary of other past archaeological assessments and investigations near the project area

Reference	Survey landforms	Summary and results
Starling 1971	Coastal foredune	Survey to assess the impact of sandmining on Aboriginal sites. Recorded discontinuous pipi midden horizons, some containing charcoal, flakes, fire-shattered and unworked pebbles, within the foredune scarp along the full length of Rainbow Beach.
Coleman 1981	Sand flat, alluvial flat, hills and ridges	Survey of a water pipeline easement and associated reservoir sites between Port Macquarie and Laurieton. The easement crossed the Rainbow Beach locality just west of Duchess Gully. Two shell middens and a scarred tree were recorded, all near the Camden Haven River estuary at Dunbogan.
Collins 1995	Alluvial flat, hills and ridges	Survey of a 10.5km long and 15m wide water pipeline easement between the Pacific Highway and Bonny Hills that ran along Houston Mitchell Drive and the western margin of Ocean Drive opposite the Lake Cathie Public School. Archaeological finds were restricted to a scatter of five stone artefacts (made on quartz and greywacke) on the bank of a permanent creek 4km north-west of the school, and an isolated quartz core on the lower slope of a hill near Bonny Hills.
Collins 2003a	Alluvial flat, hills and ridges	Survey of a 2ha section of upper ridge slope at Bonny Hills and a 67ha area comprising ridge crests, slopes and alluvial flats sandwiched between Lake Innes Nature Reserve and Ocean Drive east of and immediately north of the Lake Cathie Public School, proposed for rezoning to allow residential development. No Aboriginal objects were detected.
Collins 2003b	Sand flat, alluvial flat, ridge	Survey of a 32ha property proposed for rezoning to allow residential development, situated between the coastal dunes and the area inspected by Happ and Bowdler (1983) and Collins (1996) (see report section 5.4.1), south of Ocean Drive at Lake Cathie. The survey resulted in the recording of a scarred Brush Box tree (shield tree) standing in sand-based littoral rainforest 120m inland of Rainbow Beach.
Collins 2006	Sand flat, alluvial flat, hills and ridges	Re-inspection and assessment of sites M1 to M10 recorded by Collins (1996), in light of a revised subdivision concept plan. Survey of an additional 8ha of land adjoining the southern boundary to be included in the proposal. A scatter of 11 stone artefacts (M12) made on siltstone, chert, jasper and chalcedony was recorded on the western footslope of a bedrock soil knoll around 130m inland of Duchess Gully.
Collins 2007	Sand flat, alluvial flat	Archaeological test excavations conducted on and/or adjacent to sites M3, M6/M7, and M10 near Duchess Gully to identify and mitigate proposed residential development impacts. The test excavation results were consistent with Collins' 1996 surface findings, indicating a higher level of artefact discard on the elevated inner barrier sands than on the alluvial flat. Artefacts on the alluvial flat were considered to represent part of a background distribution of expediently discarded materials that also focussed on land close to Duchess Gully.
Collins 2009	Sand flat, alluvial flat, ridge slope	Survey of a 65ha area seaward of Ocean Drive, south and east of that previously inspected by Happ and Bowdler (1983) and Collins (1996, 2006), incorporating an 'eco tourist' development site on the degraded inner barrier dune between Rainbow Beach and Duchess Gully, sand and alluvial flats proposed for open space, drainage and habitat conservation (including a constructed wetland), and a ridge slope targeted for future school construction. The survey area encompassed the artefact scatter recorded by Happ and Bowdler in a tributary of Duchess Gully, and artefact scatter M2 recorded by Collins in 1996. No Aboriginal artefacts/materials were detected at either site, or elsewhere.

Even though the past local surveys have together sampled all available landform elements, Aboriginal objects have been recorded with outstandingly highest frequency on coastal sands (foredune and inner barrier), especially sands near the freshwater reach of Duchess Gully. Stone artefacts have been identified on the alluvial flat and footslopes of bedrock-soil hills and ridges. However, apart from four isolated finds, artefacts recorded on alluvial and bedrock substrates within 3 km of the project area similarly lie close to Duchess Gully.

## 5.5 Synthesis of available information and archaeological expectations for the project area

### 5.5.1 Summary and discussion

As an outcome of the archaeological surveys undertaken to date, the area bordered by Ocean Drive between the towns of Lake Cathie and Bonny Hills features an unusually dense concentration of Aboriginal sites, reflective of a traditional coastal landuse system that included camping, stone tool manufacture/maintenance, the extraction of bark for shield making, and the collection of pipi shells and pebbles from the Rainbow Beach shore. Whilst set within a valued wider cultural landscape, no intangible sites/places of special socio-cultural significance have been reported within or near this area, the closest being a place associated with ceremonial activities on the summit of the Jolly Nose escarpment.

Past field surveys and subsurface investigations indicate that the Rainbow Beach foredune and well-drained rises on the degraded inner sand barrier were preferred for traditional occupation. Camps were sometimes established on bedrock-soil footslopes, but the surveys have revealed these to occur within 500 m of the beach, in the proximity of Duchess Gully. A low-density distribution of stone artefacts has been recorded on the alluvial flat. These artefacts likewise focus on Duchess Gully. The past results suggest that stone artefacts found off the coastline and productive coastal margins (including Duchess Gully) are representative of a background scatter of items lost or expediently discarded, probably by small groups ranging out from their coastal camps in search of food and material resources. Non-coastal evidence of this background scatter (within 3 km of the project area) is extremely scanty, and apart from the M9 flake (#30-6-0114) on the alluvial flat 470 m south-east of the project area, is restricted to an isolated quartz core (#30-6-0094) on a spur footslope inland of Bonny Hills, and two isolated finds (#30-6-0130 and #30-6-0128) on the crest of a ridge/spur flanking the Lake Innes Nature Reserve further north.

Considering the demonstrated presence of Aboriginal people in the locality, there is little doubt that the project area would have been visited in traditional times. This visitation may have resulted in the occasional discard and/or loss of stone artefacts (background scatter), as well as tree scarring caused by the removal of bark or wood for the construction of shelters, the manufacture of material culture items, and cuttings made to collect food and assist with tree climbing. However, no Aboriginal objects have been detected on hills, ridges or slopes bordering the Duchess Gully basin off the coastal fringe despite several surveys. These surveys include the project area, which has been inspected on three separate occasions with a nil result (Happ and Bowdler 1983; Collins 1996; Virgin 2018). As suggested by the past survey findings in conjunction with the vegetation clearing and development disturbance that has already taken place, the project area is expected to have a low level of archaeological sensitivity. In the event that cultural materials were ever discarded within this area, there is next to no possibility that any could remain in a primary depositional context.

### 5.5.2 A predictive model of the nature and location of archaeological sites within the project area

The following predictions are based upon the project area's environmental and disturbance conditions, and the past survey/investigation results reviewed in Section 5.4:

- In the absence of stone or ochre outcrops, the project area will not contain occupation shelters, stone arrangements, stone or ochre quarries, axe grinding grooves or rock art.
- Due to the extent of past vegetation clearing, culturally modified trees are highly unlikely to survive. If present, such trees will be confined to the south-western corner of the project area, which would not be affected by the proposed school redevelopment.
- Given the clear preference for occupation of the local coastal margins, sites comprising evidence of sustained or repeated Aboriginal camping/use (shell middens, dense artefact scatters, occupation deposits) are highly unlikely to occur within the project area.
- Isolated stone artefacts lost and/or discarded by small itinerant resource-gathering groups may occur anywhere in the Rainbow Beach locality. Owing to its small size and the perceived very low density of this background artefact distribution off the coastal fringe, it is unlikely that the project area would have ever contained more than one or two isolated stone artefacts, if any at all. Any isolated stone artefacts that may be present within the project area will have been displaced (and possibly broken) by vegetation clearance and disturbance activities associated with development and maintenance of the existing school.

## 6 FIELD SURVEY

### 6.1 Conduct and coverage

A pedestrian survey of the project area was undertaken by the consultant with the assistance of Jason Holten (Birpai LALC Sites Officer and Chairperson of the Birpai Traditional Owners Indigenous Corporation) on the 25<sup>th</sup> of February 2019. The survey was conducted in a series of (generally north-south) transects designed to detect those parts of the project area that contained exposures of natural ground amenable to the survival and discovery of archaeological materials. These ground exposures were then fully inspected. The trunks of the three mature trees standing in the south-western corner of the school allotment were inspected for evidence of Aboriginal modification.



Figure 5. Location of field survey units

For reporting purposes, the project area was divided into the seven survey units mapped on Figure 5 and described in Table 4, which were delineated on the basis of disturbance and exposure conditions. To provide data suitable for evaluating effectiveness of the field survey, variables constraining the discovery of Aboriginal objects were estimated for each of the survey units. These include an estimation of the mean frequency with which surface exposures were encountered, as well as an estimation of the likelihood of those exposures revealing

archaeological evidence on the current surface. Once the variables of exposure and visibility are taken into account, it is estimated that 12.7% of the surveyed area was subject to effective surface coverage (Table 5). This amounts to effective coverage of around 7.9% of the total area not currently masked by built school infrastructure. Irrespective of the reasonably low level of effective coverage able to be achieved in the face of dense grass and other planted vegetation, the survey is considered to have been satisfactory for the purposes of assessing archaeological potential.

Table 4. Description of field survey units

Survey Unit	Landform	Disturbance	Primary sources of surface exposure
SU-1	Flat	Vegetation clearing, underground services, tree planting, mowing, vehicle track, informal car parking	Vehicle track, sparse grass
SU-2	Flat	Vegetation clearing, land levelling, drainage, tree planting/landscaping, mowing, foot traffic (playing field)	Sparse grass
SU-3	Flat	Vegetation clearing, land levelling, drainage, tree planting/landscaping, mowing, foot traffic (playing field)	Sparse grass, erosion exposures
SU-4	Flat and low gradient hillslope	Vegetation clearing, land levelling, landscaping, mowing, hardstand for two (removed) demountable classrooms, foot traffic	Sparse grass, erosion exposures
SU-5	Flat	Vegetation clearing, land levelling, landscaping, mowing, foot traffic, informal car parking	Sparse grass, erosion exposures
SU-6	Flat and low gradient hillslope	Vegetation clearing, mowing, sheet erosion	Sparse grass, erosion exposures
SU-7	Flat and low gradient hillslope	Vegetation clearing, planting of regenerating swamp forest (trees, shrubs and ground cover), some mowing	Nil

Table 5. Survey coverage details

Survey Unit	Approx. total area (square m)	Survey area (square m)	% of surface exposed	% visibility on exposures	Effective cover of survey area (square m)	# of Aboriginal objects detected
SU-1	3,925	3,925	20	100	785.0	0
SU-2	6,093	3,000	10	90	270.0	0
SU-3	1,116	1,116	20	100	223.2	0
SU-4	3,767	3,767	10	90	339.0	0
SU-5	1,179	1,179	20	90	212.2	0
SU-6	1,035	500	20	100	100.0	0
SU-7	7,235	1,650	0	0	0.0	0
Total	24,350	15,137			1,929.4	0
%	100	62.2			12.7	0





Plate 5. Vehicle track exposure, SU-1



Plate 6. View east across western section of SU-2





Plate 7. Typical surface exposure, SU-3



Plate 8. Erosion exposure, SU-4





Plate 9. Typical surface exposure, SU-4



Plate 10. Erosion exposure, SU-6

## 6.2 Results

No Aboriginal cultural heritage materials or potential archaeological deposits (PADs) were detected during the field survey, nor did any of the three mature trees standing within the south-western corner of Lot 2 DP 1193553 show signs of possible Aboriginal modification.

This result is consistent with the nil findings of the three previous surveys of that have included the project area (Happ and Bowdler 1983; Collins 1996; Virgin 2018), each of which may well have covered a different sample of the ground surface.

## 7 CONCLUSIONS

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On the basis of her due diligence assessment, Virgin (2018:18) stated that “there is a low likelihood that the proposed (school redevelopment) works will result in harm to Aboriginal objects”. Evidence documented in this Aboriginal Cultural Heritage Assessment report, including that provided by Aboriginal consultation, heritage register searches, background literature review and a field survey, fully supports this statement.

As reviewed in Section 5.4, a considerable number of archaeological surveys have been completed between Lake Cathie and Bonny Hills. In addition to surveys of a water pipeline easement bordering Ocean Drive (Collins 1995) and ridges/hills on the northern side of Ocean Drive directly opposite the Lake Cathie Public School (Collins 2003a), four field inspections have now included the project area itself (Happ and Bowdler 1983; Collins 1996; Virgin 2018; this report). None of these surveys have succeeded in detecting Aboriginal objects within or close to Lot 2 DP 1193553. While there is little doubt that project area would have been visited in traditional times, there is no evidence to suggest that this area was ever used as a camping place, such that the undiscovered archaeological record (if any) is likely to be restricted to a low-density distribution of isolated stone artefacts lost and/or discarded during the course of resource extraction activities. Even if isolated stone artefacts have survived the land surface alteration and disturbance caused by past vegetation clearing and school development, there is no realistic chance that these could be detected by either further archaeological investigation or development earthworks monitoring.

Aboriginal knowledge-holders consulted for several of the past local assessments (Collins 1995, 1996, 2003a, 2003b, 2006, 2007, 2009) did not reveal the presence of any tangible or intangible sites/places of ceremonial, mythological or otherwise special traditional, historic or contemporary socio-cultural significance or attachment on or near Lot 2 DP 1193553. Whilst acknowledging the general heritage value of the wider landscape, the previously disclosed cultural information in regard to the project area was confirmed by Jason Holten (Section 5.2). No objections to the proposed school redevelopment were thus raised by either the Birpai LALC or the Birpai Traditional Owners.

Considering all available information, it is concluded that the project area has a low level of Aboriginal cultural heritage sensitivity and that redevelopment of Lake Cathie Public School should be allowed to proceed as proposed without further cultural heritage constraints, providing the management recommendations presented in Section 8 below are implemented.

## 8 MANAGEMENT RECOMMENDATIONS

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Given the absence of any registered Aboriginal sites/places in conjunction with advice from Birpai LALC and Birpai Traditional Owners nominated representative Jason Holten and the nil result of the field survey, it is recommended that the proposed Lake Cathie Public School redevelopment be allowed to proceed with due caution without requiring additional Aboriginal consultation, archaeological investigation or earthworks monitoring. To demonstrate compliance with legislation and best heritage practice the following management recommendations should be adhered to. The recommendations have been endorsed by the Birpai LALC and the Birpai Traditional Owners Indigenous Corporation (Appendix H).

- 1) Prior to their on-site involvement, all contractors, subcontractors and their employees engaged for the school redevelopment works should undergo a site induction that provides information on legal obligations with respect to Aboriginal objects, and ‘stop-work’ conditions applicable in the event that any identified or suspected Aboriginal objects are discovered at any stage (see Recommendation 2). The proponent should consider engaging a representative of the Birpai LALC/Birpai Traditional Owners Indigenous Corporation to develop and deliver the heritage component of the site induction.

A register should be kept of all persons inducted. The register should include dates, names and signatures of those inducted, the name of the person carrying out the induction, and an acknowledgement that Aboriginal cultural heritage requirements have been explained and understood.

- 2) If any identified or suspected Aboriginal objects are detected at any time, all disturbance work should immediately cease within 10 metres of the find and temporary protective fencing erected around this 'no-go zone' pending further management advice from the Department of Planning and Environment in liaison with the OEH (Planning and Aboriginal Heritage Section, North East Region) and the Registered Aboriginal Parties. In the unlikely event that the find consists of or includes human remains, the NSW Police Department and the OEH Environmental Line (phone 131 555) should also be notified as soon as practicable.

Works may not recommence within the designated 'no-go zone' until formal clearance to do so has been given by the appropriate authorities.

- 3) In a further effort to mitigate potential impacts on Aboriginal cultural heritage, Recommendation 1 and the unexpected finds procedure outlined in Recommendation 2 should be written into the Construction Management Plan or equivalent documentation.
- 4) As demonstrated by its Birpai language 'house' names, the Lake Cathie Public School community is committed to promoting a student awareness and appreciation of Birpai culture. As a means of adding to this awareness and appreciation, the proponent should consider applying Birpai language names to the new hall and COLAs. The Birpai LALC and Birpai Traditional Owners Indigenous Corporation must be invited to assist with any related naming to ensure that it is accurate and suitable.

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## GLOSSARY

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### ARTEFACT

An object or specimen produced by human agency. An artefact can usually be collected without being destroyed. This is in contrast to features, which are destroyed or dismantled after collection. All lithic debitage and tools are considered artefacts (Andrefsky 2005:252).

### CHALCEDONY

A cryptocrystalline variety of silica, having a compact fibrous structure and a waxy lustre. It may be translucent or semi-transparent and occurs in a variety of colours. Chalcedony is often found as a deposit, lining or filling cavities in rocks (Lapidus 1987:99).

### CHERT

A dense, extremely hard, microcrystalline or cryptocrystalline siliceous sedimentary rock, consisting mainly of inter-locking quartz crystals, sub-microscopic and sometimes containing opal (amorphous silica). Chert occurs mainly as nodular or concretionary aggregations in limestone and dolomite, and less frequently as layered deposits (banded chert). It may be an organic deposit (radiolarian chert), an inorganic precipitate (the primary deposit of colloidal silica), or a siliceous replacement of pre-existing rocks (Lapidus 1987:102).

### CORE

A nucleus or mass of rock that shows signs of detached piece removal. A core is often considered an objective piece that functions primarily as a source for detached pieces (Andrefsky 2005:254).

### CORTEX

Chemical or mechanical weathered surface on rocks (Andrefsky 2005:254).

### DEBITAGE

Detached pieces discarded during the stone reduction process (Andrefsky 2001:254).

### FLAKE

A piece of stone detached from a larger mass by the application of force and having a feather, hinge or step termination and a bulb of percussion. A platform may be present if the proximal end is unbroken (Crabtree 1972:64).

### FLAKED PIECE

A chipped stone artefact with negative flake scars which cannot be classified as a flake, core or retouched flake (Hiscock 1988:64).

### FLAKE TOOL

A flake that has been subsequently modified by intentional retouch and/or by wear resulting from use (Andrefsky 2005:255).

### FOOTSLOPE

A moderately to very gently inclined waning lower slope resulting from aggradation or erosion from sheet flow, earth flow or creep (Speight 1990:31)

### GREYWACKE

Sedimentary rock. A very hard, dark grey or greenish-grey, coarse-grained sandstone characterised by angular particles and rock fragments embedded in a clayey matrix (Lapidus 1987:265).

### HOLOCENE

The most recent epoch of geological time, commencing approximately 10,000 years age (Lapidus 1987:274).

### PHYLLITE

A light silvery-grey metamorphic rock, intermediate in grade between slate and schist. Phyllites are derived from argillaceous (ie clayey) sedimentary rocks (Lapidus 1987:405).

### SCARRED TREE

Aboriginal scarred trees are trees that have been scarred by Aboriginal people through the removal of bark or wood for a variety of commonplace tasks, including the construction of bark shelters, watercraft and containers. Other forms of Aboriginal tree wounding include deliberate marking (such as tree carving), the removal of wood for artefact manufacture, and cuttings made to collect food and assist with tree climbing (toe-holds). Early European settlers also stripped bark from trees, though for a more limited range of uses, especially the weather-proofing of buildings and other structures (Long 2005:6-7).

### SCHIST

A metamorphic rock that is not defined by mineral composition but instead by the well-developed parallel orientation of more than half of the minerals present (Lapidus 1987:453).

#### SHELL MIDDEN

An Aboriginal campsite dominated by shellfish remains. Middens may also contain animal bone, stone artefacts, and charcoal and ash from cooking fires. Some middens are thin surface scatters which have constituted little more than a meal for a small group gathering food away from a main camp, while others are well consolidated deposits representing consistent use by large groups of people over hundreds or thousands of years (Byrne 1989:10).

#### SILCRETE

A siliceous duricrust composed of sand and gravel cemented by opal, chert and quartz, formed by chemical weathering and water evaporation (Lapidus 1987:472).

#### SILTSTONE

A fine-grained sedimentary rock principally composed of silt-grade material. Intermediate between sandstone and shale, siltstone contains less clay than shale and lacks its fissility and fine laminations (Lapidus 1987:474).

#### STONE ARTEFACT

Fragment of stone that generally possesses one or more of the following characteristics:

- Positive or negative ring crack
- Distinct positive or negative bulb of force
- Definite erillure scar in position beneath a platform
- Definite remnants of flake scars

These traits are characteristic of the spalls removed by humans using direct percussion. Stone artefacts which have none of the above may be identified as such if they possess ground facet/s characteristic of human industry (Hiscock 1984:128).

#### STONE TOOL

A stone artefact that has been intentionally modified by retouch and/or modified by usewear (Andrefsky 2005:262).

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Appendix 15 – SSD Condition B12 Implementation Matrix

# Appendix 16: Consent Condition B12 - Implementation Matrix

B12. Prior to the commencement of construction, the applicant must submit a Construction Environmental Management Plan (CEMP) to the Certifying Authority and provide a copy to the Planning Secretary. The CEMP must include, but not be limited to, the following:		
(a) Details of:		Implementation Reference
i	Hours of work	CEMP Sect 1.2 - Hours of Work
ii	24 hour contact details	CEMP Sect 2.3 – 24 hour Contact Details
iii	Management and control of dust to protect the amenity of the neighbourhood	CEMP Sect 4.15 = Dust & Air Management CEMP Appendix 2: AWE Environmental Activities Register
iv	Storm water control & discharge	CEMP Sect 4.8 Landforms Geology and Soils CEMP Sect 4.9 Water Quality and Hydrology CEMP Appendix 11 Construction Soil & Water Management Plan
v	Measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving site	CEMP Sect 4.13 Control of Sediment from Vehicles Travelling Off Site
vi	Groundwater management plan including measures to prevent ground water contamination	CEMP Sect 4.8 Landforms Geology and Soils CEMP Sect 4.9 Water Quality and Hydrology CEMP Appendix 11 Construction Soil & Water Management Plan
vii	External lighting in compliance with AS 4282-2019 Control of the obtrusive effects of outdoor lighting.	CEMP Sect 4.17 <i>Note: It is expected that all trades/work will be 'typically' finished by 4pm</i>
viii	Community consultation and complaints handling	CEMP Sect 3.2 Community Consultation CEMP Sect 3.6 Community Complaints Minutes of Community Consultation forum (11/12/2020)
(b)	Construction Traffic & Pedestrian Management Plan	CEMP Sect 4.16 Traffic Management CEMP Appendix 10 Construction Traffic & Pedestrian Management Plan PMHC email 'Men at Work' SME Review of CT&PMP
(c)	Construction Noise & Vibration Management Plan	CEMP Sect 4.14 Construction Noise & Vibration Management Plan RAPT SME Review of CN&VMP CEMP Sect 3.2 Community Consultation CEMP Sect 3.6 Community Complaints
(d)	Construction Waste Management Plan	CEMP Sect 4.7 Waste Management Reduction and Purchasing CEMP Sect 4.11 Unexpected Finds - ACM CEMP Appendix 5 Waste and Spoil Management Flow Chart CEMP Appendix 8 Construction Waste Management Plan CEMP Appendix 12 Unexpected Finds Protocol (Douglas & Partners)



(e)	Construction Soil & Water Management Plan	CEMP Sect 4.8 Landforms Geology and Soils CEMP Sect 4.9 Water Quality and Hydrology CEMP Sect 4.12 Spoils and Materials Management` CEMP Appendix 5 Waste & Spoil Management Flow Chart CEMP Appendix 11 Construction Soil & Water Management Plan Douglas Partners Soil Core Sampling Reports
(f)	an unexpected finds protocol for contamination and associated communications procedure	CEMP 4.11 Unexpected Finds Procedure – ACM CEMP Appendix 12 Douglas Partners Unexpected Finds Protocol
(g)	An unexpected finds protocol for Aboriginal and non- aboriginal heritage and associated communications procedure	CEMP 4.18 Heritage CEMP Appendix 14 Aboriginal Cultural Heritage Assessment (J. P. Collins 2019)
(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.	CEMP Sect 4.7 Waste Management Reduction and Purchasing CEMP Appendix 5 Waste & Spoil Management Flow Chart Douglas Partners Soil - Core Sampling Reports

Appendix 16 Environmental Control Map

## ENVIRONMENTAL CONTROL MAP

### Sediment Control

All work to be carried out in accordance with the environmental Risk Assessment, which nominates the risks involved with storm water discharge and adjoining waterways. Please ensure that all nominated controls are in place and strictly adhered to.  
Maintain existing kerbs where possible. The existing asphalt surface is to be retained outside the building footprint throughout the construction phase to maintain good all weather access around the site. Establish & maintain sediment controls at any existing kerb inlet pits within the site.

### Fuel & Chemical Management

Fuels, chemicals and the like will be stored in a well-ventilated area, and be banded to contain any spills or leaks. A spill kit shall be kept on site.

### Key Environmental Issues

**Water Pollution:** Under no circumstances are paints or chemicals to be poured down drains.

**Soil Contamination:** Should you uncover any materials which you suspect being contaminated, stop work immediately, do not disturb the suspected contaminated materials, and notify the site manager directly. The Site manager shall engage a consultant to assess the materials.

**Air Pollution:** Reduce or stop activities during high wind velocity periods. Any plant emitting high levels of smoke are to be stopped until repair works are completed. Turn off all plant when not in use (no long periods of idling).

**Flora:** Trees to be retained will be identified and protected throughout the course of the Project.

**Environmental Monitoring:** Weekly inspections shall be undertaken by the Site Manager, (or after any heavy rain event) to monitor all on site environmental controls

### Dust & Air Quality Management

Shade cloth to be fixed to perimeter fence.

Site manager to inspect weekly to ensure that dust mitigation measures are being performed satisfactorily.

Visual inspections are to be conducted on a daily basis to ensure that excessive dust is not leaving the site.

Tracked dirt onto public roads will be swept with brooms or a street sweeper to reduce potential dust generation.

Clean sediment collected from behind silt fences and at other controls, shall be regularly removed to prevent accumulation and development of potential dust source.

Reduce or stop activities during high wind velocity periods. Any plant emitting high levels of smoke are to be stopped until repair works are completed. Turn off all plant when not in use (no long periods of idling).



### **Legend:**

- Site Amenities
- Waste management
- Spill Kit located in site office
- Environmentally Sensitive Area
- AWE Site Boundary
- Silt Protection
- Existing Fencing
- Gate

### **A W Edwards 24hr Contact:**

Project Manager – Craig McIlveen  
Site Manager – David Barratt

### **Construction Hours:**

7:00am - 6:00pm Monday - Friday  
7:00am - 5:00pm Saturday  
No Work Sundays & Public Holidays.

**A W EDWARDS**

No.	By	Date	Description	Appd
A	CMc	10/01/2020	For construction	

Project: Lake Cathie Public School Upgrade  
ENVIRONMENTAL CONTROL MAP  
REF: LCPSU-AWE-CEMP-001

The information provided in this map is solely for the purpose of the MHRW Project. No warranty is given or implied as to its suitability for any other purpose.