# Lindfield Learning Village

# External Works and Partial School Construction Environmental Management Plan

100 Eton Road, Lindfield NSW 2070

Taylor Construction Group on behalf of the Department of Education
29 October 2018

18236 CEMP Lindfield Learning Village

# Quality Management

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# 1. Introduction

## 1.1 Background and Scope

Zoic Environmental Pty Ltd (Zoic) has been commissioned by Taylor Construction Group (Taylor) to prepare a Construction Environmental Management Plan (CEMP) for the external and Partial School construction works of the Lindfield Learning Village Development (the 'Project') located at 100 Eton Road, Lindfield NSW 2070 (the 'site').

This CEMP will manage environmental risks associated with the external works and Partial School construction works.

Taylor will ensure that the requirements of this plan are communicated and implemented by all relevant personnel involved with the Project. This plan may be updated as required throughout the Project.

## 1.2 Site Location

The Project site is located at the former UTS Ku-ring-gai Campus, which has been vacated since 2015. The site is located at the end of Eton Road, and is surrounded by national park to the south, and low density housing to the north. The former UTS structures are zoned as B4 – Mixed Use in accordance with the Ku-ring-gai Local Environmental Plan (LEP) (2015). The area in general is zoned as R1 –General Residence and surrounding this to the east, west, and south is E3 – Environmental Management.

The site is predominately located on Lot 2 on Deposited Plan 1151638 and is approximately 4.6 ha in size.

The encountered topography slopes to the south east towards Sugarbag Creek and south / south west towards Blue Gum Creek. Site elevation is approximately between 50 – 70m above Australian Height Datum (AHD). The location and layout of the site is available in Appendix A, Figures 1 and 2 respectively.

## 1.3 External Works and Partial School Construction Activities

As part of the external works for the site, construction activities will consist of the following:

- Footpath widening and improvement along Eton Road and in the carpark area in the south eastern portion of the site.
- Cutting back road verges.
- Alterations to the carpark area and associated drainage.
- Upgrades to roundabouts.

A copy of the external works construction areas is available in Appendix A, Figure 3.

Activities associated with the Partial School construction works will consist of:

- Internal reconfiguration and refurbishment of the former UTS Ku-ring-gai Campus.
- New learning spaces to accommodate approximately 300 students across Kindergarten to Year 12 in Partial School.

- Minor external alterations to revitalise the existing building facades.
- Upgrades to the existing facilities and access requirements.
- Landscaping and open space throughout the site.
- Refurbishment of existing facilities including refurbishment of basketball court, squash court, and auditorium.

## 1.4 Operating Hours

Construction works will be carried out during standard construction hours:

- Monday to Friday 7.00am to 6.00pm; and
- Saturdays 8.00am to 3.30pm.
- No work may be carried out on Sundays or public holidays.

Activities may be undertaken outside the hours above if required:

- By the Police or a public authority for the delivery of vehicles, plant or material; or
- In an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or
- Where the works are inaudible at the nearest sensitive receivers; or
- Where a variation is approved in advance in writing by the Secretary or their nominee if appropriate justification is provided for the works.

Notification of such activities must be given to affected residents before undertaking activities or as soon as practical afterwards.

High impact activities such as rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

- Monday to Friday 9.00am to 12pm;
- Monday to Friday 2.00pm to 5pm; and
- Saturday 9am to 12pm.

## 1.5 Environmental Objectives and Targets

The environmental objectives and targets for the project are in Table 1.1 below.

**Table 1.1 Environmental Objectives and Targets**

| Objective | Target |
|---|---|
| Effective site environmental controls | Achieve alignment with Taylors and Client expectation in relation to best practice control measures<br>-Fulfil environmental obligations. |
| Increase amount of waste being recycled, reduce waste cost | 85% of waste to be recycled. |
| Environmental Performance | • Zero environmental incidents and no breaches<br>• Zero infringement notices<br>• All environmental spills to be reported to Taylor within 2 hrs of occurrence<br>• Environmental inspection completed each week and documented using SE-F-02 HSE Inspection Checklist (frequency of documented inspections can increase if required) |
| Reduce the amount of environmental impact our operations have on the environment | Environmental issues identified and controlled prior to causing negative impacts on the project or |

| Objective | Target |
|---|---|
| | on the environment |
| Effective implementation of the environmental system | • 80% or better internal audit results<br>• Full compliance with Planning Approval requirements |
| Community issues carefully handled | Zero valid complaints and all complaints reported to Taylor Representative |

## 1.6 Consultation

Prior to construction works, this CEMP is to be provided to Ku-ring-gai Council and to the Secretary of Department of Planning and Environment (DP&E) for comment.

# 2. Construction Management

## 2.1 Environmental Management Structure and Responsibilities

The organisation chart for the delivery of the works is:

**Table 2.1: Project Roles and Responsible Persons**

| Role | Responsible Person |
|---|---|
| Construction Manager | Ben Folkard |
| Project Manager | Dean Fondas, Tom Keller |
| Site Manager | Brent Kendall, Mark Lockwood |
| Corporate HSE Manager | Andrew Andreou |
| Site HSE Officer | Shaggy Sen |
| Project/Site Engineers | Daniel Diab |
| Contracts Administrator | Matt Murray |

Specific responsibilities expected under the CEMP are as follows:

**Construction Manager**

- Facilitate a systematic approach to manage HSE including the identification, assessment, control and monitoring of related risks that may arise through both normal and adverse operating conditions.
- Check that personnel are adequately skilled and trained for the tasks they are required to undertake.
- Encourage and promote safety within the Company by participating and openly consulting with employees in respect to their health and safety.
- Support the HSE manager in ensuring Project / Site Managers have develop and implement systems, which will ensure subcontractors and or suppliers engaged by the Company comply with the health and safety management systems and the relevant Work Place Health and Safety legislation.
- Respond to non-conformance by any member of the Company who fails to discharge their duties as set by the responsibility statement and actively participate in dispute resolution where required.

**Project Manager**

- Monitor construction activities against the conditions of approval to evaluate compliance.
- Establish or Oversee the Preparation of the Project Environmental Management Plan prior to commencing work on a project. This includes preparation of an Environmental Risk

Assessment, reviewing and incorporating legal requirements, and any other relevant plans such as Environmental Impact Assessments prepared for the development.

- Identifying, planning and ensuring all environmental training required for personnel is undertaken. This task may be done in liaison with the Corporate HSE Manager.
- Support the Site Manager in the management of employees, sub-contractors, and suppliers' performance in complying with the requirements of this CEMP.
- Selecting appropriate sub-contractors, giving due regard to their ability to comply with legislative and Taylor's environmental requirements.
- Ensure environmental emergencies are incorporated in the site Emergency Response Procedures.
- Ensuring incidents are investigated and appropriate action taken as required by Taylor's site environmental plan requirements in consultation with the Corporate HSE Manager.
- Ensuring compliance with environmental legislation and Taylors environmental procedures.
- The Project Manager is required to carry out at least one formal site inspection per month on every site under his control.
- Ensuring compliance with environmental legislation, regulations and licensing conditions, and authorities' requirements relevant to all construction work.
- Reporting to the Taylor's Directors on environmental performance of all Taylor's projects they are managing.

**Site Manager**

- Unless otherwise nominated, undertaking the role of Site HSE Officer for environmental issues and control of the site. This role is supported by the Project Manager and the Corporate HSE Manager.
- Ensuring site security and site specific signage is fixed to key access, internal and perimeter areas including 24 hour project contact details, attendance details for visitors, PPE requirements and construction zone signage.
- Monitor environmental controls for effectiveness and suitability.
- Implementing through consultation with the Project Manager, the Construction Environmental Management Plan in accordance with Legislation and Regulations, Codes of Practice, Australian Standards and/or other statutory requirements.
- Implementing and undertaking formal and proactive consultation measures between the project team, Subcontractors and industrial representatives such as Subcontractor meetings, toolbox talks, site HSE committee meetings and inspections.
- Monitoring Subcontractors compliance with the CEMP in particular Subcontractor compliance to the environmental components of their safe work method statements.
- Identifying any hazards and assessing risks onsite, and implementing risk control measures.
- Liaising with civil or statutory authorities should an onsite emergency situation occur.
- Investigating, recording and reporting incidents and initiating corrective and action plans by relevant personnel. Reporting any serious incident immediately to the Project Manager and Corporate HSE Manager.
- Ensuring that all plant and equipment used on Taylor sites is safe, correctly maintained and that the operator is correctly licensed or qualified for that equipment.

- Ensure that all environmental incidents (including spills, failure of sediment controls, water pollution etc.) are reported in accordance with the Incident Reporting and Investigation Procedure.
- Assessing Subcontractors Safe Work Method Statements prior to any work commencing, to ensure environmental requirements are met.

**Corporate HSE Manager**

- Overseeing the implementation of the integrated HSE management system and the Environmental Management Plans throughout Taylor Construction Group activities.
- Ensuring a PEMP and CEMP are prepared for each project.
- Advise Management and Site teams to any new or revised Act's, Standards, COP or legal requirements associated or required in conducting the works.
- Setting and reviewing overall environmental targets and allocating priorities within the framework of the HSE management system.
- Planning and facilitating training in environmental management, including arranging for the appropriate internal or external trainers/facilitators to conduct the training.
- Manage collection and reporting of environmental performance data from monthly site reporting.
- Conducting or delegating internal HSE management system and site audits.
- Reviewing internal and external (independent) audit reports, and in consultation with the Directors and the Project Manager - develop appropriate action plans if necessary.
- Assist Project Managers in preparation of Environmental Risk Assessment and determining appropriate controls.
- Communicating relevant environmental information to management, staff and contractors.

**Site HSE Officer**

- Carry out erosion and sediment control inspections.
- Prepare Soil & Water Management Plan and Erosion & Sediment Control Plans (including Stabilisation Plans and Stockpile Management Plans).
- Maintenance of the project environmental management plans including preparing the CEMP and minor revisions.
- Ensure training/induction of personnel is carried out and that staff operate in an environmentally responsible manner.
- Ensure compliance with Environmental Approvals.
- Operate as 24-hour contact person for environmental matters.
- Report on environmental incidents, liaise with the Client on corrective actions and verify environmental measures as requested by the Client.
- Manage the register of environmental complaints and the subsequent corrective measures.
- Undertake and report on all monitoring and inspections completed.
- Monitor construction activities against the conditions of approval to evaluate compliance with the Environmental Management Systems (EMS), including at a minimum weekly site inspections.
- Maintain a register of all environmental management documents for the Contract.

- Ensure that the CEMP is established, implemented and maintained in compliance with all sub-plans, supplementary method statements and DA conditions.
- Overall responsibility for on-site establishment, management, monitoring and maintenance of erosion and sediment controls.
- Carry out regular inspections and auditing of the works to ensure that environmental safeguards are being followed.
- Identifying where environmental measures are not meeting the targets set and where improvement can be achieved.
- Facilitating environmental induction and toolbox talks for all site personnel.
- Specific authority to stop work on any activity where it is considered necessary to prevent environmental non-conformances.

**Project/Site Engineers**

- Liaise closely with the ESR to ensure environmental considerations contained within this CEMP are incorporated into construction activities.
- Produce WMS which address environmental requirements.
- Conduct regular checks of the site to ensure environmental controls such as sediment controls and dust suppression are functioning effectively.
- Where engineers are responsible for managing Subcontractors and/or utilities authorities, ensure that any work performed by these external parties meets with the requirements of this CEMP and Sub Plans, including identifying and documenting the environmental risks of the proposed works.
- Report any non-compliance with Erosion and Sediment Control Plans (ESCP) and/or the CEMP to the ESR.

**Contracts Administrator**

- Support the Project and Site Management in the management of employee, sub-contractor, and suppliers' performance in complying with Taylor Construction WHS and the site specific rules for the Project.
- Assist the Project / Site Manager to ensure the Site Environmental Plan/s and associated documentation, including standard forms, procedures and templates; remain current and up to date.
- Include in subcontract agreement the requirement for subcontractors to carry out their works in accordance with the companies or subcontractors approved Environmental Plans.
- At the tender interview stage discuss with the subcontractor's their obligation for managing Environmental requirements by issuing to them relevant section of the tender interview form and ensuring this is completed by subcontractor prior to commencing on site.
- Request and obtain from the subcontractor copies of their Environmental Plans.
- Where required, assist the Project / Site Manager in collecting required Environmental documentation from engaged subcontractors, and for conducting initial review ensuring all required documents have been submitted prior to forwarding documentation provided by Subcontractors to the Project / Site Manager for review.
- Ensure that the latest copies of Project Plans and HSE Risk Assessments are uploaded onto Project Centre, or preferred data control system used, and engaged subcontractors have access to these.

- Assist the Project / Site Manager in conducting project audits, to report on safety compliance and in the maintenance of Environmental records.
- Ensure all external complaint/incidents are recorded on 'SE-F-21 Incident Report Form' and filed in the 'External Complaints' register located in the WHS folder in the 'U' drive.
- Assist Project / Site Management in the general administration of HSE where requested.

**Employees / Subcontractors**

- Must comply with all site HSE rules and environmental requirements and abiding by the procedures and work practices identified in the CEMP, and / or as directed or informed by the Site Manager / Foreman.
- Attending environmental training / inductions as directed by the Site Manager / Foreman.
- Complying with all relevant environmental legislation.
- Reporting promptly to a Site Manager / Foreman of any spills, leaks, potential pollution and / or poor environmental practices.

## 2.2 Approval and Licencing Requirements

In general, all activities carried out onsite must comply with the provisions of all legislation relating to the construction and operation of the Project.

Key planning legislation requirements are listed in Table 2.2 below.

**Table 2.2 List of Legal and Legislative Requirements**

| Legislation / Policy (Administering Authority) | Summary of Legislation Requirements | Approvals/Permits or Licences Required |
|---|---|---|
| Contaminated Land Management Act 1997<br>(NSW Office of Environment & Heritage (OEH) / Ku-ring-gai Council) | Establishes a process for investigating and, where appropriate, remediating land where contamination presents a risk of harm to human health and/or the environment. | Waste classification is required to be conducted for material disposed offsite.<br>No further approvals required, however management of contaminated soils is to occur in accordance with the waste management plan outlined in this CEMP. |
| Environmental Planning and Assessment Act 1979 | Works must proceed in accordance with the consent provided, including any conditions. | Comply with the Development Consent conditions.<br>Planning approval is required for any changes which are not in accordance with the Development Consent conditions. |
| Environmental Protection and Biodiversity Conservation Act (1999)<br>(Commonwealth Department of Environment and Water Resources) | The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places – defined in the EPBC Act as Matters of National Environmental Significance (MNES). In addition, the EPBC Act confers jurisdiction over actions that have significant impact on the environment where the actions affect, or are taken on, Commonwealth land, or are carried out by a Commonwealth agency (even if that | There are no known MNES on the site.<br>No requirement for permit or approval identified. |

| Legislation / Policy (Administering Authority) | Summary of Legislation Requirements | Approvals/Permits or Licences Required |
|---|---|---|
| | significant impact is not on one of the nine matters of 'national environmental significance'). | |
| Environmentally Hazardous Chemicals Act 1985 (OEH) | Regulates the disposal of wastes issued with a "chemical control order" and designated chemical and chemical wastes (including asbestos).<br>Disposal requirements for asbestos are identified under the Protection of the Environment Operations Act 1997 (POEO)<br>Other chemical wastes designated under this act are:<br>• Polychlorinated Biphenyls (PCB)<br>• Pesticide wastes including used pesticide containers<br>• Copper/chrome/arsenic (CCA) wastes. | Clearance, transport and disposal of designated chemical wastes should be completed under appropriate licences.<br>Chemical wastes designated under this Act to be removed from this site must be transported and disposed of by appropriately licensed waste transport contractors to a facility lawfully able to accept that type of waste. |
| Heritage Act 1977 (OEH) | Protects all items of environmental heritage (natural and cultural) in NSW. The Act does not apply to Aboriginal "relics". | The site is not listed under a |
| Local Government Act 1993 | Controls environmental impacts including noise, pollution and nuisance not controlled under the POEO Act.<br>Provides for licensing of trade waste discharges, in conjunction with the *Liquid Trade Waste Guidelines*. | Approval required. |
| National Parks and Wildlife Act 1974 | Provides protection for most fauna species and protected flora. Provides protection for indigenous heritage in NSW.<br>It is an offence: to harm animal which is part of a threatened species, population or ecological community; to pick any plant which is part of a threatened species, population or ecological community.<br>It is also an offence if a person knows that an area of land is the habitat of a threatened species, population or ecological community, to do something or fail to do something that causes damage to that habitat. | There are no threatened species which have been identified.<br>The potential for indigenous artefacts, based on the former site use as landfill, considered low. |
| Noxious Weeds Act 1993 (NSW Department of Primary Industries) | Provides for the identification, classification and control of noxious weeds in NSW.<br>Applies to the management and disposal of noxious weeds if found and removed during works. | No approvals required. |
| Protection of the Environment Operations Act 1997 (OEH) | Environment protection licences are required for scheduled activities.<br>Provides for the control of polluting activities in NSW to prevent pollution to the environment.<br>Provides a duty to notify OEH of any environmental harm from site activities. | No requirement for an Environment Protection Licence identified for scheduled activities.<br>Waste classification assessment and waste classification certificates (produced by a qualified environmental assessor) are required prior to disposal and are required to |

| Legislation / Policy (Administering Authority) | Summary of Legislation Requirements | Approvals/Permits or Licences Required |
|---|---|---|
| | Waste Classification is required prior to the removal of waste (including fill/soil) form a site to establish the appropriate means of disposal. | accompany all waste soils materials being transported to waste facilities that are licenced by the NSW EPA to accept the respective class of waste.<br>Transport contractors must be appropriately licensed to transport the class of waste they are carrying.<br>NSW EPA is the appropriate regulatory authority for the works. |
| Soil Conservation Act 1938 (OEH) | Controls activities causing or likely to cause soil erosion or land degradation.<br>Project activities must prevent soil erosion or land degradation. | No requirements for permit or approval or licence identified. |
| Threatened Species Conservation Act 1995 (OEH) | This Act protects vulnerable and threated species, populations and ecological communities. | No requirements for permit or licence identified. |
| Ku-ring-gai Local Environmental Plan 2015 | Provides detailed implementation of development requirements, including where particular typed of development are permitted with or without consent.<br>Identifies items of local heritage value and trees which require preservation. | Trees onsite that have been identified as having environmental significance must be protected in compliance with the Australian Standard AS4970 2009. |
| Waste Avoidance and Resource Recovery Act 2001 (OEH) | Promotes the waste management hierarchy (avoidance, resource recovery, and disposal). | No requirement for permit or approval or licence identified.<br>Where possible, excavated material is to be reused onsite. |
| Waste Management Act 2000 (NSW Office of Water) | Controls water use for excavation activities and in areas of groundwater management. | It is considered unlikely that groundwater will intrude into excavations; however, a temporary groundwater dewatering licence may be required if excavations require dewatering during works. |

# 3. Environmental Management Activities and Controls

## 3.1 Impact Identification

A list of Environmental Aspect and Impacts has been prepared for the external works and the Partial School construction and is available in Appendix B. The list outlines the major environmental aspects associated with the proposed works which have the potential to impact the surrounding environment. The list contains a risk assessment based approach to the risks identified, describes mitigation and management measures, and provides a residual risk rating based on implementation of the management measures. Upon identification of additional potential impacts, the Environmental Aspects and Impacts and Environmental Weekly Checklist will be updated accordingly.

## 3.2 Control Measures

Control measures to be implemented to address identified potential effects are included in the Project's Environmental Aspects and Impacts list and Environmental Weekly Checklist (Appendices B and C). Relevant procedures will be followed by implementing the required control measures.

Specific requirements and all reasonable practical steps to reduce impacts regarding erosion and sediment, stockpiles, groundwater, contamination, waste, traffic, noise and vibration, flora and fauna, air quality, acid sulfate soils, asbestos, Aboriginal and non-Aboriginal heritage items, and external lighting are addressed in the following sections and the Environmental Aspects and Impacts list (Appendix B).

### 3.2.1 Erosion and Sediment Control

Taylor and Subcontractors shall plan and carry out works to avoid erosion and prevent sediment leaving the site to the surrounding land, watercourses, water bodies, wetlands, and stormwater drainage systems. This includes the installation of erosion and sedimentation controls prior to commencing works. Where possible, works should be staged to reduce the areas cleared at the time to minimise soil disturbance.

The construction zone of the site comprises of predominately paved and grassed areas. As work progresses the ground surface and excavated material will be exposed to rain fall and flows. It is important to manage flows on site so that sediment laden water is not mobilised into existing or temporary stormwater drains or channels.

An Erosion and Sediment Control Plan (ESCP) has been developed for the external works and Partial School construction components and is available in Figures 4 - 11, Appendix A). It is to be available at the site, and will be communicated to all Project staff during induction processes.

The ESCP identifies control measures that control water quantity and reduce the potential for soil erosion, land degradation, and impacts on water quality within the construction zone, including typical measures as follows:

- Silt fences to prevent sediment from entering adjoining land.
- Stormwater inlet filters comprising of gravel filled wire mesh or geotextile 'sausage'

- Geotextile pit filters and / or geotextile filter pit surrounds will maintain stormwater quality by preventing sediment from entering stormwater pits.
- Temporary construction vehicle exit providing a stabilised site access point comprising of a berm and timber or metal sleepers underlain by a gravel bed followed by geotextile fabric.

The controls should be inspected and approved by the Site HSE Officer prior to the commencement of works. The controls shall be maintained in good working order and inspected to ensure they are effective in controlling erosion and sedimentation. Accumulated sediment shall be removed and disposed of regularly, i.e. weekly and after rain events.

Works shall be undertaken in accordance with this plan, which will be subject to review and update by the Project Manager as works progress – the ESCP is to be considered a working document. Specific details such as the sizing of diversion channels must be confirmed by the Contractor prior to commencing works.

To further protect water quality, additional actions have been outlined in Appendix B.

A weekly checklist to be completed by the Site Manager is provided in Appendix C.

### 3.2.2 Soil and Stockpile Management

Should stockpiling of material be required for any excavation works, stockpiles should be kept to a maximum of 2m in height and be situated in area of the site of relatively level ground with no intercepting surface water flow paths. Stockpiles are to be 2m clear of drainage lines, natural water courses and established trees. Stockpiles are to have temporary silt fences in place around the stockpiles to create an enclosure and if necessary they will be covered with a shade cloth or tarpaulin to retain the materials on the stockpile.

### 3.2.3 Groundwater

Groundwater is unlikely to be encountered during the proposed works given the depth to groundwater in the area and the proposed near surface works.

### 3.2.4 Contamination Management

To prevent the possible contamination of the site with hydrocarbons during construction, several measures are to be implemented to reduce the risk of an oil / fuel spill:

- Dangerous goods (such as petrol, diesel, oxy-acetylene, oils, etc) will be stored in a lockable compound with sufficient ventilation in accordance with the relevant codes of practice and standards.
- Safety Data Sheets on all flammable and potentially harmful liquids will be provided by the contractor undertaking the works.
- A register is to be kept of all chemicals stored onsite.
- A Spill Response Procedure Flow Chart is available in Appendix D.

### 3.2.5 Water Quality and Storm Water Control

Taylor Construction Group and subcontractors shall comply with the requirements of Section 120 of the Protection of the Environment Operations Act 1997 – Prohibition of pollution of waters. The Act prohibits all forms of pollution unless specifically authorised through an Environmental Protection Licence (EPL). To address this, the following control measures will be in place.

Potentially hazardous activities, including washing out of concrete delivery vehicles, washing down of construction plant are not permitted on site except in specially constructed bays that

retain high pH water. Washing out of concrete delivery vehicles offsite is only permitted at locations approved for that purpose by the appropriate authority. Drains are to be labelled to reduce likelihood of misuse.

Washing of paint brushes must be managed via collection of the wash-water and removed from the site and appropriately treated and / or disposed. The chemicals, acids or residues from any "wet trades" such as brick cleaning must be prevented from entering drains and waterways.

All liquids and materials that could cause water pollution must be stored in areas with secondary containment.

In general, stormwater will be managed onsite vie the Erosion and Sediment Controls (ESCPs available in Figures 4-11, Appendix A). In the event of stormwater collecting in erosion and sediment controls and the stormwater is required to be pumped out, the pump intake is to be located no more than one metre below the surface of the collected water to reduce the amount of settled silt being pumped out for further treatment. Discharge of stormwater to the stormwater system requires prior written consent by Council.

For site stormwater treatment there are two options, flocculation and / or filtration, for each option the applicable procedures in their entirety are to be followed. The two options are the Taylor internal procedure Ref: SE-OP-01 '*Hazardous Substances and Dangerous Goods Procedure*' and *Storing and Handling Liquids* – Environmental Protection (DECWW publication).

If stormwater cannot be treated suitable to regulations, an appropriately licenced liquid waste contractor must be engaged and the stormwater collected and disposed of at a location lawfully able to receive that type of waste and receipt documentation must be recorded.

### 3.2.6 Waste Management Plan

A Waste Management Plan (WMP) has been prepared for the Project and available in Appendix E.

Taylor Construction Group and Subcontractors shall adopt the hierarchy of waste – avoid, reduce, recycle/reprocess and dispose, to maximise resource recovery and minimise disposal wherever possible and practical. The Project's target is to recycle 85% of waste. The importance of appropriate waste management practices is to be included in the site induction.

For general waste and general recycling, bins are to be provided onsite.

Any soils designated for offsite disposal must be classified in accordance with NSW EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste. Once classified, waste designated for offsite disposal must be taken to a facility lawfully allowed to receive that type of waste.

The WMP also provides Unexpected Finds Protocols for contamination, details on air monitoring requirements and the approach for the removal of hazardous materials including asbestos.

### 3.2.7 Construction Traffic Management

A Construction Traffic Management Plant (CTMP) has been prepared for the site outlining how Taylors proposes to manage safety in regards to traffic during the external works and Partial School construction components of the Project. The CTMP includes provisions for:

- The safe movement of vehicular and pedestrian traffic;
- The protection of workers on the site and from passing traffic;
- Access to the property for delivery of material and movement of work vehicles located within the limits of the project;

- Design, construction, maintenance and removal of any necessary temporary roadways and detours;
- Traffic controllers;
- The installation of temporary signs, road markings, lighting and safety barriers;
- The proposed protection of pedestrians adjacent to the site; and
- The best route / road corridor for all work activities including the existing road and road shoulder that may be used for the temporary diversion of traffic.

A copy of the CTMP is available in Appendix F.

### 3.2.8 Noise and Vibration Management

From an environmental viewpoint, noise can create a nuisance to neighbours, members of the public, and fauna and is subject to legal requirements. Taylor and its Subcontractors shall make all practical efforts to comply with statutory requirements for noise management and minimise nuisance to neighbours.

A Construction Noise Management Plan (CNMP) has been prepared for the site by Acoustic Logic. The CNMP discusses that intermittent use of tools outside would result in intermittent exceedances of Noise Affected levels determined for the local residences but would not reach the Highly Noise Affected levels. Use of jackhammers, compactors and asphalting equipment within 40m of the apartments in the northern portion of the site will risk exceeding the Highly Noise Affected threshold.

The recommendations of the CNMP include:

- Notification should be provided prior to civil works involving rock excavation, asphalting or compaction within 40m of the Gove or Tubbs View apartments.
- In the event that sustained noise complaint is generated as a result of these activities, respite periods are recommended for these activities to be considered. Typically, avoiding these activities prior to 8am is of the most benefit as after this time the majority of residences would not be occupied.
- Use of an electric crane if feasible.
- Trucks to be located as far south on the site as practicable.
- Ensure that trucks are not left idling when stationary (unless required to do so, in the case of a concrete truck).
- In the event of a complaint, Section 6.2.2 of the CNMP and Section 5 of the CEMP are to be followed.

A copy of the CNMP is available in Appendix G.

### 3.2.9 Flora and Fauna Management

A Construction Flora and Fauna Management Plan (FFMP) has been prepared by Kleinfelder Australia Pty Ltd for the site. The FFMP addresses:

- Measures to minimise the loss of key fauna habitat, including tree hollows, potential sandstone outcrops and any unexpected finds.
- Measures to minimise the impacts on fauna on site, including conducting fauna preclearance surveys prior to vegetation clearing, building/structure demolition.

- Engagement of an appropriately qualified ecologist with experience in capturing native wildlife to be on site for all vegetation removal activities.
- Controlling weeds and feral pests.
- An Unexpected Finds Procedure detailing procedures and management measures to be implemented in the event that flora and fauna is uncovered in any area not identified in the updated Biodiversity Assessment (BAR).
- Measures to ensure biodiversity values not intended to be impacted are protected, including barriers and mapping of protected / 'no-go' areas.
- A program to monitor the effectiveness of the measures in the FFMP for the external works and Partial School construction development of the Lindfield Learning Village.

A copy of the FFMP is available in appendix H.

### 3.2.10 Bushfire and Flood Emergency Pan

A Bushfire and Flood Emergency Plan (BFEP) has been prepared for the site by EWFW Consulting Engineers (EWFW). The BFEP is based on EWFWs understanding of the local conditions including existing topography and with consideration to Ku-ring-gai Council requirements including Development Control Plan 24R.7 Flood Study Requirements.

The BFEP provides information pertaining to anticipated flood likelihood and behaviour and provides provisions for the management of flood based scenarios including flood warnings, emergency evacuation points, emergency contacts, monitoring of weather stations and flood response actions such as cancellation of construction works based on predicted rainfall.

A copy of the BFEP is provided in Appendix I.

### 3.2.11 Air Quality

The Site Manager will ensure that all construction facilities erected on the site and equipment associated with the works are designed and operated to minimise the emission of dust, cement dust, plant and vehicle exhausts and other substances into the atmosphere.

Taylor and its' Subcontractors shall employ construction methods that will keep the air pollution to a minimum and apply measures as those listed below to ensure that airborne pollutants do not cause air pollution and nuisance in the vicinity of the works:

- The spraying of disturbed soil and roads with water while under construction as required.
- Minimising exposed and disturbed soil areas.
- The removal of mud from the wheels and bodies of plant and vehicles before it enters public roads or other sealed pavements. This could be rumble grids, dry brushing, wheel wash etc. depending on the nature and conditions of the site.
- The removal of mud or dirt spilt by construction equipment on to public roads or other sealed pavements.
- The provision of coverings or stabilisation of soil stockpiles.
- Covering all loads leaving the site.
- Stabilisation of ground likely to be exposed for significant periods (e.g. – using sterile seed).
- Fitting power tools with dust collection devices where practical.
- Keeping all plant and equipment well maintained and not leaving them idling while not being used.

- Reporting excess air emissions from plant and arranging for a service to fix the problem.

### 3.2.12 Acid Sulfate Soils

The site lies within a Class 5 Acid Sulfate Soils (ASS) area. ASS is not typically found in Class 5 areas, but they are within 500m of higher class soils (1, 2, 3, & 4) areas on adjacent land, which have higher ASS risk. The development is not likely to be affected by ASS materials at this site.

### 3.2.13 Asbestos

The external works Partial School construction is not expected to encounter any asbestos containing materials; however, in the event that asbestos is suspected, an Unexpected Finds Protocol has been developed for the Project and is available in the Asbestos Management Plan (AMP) within the WMP in Appendix E.

### 3.2.14 Aboriginal and Non-Aboriginal Heritage

Indigenous Heritage

Should any relic, artefact or material (including skeletal remains) suspected of being of Aboriginal origin be encountered, Taylor and Subcontractors must cease all construction work that might affect the relic, artefact or material and protect the relic, artefact or material from damage or disturbance. The Project Manager will notify the Client immediately, who will then consult the relevant government department.

Non-Indigenous Heritage

Should any item be encountered which is suspected to be a relic of heritage value, Taylor and Subcontractors must cease all construction work that might affect the item and protect the item from damage or disturbance and notify the Client immediately who will arrange for an officer from the relevant government heritage department to be consulted.

A 'relic' means any deposit, object or material evidence:

- Which relates to the settlement of the area, not being aboriginal settlement; and
- Which are 50 or more years old.

An unexpected finds protocol has been developed should any items of heritage be identified.

### 3.2.15 External Lighting

External lighting will comply with AS 4282-1997 Control of the obtrusive effects of outdoor lighting.

## 3.3 Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. At this site, these types of hazards may include friable types of asbestos in soil and odorous or stained hydrocarbon impacted soils. Other types of expected finds include items/relics/areas of Aboriginal and non-Aboriginal heritage. The Project Manager is to maintain communication with the engaged Environmental Consultant or Heritage Consultant to ensure the appropriate procedures are implemented.

An Unexpected Finds Protocol for contamination and heritage items has been prepared for the works and is available in Appendix J.

### 3.3.1 Unexpected Finds – Contamination

The procedure to be followed in the event of an unexpected find in relation to contamination is presented below:

- In the event of an unexpected find, all work in the immediate vicinity should cease and the Project Manager notified.
- Project Manager is to inspect the area of the find and determine actions to be taken to WHS or Environmental issues.
- Temporary barricades should be erected to isolate the area from access to the workers and machinery.
- In the event that friable asbestos material is encountered, an occupational hygienist or asbestos assessor should be contacted immediately.
- An environmental consultant should be contacted and attend the site to assess the extent of additional remediation that may be required and/or adequately characterise the contamination.
- In the event that additional remediation is required outside the scope of the original Remedial Action Plan (RAP), prepared by Environmental Investigation Services (EIS) (2018) *Report on Designinc Sydney Pty Ltd on Remediation Action Plan for Proposed Lindfield Learning Village Development at Eton Road, Lindfield*, then an addendum to the RAP should be prepared and submitted to the client and the Site Auditor for approval.
- If appropriate, additional validation sampling should be undertaken and the results should be included in the validation report.

Any material identified as contaminated must be disposed offsite, with the disposal location and results of testing submitted to the Planning Secretary, prior to its removal from the site.

# 4. Monitoring and Review

## 4.1 Environmental Monitoring Program

Requirements for environmental monitoring for the project are included in the Environmental Aspects and Impacts list (Appendix C). The monitoring program consists of: daily site inspections; weekly inspections, which are formally documented each week by using the Weekly Checklist (Appendix D); and specific monitoring carried out at agreed intervals or following major events, e.g. rainfall and vegetation clearing. An environmental checklist is attached in Appendix B. The environmental monitoring program will be the responsibility of the Site HSE Officer (or Project Manager Nominee), and will include:

- Sufficient training of personnel.
- Arranging specialist consultants when required.
- Coordination of monitoring equipment and materials.
- Coordination of sample collection, documentation and delivery.
- Ensuring frequency and methodology is in accordance with all licences, permits, approvals, Australian Standards and any other industry standards.
- Data management and representation of results.
- Reporting non-conformances and implementing corrective actions.

Field data such as weather, air quality, and noise and water quality will be recorded electronically where possible and transferred into monitoring results spreadsheets. Field data sheets will be completed where required, and data input directly into monitoring results spreadsheets. In addition to measured parameter readings, the following information will be recorded on Field Data sheets:

- Date
- Time
- Sampling point/location
- Name of sampler

Laboratory analysis results will be filed electronically onsite.

### 4.1.1 Site Inspections

Environmental site inspections will be undertaken by various project personnel to assess the adequacy and effectiveness of environmental controls. These inspections will address the following as a minimum:

- High risk activities and processes.
- Work in environmentally sensitive areas.
- Site preparation for adverse weather conditions.

Responsibilities for environmental inspections on the Project are summarised below:

- Site staff will conduct daily inspections of areas under their supervision, including assessment of environmental controls and issues. Daily inspections will be documented in Daily Diaries.

- Site supervisory staff / Site HSE Officer (or nominated person) will conduct weekly inspections completing the Weekly Environmental Checklist. Environmental issues arising will be immediately reported to the Site HSE Officer and Site Manager for rectification. Where required, issues may be entered into the Corrective Action Database.
- Any Taylor's staff member or Subcontractor may raise an environmental issue through tool box talks or to any managing personnel.
- Safety, Environment and Quality Audits will be performed by Taylors HSE staff on a regular basis.

### 4.1.2 Auditing of CEMP

Audits of the CEMP will be conducted regularly to ensure the Plan is appropriately in place and implemented. As part of the audit program, audits will be undertaken for compliance to the requirements of the Project Environmental Management Plans. Audits should be undertaken by suitably experienced auditors.

Projects that have duration of more than six months will have at least one audit of the CEMP, and after the 6 months, will be audited at least once per year. Projects with high risk activities or that performed poorly at the initial audit may be audited at a higher frequency. The Corporate HSE Manager is responsible for coordinating project audits.

A concluding environmental compliance audit will be undertaken at completion of the work under this Project. It shall include the following:

- Site surveillance/inspection.
- Full review of environmental records.
- Identification of any environmental protection measures and operational controls that have not yet been implemented to the levels identified in the associated plans.
- Recording of the condition of existing environmental protection controls.
- Identification of any environmental protection measures which require rectification and ongoing management.

## 4.2 Site Environmental Inspections

Site Environmental Inspections are to be undertaken weekly using the Weekly Environmental Checklist provided in Appendix D to ensure that environmental hazards are recognised and can be promptly rectified.

Additional environmental issues may be added to the Site HSE Inspection form as required.

## 4.3 Monitoring of Project Environmental Activities

Objectives and Targets for the project are specified in Section 1.5. Data relating to these targets are to be documented daily using site diaries which are to be reviewed by Project / Site Managers on a monthly basis and forwarded to the Corporate HSE Manager for reporting to senior management.

The KPI Monthly Report captures information on lag and lead indicators. The current indicators are:

Lag indicators:

- Number of environmental incidents.

- Number of Penalty Infringement Notices (PINs) or clean-up notices.
- Number of community complaints.

Lead Indicators:

- Number of toolbox talks (combined with WHS & include environmental issues)
- Number of environmental inspections undertaken.
- Waste and recycling volumes (initially to set benchmark then track improvement).

## 4.4 Review of CEMP

This CEMP must be reviewed by the Project Manager in consultation with the Site HSE Officer and the Corporate HSE Manager whenever any major changes occur on the site that may have an impact on the environment, or at least once annually during construction. Changes made to the plan are to be documented.

# 5. Environmental Incidents, Non-Conformance and Complaints

## 5.1 Environmental Incidents

An environmental incident may, amongst other things, include a fuel or hazardous material spillage, a major leak, failure of a pollution control device such as sediment controls, major noise and/or vibration affecting neighbours.

Any Environmental Incidents will be immediately reported to the Site HSE Officer or Project Manager who will report the incident to the Client / Superintendent as per project requirements.

In the event of serious or material environmental harm, Taylor will notify the relevant regulatory authorities in accordance with State / Commonwealth requirements. Where necessary, Taylor will also notify the respective property owners or occupiers within 24 hours of the incident occurring.

An incident will be reported if any of the following scenarios occur or have the potential to occur:

- Serious environmental harm.
- Material environmental harm.
- Prosecution by a regulatory authority.
- Environmental approval condition breach.
- Environmental monitoring parameter breach.

Incidents shall be reported both verbally and in writing. Additionally this information shall be forwarded to the Superintendent / Client. Verbal notification shall be provided immediately, and written notification will be forwarded to the client within 24 hrs of incident occurring. All incidents and accidents shall be recorded in an appropriate Incident and Accident Database.

All environmental incidents that cause, or could potentially cause environmental harm are to be investigated, and corrective actions implemented following the investigation. Depending on the seriousness of the incident, key site personnel, the Taylor Site HSE Officer / Project Manager, witnesses etc. shall be consulted on the investigation and in determining appropriate corrective or preventive actions.

## 5.2 Preparedness

The key to effective prevention of incidents is risk assessment, procedure development, monitoring and training. During construction activities, Taylor's inspections and preventive actions will include:

- Activity specific and daily risk assessments.
- Development of work procedures and construction method statements in consultation with relevant Taylor staff such as work teams, environment team members and senior management.
- Daily inspections of active work sites.
- Completion of routine environmental checklists.
- Issue and quick close-out of non-compliance notices.

- On-going environmental training.
- Environmental audits of work sites, Subcontractors and compliance issues.

Environmental and safety information on hazardous substances (e.g. SDS) will be available at the main site office and where such substances are stored. Environmental response procedures may be tested in areas where a pollution risk is present, such as those adjacent to waterways.

Personnel involved in emergency response activities will be provided with specific training.

An up-to-date list of emergency response personnel and organisations will be maintained at the site office and compounds.

## 5.3 Reporting

Site environmental incidents must be reported to the Project / Site Manager as soon as practically possible; in addition, any major environmental incidents must also be reported to the Taylor Corporate HSE Manager. The first priority is to ensure that the situation is controlled as soon as possible, and to avoid further pollution or other adverse environmental consequences. Reporting of the incident should not delay any immediate responses to the incident.

Environmental incidents that cause or threaten to cause material environmental harm must be reported to the Appropriate Regulatory Authority (ARA – the local Council in which the project is located) as soon as practicable following the incident. This would include any spillage or leak of substances that cause water or land pollution. Material environmental harm generally means harm that is not trivial and / or costs more than $10,000 to clean up. The phone number of the ARA is including in Section X Emergency Contacts below.

If the Site Manager believes the incident may be reportable to the ARA, contact the WHS Manager for further advice prior to making an Investigation Report.

Incident reports must be completed and forwarded to the Corporate HSE Manager within 24 hours and must be kept for a minimum of 5 years.

In the event of an environmental emergency, the following persons can be contacted 24 hours per day, seven days per week:

Name(s): Brent Kendall, Mark Lockwood

Position/Responsibility: Project Manager

Contact Number: 0415 161 350, 0405 212 597

Emergency services contact details are as follows:

- Emergency Hotline: 000
- Ambulance: 000
- NSW Fire Service: 000
- NSW Police (Chatswood): (02) 9414 8499
- State Emergency Service (SES): 13 2500
- WIRES (injured wildlife): 1300 094 737
- OEH Environmental Hotline: (02) 9995 5911

All onsite information relating to hazardous materials, including Safety Data Sheets and spill containment materials will be kept at the site office.

## 5.4 Non-Conformance Reports (NCRs)

Taylor has a non-conformance and Corrective Action process in place to address all non-conformities across the business regardless of the source. The process is defined in the Non-conformance, Corrective and Preventive Action procedure. Typically, environmental non-conformances would result from audits and inspections, from observations by the Site Manager of poor environmental practices including incorrect waste disposal/recycling including liquid waste, poor storage of hazardous substances, oils, chemicals and damage to existing environmental controls such as sediments fencing. Non-conformances may be issued for serious breaches, or repeated minor breaches.

Internal Taylor references for this process are listed below:

- QSP-OP-29 = Non-Conformance, Corrective and Preventative Action Procedure
- Notices – electronic raining of non-conformances (internal)
- Notices – electronic (printable) non-conformance for raising NCRs on Subcontractors.

# 6. Environmental Control Documentation

## 6.1 Records

Where applicable, Taylor will maintain the following records for the project, in legible format, in order to demonstrate compliance with the CEMP:

- The CEMP (all versions), supplementary plans and procedures.
- Internal and external Construction Environmental Management Systems and CEMP audit reports approvals, regulatory licences and permits.
- Regulatory authority inspection reports.
- Correspondence with regulatory authorities and other key stakeholders.
- Employee induction and training records.
- Environmental monitoring records.
- Monthly KPI reports
- Sediment control works checklist and release records.
- Environmental accidents/incidents/emergency reports.
- Non-conformance reports.
- Reports to regulatory bodies.
- Complaint records.
- Community involvement information.
- Waste records.
- Checklists and field sheets.
- Any relevant reports submitted to regulatory bodies.
- Management review minutes and action taken.

Records will be held for at least five years after the date of final completion and will be available to upon request by regulatory authorities.

## 6.2 Inspections and Checklists

Inspections and checklists to be completed are documented within each Environmental Sub-Plan. The primary Environmental Weekly Checklist is available in Appendix C.

## 6.3 Availability

Environmental control documentation, monitoring results and other environmental records will be made available to the Client or any regulatory authority immediately upon request.

# 7. Communication

## 7.1 Complaints Management

Dedicated community engagement personnel will be responsible for fielding stakeholder feedback and coordinating appropriate responses from the Project team; exercising the same mechanisms during construction as used through planning.

Community concerns will be captured, documented, and escalated to the relevant person for a response and to be resolved within 72 hours. The primary means for a stakeholder to contact the Project will be through the 1800 103 025 number, dedicated email address (SINSW) and at information booths / community information feedback sessions.

The team undertaking complaints and feedback handling will be equipped to respond promptly to concerns about construction impacts, including but not limited to noise, dust, and vehicle movements – notwithstanding proper conduct on the part of the Contractor to mitigate foreseeable impacts. Where required, enquiries and / or disputes about compensation and rectification will be escalated.

A complaints register will be maintained by the Site HSE Officer with the following records for all complaints and enquiries:

- Date and time of complaint.
- The method by which the complaint was made (telephone, letter, meeting, etc.).
- Name, address, and contact telephone number of complainant (if no such details were provided, a note to that effect).
- Nature of complaint.
- Action taken in response including follow up of contact with the complainant.
- Any monitoring to confirm that the complaint has been satisfactorily resolved.
- If no action was taken, the reasons why no action was taken.

This process enables the management of receipt and response to issues and reports.

All project staff will be advised of the procedures to be followed on receipt of a complaint during the project induction.

Taylor will notify relevant authorities (i.e. Council) upon the receipt of a complaint, and provide a final report within 5 working days detailing the action taken to remedy the situation and any proposed measures to prevent recurrence.

## 7.2 Internal Communication

- Essential information relating to project environmental management will be communicated through tool-box talks and inductions.
- Environmental alerts will be periodically prepared and sent to sites for posting on notice boards.
- Key changes to environmental legislation will be sent by email to all Project Managers and Site Managers.

## 7.3 External Communication

### 7.3.1 Regulatory Authorities

Communication with a range of Regulatory Authorities shall be undertaken throughout the Project. This communication shall be through the Project Manager. Any communication from a regulator must be notified to the Corporate HSE Manager, and records of all communications retained and appropriately filed.

The name and contact numbers for two site personnel who are available on a 24 hour basis and who have authority to take immediate action to shut down any activity or to effect any pollution control measure:

| Position | Name | Contact Number | E-mail |
|---|---|---|---|
| Project Manager | Dean Fondas | 0415 161 350 | deanf@taylorau.com.au |
| Project manager | Tom Keller | 0405 212 597 | tomk@taylor.com.au |

### 7.3.2 Media

All contact with the media shall be through the Client. Under no circumstances is the Project staff to engage with the media.

# 8. Emergency Plan and Response

Emergency planning and response will be implemented in accordance with Taylor's Emergency Response Plan and Safety Response Plan and have been developed for emergency situations which may impact upon the environment. A Spill Response Procedure Flow Chart is contained in Appendix D. A Safety Response Plan will be developed for the following table of potential major incidents/emergencies:

| Incident / Emergency | Potential Impact | Contingency Response Measures |
|---|---|---|
| Major Oil or Fuel or Chemical Spill<br>Major spills defined as a spill that is likely to have direct environmental consequences. | • Contamination of land or stormwater system.<br>• Contamination of soil.<br>• Prosecution. | • Immediately call the fire brigade and notify superintendent.<br>• All work to stop immediately in vicinity.<br>• Identify the source of the spill.<br>• Refer to the Material / Safety Data Sheet, MSDS / SDS and evaluate the hazards of the material.<br>• Spill response kits and equipment deployed if it is safe to do so.<br>• Use all available resources to contain and clean up spill.<br>• Contact additional consultants or Subcontractors if required.<br>• Notify relevant authorities and persons (Corporate HSE Manager, Site Manager & Project Manager, EPA).<br>• Implement incident reporting procedures. |
| Minor Site Spills<br>Minor spills defined as spills which can be contained and rectified correctly without the need of external services.<br>• Including Acid Sulfate Soil management. | • Contamination of land or stormwater system.<br>• Contamination of soil.<br>• Prosecution. | • Stop work in the vicinity.<br>• If the material is dangerous, evacuate the site immediately and notify neighbours.<br>• If it is safe, halt the source of the spill immediately.<br>• Contain the spill with spill kits and control the flow.<br>• Block stormwater drains downstream of the spill.<br>• EPA and local Council must be notified about any spills that are likely to threaten the environment.<br>• Minor spills shall be contained and rectified with the site spill kit and disposed of correctly. Superintendent to be notified via incident report.<br>• Reported to the Site Manager.<br>• In the unlikely event that Acid Sulfate Soils are discovered, the spoils shall not be removed from site and subsequent notification and testing will follow. |

| Incident / Emergency | Potential Impact | Contingency Response Measures |
|---|---|---|
| Major Sediment Discharge<br>This could result from heavy rainstorm and flooding beyond the capacity of the sediment and erosion controls or a failure in the sedimentation control measures. | • Contamination of stormwater system.<br>• Risk to aquatic flora/fauna.<br>• Prosecution. | • All work to stop immediately in the vicinity.<br>• Reinstate controls if required.<br>• Install new controls if required.<br>• Apply flocculants if required.<br>• Commence clean-up activities.<br>• Contact additional consultants or Subcontractors if required.<br>• Notify relevant authorities (i.e. Council)<br>• Implement incident reporting procedures. |

At practical completion, Taylor will ensure the site and surround, or any area which may have been used or impacted upon as a result of project-related works, will be rehabilitated to a state equivalent or better in comparison to the pre-construction state.

# 9. Contacts

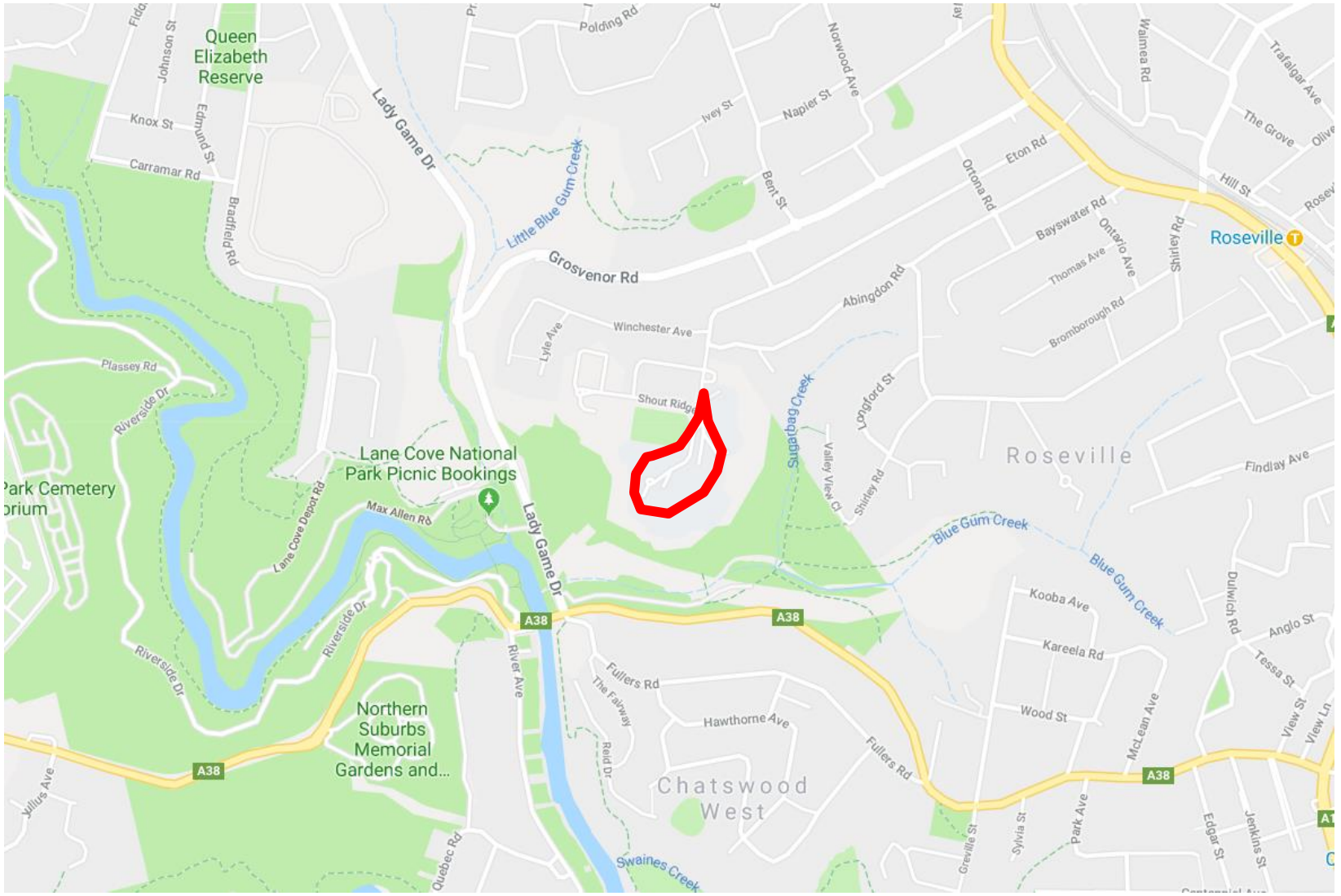
| Internal Contacts Position | Name | Contact Number |
|---|---|---|
| Construction Manager | Ben Folkard | 02 8736 9000 |
| Project Manager | Dean Fondas & Tom Keller | 0415 161 350 & 0405 212 597 |
| Corporate HSE Manager | Andrew Andreou | 0404 492 614 |
| Environmental/Community Representative | DoE Community Contact Hotline | 1300 482 651 |
| Site HSE Officer | Shaggy Sen | (p) 02 8736 9000<br>(m) 0405 025 614 |
| Project Engineer | Daniel Diab | (p) 02 8736 9000<br>(m) 0404 801 996 |
| Site Manager | Brent Kendall & Mark Lockwood | 0488 022 764 & 0422 752 423 |
| Contract Administrator | Ash Zeinolabedin, Mathew Murray, Scott Dobson | 0422 590 223,<br>0424 960 306,<br>0414 984 567 |

| External Contacts Position | Name | Contact Number |
|---|---|---|
| Emergency Services | Police/Fire/Ambulance | 000 |
| NSW Police (Chatswood) | TBC | (02) 9414 8499 |
| Australian Federal Police | TBC | (02) 9286 4000 |
| Ku-ring-gai Council | TBC | (02) 9424 0000 |
| Poisons Info Line | TBC | 13 11 26 |
| EPA Hotline | TBC | 131 555 |

# 10. References


- AS/NZS ISO 14001: Environmental Management Systems – Specifications with Guidance for Use
- AS 3480.4: Methods for Sampling and Analysis of Ambient Air
- AS 1940-2017 The Storage and Handling of Flammable and Combustible Liquids
- Ku-ring-gai Local Environmental Plan 2015
- Contaminated Land Management Act 1997
- Environmental Planning and Assessment Act 1979
- Environmental Protection and Biodiversity Conservation Act 1999
- Environmentally Hazardous Chemicals Act 1985 (OEH)
- Heritage Act 1977 (OEH)
- IECA Best Practice Erosion and Sediment Control Guidelines 2008.
- Landcom, 2008, The Blue Book – Managing Urban Stormwater: Soils and Construction.
- Local Government Act 1993
- NEPC Assessment of Contaminated Sites Measure 2013.
- NSW EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste
- Protection of the Environment Operations Act 1997 (OEH)
- Soil Conservation Act 1938 (OEH)
- Waste Avoidance and Resource Recovery Act 2001 (OEH)
- Waste Management Act 2000 (NSW Office of Water)

# Appendix A Figures

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**LEGEND**

Site Location

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps.

0m 250m

Scale indicative only

# Figure 1: Site Location Plan

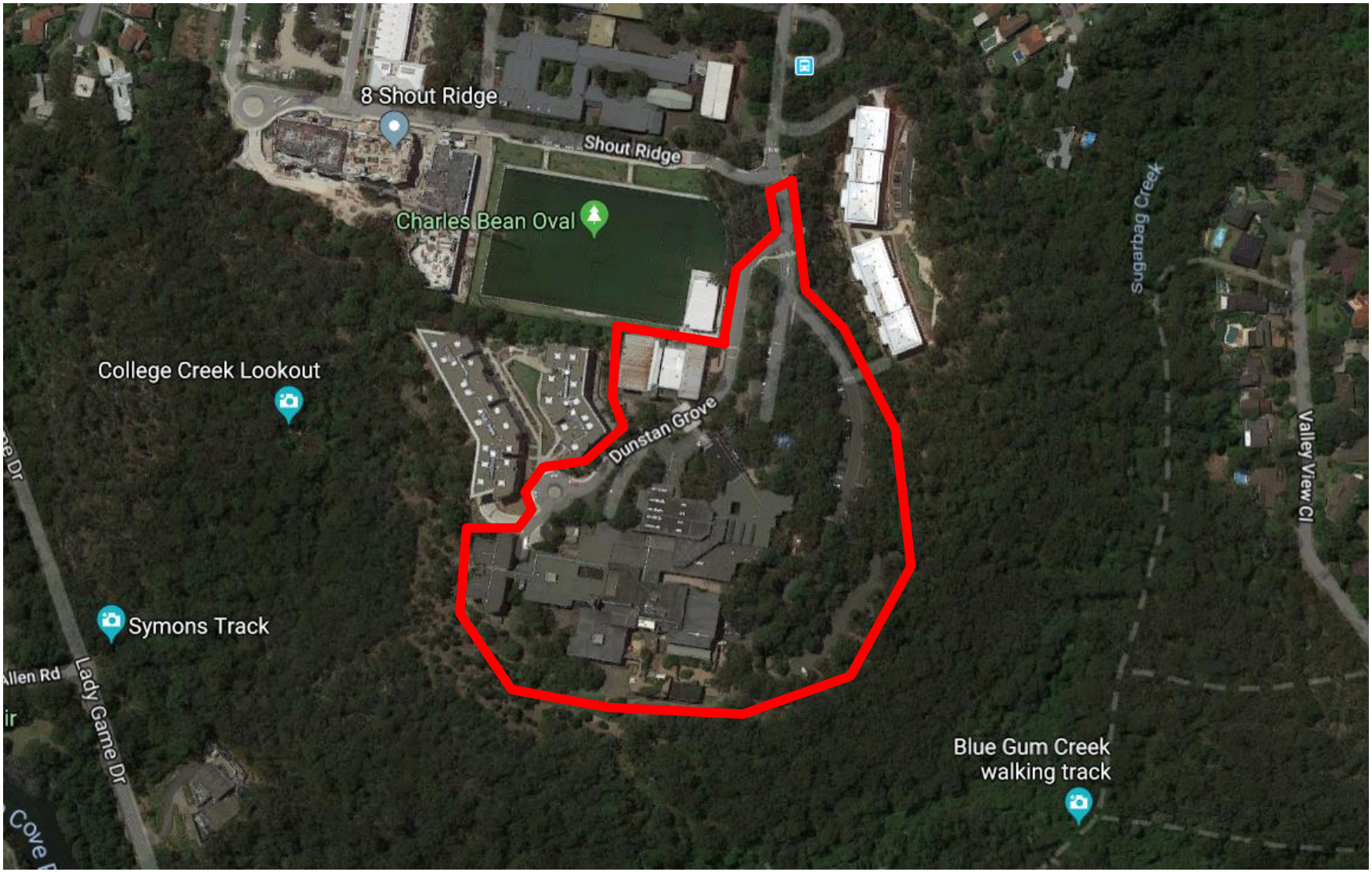
Site Address: 100 Eton Road, Lindfield, NSW 2070

Client: Taylor Construction Group on behalf of the Department of Education

Job Number: 18236

Date: October 2018

ZOIC




**LEGEND**

Site Location

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps.

0m 100m

Scale indicative only

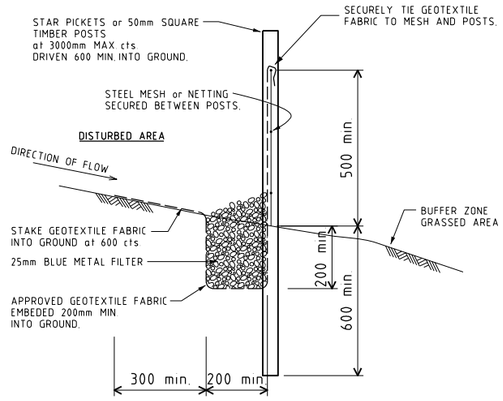
Figure 2: Site Layout

Site Address: 100 Eton Road, Lindfield, NSW 2070

Client: Taylor Construction Group on behalf of the Department of Education

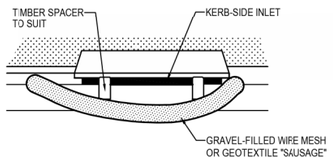
Job Number: 18236

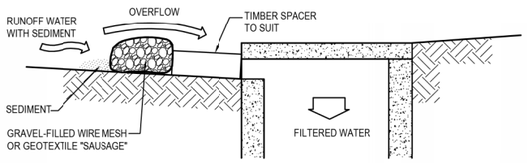
Date: October 2018




## SECTION - TYPICAL SILT FENCE DETAIL

REFER TO PLAN FOR LOCATIONS



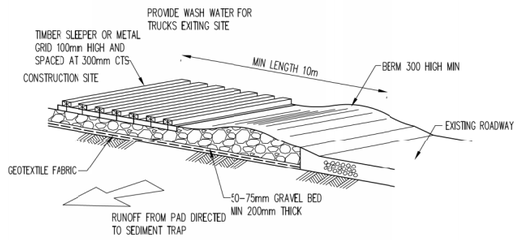

MESH & GRAVEL INLET FILTER CONSTRUCTION NOTES:

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
3. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
4. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
5. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY CAN FIRMLY ABUT EACH OTHER AND SEDIMENT / LADEN WATERS CANNOT PASS BETWEEN.

## MESH & GRAVEL INLET FILTER

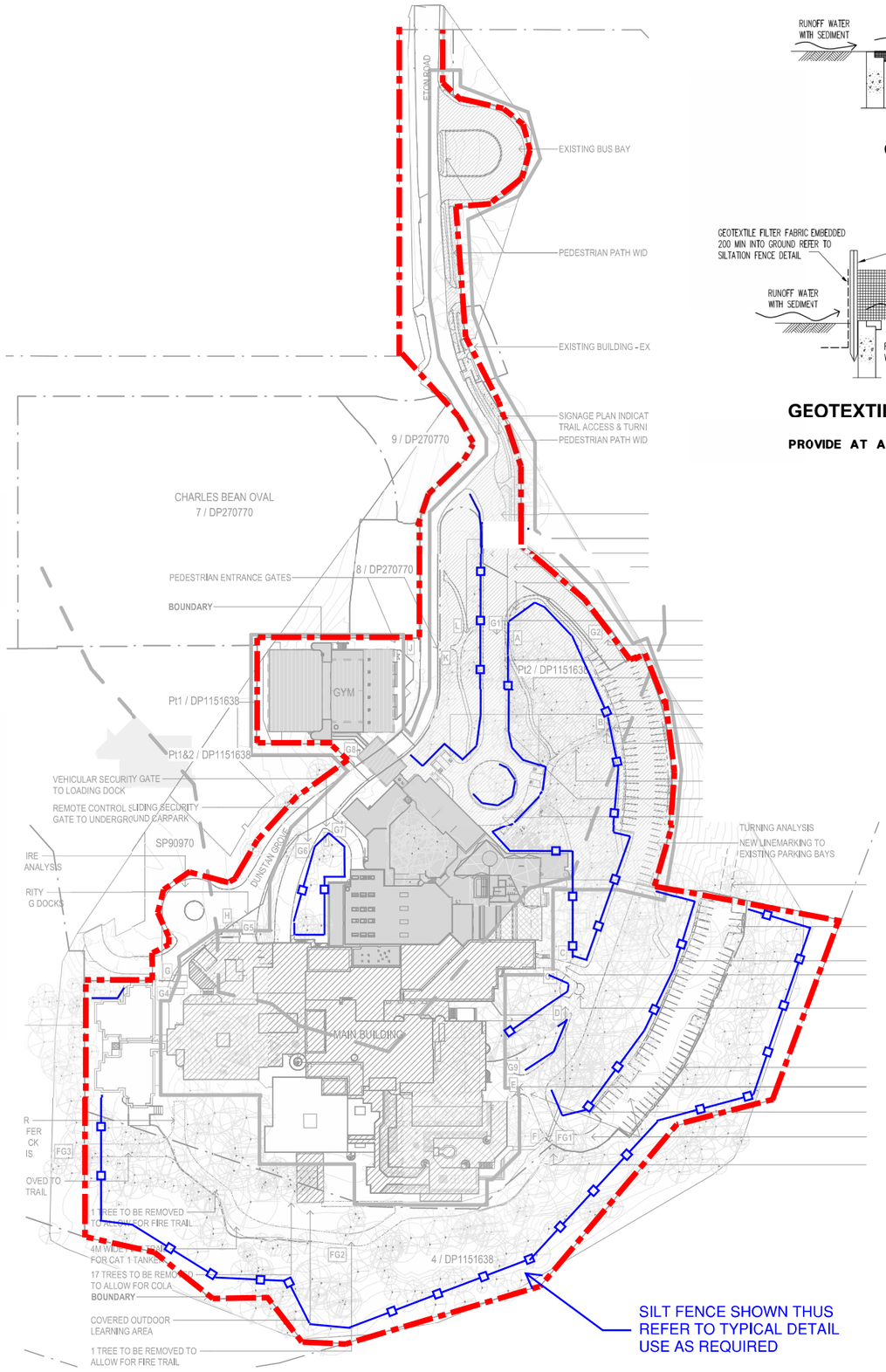
SCALE N.T.S.

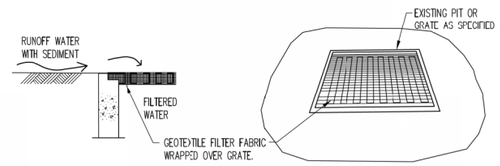
**PROVIDE AT ALL EXISTING KERB SIDE INLET**




## TEMPORARY CONSTRUCTION VEHICLE EXIT

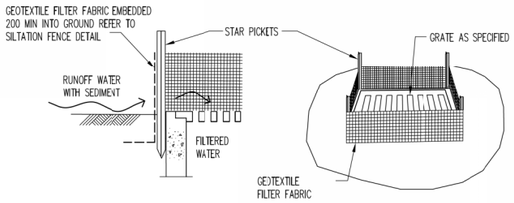
NTS




## GEOTEXTILE PIT FILTER

NTS




## GEOTEXTILE FILTER PIT SURROUND

NTS

**PROVIDE AT ALL EXISTING PITS AND GRATED DRAINS**



**Please note**

If the Status of this drawing is not signed off For Construction it may be subject to change, alteration or amendment at the discretion of DesignInc Sydney Pty Limited. If so, DesignInc Sydney Pty Limited is not liable for any loss, damage, harm or injury whether special, consequential, direct or indirect, suffered by you or any other person as a result of your use of this drawing for construction purposes.

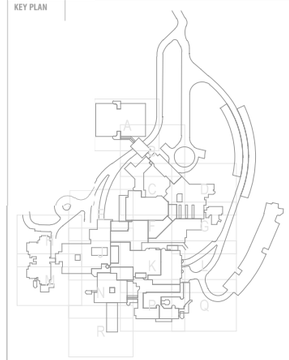
Figured dimensions take preference to scalle readings. Verify all dimensions on site. Report any discrepancies to the Architect for decision before proceeding with the work.

**Nominated Architects**

Anthony Quinn 5421 | Sandeep Lamin 7337 | Ian Armstrong 7360 | Richard Dodo 8126

| No | DATE | REVISIONS | BY |
|---|---|---|---|
| 1 | 27/04/2018 | ISSUE FOR TENDER | TG |
| 2 | 18/05/2018 | AMENDED APZ | RK |

KEY PLAN



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Architecture Urban Design Interiors

CLIENT

SCHOOL INFRASTRUCTURE NSW

PROJECT

*Lindfield Learning Village - Partial*
School
Eton Road,
Lindfield NSW 2070

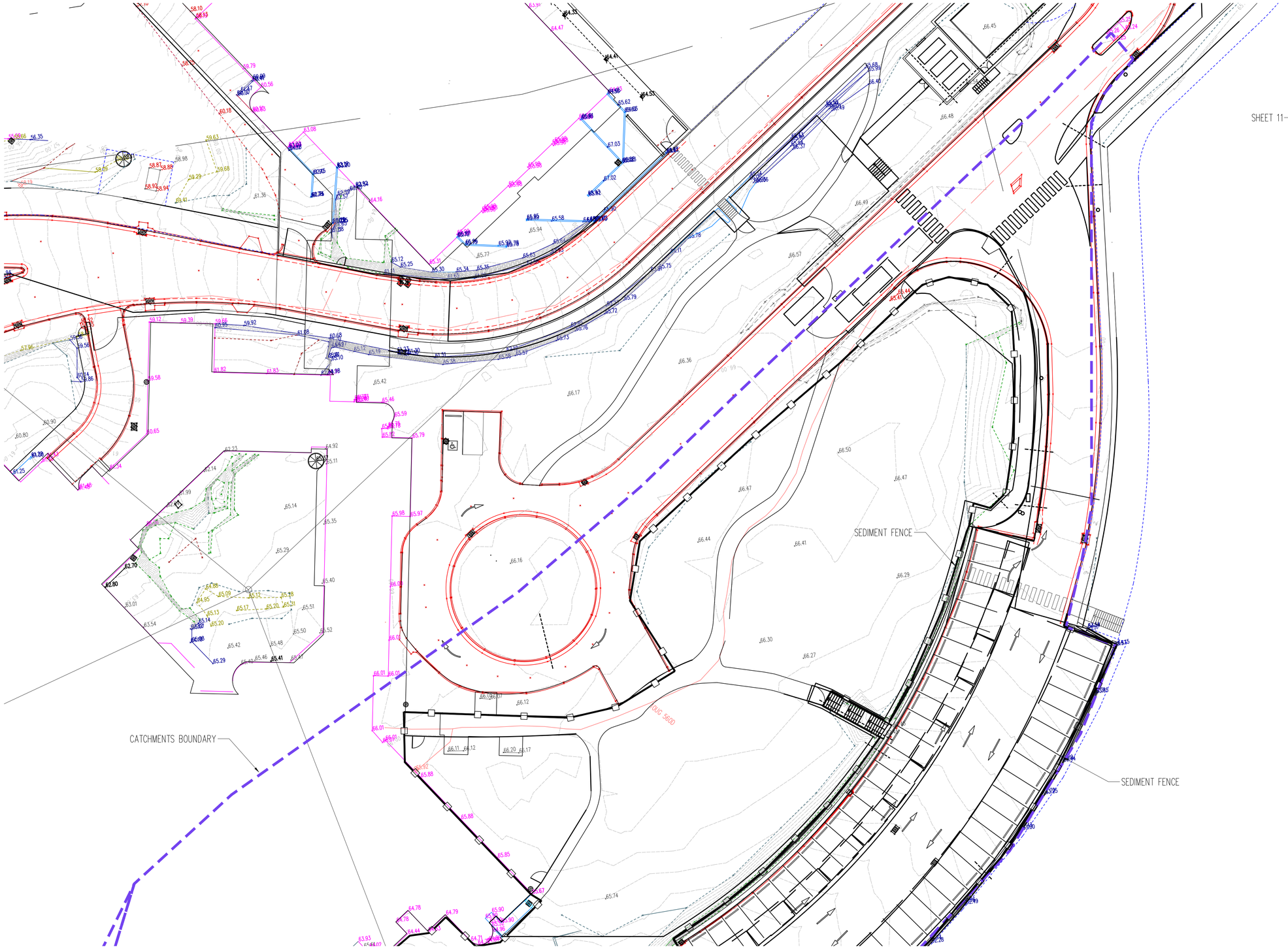
TITLE

PARTIAL SCHOOL & EXEMPT WORKS - SITE PLAN

# PRELIMINARY EROSION & SEDIMENT CONTROL PLAN (FOR REVIEW)

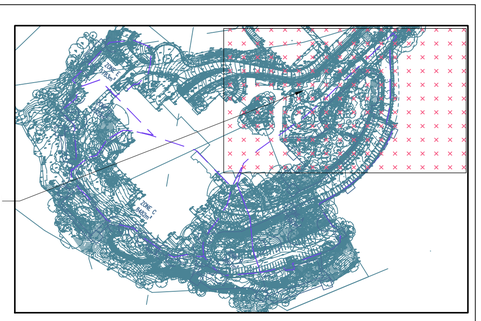
TENDER

PLOTTED : 18/05/2018 5:19:03 PM C:\Users\rkwok\Documents\P18-023-AR-LLV-SHEETS_CENTRAL_R18_rkwok.rvt




PLAN VIEW

SCALE 1:250




KEY PLAN

NTS

**PRELIMINARY**

**NOT FOR CONSTRUCTION**

| Issue | Date | Amendment | Int. | App. |
|---|---|---|---|---|
| A | 12-10-18 | FOR PARTIAL DA ISSUE | LDG | DDG |

COORDINATED REFERENCE DRAWINGS

| SERVICE | DRAWING NUMBER | ISSUE | DATE |
|---|---|---|---|
| ARCH | | | |
| HYD | | | |
| MECH | | | |
| STRUCT | | | |
| ELEC | | | |
| CIVIL | 21151 | A | 12-10-08 |

NOTE : SYMBOLS ARE DRAWN IN THE CORRECT POSITION BUT ARE NOT SHOWN TO SCALE



Client:

Engineer:
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CONSULTING ENGINEERS
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EMAIL: ewfw@ewfw.com.au
WEB: www.ewfw.com.au
ISO 9001 Quality Management

Project:
LINDFIELD LEARNING VILLAGE - PARTIAL SCHOOL
EATON ROAD
LINDFIELD NSW 2070

Drawing Title:
EROSION AND SEDIMENT CONTROL PLAN
1 OF 4

| | |
|---|---|
| North Point: | Design: SB |
| | Design Validated: LDG |
| | Amendment Approved: DDG |
| | Drawn: DS |
| Date: 12/10/2018 | Scale: (A1) AS SHOWN |

| Job No: | Area: | Disc: | Dwg No: | Stage: | Issue: |
|---|---|---|---|---|---|
| 21151 | EX - | C | 011 | 1 | A |

ORIGINAL SIZE: A1

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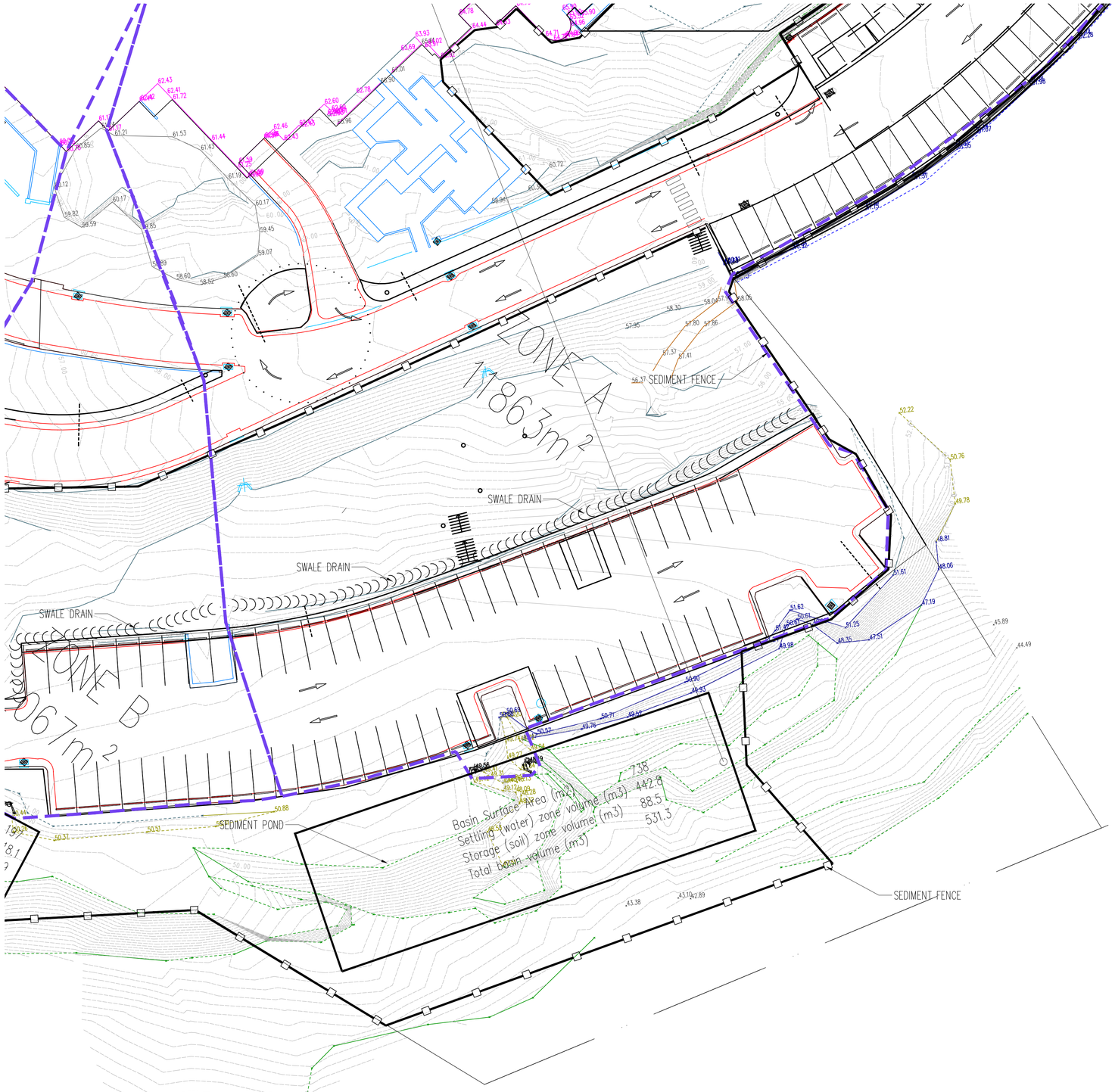


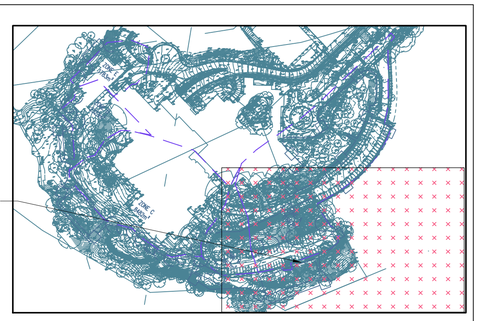


KEY PLAN

NTS

5 0 5 10 15 20 25

DIMENSIONS ARE IN METRES

1:250 (A1)

PLAN VIEW

SCALE 1:250

**PRELIMINARY**

**NOT FOR CONSTRUCTION**

| Issue | Date | Amendment | Int. | App. |
|---|---|---|---|---|
| A | 12-10-18 | FOR PARTIAL DA ISSUE | LDG | DDG |

| COORDINATED REFERENCE DRAWINGS | | | |
|---|---|---|---|
| SERVICE | DRAWING NUMBER | ISSUE | DATE |
| ARCH | | | |
| HYD | | | |
| MECH | | | |
| STRUCT | | | |
| ELEC | | | |
| CIVIL | 21151 | A | 12-10-08 |

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Project:
LINDFIELD LEARNING VILLAGE - PARTIAL SCHOOL
EATON ROAD
LINDFIELD NSW 2070

Drawing Title:
EROSION AND SEDIMENT CONTROL PLAN
2 OF 4

North Point:

| | |
|---|---|
| Design: | SB |
| Design Validated: | LDG |
| Amendment Approved: | DDG |
| Drawn: | DS |
| Date: | 12/10/2018 |
| Scale: (A1) | AS SHOWN |

| Job No: | Area: | Disc: | Dwg No: | Stage: | Issue: |
|---|---|---|---|---|---|
| 21151 | EX - | C | 012 | 1 | A |

ORIGINAL SIZE: A1

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SEDIMENT POND

SWALE DRAIN

SWALE DRAIN

SEDIMENT FENCE

SITE BOUNDARY

SEDIMENT POND

SEDIMENT FENCE

ZONE E
178.3m²

ZONE D
232m²

CATCHMENT BOUNDARY

Basin Surface Area (m2) 222
Settling (water) zone volume (m3) 103.3
Storage (soil) zone volume (m3) 6.7
Total basin volume (m3) 110.0

SHEET 13

KEY PLAN
NTS

5 0 5 10 15 20 25
DIMENSIONS ARE IN METRES

1:250 (A1)

PLAN VIEW
SCALE 1:250

**PRELIMINARY**

**NOT FOR CONSTRUCTION**

| Issue | Date | Amendment | Int. | App. |
|---|---|---|---|---|
| A | 12-10-18 | FOR PARTIAL DA ISSUE | LDG | DDG |

| COORDINATED REFERENCE DRAWINGS | | | |
|---|---|---|---|
| SERVICE | DRAWING NUMBER | ISSUE | DATE |
| ARCH | | | |
| HYD | | | |
| MECH | | | |
| STRUCT | | | |
| ELEC | | | |
| CIVIL | 21151 | A | 12-10-08 |

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Project:
LINDFIELD LEARNING VILLAGE - PARTIAL SCHOOL
EATON ROAD
LINDFIELD NSW 2070

Drawing Title:
EROSION AND SEDIMENT CONTROL PLAN
3 OF 4

North Point:

Design: SB
Design Validated: LDG
Amendment Approved: DDG
Drawn: DS
Date: 12/10/2018
Scale: AS SHOWN (A1)

Job No: 21151 Area: EX - Disc: C Dwg No: 013 Stage: 1 Issue: A

ORIGINAL SIZE A1

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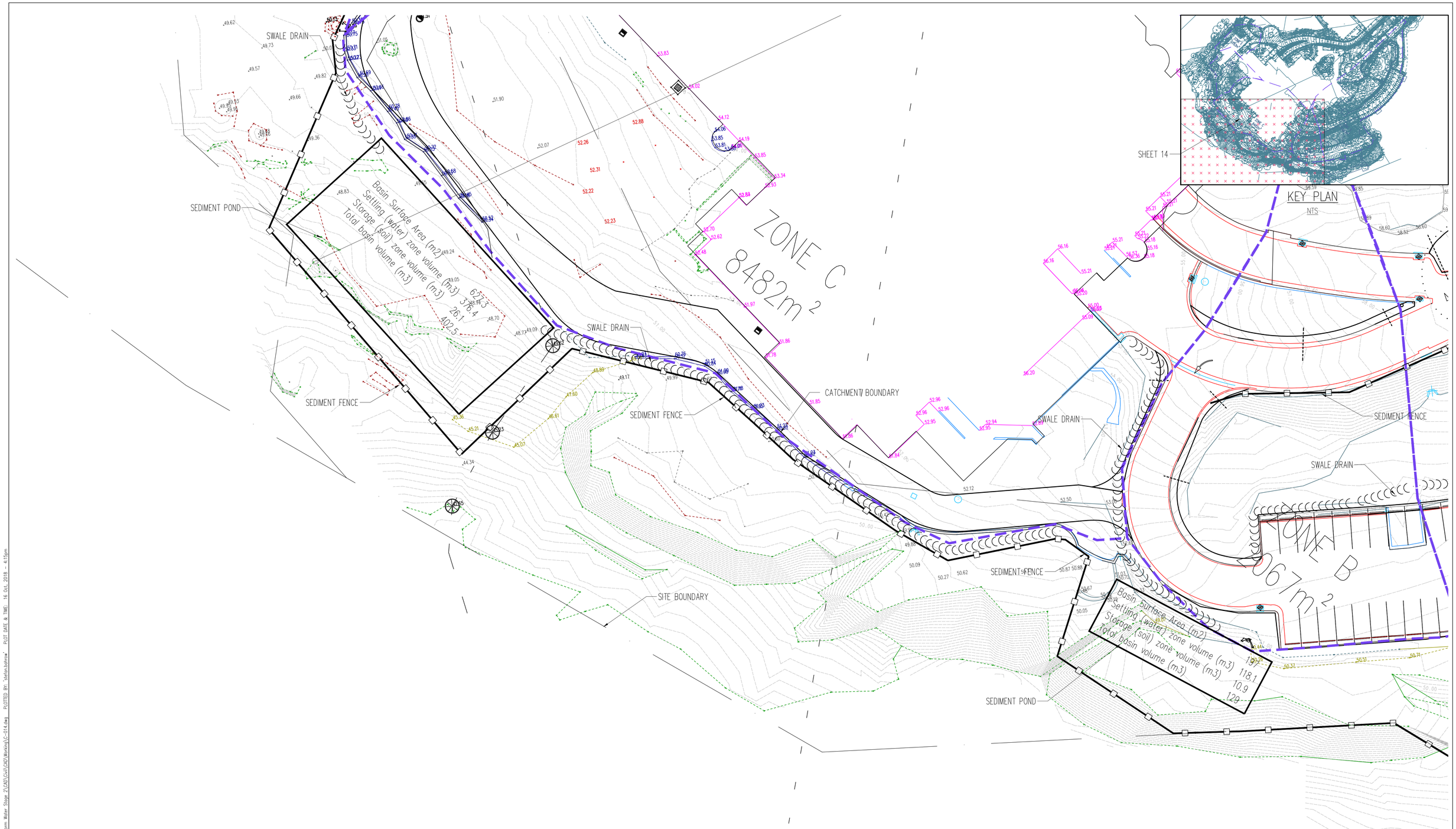


5 0 5 10 15 20 25

DIMENSIONS ARE IN METRES

1:250 (A1)

## PLAN VIEW

SCALE 1:250

**PRELIMINARY**

**NOT FOR CONSTRUCTION**

| Issue | Date | Amendment | Int. | App. |
|---|---|---|---|---|
| A | 12-10-18 | FOR PARTIAL DA ISSUE | LDG | DDG |

COORDINATED REFERENCE DRAWINGS

| SERVICE | DRAWING NUMBER | ISSUE | DATE |
|---|---|---|---|
| ARCH | | | |
| HYD | | | |
| MECH | | | |
| STRUCT | | | |
| ELEC | | | |
| CIVIL | 21151 | A | 12-10-08 |

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Project:
LINDFIELD LEARNING VILLAGE - PARTIAL SCHOOL
EATON ROAD
LINDFIELD NSW 2070

Drawing Title:
EROSION AND SEDIMENT CONTROL PLAN
4 OF 4

North Point:

| | |
|---|---|
| Design: | SB |
| Design Validated: | LDG |
| Amendment Approved: | DDG |
| Drawn: | DS |
| Date: | 12/10/2018 |
| Scale: (A1) | AS SHOWN |

| Job No: | Area: | Disc: | Dwg No: | Stage: | Issue: |
|---|---|---|---|---|---|
| 21151 | EX - | C | 014 | 1 | A |

ORIGINAL SIZE: A1

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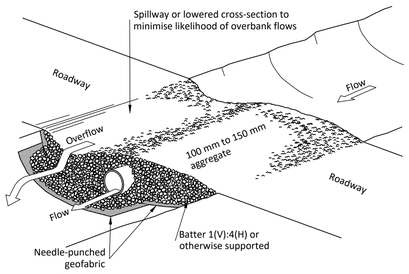
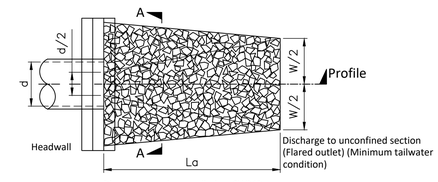


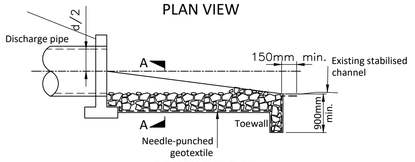

## Construction Notes:

1. All traffic prohibited until access way is constructed
2. Strip topsoil and place a needle punched fabric over the base of the crossing
3. Place clean rigid non-polluting aggregate or gravel in 100mm to 150mm class over fabric to a minimum depth of 200mm
4. Provide 3 metre wide carriage way along with sufficient length of culvert pipe to allow less than a 3(H): 1(V) slope on side batters
5. Ensure that culvert outlets extend beyond the toe of fill embankments.

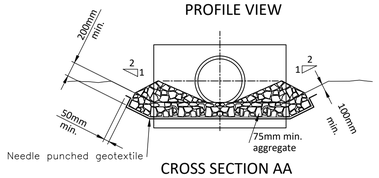
WATERWAY CROSSING




PLAN VIEW




PROFILE VIEW

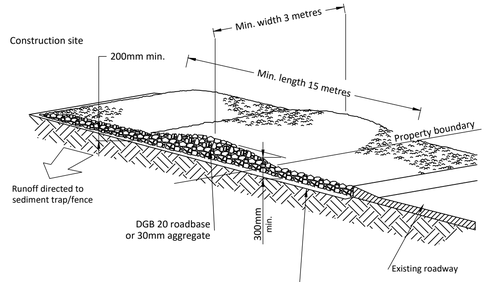



CROSS SECTION AA

## Construction Notes:

1. Subgrade fill to be compacted to the density of the surrounding undisturbed material
2. Ensure that concrete or riprap used for energy dissipater or outlet protection conforms to the grading limits specified on the SWMP/ESCP
3. Ensure that the geotextile does not sustain serious damage by preparing a smooth, even foundation
4. Repair minor damage to the geotextile before spreading any aggregate For repairs, patch one piece of fabric over the damage, making sure that all joints and patches overlap more than 300 mm.

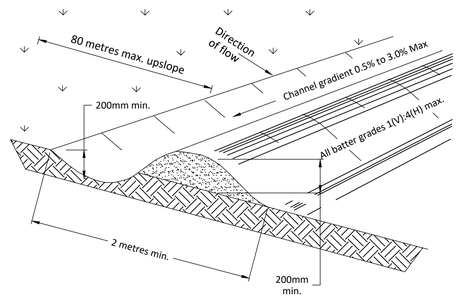
ENERGY DISSIPATER




## Construction Notes:

1. Strip topsoil and level site
2. Compact subgrade
3. Cover area with needle-punched geotextile
4. Construct 200mm thick pad over geotextile using roadbase or 30mm aggregate. Minimum length 15 metres or to building alignment. Minimum width 3 metres
5. Construct hump immediately within boundary to divert water to a sediment fence or other sediment trap.

STABILISED SITE ACCESS



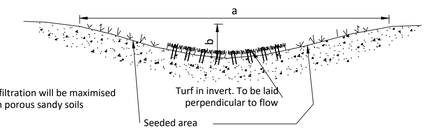

NOTE: Only to be used as temporary bank where max. upslope length is 80 metres

## Construction Notes:

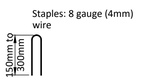
1. Construct along gradient as specified
2. Maximum spacing between banks shall be 75 metres
3. Drains to be of parabolic or trapezoidal cross section not V-shaped
4. Earth banks to be adequately compacted in order to prevent failure
5. Construction is of a temporary nature and shall be completed at the end a days work or immediately prior to rain
6. All outlets from disturbed lands are to feed into a sediment basin or similar
7. Discharge runoff collected from undisturbed lands onto either a stabilised or an undisturbed disposal site within the same subcatchment area from which the water originated
8. Compact with a suitable implement in situations where they are required to function for more than five days
9. Earth banks to be free of projections or other irregularities that will impede normal flow.

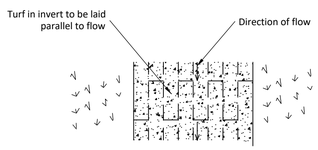
CATCH DRAINS

Dimensions including channel gradient to be specified on SWMP/ESCP




Section



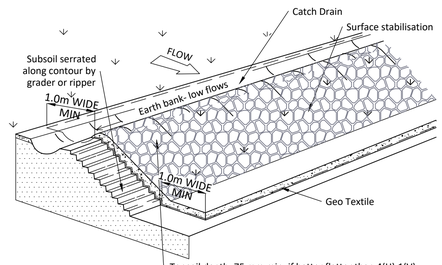

Plan

NOTE: This practice can only be used to treat runoff free of sediment.

## Construction Notes:

1. Ensure that sufficient upstream site work practices are in place to ensure that sediment is unlikely to reach the swale
2. Remove topsoil and stockpile outside swale area
3. Form a shallow depression as shown on the SWMP/ESCP ensuring that its grade does not exceed 5 per cent and sideslopes do not exceed 30 per cent
4. Prepare seedbed and sow seed in accordance with Standard Drawing 4-3
5. Turf the invert as specified in the SWMP/ESCP
6. Pin turf through topsoil to natural ground at 1 pin per square metre
7. Fertilise and irrigate frequently for two months to establish vigorous ground cover.

GRASS SWALES




EMBANKMENT STABLISATION

## Construction Notes:

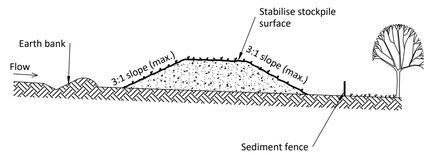
1. Scarify ground surface along the line of the contour to a depth of 50mm to 100mm to break up any hardsetting surfaces and provide a good bond between the respread material and subsoil

2. Add soil ameliorants as required by the SWMP/ESCP

3. Rip to a depth of 300mm where a compacted layer occurs

4. Replace topsoil.

REPLACING TOPSOIL




## Construction Notes:

1. Locate stockpile at least 5 metres from existing vegetation, concentrated water flows, roads and hazard areas

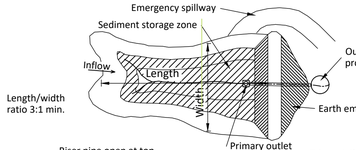
2. Construct on the contour as a low, flat, elongated mound

3. Where there is sufficient area topsoil stockpiles shall be less than 4 metres in height

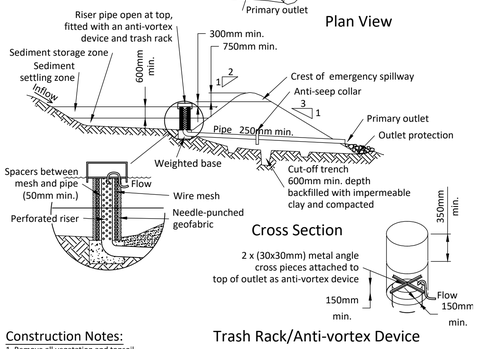
4. Rehabilitate in accordance with the SWMP/ESCP

5. Construct earth bank on the upslope side to divert run off around the stockpile and a sediment fence (Standard Drawing 6-7) 1 to 2 metres downslope of stockpile.

STOCKPILES




Plan View




Cross Section

Trash Rack/Anti-vortex Device

## Construction Notes:

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area
2. Form a cut off trench under the centreline of the embankment 600mm deep and 1200mm wide extending to a point on the gully wall above the riser sill level
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density
4. Select fill according to the directions of the SWMP that is free from roots, wood, rock, large stone or foreign material
5. Prepare the site under the embankment by ripping at least 100mm deep to help bond compacted fill to existing substrate
6. Spread fill in 100mm to 150mm layers and compact at optimum moisture content in accordance with the SWMP
7. Install pipe outlet with seepage collars as specified in SWMP
8. Form batter grades at 2(H):1(V) upstream and 3(H):1(V) downstream or as specified in SWMP
9. Install pipe riser as specified in SWMP
10. Construct emergency spillway 300mm above sill height of riser pipe
11. Rehabilitate structure in accordance with the SWMP
12. Geotextile to be replaced with the specified material if basin does not freely drain within four days
13. Place a "Full of Sediment" marker to show when less than design capacity occurs and sediment removal is required.

**PRELIMINARY**

**NOT FOR CONSTRUCTION**

| Issue | Date | Amendment | Int. | App. |
|---|---|---|---|---|
| A | 12-10-18 | FOR PARTIAL DA ISSUE | LDG | DDG |

COORDINATED REFERENCE DRAWINGS

| SERVICE | DRAWING NUMBER | ISSUE | DATE |
|---|---|---|---|
| ARCH | | | |
| HYD | | | |
| MECH | | | |
| STRUCT | | | |
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| CIVIL | 21151 | A | 12-10-08 |

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EMAIL: ewfw@ewfw.com.au
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ISO 9001 Quality Management

Project:
LINDFIELD LEARNING VILLAGE - PARTIAL SCHOOL
EATON ROAD
LINDFIELD NSW 2070

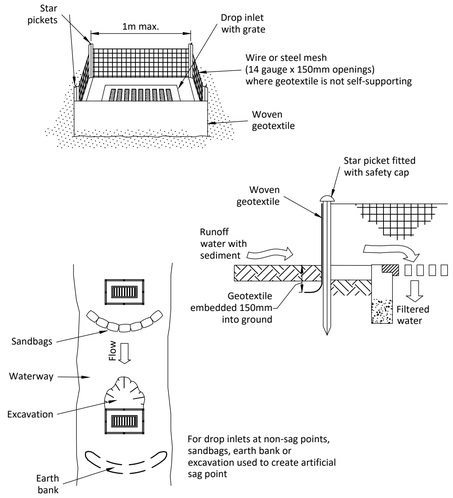
Drawing Title:
EROSION AND SEDIMENT CONTROL DETAIL SHEET 1 OF 2

| | |
|---|---|
| North Point: | Design: SB |
| | Design Validated: LDG |
| | Amendment Approved: DDG |
| | Drawn: DS |
| Date: 12/10/2018 | Scale: AS SHOWN (A1) |

| Job No: | Area: | Disc: | Dwg No: | Stage: | Issue: |
|---|---|---|---|---|---|
| 21151 | EX - | C | 015 | 1 | A |

ORIGINAL SIZE: A1

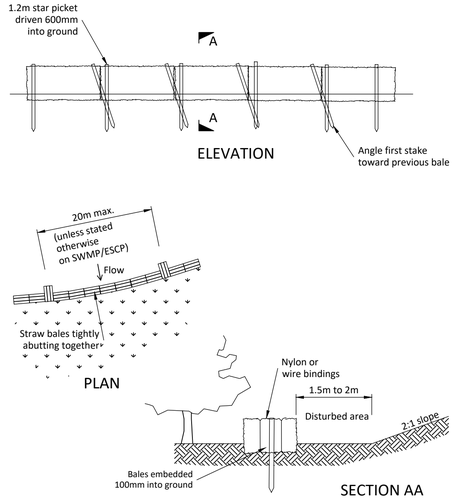
FILE NAME & PATH: W:\21\ex\21151 - UTS Ku-ring-gai Campus Redevelopment\002 - Storm Water Stage 2\CAD\Civil\CAD\Working\C-015.dwg PLOTTED BY: 'stefan.bobrow' PLOT DATE & TIME: 16 Oct, 2018 - 3:57pm




## Construction Notes:

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Support geotextile with mesh tied to posts at 1 metre centres.
3. Do not cover inlet with geotextile.
4. Construction details are similar to Standard Drawing 6-6 and Standard Drawing 6-7.

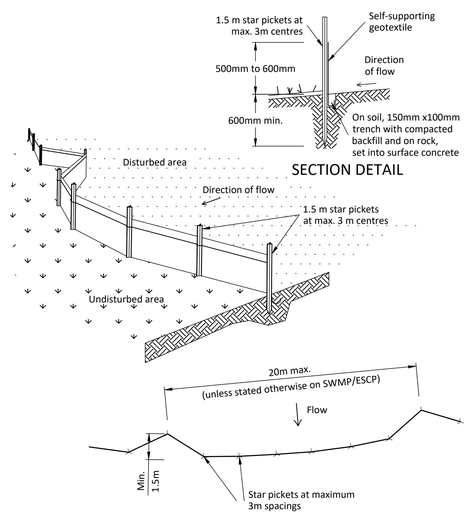
GEOTEXTILE INLET FILTER




## Construction Notes:

1. Construct straw bale filter as close as possible to parallel to the contours of the site or at the toe of a slope.
2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws to be placed parallel to ground.
3. Maximum height of filter is one bale.
4. On soft materials, embed each bale in the ground 75mm to 100mm and anchor with two 1.2 metre star pickets. Angle the first stake in each bale towards the previously laid bale. Drive stakes 600mm into the ground and flush with the top of the bales.
5. Where a straw bale filter is constructed downslope from a disturbed batter the bales should be located 1.5 to 2 metres downslope from the toe of the batter.

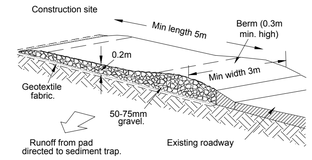
STRAW BALE FILTER




## Construction Notes:

1. Construct sediment fence as close as possible to parallel to the contours of the site.
2. Drive 1.5 metre long star pickets into ground, 3 metres apart.
3. Dig a 150mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
4. Backfill trench over base of fabric.
5. Fix self-supporting geotextile to upslope side of posts with wire ties or as recommended by geotextile manufacturer.
6. Join sections of fabric at a support post with a 150mm overlap.

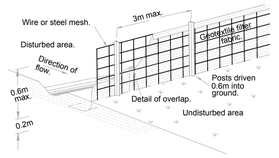
SEDIMENT FENCE




## TEMPORARY CONSTRUCTION ACCESS TREATMENT

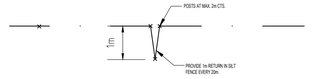
MAINTENANCE

THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND / OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.




## SEDIMENT FENCE DETAIL

N.T.S.




## SILT FENCE RETURN DETAILS

GEOTEXTILE FABRIC (BIDIM U24 OR SIMILAR)

# SOIL EROSION AND SEDIMENT CONTROL NOTES

## GENERAL INSTRUCTIONS

1. THE SITE SUPERINTENDENT WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
   a. LOCAL AUTHORITY REQUIREMENTS
   b. EPA REQUIREMENTS
   c. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. THE WATER IN THE SEDIMENT BASIN(S) SHALL BE LOWERED PERIODICALLY TO MAINTAIN THE MINIMUM STORAGE VOLUME REQUIRED FOR FINE SOILS
5. AT ALL TIMES A WATER CART(S) SHALL BE MAINTAINED ON SITE TO:
   (A) WATER THE AREAS OF HYDROMULCH
   (B) CONTROL DUST
   WATERING OF MULCH, DUST OR VEGETATION MUST BE KEPT TO THE MINIMUM REQUIRED TO ACHIEVE SPECIFIED OUTCOMES. IN NO CASE SHALL AREAS BE OVER WATERED TO SATURATION OR TO THE POINT WHERE WATER PONDS ON THE SURFACE.
6. STORMWATER IN THE SETTLING ZONE SHALL BE DRAINED OR PUMPED OUT WITHIN 7 DAYS (NO LATER THAN 14 DAYS AS SITE CONDITIONS ALLOW) FOLLOWING RAINFALL EVENT IF THE NOMINATED WATER QUALITY TARGETS CAN BE MET. THE LOWER LEVEL OF THE SETTLING ZONE SHALL BE IDENTIFIED WITH A PEG THAT SHOWS CLEARLY THE LEVEL WHICH DESIGN CAPACITY IS AVAILABLE.
7. ON THE SUPERINTENDENT'S INSTRUCTIONS AIDED FLOCCULATION SHOULD BE EMPLOYED WHERE EXTENDED SETTLING IS LIKELY TO FAIL TO MEET QUALITY STANDARDS WITHIN 5 DAYS.
8. STORED SEDIMENT SHALL NOT ENCROACH INTO SETTLING ZONE. SEDIMENT REMOVED FROM SEDIMENT BASINS SHALL BE DISPOSED IN PLACES THAT WILL NOT RESULT IN A FUTURE EROSION OR POLLUTION HAZARD.
9. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
10. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

## LAND DISTURBANCE

11. THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
    (A) INSTALL A WIND FENCE ALONG THE BOUNDARIES
    (B) INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES REFER DETAIL.
    (C) CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
    (D) INSTALL SEDIMENT BASIN AS SHOWN ON PLAN
    (E) INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
    (F) UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

## EROSION CONTROL

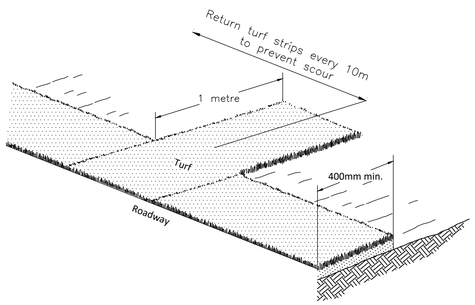
12. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.

## SEDIMENT CONTROL

14. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
15. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
16. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
17. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

## OTHER MATTERS

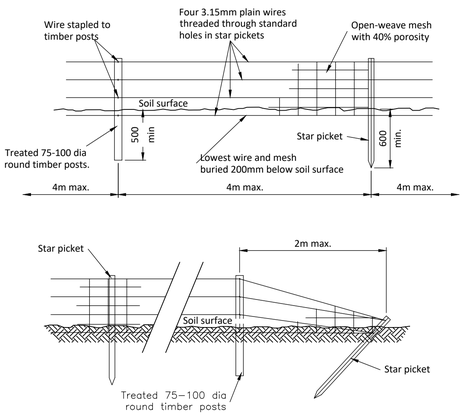
18. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
19. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
    (A) PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
    (B) ENSURING THAT NOTHING IS NAILED TO THEM
    (C) PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.




## CONSTRUCTION NOTES:

1. Install min. 400mm wide roll of turf on the footpath adjacent to the kerb and at the same level as the top of the kerb.
2. Lay 1.5 metre long turf strips normal to the kerb every 10 metres.
3. Rehabilitate disturbed soil behind the turf strip in accordance with the SWMP/ESCP.

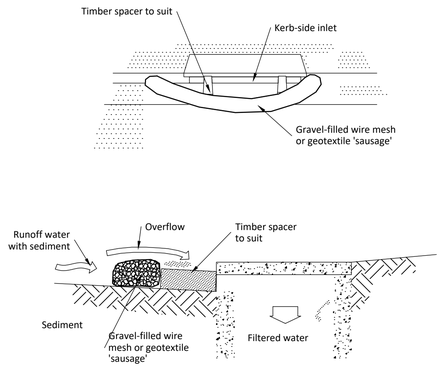
KERBSIDE TURF STRIP




## Construction Notes:

1. Install fence to height and location as specified on SWMP/ESCP
2. Cut a channel 200mm deep along the fence line
3. Place wire and light resistant, open-weave polymer mesh with 40% porosity on prevailing wind side of fence
4. Fasten mesh to all wires using ring fasteners at 100mm - 150mm intervals on top wire and 300mm intervals on other wires
5. Use one 75mm - 100mm dia. treated round timber post every 20 metres
6. Star pickets to be fitted with safety caps.

CONTROL OF WIND EROSION




NOTE: This practice only to be used where specified in an approved SWMP/ESCP

## Construction Notes:

1. Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit
2. Fill the sleeve with 25mm to 50mm gravel
3. Form an elliptical cross-section about 150mm high x 400mm wide
4. Place the filter at the opening of the kerb inlet leaving a 100mm gap at the top to act as an emergency spillway
5. Maintain the opening with spacer blocks
6. Form a seal with the kerbing and prevent sediment bypassing the filter
7. Fit to all kerb inlets at sag points.

MESH AND GRAVEL INLET FILTER SD6-8

**PRELIMINARY**

**NOT FOR CONSTRUCTION**

| Issue | Date | Amendment | Int. | App. |
|---|---|---|---|---|
| A | 12-10-18 | FOR PARTIAL DA ISSUE | LDG | DDG |

| COORDINATED REFERENCE DRAWINGS | | | |
|---|---|---|---|
| SERVICE | DRAWING NUMBER | ISSUE | DATE |
| ARCH | | | |
| HYD | | | |
| MECH | | | |
| STRUCT | | | |
| ELEC | | | |
| CIVIL | 21151 | A | 12-10-08 |

NOTE : SYMBOLS ARE DRAWN IN THE CORRECT POSITION BUT ARE NOT SHOWN TO SCALE



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ISO 9001 Quality Management

Project:
LINDFIELD LEARNING VILLAGE - PARTIAL SCHOOL
EATON ROAD
LINDFIELD NSW 2070

Drawing Title:
EROSION AND SEDIMENT CONTROL DETAIL SHEET 2 OF 2

| | |
|---|---|
| North Point: | Design: SB |
| | Design Validated: LDG |
| | Amendment Approved: DDG |
| | Drawn: DS |
| Date: 12/10/2018 | Scale: AS SHOWN (A1) |

| Job No: | Area: | Disc: | Dwg No: | Stage: | Issue: |
|---|---|---|---|---|---|
| 21151 | EX - | C | 016 | 1 | A |

ORIGINAL SIZE: A1

FILE NAME & PATH: W:\21\ex\21151 - UTS Ku-ring-gai Campus Redevelopment\002 - Storm Water Stage 2\CAD\Civil\CAD\Working\C-016.dwg PLOTTED BY: 'stefan.bobrow' PLOT DATE & TIME: 16 Oct, 2018 - 3:55pm

# 1. Erosion Hazard and Sediment Basins

**Site Name:** UTS Linfield

**Site Location:** Eaton Road, Linfield. NSW 2070

**Precinct/Stage:** Stage 1

**Other Details:**

| Site area | Sub-catchment or Name of Structure | | | | | | Notes |
|---|---|---|---|---|---|---|---|
| | Zone A | Zone B | Zone C | Zone D | Zone E | | |
| Total catchment area (ha) | 1.186 | 0.267 | 0.848 | 0.232 | 0.176 | | |
| Disturbed catchment area (ha) | 0.783 | 0.124 | 0.524 | 0.102 | 0.076 | | |

**Soil analysis (enter sediment type if known, or laboratory particle size data)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sediment Type (C, F or D) if known: | C | C | C | C | C | | From Appendix C (if known) |
| % sand (fraction 0.02 to 2.00 mm) | | | | | | | Enter the percentage of each soil fraction. E.g. enter 10 for 10% |
| % silt (fraction 0.002 to 0.02 mm) | | | | | | | |
| % clay (fraction finer than 0.002 mm) | | | | | | | |
| Dispersion percentage | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | | E.g. enter 10 for dispersion of 10% |
| % of whole soil dispersible | | | | | | | See Section 6.3.3(e). Auto-calculated |
| Soil Texture Group | C | C | C | C | C | | Automatic calculation from above |

**Rainfall data**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Design rainfall depth (no of days) | 20 | 20 | 20 | 20 | 20 | | See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25. |
| Design rainfall depth (percentile) | 90 | 90 | 90 | 90 | 90 | | |
| x-day, y-percentile rainfall event (mm) | 172 | 172 | 172 | 172 | 172 | | |
| Rainfall R-factor (if known) | 3470.67 | 3470.67 | 3470.67 | 3470.67 | 3470.67 | | Only need to enter one or the other here |
| IFD: 2-year, 6-hour storm (if known) | 12.68 | 12.68 | 12.68 | 12.68 | 12.68 | | |

**RUSLE Factors**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rainfall erosivity (*R*-factor) | 3470.67 | 3470.67 | 3470.67 | 3470.67 | 3470.67 | | Auto-filled from above |
| Soil erodibility (*K*-factor) | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | | RUSLE LS factor calculated for a high rill/interrill ratio. |
| Slope length (m) | 190.63 | 93.25 | 76.6 | 46.1 | 39.2 | | |
| Slope gradient (%) | 9.65 | 11.2 | 8.4 | 13 | 17.2 | | |
| Length/gradient (*LS*-factor) | 4.78 | 3.72 | 2.11 | 2.80 | 3.56 | | |
| Erosion control practice (*P*-factor) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | |
| Ground cover (*C*-factor) | 1 | 1 | 1 | 1 | 1 | 1 | |

**Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Storage (soil) zone design (no of months) | 9 | 6 | 3 | 4 | 2 | 2 | Minimum is generally 2 months |
| Cv (Volumetric runoff coefficient) | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 | | See Table F2, page F-4 in Appendix F |

**Calculations and Type D/F Sediment Basin Volumes**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Soil loss (t/ha/yr) | 862 | 671 | 381 | 505 | 642 | | |
| Soil Loss Class | 6 | 5 | 4 | 5 | 5 | | See Table 4.2, page 4-13 |
| Soil loss ($m^3$/ha/yr) | 663 | 516 | 293 | 389 | 494 | | Conversion to cubic metres |
| Sediment basin storage (soil) volume ($m^3$) | 389 | 32 | 38 | 13 | 6 | | See Sections 6.3.4(i) for calculations |
| Sediment basin settling (water) volume ($m^3$) | 1285 | 289 | 919 | 252 | 191 | | See Sections 6.3.4(i) for calculations |
| Sediment basin total volume ($m^3$) | 1674 | 321 | 957 | 265 | 197 | | |

# 2. Flow Calculations

Peak flow is given by the Rational Formula: $Q_y = 0.00278 \times C_{10} \times F_Y \times I_{y,\,tc} \times A$

where:
- $Q_y$ is peak flow rate ($m^3$/sec) of average recurrence interval (ARI) of "Y" years
- $C_{10}$ is the runoff coefficient (dimensionless) for ARI of 10 years.
- $F_y$ is a frequency factor for "Y" years.
- A is the catchment area in hectares (ha)
- $I_{y,\,tc}$ is the average rainfall intensity (mm/hr) for an ARI of "Y" years and a design duration of "tc" (minutes or hours)

Time of concentration ($t_c$) = $0.76 \times (A/100)^{0.38}$ hrs

**Note: For urban catchments the time of concentration should be determined by more precise calculations or reduced by a factor of 50 per cent. Place an x in the appropriate row below to automatically halve the time of concentration for that sub-catchment.**

| Structure Details | | | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Name | Zone A | Zone B | Zone C | Zone D | Zone E | | | | |
| Catchment Area (ha) | 1.1863 | 0.267 | 0.848 | 0.2323 | 0.176 | | | | |
| Place an x here to halve tc | | | | | | | | | Place an x if disturbed catchment |
| Time of concentration (tc) | 8 | 5 | 7 | 5 | 4 | | | | minutes |
| **Rainfall Intensities** | | | | | | | | | |
| 1-year, tc | 80.3 | 95.3 | 80.3 | 95.3 | 95.3 | | | | Enter the relevant rainfall intensities (in mm/hr) for each of the nominated rainfall events. The time of concentration (tc) determines the duration of the event to be used |
| 2-year, tc | 102.6 | 121.9 | 102.6 | 121.9 | 121.9 | | | | |
| 5-year, tc | 130.2 | 154.1 | 130.2 | 154.1 | 154.1 | | | | |
| 10-year, tc | 145.9 | 172.4 | 145.9 | 172.4 | 172.4 | | | | |
| 20-year, tc | 167 | 196.9 | 167 | 196.9 | 196.9 | | | | |
| 50-year, tc | 194.2 | 228.7 | 194.2 | 228.7 | 228.7 | | | | |
| 100-year, tc | 214.9 | 252.65 | 214.9 | 252.65 | 252.65 | | | | |
| C10 runoff coefficient | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | | | | Use AR&R or Table F3, pg F-6 |
| **Frequency Factors** | | | | | | | | | |
| FF, 1-year | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | Can use 0.8 for a construction site |
| FF, 2-year | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | Can use 0.85 for a construction site |
| FF, 5-year | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | Can use 0.95 for a construction site |
| FF, 10-year | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Generally always 1 |
| FF, 20-year | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | Can use 1.05 for a construction site |
| FF, 50-year | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | 1.15 | Can use 1.15 for a construction site |
| FF, 100-year | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | Can use 1.2 for a construction site |
| **Flow Calculations** | | | | | | | | | Notes |
| 1-year, tc ($m^3$/s) | 0.18 | 0.048 | 0.129 | 0.042 | 0.032 | | | | |
| 2-year, tc ($m^3$/s) | 0.244 | 0.065 | 0.175 | 0.057 | 0.043 | | | | |
| 5-year, tc ($m^3$/s) | 0.347 | 0.092 | 0.248 | 0.08 | 0.061 | | | | |
| 10-year, tc ($m^3$/s) | 0.409 | 0.109 | 0.292 | 0.095 | 0.072 | | | | |
| 20-year, tc ($m^3$/s) | 0.492 | 0.13 | 0.351 | 0.113 | 0.086 | | | | |
| 50-year, tc ($m^3$/s) | 0.626 | 0.166 | 0.448 | 0.144 | 0.109 | | | | |
| 100-year, tc ($m^3$/s) | 0.723 | 0.191 | 0.517 | 0.166 | 0.126 | | | | |

NB for flow calculations on sediment basin spillways, see Worksheet 3 (if required).

# 3. Sediment Basin Spillway Design

**Structure Details**

| Structure Name | Zone A | Zone B | Zone C | Zone D | Zone E | | Auto-filled from Worksheet 1 |
|---|---|---|---|---|---|---|---|
| Catchment Area (ha) | 1.1863 | 0.267 | 0.848 | 0.2323 | 0.176 | | Auto-filled from Worksheet 1 |
| Time of concentration (tc) | 4 | 2 | 4 | 2 | 2 | | Auto-calculated assuming tc is halved |
| **Rainfall Intensities (IFD Values)** | | | | | | | |
| 1 year, tc | 80.3 | 95.3 | 95.3 | 95.3 | 95.3 | | Enter the relevant rainfall intensities (in mm/hr) for each of the nominated rainfall events. The time of concentration (tc) determines the duration of the event to be used |
| 2 year, tc | 102.6 | 121.9 | 121.9 | 121.9 | 121.9 | | |
| 5 year, tc | 130.2 | 154.1 | 154.1 | 154.1 | 154.1 | | |
| 10 year, tc | 145.9 | 172.4 | 172.4 | 172.4 | 172.4 | | |
| 20 year, tc | 167 | 196.9 | 196.9 | 196.9 | 196.9 | | |
| 50 year, tc | 194.2 | 228.7 | 228.7 | 228.7 | 228.7 | | |
| 100 year, tc | 214.9 | 252.65 | 252.65 | 252.65 | 252.65 | | |
| $C_{10}$ runoff coefficient | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | | Use AR&R or Table F3, pg F-6 |
| Design ARI event (select): | 20 | 20 | 100 | 100 | 100 | 100 | Select design ARI (years) from dropdown |
| Frequency Factor | 1.05 | 1.05 | 1.2 | 1.2 | 1.2 | 1.2 | Auto-filled based on selected ARI |
| Flow Calculation | 0.492 | 0.13 | 0.608 | 0.166 | 0.126 | | Auto-calculated based on selected ARI |

# 4. Volume of Type C (Coarse) Sediment Basins

**Type C Basin Design Criteria**

| Structure Name | Zone A | Zone B | Zone C | Zone D | Zone E | | Auto-filled from Worksheet 1 |
|---|---|---|---|---|---|---|---|
| Catchment Area (ha) | 1.1863 | 0.267 | 0.848 | 0.2323 | 0.176 | | Auto-filled from Worksheet 1 |
| Sediment type (C, F or D) | C | C | C | C | C | | Auto-filled from Worksheet 1 |
| Design rainfall event | 1 | 1 | 1 | 1 | 1 | | Choose design event from dropdown |
| Flow volume ($m^3$/s) | 0.18 | 0.048 | 0.153 | 0.042 | 0.032 | | Calculated from IFD values above |
| Area Factor | 4100 | 4100 | 4100 | 4100 | 4100 | 4100 | Default is 4,100. See pg 6-12 |
| Depth of settling (water zone) (m) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | Minimum is 0.6m (pg 6-12) |

**Type C Basin Volume Calculations**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Basin Surface Area ($m^2$) | 738 | 196.8 | 627.3 | 172.2 | 131.2 | Not Type C | Auto-calculated |
| Settling (water) zone volume ($m^3$) | 442.8 | 118.1 | 376.4 | 103.3 | 78.7 | Not Type C | Auto-calculated |
| Storage (soil) zone volume ($m^3$) | 88.3 | 10.9 | 26.1 | 6.7 | 6.4 | Not Type C | Auto-calculated |
| Total basin volume ($m^3$) | 531.1 | 129 | 402.5 | 110 | 85.1 | Not Type C | Auto-calculated |

**Basin Shape**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Enter length:width ratio | 3 | 3 | 2 | 3 | 3 | 3 | E.g. for 3:1 (L:W) enter 3. |
| Length (m) | 47.1 | 24.3 | 35.4 | 22.7 | 19.8 | N/A | These figures should be taken as a guide only. Detailed calcs might be required. |
| Width (m) | 15.7 | 8.1 | 17.7 | 7.6 | 6.6 | N/A | |

**PRELIMINARY**

**NOT FOR CONSTRUCTION**

| Issue | Date | Amendment | Int. | App. |
|---|---|---|---|---|
| A | 12-10-18 | FOR PARTIAL DA ISSUE | LDG | DDG |

| COORDINATED REFERENCE DRAWINGS | | | |
|---|---|---|---|
| SERVICE | DRAWING NUMBER | ISSUE | DATE |
| ARCH | | | |
| HYD | | | |
| MECH | | | |
| STRUCT | | | |
| ELEC | | | |
| CIVIL | 21151 | A | 12-10-08 |

NOTE : SYMBOLS ARE DRAWN IN THE CORRECT POSITION BUT ARE NOT SHOWN TO SCALE



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Project:
LINDFIELD LEARNING VILLAGE - PARTIAL SCHOOL
EATON ROAD
LINDFIELD NSW 2070

Drawing Title:
EROSION AND SEDIMENT CONTROL CALCULATION SHEET
1 OF 1

| | |
|---|---|
| North Point: | |
| Design: | SB |
| Design Validated: | LDG |
| Amendment Approved: | DDG |
| Drawn: | DS |
| Date: | 12/10/2018 |
| Scale: (A1) | AS SHOWN |

Job No: 21151 Area: EX - Disc: C Dwg No: 017 Stage: 1 Issue: A

ORIGINAL SIZE: A1

FILE NAME & PATH: W:\21151\21151 - UTS Kuring-gai Campus Redevelopment\002 - Storm Water Stage 2\CAD\Civil\CAD\Working\C-017.dwg PLOTTED BY: 'stefan.bohrne' PLOT DATE & TIME: 16 Oct, 2018 - 4:26pm

# Appendix B Environmental Aspects and Impacts List

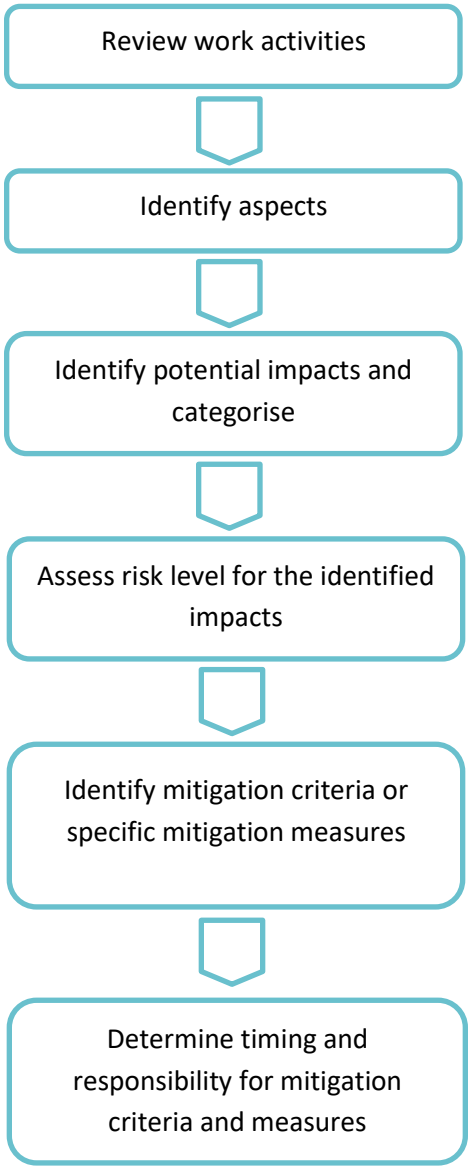
**Environmental Aspects and Impacts: Lindfield Learning Village**

The process used to develop possible mitigation measures after an environmental risk has been identified, is illustrated in the Figure to the right.

The mitigation measures developed to control the identified environmental impacts are presented in the following tables. Also shown are the associated levels of risk of impact and responsible party for implementation of the respective mitigation measure. In accordance with the roles and responsibilities described in Section 2.1.

As defined in ISO 14001, an environmental aspect is "an element of an organisation's activities, products or services that can interact with the environment" (SAI Global, 2004). Environmental aspects within this project are specific actions or items that could cause an impact.

The risk assessment matrix on the following page is used to determine the level of risk for identified potential impacts from the proposed works.



| Severity | How severe are potential adverse impacts on: | | | What is the likelihood (risk) of this level of severity? | | | |
|---|---|---|---|---|---|---|---|
| | **Human Health** | **Environment** | **Construction schedule and/or project costs** | **Very Likely** | **Likely** | **Unlikely** | **Very Unlikely** |
| **Catastrophic** | Death, life-threatening injuries, permanent disability / ill health | Catastrophic environmental incident, serious risk and/or damage to onsite or offsite receptors, regulatory involvement, significant onsite and offsite remediation, financial penalties enforced, legal action | Severe delays, significant cost increases, possible project termination | 16 | 15 | 13 | 10 |
| **Major** | Major illness or injury requiring surgery / hospitalisation | Major environmental incident, onsite and offsite contaminant migration, regulatory notification and remediation needed | Lengthy project delays / major cost increases | 14 | 12 | 9 | 6 |
| **Moderate** | Injury or illness requiring treatment and resulting in lost time | Moderate environmental incident, contained onsite, requires some remedial action | Moderate project delays and cost increases | 11 | 8 | 5 | 3 |
| **Minor** | Minor injury or exposure not requiring medical attention | Minor environmental incident, localised | Minor project delays / some additional costs | 7 | 4 | 2 | 1 |

Should additional environmental impacts relating to changed or additional work activities be identified during the project, the risks are to be assessed according to this procedure. Following this risk assessment system, mitigation measures must be selected as required, with responsibility allocated and the details documented in the relevant table, as part of the ongoing review of the CEMP.

| Erosion and Sedimentation Risks | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Pre-construction | | | | | |
| Erosion and sediment control design | Inappropriate design, resulting in offsite transport of sediment to roads, and/or stormwater drains | 12 | An approved erosion and sediment control plan (ESCP) is to be implemented with controls in place. | 4 | Project Engineers / Site Manager |
| Construction | | | | | |
| Site preparation | Sediment mobilisation and surface runoff from site establishment and clearing. | 12 | Prior to commencement of site work, install all erosion and sediment control measures based on an erosion and sediment control plan and ensure controls are operational in accordance with approved ESCP. | 4 | Site Manager |
| Vehicle traffic leaving site | Sediment tracked offsite by vehicle wheels. | 8 | Appropriate measures are to be implemented during the construction period to ensure vehicles leaving the premises are sufficiently free from dirt, aggregate or other materials such that material are not transported onto public roads. These may include shake-down areas at access points and truck wash-down facilities. | 4 | Site Manager |
| Transport of materials to and from site | Loss of load resulting in pollution of roads | 5 | Truck loads shall be covered. Should any material be transported onto the road or any spills occur it is to be cleaned up prior to cessation of the same day's work and/or commencement of any rain event. | 2 | Site Manager |
| Stormwater run-off | Run-off resulting in soil erosion. | 12 | Do not stockpile materials on drainage lines. Ensure stockpile slopes and batters are not excessive. Control stormwater runoff during construction in accordance with the ESCP. | 5 | Site Manager |

| Erosion and Sedimentation Risks Cont. | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Exposed surfaces and stockpiling of fill and construction materials | Offsite transport of sediment to roads and stormwater drains. Loss of fill material. | 12 | Maintain a project ESCP: Daily operational check of control measures by Project Engineer or nominated person. Additional inspections to be carried out by the Site Manager / Project Engineer after each storm event to assess adequacy of the erosion control measures, repair/replace any dysfunctional erosion control devices, and clean up any sediment that has left the site or is deposited on public land or drainage channels. | 5 | Site Manager / Project Engineer |

| Water quality | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Pre-construction | | | | | |
| Design of erosion and sedimentation control | Inappropriate design, resulting in localised ponding or flooding, excessive runoff, erosion and pollution of local area. | 12 | Controls to be installed in accordance with the ESCP. Any discharge to the street stormwater system is to be approved by the Council in writing prior to discharge. | 4 | Contractor / Site Manager |
| Construction | | | | | |
| Discharge of waters from site | Discharge of sediment laden waters into watercourses. | 14 | Any discharge to the street stormwater system is to be approved by the Council in writing prior to discharge. Implement ESCP. | 2 | Site Manager |
| Plant and equipment refueling, chemical use and storage | Accidental spills and leaks into nearby watercourses during refueling of equipment or storage of fuels and chemical. | 8 | Refuel plant and equipment in a location away from drains and watercourses. Ensure sufficient spill response kits are accessible on site at all times. Chemicals to be stored on site must comply with the management measures in the CEMP. Ensure site induction covers dangerous/hazardous goods and appropriate spill response procedure. | 2 | Site Manager |
| General use of construction site | Waste, litter etc. entering waterways via stormwater drains. | 4 | Ensure contractors leave the construction work sites free of debris and other rubbish (daily) and at the completion of the works. Provide sufficient number of and type of suitable receptacles on site for general waste, recyclable materials and other waste types (as required). | 2 | Project Manager / Site Manager |

| Noise and Vibration Management | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Pre-construction/Construction | | | | | |
| Pre-construction and construction activities resulting in noise complaints | Disturbance of onsite receptors/personnel, local residents, potential noise complaints. Non-conformance with Consent Conditions. | 8 | Comply with defined work hours: 7.00am to 6.00pm Monday to Friday, 8.00am to 3:30pm Saturdays, no work on Sundays or public holidays. All subcontractors to be managed to ensure they work only within defined hours. | 4 | Site Manager |

| Traffic Management | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Pre-construction / construction | | | | | |
| Parking due to construction related vehicles | Loss of parking availability in local streets or Bankstown Airport. | 8 | All site personnel are to be advised of parking allocations. Ensure work vehicles and plant/equipment do not obstruct vehicular or pedestrian traffic on roadways, footpaths or access to land uses unless absolutely necessary. | 4 | Site Manager |
| Construction traffic movements to and from site (deliveries and site staff) | Increased traffic volume on roads during construction. | 8 | Haul routes to be identified and communicated to staff, personnel and subcontractors. Co-ordinate deliveries to avoid peak periods where feasible. Implement traffic management plans, including use of designated routes. Implement traffic control plan, including traffic controller where necessary. | 4 | Site Manager |
| Pedestrian movements surrounding construction site / site occupant movements | Pedestrian/occupant confusion, interference with vehicles, potential incident due to conflict between pedestrian/occupant and construction access points. | 15 | Identify traffic controls required. Restrict site access to personnel and authorised people only in accordance with WorkCover 2000 Regulations. Provide appropriate restriction signage. | 9 | Project Manager |

| Heritage Management | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Construction | | | | | |
| Discovery of unexpected find of heritage item/artifact | Impact on that heritage item in the event that correct steps are not taken. | 8 | Follow heritage protocol for unexpected heritage finds. | 5 | Site Manager |

| Air Quality | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Construction | | | | | |
| Operation of plant and equipment | Air pollution from emissions | 1 | Ensure equipment and machinery is maintained and not left idling when not in use. | 1 | Site Manager |
| Vehicle movement, earthworks, handling and transport of spoil and fill | Dust generated from earthworks, including materials handling and wheel dust | 4 | Cover all loads of excavated material and other erodible materials that are transported to and from the work site. Avoid or restrict dust generating activities during windy conditions. | 2 | Site Manager |
| Management of stockpiles, exposed areas and general site | Wind erosion of exposed surfaces and stockpiles | 4 | Keep areas adjacent to the work sites free of construction soil or dust. Monitor all work sites, general work areas, stockpiles and skip bins for dust generation and water down or cover affected areas especially stockpiles of waste material. Minimise soil and vegetation disturbance, in order to minimise dust generation. | 2 | Site Manager |
| Excavation works | Release of dust from excavation | 4 | Implement dust suppression measures appropriate for the specific works; no dust is to leave the site. Wetting down / water carts can be used to minimise dust release. | 2 | Site Manager |

| Waste Management | | | | | |
|---|---|---|---|---|---|
| **Aspect** | **Impact** | **Risk of Impact** | **Mitigation Criteria or Management Measure** | **Risk After Mitigation / Management** | **Responsibility** |
| Construction | | | | | |
| Earthworks and construction | Generation of waste including potentially recyclable or reusable materials | 12 | Waste Management is to be based on the waste hierarchy, and is to maximise recycling and reuse of waste material and construction wastes, and to minimise waste to landfill. Waste management is to include the following steps. All material leaving site is to be disposed of at a suitable location lawfully able to accept the waste it is receiving. All material leaving the site is to be disposed of in accordance with the provisions of the Protection of the Environment Operations Act 1997 and the NSW EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste. The waste disposal facility must be appropriately licensed to receive the class of waste being delivered as described in the respective waste classification. Monitor waste volumes and record their method and location of disposal and whether or not that location was a place that could lawfully be used as a waste facility for that waste. | 9 | Project Manager |
| Earthworks and construction | Generation of waste leading to disposal - construction waste | 7 | Provide a sufficient number of and type of suitable receptacles onsite for general waste, recyclable materials and other waste types (as required). Maximise segregation of wastes. Recycle and divert from landfill surplus soil, rock, and other excavated material where possible. Separately collect and stream quantities of waste concrete, bricks, blocks, timber, metals, plasterboard, paper, and packaging, glass, and plastics and offer them for recycling where practical. Ensure that no waste from the site is conveyed to or deposited at any place that cannot lawfully be used as a waste facility for that waste. | 2 | Project Manager |

# Appendix C Weekly Environmental Checklist

Notes:

1. This checklist is to be used as a guide for the weekly monitoring of environmental issues by the Site Manager.
2. The checklist is to be completed, reviewed and signed at the end of each week and filed as a component of the Project's records.
3. The weekly checklist applies to the entire site until construction has been completed. After this time, the monitoring/reporting component of the CEMP will be reassessed. As some activities become completed, some items in the weekly checklist may no longer be applicable.
4. Additionally, general site conditions should be checked daily for compliance and to ensure controls in general appear to be maintained in good conditions such as the erosion and sediment controls and stockpile controls.

Environmental Weekly Checklist

Project: Lindfield Learning Village

Week Ending:.....

| Action | Yes/ No/ NA | Comments/ Actions |
|---|---|---|
| **GENERAL OBLIGATIONS** | | |
| Have all site managers, operators and staff undergone site induction and are aware of the appropriate method statements/procedures and environmental responsibilities that apply to their work? Has a written record been kept? | | |
| **NOISE & VIBRATION** | | |
| Are construction activity times being complied with? | | |
| Are all work activities limited to the approved time periods? | | |
| Are noise suppressors on site in working order? | | |
| Are all reasonable practicable steps to reduce construction noise and vibration taken? | | |
| **ODOUR & AIR POLLUTION** | | |
| Is the disturbed area being minimised? | | |
| Is dust suppressed on disturbed areas (including stockpiles)? | | |
| Are odour emissions from portaloos minimal? | | |
| Is dust control applied, as requested, to landscaping activities? | | |
| Are vehicle loads covered, as required, to prevent air pollution? | | |
| Is machinery inspected and maintained to prevent noxious emissions? | | |
| Machinery on site is not left idling when not in use. Is this statement correct? | | |
| **SITE ACCESS & TRAFFIC** | | |
| Have Council / residents been informed of upcoming traffic disruptions? | | |
| **EROSION AND SEDIMENTATION** | | |
| Are erosion and sedimentation controls designed and installed according to Blue Book specifications prior to commencement of works and according to design specifications (including diversion drains where appropriate)? | | |
| Are controls functioning and trapping approximately 80- 90% of sediment? | | |

| | | |
|---|---|---|
| Are erosion and sediment controls being maintained weekly, or after every rain event, e.g. sediment removed, materials repaired or replaced? | | |
| Are stockpiles located greater than 25 metres from water flow paths/spoon drains and controls used to prevent sediment escaping (e.g. silt fences, spray grass, sediment pond)? | | |
| Are erosion/sedimentation controls installed at vehicle wash-down areas? | | |
| Are controls decommissioned according to Blue Book specifications when replaced/removed? Has approval been sought prior to removal of controls when construction and revegetation works ceases? (Liaise with Project Manager and Site Manager). | | |
| Are inspections of erosion and sediment controls conducted daily/following incidents? | | |
| **WASTE MANAGEMENT** | | |
| Is waste reused on site where possible? | | |
| Is waste separation occurring on site? | | |
| Is waste stockpiled according to Waste Management Plan? | | |
| Is all litter generated on site being disposed of using onsite, covered bins? | | |
| Is the site tidy and free from windblown waste? | | |
| Are waste materials leaving site covered to prevent windblown litter as required? | | |
| Is waste being disposed to appropriate waste management centres? | | |
| Have waste disposal dockets been maintained and recorded? | | |
| Is concrete, asphalt and asbestos disposed of offsite? If disposed of onsite, is this in an appropriately bundled and designated area?<br>In the case of asbestos, has the Asbestos Management Plan been implemented? | | |
| When handling asbestos waste have the appropriate precautions been implemented as listed in the Environmental Aspect and Impact list? | | |
| Are "Portaloo" toilets established on site and emptied as per relevant regulations? | | |
| **WATER POLLUTION** | | |
| Are vehicles stored in an appropriate area i.e. compound located greater than 50m from water flow path? | | |
| Is equipment refuelled/ maintained offsite or in the vehicle compound? | | |

| | | |
|---|---|---|
| Are appropriate spill containment information (SDS) and/or spill kits kept on site? | | |
| Are site managers and operators aware of spill kit locations and procedures? | | |
| Is chemical/fuel storage appropriately located at 25m distance away from water flow paths? | | |
| Is bund height and bund condition sufficient (sufficient volume to contain 120% of largest container within bunded area? | | |
| Are concrete/agitator trucks leaving the site and returning to base for wash-out | | |
| Is a schedule of hazardous chemicals maintained? | | |
| **EMERGENCY/ INCIDENT RESPONSE** | | |
| Were emergency/ incident procedures implemented as required? | | |
| **INCIDENTS** | | |
| Are Environmental Incident Reports completed and investigated? | | |

**SIGNED:**..... **DATE:**

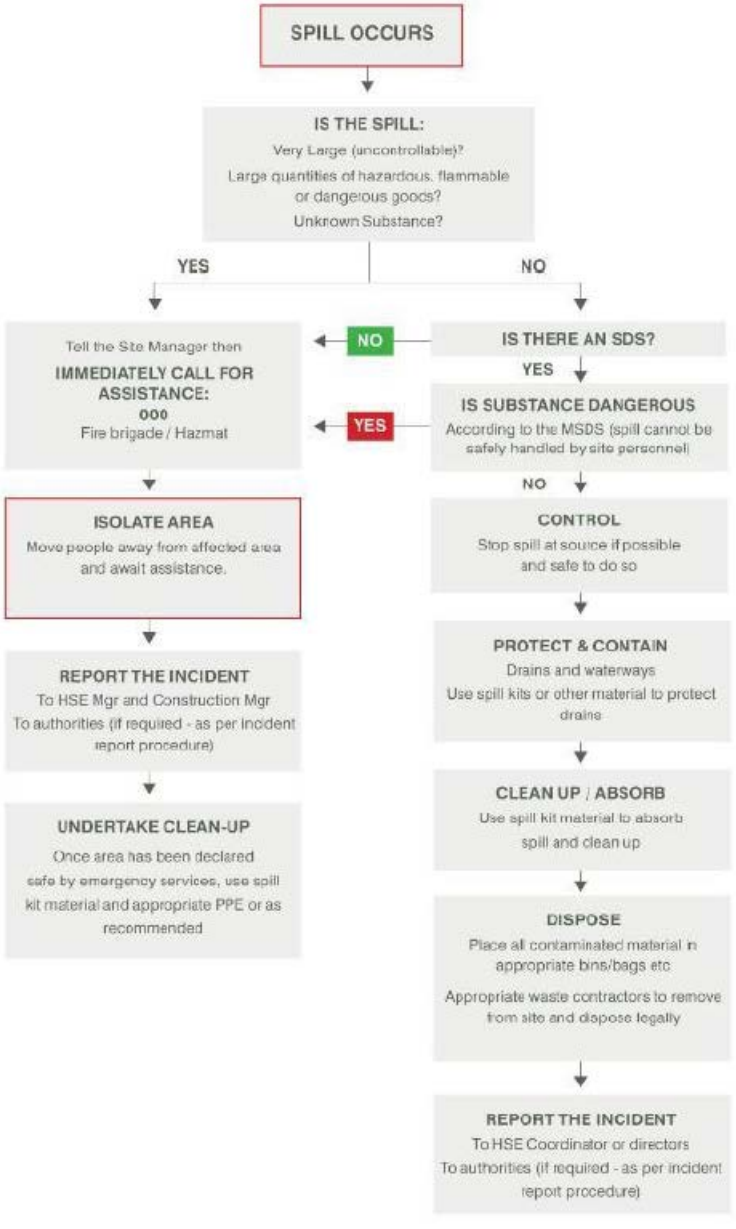
(Site Manager)

**REVIEW/SYSTEM CHECK:**
**Environmental Weekly Checklist has been reviewed. All necessary NCRs have been raised.**

**SIGNED:**..... **DATE:**

(Project Manager)

# Appendix D Spill Response Procedure


SPILL OCCURS
IS THE SPILL:
Very Large (uncontrollable)?
Large quantities of hazardous, flammable or dangerous goods?
Unkrown Substance?
YES
NO
Tell the Site Manager then
IMMEDIATELY CALL FOR ASSISTANCE:
000
Fire brigade / Hazmat
NO
IS THERE AN SDS?
YES
IS SUBSTANCE DANGEROUS
According to the MSDS (spill cannot be safely handled by site personnel)
YES
NO
ISOLATE AREA
Move people away from affected area and await assistance.
CONTROL
Stop spill at source if possible and safe to do so
PROTECT & CONTAIN
Drains and waterways
Use spill kits or other material to protect drains
REPORT THE INCIDENT
To HSE Mgr and Construction Mgr
To authorities (if required - as per incident report procedure)
CLEAN UP / ABSORB
Use spill kit material to absorb spill and clean up
UNDERTAKE CLEAN-UP
Once area has been declared safe by emergency services, use spill kit material and appropriate PPE or as recommended
DISPOSE
Place all contaminated material in appropriate bins/bags etc
Appropriate waste contractors to remove from site and dispose legally
REPORT THE INCIDENT
To HSE Coordinator or directors
To authorities (if required - as per incident report procedure)

# Appendix E Waste Management Plan

LINDFIELD LEARNING VILLAGE

# Construction Waste Management Plan

1824

# Waste Management and Resource Recovery

Taylor Construction Group and Subcontractors shall adopt the hierarchy of waste – avoid, reduce, recycle/reprocess and dispose to maximise resource recovery and minimise disposal wherever possible and practical. The importance of appropriate waste management practices is to be included in the site induction.

Sites are to be provided with suitable bins and skips for appropriate collection and separation of waste and recyclables, and these are to be collected with appropriately qualified and licensed (where required) waste contractors.

Prior to disposal, wastes must be classified in accordance with the DECCW's Waste Classification Guidelines (April 2008) prior to transporting waste off site. Waste receipts must be kept for legal requirements and details of waste separated and disposed of is to be documented. Contractors are to provide monthly reports of materials disposed from site.

Taylor Construction Group will ensure the procedures are followed as outlined in each of the plans provided for waste management. See attached appendices.

1. Dump It- Waste and Recycling Process & Flow
2. Foresight Environmental- Construction and Demolition Waste Management Plan
3. Pure Contracting- Asbestos Removal Control Plan

Condition B32, the following can be found as indicated:

a. Estimated quantities can be found within Foresight Plan pages 6-7.
b. Removal of hazardous materials, particularly Asbestos can be located within the Pure contracting plan page 11
c. Air monitoring and clearance is identified in the Pure Contracting plan pages 12-13.

# Appendix 1- Dump it Bins

Waste and Recycling Process & Flow
Written and Implemented for:-

Taylor Construction Group

Project:- Lindfield Learning Village –
100 Eaton Rd, Lindfield NSW 2070

# Contents

# 1. Overview

This document is designed to outline the Waste & Recycling process that is used at Calleija Waste Management. It is the only process that will be used for all product "Waste" that is collected and processed by all associated area of the company, i.e. Dump It Bins & Dump it Recycling Centre. Although this document is in line with our standard processes and procedures it has been updated for use with the:-

Taylor Constructions, Lindfield Learning Village – 100 Eaton Rd, Lindfield NSW 2070

This project is expected to generate predominately Mixed Construction and Demolition Waste and a small quantity of site office/food waste.

# 2. Definitions

## Section 2.01 Abbreviations

### (a) Waste

This is any product transported from customer sites to our facilities. This is mostly but not limited to transport by Dump It vehicles.

### (b) Product

Product is the material that comes through our skip bins and our recycling facility. It is generally what our customers classify as waste.

### (c) Recycling

This is the part of the process where products are broken down and reused. This may all happen at one place or separate places. For example, Ferrous Metals otherwise known as Scrap Steel are taken to one facility and melted down into ingots that are then taken to another facility to be remelted and turned into a new product.

### (d) Reuse

Where a product is reused in its original form straight from our yard

### (e) Sorting

The process of separating product from "Mixed Waste" so it can go to the correct destination for recycling or reuse.

## Section 2.02 Waste Types

### (a) All waste types used within our companies are aligned with those set out by the Environmental Protection Authority and are as follows:-

| Description of waste | Code |
|---|---|
| Aggregate, roadbase or ballast | AGG |
| Aluminium (non-ferrous) | AL |
| Asbestos (N220) | ASB |
| Ashes | ASH |
| Batteries | BATT |
| Bricks or concrete | BC |
| Biosolids or manures | BIO |
| Ceramics, tiles, pottery | CER |
| Commingled recyclables | COMM |
| Composts or mulches | COMP |
| Contaminated soil | CONT |
| Dredging spoil | DSP |
| E-waste | EWASTE |
| Ferrous (iron or steel) | FE |
| Food or kitchen | FOOD |
| Glass | GLASS |
| Mattresses | MATT |

| | |
|---|---|
| Mixed waste * | MIX |
| Non-ferrous (metals, not iron steel or aluminium) | NFE |
| Oil | OIL |
| Paper or cardboard | PAPER |
| Plasterboard | PB |
| Pharmacy or clinical | PHARM |
| Plastic | PL |
| Problem Waste | PROB |
| Residues or rejects | RES |
| Shredder floc | FLOC |
| Soil (not contaminated or VENM) | SOIL |
| Textiles, rags | TEXT |
| Tyres | TYRE |
| Vegetation or garden | VEG |
| Virgin excavated natural material | VENM |
| Veterinary waste | VET |
| Wood, trees or timber | WOOD |

Note: * For loads which contain more than one waste type, the 'description of waste' and 'Code' should be mixed waste and MIX respectively.

# 3. Our Process

## Section 3.01 General compliance with Green Star Criteria

### (a) Aim

To provide a service to our customers that is equivalent or better than The Green Star Building Council of Australia requirements for both waste contractors and waste processing facilities as outlined below.

## Section 3.02 Waste contractors compliance

### (a) Aim

Maintain accurate records on weight of waste removed from customer's sites and final location of this waste.

### (b) Requirement

To be able to provide accurate reports on monthly and cumulative weight and final location of waste removed from customers sites. Maximum allowable error of 5%.

### (c) Our process

As detailed in our process below all wastes are brought through our own Smithfield facility which has a certified weighbridge. This allows us to accurately record the source and weight of all waste at time of entry to satisfy the requirements as detailed by the Green Star Council of Australia.

While the maximum allowable margin of error by the Green Star Council is 5% our process has been designed to encourage a 0% error.

## Section 3.03 Waste processing facility compliance

### (a) Aim

To ensure our service to our customers is fully licenced and outbound waste is diverted from landfill. This means we are complaint with both Criterion One and Two as nominated by the Green Star Council of Australia.

All waste received at our facility is tipped and sorted through a rigorous process involving machine and plant equipment as well as manual labour.

We are currently removing the following waste streams from each and every bin that comes through our site:-

Brick

Concrete

Timber

Plasterboard

All metals

Through this process we are already receiving around 90% recycling rates and continually improving through the use of our strategic partners that further sort and recycling all other products leaving our facility.

### (b) Criterion one

We are currently hold and will maintain our local government & EPA licencing at our Smithfield facility. Waste licence is available by contacting us or from the EPA Website EPA Public Register

Our DA is not obtainable through our local government but we are happy to provide the information on request.

### (c) Criterion two

#### *(i) Requirement 1*

Our Smithfield site is in no way linked to a landfill site and therefore clear separation from landfill is easily demonstrated. It is a requirement of our Waste Licence that we have an auditable trail available to the EPA for all product to and from the site.

#### *(ii) Requirement 2*

To maintain our both, local government & Environmental Protection Agency approved, licenced waste facility we already maintain an auditable trail for all material onto and off the site as set out in the EPA guidelines. NSW Waste Regulation

#### *(iii) Requirement 3*

Weighbridge & operational procedures have been reviewed by the EPA and are a part of maintaining our current EPA licence. NSW Waste Regulation

#### *(iv) Requirement 4*

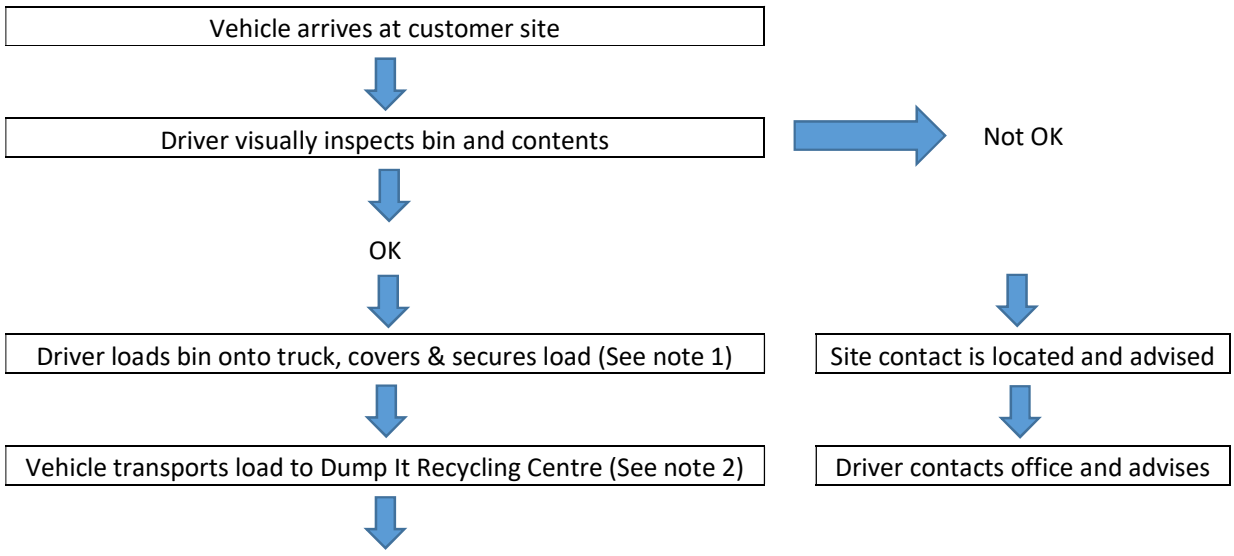
Source and fate of all inbound and outbound waste are also part of maintaining our current EPA licence. NSW Waste Regulation

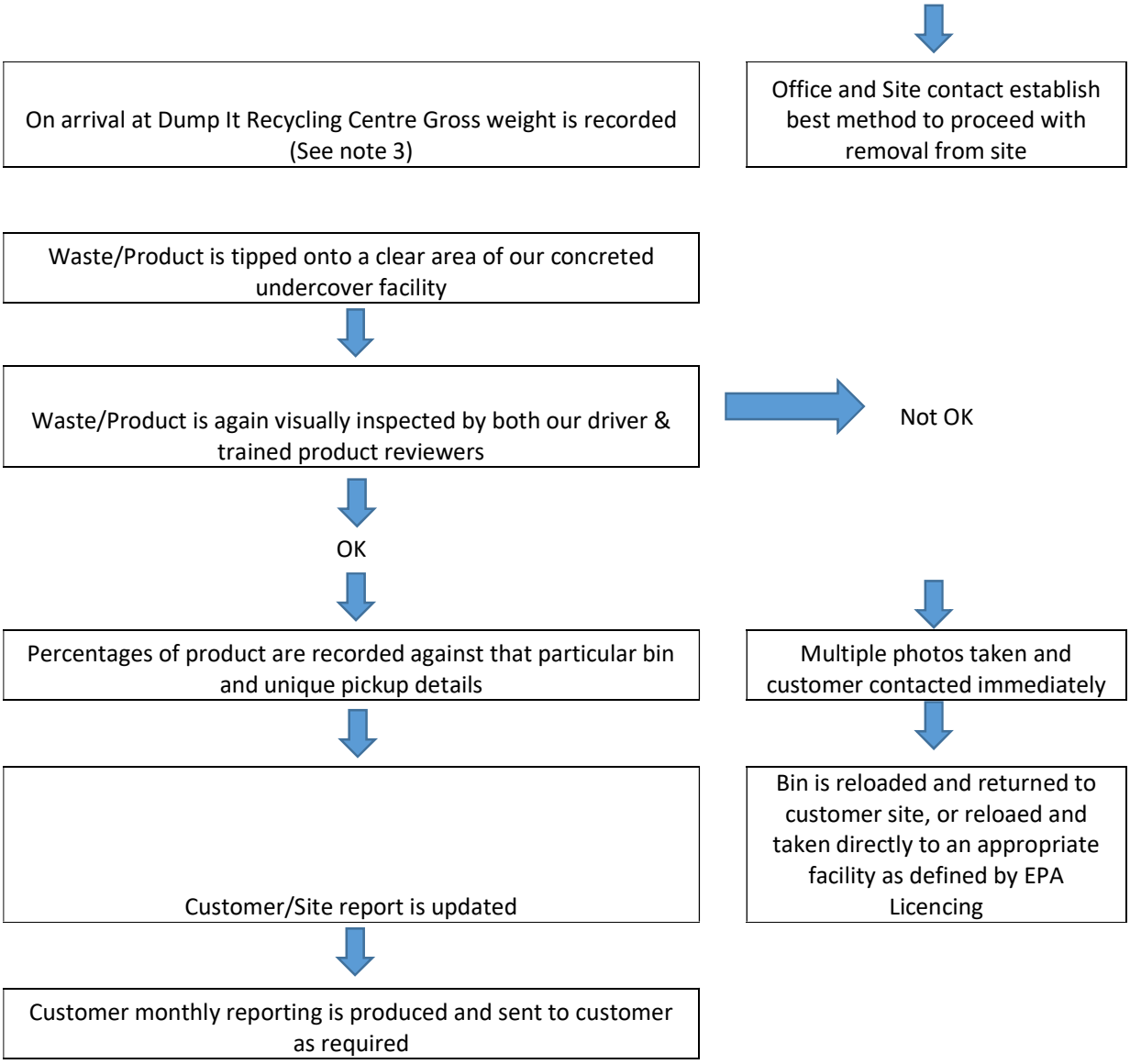
### (d) Criterion three

While Dump It have not become certified members of the Green Building Council we have commenced the process and hope to have our certification in 2018.

We already are continually checked on the output of all product and are willing to show you our monthly EPA submissions to verify that we are committed to not sending anything to landfill.

## Section 3.04 The Process Flow






| | |
|---|---|
| Note 1 | Vehicle is loaded in accordance with our standard operating procedures, load is secured in line with RMS & State Law |
| Note 2 | All vehicle movements are tracked by our third party vehicle tracking partner "C Track" |
| Note 3 | All weights are determined using our approved and certified weighbridge |

# Appendix 2- Foresight Environmental

FORESIGHT ENVIRONMENTAL

# Lindfield Learning Village

# 100 Eton Road, Lindfield

## Construction & Demolition Waste Management Plan

Prepared by Foresight Environmental

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w. www.foresightenvironmental.com

This report is based on information provided by The NSW Department of Education c/o Designinc Sydney Pty Ltd coupled with Foresight Environmental's knowledge of waste generated within the education and commercial sectors. To that extent this report relies on the accuracy of the information provided to the consultant. It has been compiled by Foresight Environmental on behalf of Designinc Sydney.

This report is not a substitute for legal advice on the relevant environmental related legislation, which applies to businesses, contractors or other bodies. Accordingly, Foresight Environmental will not be liable for any loss or damage that may arise out of this project, other than loss or damage caused as a direct result of Foresight Environmental negligence.

| Revision No. | Issue date | Author | Reviewed by | Reason/comments |
|---|---|---|---|---|
| 1 | 13 March 2017 | Scott Ebsary | Sandy Casaroli | Initial issue for review |
| 2 | 15 March 2017 | Scott Ebsary | Patrick Arnold | Update comments regarding stage 2 |
| 3 | 27 March 2017 | Scott Ebsary | Patrick Arnold | Combine staged analysis and add collection vehicle details |

# Table of Contents

# 1. Introduction

This construction and demolition waste management plan (WMP) has been prepared by Foresight Environmental on behalf of the New South Wales Department of Education (the 'Applicant'). It accompanies an Environmental Impact Statement (EIS) prepared in support of State Significant Development Application SSD 8114 for the development of 'Lindfield Learning Village' in the former UTS Ku-ring-gai Campus at 100 Eton Road, Lindfield, NSW (the site). The site, is located within Ku-ring-gai Municipal Council LGA.

It is proposed to refurbish the existing building to accommodate 2124 students in six home bases, each comprising 354 students ranging in ages from Kindergarten to year 12. The new school is currently to be known as the Lindfield Learning Village (the School) and will contain 'state of the art' collaborative learning spaces, shared educational facilities, open play spaces, auditorium and gymnasium in a landscaped Australian bush setting.

The purpose of this operational waste management plan is to outline the systems and practices involved in managing waste and recycling during the demolition and construction phase of the development as detailed within the EIS.

# 2. Overview of Development

The proposed development at the former UTS Ku-ring-gai campus consists of extensive internal demolition works involving the removal of many internal brick and framework walls, removal of asbestos-lined external glazing, removal of carpet and other existing internal surfaces and fixtures.

Construction of the proposed Lindfield Learning Centre consists of:

- Shared facilities including gymnasium, auditorium, cafeteria/dining and other specialist learning spaces, including science labs etc;
- Administration area for the whole school;
- Research space for PhD students;
- A 40-unit childcare

The following tables provide details on the waste estimates and collection protocols for the proposed development during demolition and construction phases.

# 3. Waste Generation Estimate

The aim of this Plan is to ensure that all waste resulting from construction and demolition activities is managed in an effective and environmentally aware manner. Specifically,

- To maximize the reuse and recycling of demolition and construction materials
- To reduce the volume of materials going to landfill
- To maximise waste material avoidance and reuse on site
- To ensure that where practicable, an efficient recycling procedure is applied to waste materials
- To ensure efficient storage and collection of waste

The following waste estimates address the stage 1 and stage 2 works of the proposed Lindfield Learning Centre development which consists of the extensive internal demolition and construction of six home bases. The waste quantity estimates and materiality are based on the cost plan provided by DesignInc Sydney.

## 3.1 Demolition

The testing and classification of any excavated material is not covered in this report. Where necessary separate specialist testing should be conducted by the project managers.

If acid sulphate soils are present on site, a separate management plan will need to be prepared for handling and disposal of such soil.

Based on the quantity survey provided to Designinc Sydney, it is estimated that approximately **3,986m$^3$** of waste will be generated during the demolition/excavation phase of the stage 1 works of the development. The following table details the estimated composition by area or volume of demolition waste to be generated.

Table 1 - Composition of stage 1 demolition waste by volume

| Material | M$^3$ |
|---|---|
| Bricks | 1039 |
| Plasterboard | 909 |
| Concrete | 678 |
| Asbestos | 407 |
| Timber | 335 |
| Glazing | 319 |
| Carpet | 239 |
| Metal | 199 |
| General Residual | 80 |
| Recycling residual | 80 |
| **Total** | **3,986** |

## 3.2 Construction

The quantity of waste materials to be generated onsite are estimates based on the information provided to Foresight Environmental and therefore the systems that will be put in place need to incorporate flexibility to allow for variation in the total quantities generated. Active site management during the construction phase will ensure all waste/recyclable materials are disposed of appropriately and that all waste receptacles are of sufficient capacity to manage onsite activities.

Table 2 below details the estimated composition by area or volume of construction waste to be generated during the construction works.

Table 2 - Composition of stage 1 construction waste by volume

| Material | $M^3$ |
|---|---|
| Timber | 311 |
| Concrete | 277 |
| Plasterboard | 198 |
| Glazing | 119 |
| Carpet | 90 |
| Paint | 43 |
| General Residual | 40 |
| recycling residual | 40 |
| **Total** | **1,116** |

# 4. Waste Management Strategy

The following waste hierarchy will be used as a guiding principle:


## Avoid and Reduce

Minimise the production of waste materials in the construction process by

- Assessing and taking into consideration the resultant waste from different design and construction options
- Purchasing materials that will result in less waste, which have minimal packaging, are pre-cut or fabricated.
- Not over ordering products and materials

## Reuse

Ensure that where ever possible, materials are reused either on site or offsite

- Identify all waste products that can be reused
- Put systems in place to separate and store reusable items
- Identify the potential applications for reuse both onsite and offsite and facilitate reuse

## Recycling

Identify all recyclable waste products to be produced on site

- Provide systems for separating and stockpiling of recyclables
- Provide clear signage to ensure recyclable materials are separated
- Process the material for recycling either onsite or offsite

Note: In some cases it may be more economical to send the unsorted waste to specialised waste contractors who will separate and recycle materials at an offsite location.

## Disposal

Waste products which cannot be reused or recycled will be removed and disposed of. The following will need to be considered:

- Ensure the chosen waste disposal contractor complies with OEH requirements
- Implement regular collection of bins

# 5. Waste Management Systems

## 5.1 Onsite and Offsite Systems

Table 3 – Waste management systems (demolition)

| Material | Estimated volume ($m^3$) | Onsite (re-use or recycle) | Offsite (recycling contractor) | Disposal (contractor and landfill site) |
|---|---|---|---|---|
| Bricks | 1,039$m^3$ | | Separated onsite then transported to brick recycling facility | |
| Plasterboard | 909$m^3$ | | Stockpiled onsite and collected by plasterboard supplier/recycler or taken to appropriate recycling facility | |
| Concrete | 678$m^3$ | | Removed from site as required for recycling/reuse at C&D facility for processing. | |
| Asbestos | 407$m^3$ | | | A licensed asbestos contractor will be engaged to dismantle and dispose of asbestos as per legislative requirements – a separate asbestos management plan will be produced detailing the safe disposal of the material |
| Timber | 335$m^3$ | | Separated onsite then returned to supplier for re-use if appropriate or transported | |

| | | | | |
|---|---|---|---|---|
| | | | timber recycling yard | |
| Glazing | 319m$^3$ | | Stockpiled and collected as required by specialty glass recycler or taken to appropriate C&D facility for separation and recycling | |
| Carpet | 239m$^3$ | | Stockpiled and collected as required by carpet supplier for recycling contractor | Unsuitable material will be taken to landfill for disposal |
| Metal | 199m$^3$ | | Stockpiled and collected as required by specialty metal recycler or taken to appropriate C&D facility for separation and recycling | |
| Residual general recyclables | 80m$^3$ | | Collected by contractor and disposed at appropriate recycling facility | |
| Residual general waste | 80m$^3$ | | | Collected by contractor and disposed at appropriate landfill |

Table 4 details the expected waste materials and management systems for the construction phase of the project.

Table 4 – Waste management systems (construction)

| Material | Estimated volume ($m^2$ or $m^3$ where indicated) | Onsite (re-use or recycle) | Offsite (recycling contractor) | Disposal (contractor and landfill site) |
|---|---|---|---|---|
| Timber | 311$m^3$ | | Separated onsite then returned to supplier for re-use if appropriate or transported timber recycling yard | |
| Concrete | 277$m^3$ | | Separated where possible and taken to concrete recycling facility – deposited onsite directly into skips or trucks to be removed from site. | |
| Plasterboard | 198$m^3$ | | Stockpiled onsite and collected by plasterboard supplier/recycler or taken to appropriate recycling facility | |
| Glazing | 119$m^3$ | | Stockpiled and collected as required by specialty glass recycler or taken to appropriate C&D facility for separation and recycling | |
| Carpet | 90$m^3$ | | Stockpiled and collected as required by carpet supplier for recycling contractor | Unsuitable material will be taken to landfill for disposal |
| Paint | 43L | | Clean tins recycled by metal recycler where possible | Residue/wash-off hardened and disposed appropriately |
| Residual general recyclables | 40$m^3$ | | Collected by contractor and disposed at appropriate recycling facility | |
| Residual general waste | 40$m^3$ | | | Collected by contractor and disposed at |

| | | | | |
|---|---|---|---|---|
| | | | | appropriate landfill |

Note: The quantities of construction and demolition waste materials have been estimated using industry guides for predicting waste quantities[1]. The figures in Table 3 and 4 above are estimates and are used as a guide for designing the waste management systems on site. These figures will be adjusted according to the final building material selection and quantities. The waste management systems will be adjusted as necessary.

It should be noted that there are multiple offsite recycling/disposal facilities available for the appropriate processing of the materials detailed above and the facility choice will depend largely on the waste contractor/supplier engaged.

## 5.2 Waste Vehicle Movements

Detailed information regarding onsite traffic management has been provided in the Traffic and Transport Assessment prepared by Arup (draft 3, 23 March 2017). An excerpt from that report is provided below relating to construction activity (including waste collection):

*The level of construction traffic will be low with up to 2 trucks per hour expected at busy times for removal of waste materials and delivery of new building materials.*

Waste collection vehicles would enter site via the Eton Road main access point within the standard construction operating hours (7am-6pm Mon-Fri, 8am-1pm Saturdays).

## 5.3 Contracts and Purchasing

Each subcontractor working on the site will be required to adhere to this Waste Management Plan.

The Head Contractor will ensure each subcontractor:

- Takes practical measures to prevent waste being generated from their work
- Implements procedures to ensure waste resulting from their work will be actively managed and where possible recycled, as part of the overall site recycling strategy or separately as appropriate
- Ensures that the right quantities of materials are ordered, minimally packaged and where practical pre fabricated. Any oversupplied materials are returned to the supplier
- Implements source separation of off cuts to facilitate reuse, resale or recycling.

[1] McGregor Environmental Services (2000) Predicting C&D waste quantities in the Inner Sydney Waste Board Waste Planning Guide for Development Applications-Planning for Less Waste (1998) NSW Waste Boards

The Site Manager will be responsible for:

- Ensuring there is a secure location for on-site storage of materials to be reused on site, and for separated materials for recycling off site.
- Ensuring all skips/bins/stockpiles are clearly labeled identifying which material is suitable for each receptacle
- Engaging appropriate waste and recycling contractors to remove waste and recycling materials from the site
- Co-coordinating between subcontractors, to maximise on site reuse of materials
- Monitoring of bins on a regular basis by site supervisors to detect any contamination or leakage
- Ensuring the site has clear signs directing staff to the appropriate location for recycling and stockpiling station/s. And that each bin/skip/stockpile is clearly sign posted
- Providing training to all site employees and subcontractors in regards to the WMP as detailed in section 5.3 below.
- Should a subcontractor cause a bin to be significantly contaminated, the Site Manager will be advised by a non-conformance report procedure. The offending subcontractor will then be required to take corrective action, at their own cost. The non-conformance process would be managed by the Head Contractors' Quality Management Systems
- Retaining demolition and construction waste dockets to confirm and verify which facility received the material for recycling or disposal.

## 5.4 Training and Education

All site employees and sub-contractors will be required to attend a site-specific induction that will outline the components of the WMP and explain the site-specific practicalities of the waste reduction and recycling strategies outlined in the WMP.

All employees are to have a clear understanding of which products are being reused/recycled on site and where they are stockpiled. They are also to be made aware of waste reduction efforts in regards to packaging.

The site manager will post educational signage in relation the recycling activities on site in breakout areas, lunch rooms etc.

# Appendix 3- Pure Contracting

PURE CONTRACTING
Specialist Solutions

4/31-33 Nyrang Street
Lidcombe NSW 2141
P: 02 8016 2400
F: 02 8016 2499
ABN: 54 154 400 950

# ASBESTOS REMOVAL CONTROL PLAN

| | | |
|---|---|---|
| **Project:** | UTS Learning Village – Eton Rd Linfield | |
| **Revision:** | A | |
| **Distribution:** | | |
| | Pure Contracting – Project Manager | James Low |
| | Pure Contracting – Asbestos Supervisor (Competent Person) | Bich Kim |
| **Prepared By:**<br><br>**James Low**<br>**Project Manger** | To be reviewed with amendments or additions clearly shown and then signed off by the Pure Contracting Asbestos Supervisor<br><br>Sign: ……<br><br>Print Name:…….. | |
| **Date:** | 10 August 2018 | |

# Table of Contents

# Appendices

# Asbestos Introduction

### Purpose of this Asbestos Removal Control Plan

Asbestos poses a risk to health by inhalation whenever asbestos fibres become airborne in close proximity to people. Accordingly the best preventative measure to avoid such exposure is for high risk asbestos materials to be removed. Due to the inherent risk involved in removing an unstable and highly hazardous material, asbestos remediation works must be conducted under the strict guidance of the following documents:

- Code of Practice - How to Manage and Control Asbestos in the Workplace;
- Code of Practice - How to Safely Remove Asbestos;
- Guide Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]
- Work Health and Safety Regulation 2017;
- SafeWork NSW Regulations.

The purpose of this plan is to ensure that the asbestos removal project is well planned and carried out in a safe and professional manner.

# Project Outline & Asbestos Identification

### Project Description
Pure Contracting has been engaged by Prefect Contracting to carry out the removal of asbestos containing materials from UTS Learning Village Stage 1

### Site Location
The site is located at Eton Rd Linfield.

### Site Description
The site is currently an unoccupied University Building.

### Surrounding Sites
The site is surrounded by commercial and residential buildings.

### Project Team

| Name | Position | Contact Details |
|---|---|---|
| James Low | Project Manager | 0402 163 007 |
| Bich Kim | Asbestos Supervisor | 0432 402 300 |
| James Low | Systems Manager | 0402 163 007 |

### Roles & Responsibilities
The role of the project manager is to ensure the overall smooth running of the project. His responsibilities include client liaison, safety management, financial control and ensuring that the works are carried out in accordance with the terms of the contract and relevant Codes and Regulations.

The asbestos supervisor (competent person) is responsible for managing the works on site in a safe and professional manner. He coordinates his works to ensure that the project runs smoothly and without incident. He also works hand in hand with the asbestos assessor to ensure that the works are carried out in accordance with the contract conditions, the WHS Regulation 2017 and the relevant Codes of Practice.

The Systems Manager is responsible for the development of the project management plans. He provides assistance to the project team throughout the project to ensure that the management plans are implemented, amended and updated as required.

### Asbestos Identification
The asbestos materials survey undertaken by Green Cap has indicated the presence of asbestos in the following locations within the on site:

| Type | Item Description | Quantity | Location |
|---|---|---|---|
| Non Friable | Mastic to windows | All windows | Throughout building |
| Non Friable | Asbestos roof tiles | 700m2 | Roof top |
| Non Friable | Electrical backing boards | Unknown | Unknown |
| Friable | Fire Doors | Unknown | Unknown |

# Hazard Identification and Risk Control

## Risk Assessment

An overall worksite OHS and Environmental hazard identification and risk assessment will be carried out and documented before works commence. The identified hazards and risk controls will then be incorporated into the Safe Work Method Statements.

## Safe Work Method Statements

Safe Work Method Statements (SWMS) identify the safety controls that must be put in place to minimise identified risks as part of the hazard assessment. SWMS have been developed as per IMS-SP-21 Developing Safe Work Method Statements procedure.

At the start of each shift the supervisor will assess the adequacy of the SWMS to current site conditions and will document any hazards not controlled by the existing SWMS. The daily toolbox will document any additional hazardous and control measures highlighted during this review.

It is the responsibility of the supervisor to ensure that the control measures adopted are monitored in both their implementation and also their ongoing adequacy for the activity. It is also the responsibility of those undertaking the work to inform supervisor/management if the proposed controls are inappropriate.

## OHS & Environmental Performance Monitoring

To demonstrate compliance the supervisor will conduct regular inspections to monitor the performance of safety and environmental controls implemented on site. Any actions resulting from the inspections will be promptly resolved. The project manager will ensure that project performance is evaluated on a regular basis. This will include a review of inspections records, complaints, enquires received, incidents and accidents.

# OHS &R Issues & Project Training

## OHS Communications

To ensure consistency and to gain employee commitment Pure Contracting encourages open and honest communication between all team members. A number of methods such as daily tool box meetings will be adopted on site to ensure that this is achieved.

OHS issues can be more readily resolved when there is cooperation and consultation in identifying potential hazards, assessing the risks and proposing control measures. However all employees are encouraged to participate in all stages of the design and planning of work procedures during Pre-Start Meetings, Toolbox Meetings or through developing the Safe Work Method Statement.

Workers or their representatives will be consulted regarding proposed changes to the work environment, processes or practices, proposed corrective actions and purchasing decisions that could affect their health and safety.

Employees are encouraged to contribute to the decision making process and be involved in the development of work practices, SWMS's and other documents and procedures.

## Training

- All project personnel will be trained to a sufficient level of competency that will enable each person to carry out all required tasks in a safe manner.
- All training will be provided through authorised or accredited trainers /assessors.
- Training will be ongoing to ensure that a continuous improvements process is maintained.

## Project Training Needs

- All asbestos removal personnel will hold friable asbestos removal tickets for friable works and non-friable tickets for non-friable removal as a minimum
- Supervisors will be SafeWork NSW accredited competent persons
- Supervisors will be trained in first aid
- Personnel required to operate EWP's will be ticketed

# Notification & Preparation

### SafeWork NSW Notification

The SafeWork Authority of NSW will be notified 5 days prior to the commencement of works. An approved notification for Asbestos Removal will be in place prior to removing any asbestos containing materials.

### Site Specific Preparation

- All relevant stakeholders including the person in control of the workplace will be notified in writing prior to the commencement of asbestos removal works.
- In a commercial premises the person in control of the premises is to notify the following persons before work commences-
  - Workers at the workplace
  - Tenants/business owners in the immediate area of the works
  - The person who commissioned the works
- In a domestic premises Pure Contracting will notify the following persons before work commences-
  - Occupier/owner of the premises
  - Tenants/business owners in the immediate area of the works
  - The person who commissioned the works
- Copies of licences, permits, notification receipts, personnel training records and insurances will be provided on site and will be issued to the client.
- The project manager and supervisor will identify the location of all asbestos on site using the asbestos materials survey compiled by Green Cap.
- Safe Work Method Statements will be discussed, agreed on and amended if necessary in conjunction with the workers, the project manager and the supervisor prior to the commencement of any removal works.

### Program of Works

| | |
|---|---|
| Planned Asbestos Removal Start Date | 20/08/18 |
| Intended Asbestos Removal Completion Date | TBA |

### Activity Induction & Toolbox Training

All personnel on site will complete a site specific induction with Prefect Contracting & Taylor. As a component of the site induction Pure Contracting personnel will provide appropriate tickets/documents for their assigned task on site, which in turn will be recorded by the client's representative

Established communication lines including Toolbox Talks will be used to continue the consultation process throughout the duration of the project. In addition to the site specific induction, all personnel involved in asbestos removal will undertake inductions in the job-specific SWMS. All aspects of the job-specific SWMS will be discussed during these inductions and continual consultation will take place via daily Toolbox Talks. Details of personnel inducted into each SWMS will be included in the sign-off at the last page of the document

Employees are encouraged to contribute to the decision making process and be involved in the development of work practices, SWMS's and other documents and procedures.

| | |
|---|---|
| Frequency of meeting: | Daily and/or when required |
| Attendance: | Site based workforce |
| Chair: | Project Manager/Supervisor |

# Asbestos Removal Procedure

### Site Set-up

- Ensure that all access-ways are sealed to prevent unauthorised access.
- Ensure the work area is free of hazards – i.e. trip, slips and falls.
- All tools and equipment are to be tested and tagged by a qualified and competent person to confirm that they are in working order.
- Adequate water and power supplies are to be available prior to the commencement of any work.
- Ensure that there is a sign-off in place confirming that all permanent power, smoke sensors and air conditioning have been terminated in the work area.

### Work Site Set-up

- Establish boundaries and erect asbestos signs around the asbestos removal work area and the asbestos removal site boundary. Exclusion zone limits will be determined in consultation with the licenced assessor/competent person.
- The signs should conform to the AS1319 – Safety Signs for the Occupational Environment.
- Decontamination facilities will be established immediately adjacent to and directly connected to the asbestos removal work area.
- For internal works 200um plastic is to be used to seal all openings and is to be laid over the entire removal work area.

### Non-Friable Removal Procedure

Removal of asbestos is to be performed in accordance with the "Code of Practice - How to Safely Remove Asbestos".

The following procedures will be conducted throughout the removal works:

- Pure Contracting daily toolbox talks completed on a daily basis outlining results of previous days air monitoring and issues/improvements to be undertaken to improve the progress/effectiveness of the project.
- The licenced assessor/competent person will complete daily air monitoring, clearance inspections (where required) and clearance air monitoring (where required).
- The licenced assessor/competent person will to complete and forward daily air monitoring reports to Pure Contracting and Prefect Contracting/ Taylor on a daily basis.
- The licenced assessor/competent person will undertake daily inspections of the works.
- The licenced assessor/competent person will report non-conformance issues to the Pure Contracting supervisor, ongoing non-conformance issues will be elevated and reported to Pure Contracting management and Prefect Contracting/ Taylor

Asbestos cement roof tiles

- The asbestos cement sheeting is to be removed with care to minimise breakage
- Small hand tools including hammers and pinch bars are to be used to remove the materials ensuring that it is kept wet down at all time to minimise the release of fibres.
- The removed asbestos materials are to be continually placed into asbestos rated bulka bags that are to be craned over the roof and into skip bins
- Once the asbestos materials have been completely removed the work area is to be detailed using HEPA vacuums and by wet wiping all surfaces.
- Once the removal work is complete the area will be independently inspected by the licenced assessor/competent person.

- Once notified by the licenced assessor/competent person the containment/exclusion zones will be removed. All material used to construct the containment/exclusion zones will be disposed of as asbestos waste.
- The area will then be handed back to the client.

## Asbestos containing mastic to windows

- All work at heights will be performed from mobile scaffolds/platform ladders/EWP/Roof anchor points
- All works to be completed from working internally on each floor
- Remove the opening window section of the window frame by lifting it out of the hinge pin locations
- Remove the plaster/timber trim around the window frame to expose the brackets holding the window frame in place
- Cut the holding brackets with a sabre saw
- Release the window frame from the opening using a pinch bar and place it on the floor
- Remove mastic residue from the window frames using hand scarpers
- Place mastic into asbestos bags
- At the completion of the works the removal area is to be detailed with HEPA vacuums and by wet wiping.
- Once notified by the licenced assessor/competent person the containment/exclusion zones will be removed. All material used to construct the containment/exclusion zones will be disposed of as asbestos waste.
- The area will then be handed back to the client.

## Asbestos containing electrical backing boards

- Ensure that there is a sign-off in place confirming that the power to the board has been terminated.
- The asbestos containing backing board is to be removed with care to minimise breakage
- Small hand tools and power tools are to be used to remove the fixings so that the board can be removed in one piece.
- The removed board is to be bagged or wrapped in 200um plastic directly after the removal process.
- Once the asbestos materials have been completely removed the work area is to be cleaned using HEPA vacuums and by wet wiping all surfaces.
- Once the removal work is complete the area will be independently inspected by the licenced assessor/competent person.
- Once notified by the licenced assessor/competent person the containment/exclusion zones will be removed. All material used to construct the containment/exclusion zones will be disposed of as asbestos waste.
- The area will then be handed back to the client.

## Asbestos fire doors

- The fire door is to be wrapped in 200um black plastic.
- The door is then to be removed by unscrewing the hinge from the door frame or by removing the hinge pin.
- All door hardware is to be left on the door.
- The immediate area is to be detailed with HEPA vacuums and by wet wiping
- Once the removal work has been completed the area is to be independently inspected by the licenced assessor.
- Once notified by the licenced assessor the containment/exclusion zones will be removed. All material used to construct the containment/exclusion zones will be disposed of as asbestos waste
- The area will then be handed back to the client.

## Decontamination Procedure

Decontamination procedures will be followed each time personnel leave the asbestos removal work area. No external personnel are to enter the work area without permission of the supervisor. All equipment (tools, scaffolds, vacuums etc) will be appropriately cleaned and inspected prior to removal from site.

The following decontamination procedures will be performed each time personnel leave the work area:

- Workers are to remove all visible fragments of asbestos from their work boots, respirator and coveralls using a HEPA vacuum and by wet wiping.
- Clean hands and face using wet wipes. Place wet wipes in asbestos bag.
- Remove coveralls and place in an asbestos bag.
- Asbestos bag is to be sealed and disposed of as asbestos waste
- Remove respirator and check for cleanliness.
- Proceed from the decontamination area.

Prior to removing tools, plant and equipment from the containment they will be cleaned and inspected by the asbestos assessor/competent person.

## Personnel Protective Equipment

All persons engaged in asbestos removal processes will wear approved PPE including but not limited to the following:

- Disposable hooded asbestos coveralls – Type 5.
- Approved safety footwear, gloves and eye protection
- A half face respirator (P2) is to be used. The respirator must be in accordance with AS1715 and AS1716. Records of fit tests are to be made available on site. All personnel are to be clean shaven
- Regular cleaning, inspection and maintenance of all PPE is conducted daily, with records collected and maintained.

## Load out Procedure

- Load out will be co-coordinated with the client.
- Asbestos waste is to be stored inside the removal work area but will not be allowed to stockpile. It will be removed from site on a regular basis.
- Asbestos waste bags will be loaded into the lined bin/truck ready for transport.
- Any improvements to this procedure will be assessed and raised by the licenced assessor/competent person and supervisor.

## Off-site Waste Disposal

All asbestos waste will be transported by our asbestos trained personnel in our EPA licensed tip trucks to a licenced landfill.

Disposal dockets issued at the landfill weighbridge will be forwarded to the client.

Additionally all waste weighing over 100kilos or greater than 10m2 will be tracked using the EPA Waste Locate Tracking System. This system allows all loads to be tracked from when they leave the collection point until they arrive and are disposed of at the licenced landfill facility.

The truck driver needs to download the Waste Locate QR Reader Application and register as a user on the system under Pure Contracting's account.

For each load the following procedure will be followed:

- The driver will log into the system and generate a consignment number using his smart phone
- He will collect the waste under the allocated consignment number
- On arrival at the licenced landfill and following disposal of the waste the driver will terminate the consignment number by selecting the deliver function in the system using his smart phone

### Tools and Equipment

The following tools and equipment will be required during the removal of asbestos:

- EWP
- Harnesses
- PPE
- Mobile scaffold
- Platform ladders
- 200um plastic
- Tape
- PVA
- Asbestos removal signage
- Asbestos bags
- HEPA vacuums
- Airless sprayer
- Hand tools
- Power tools

## Air Monitoring

### Asbestos Fibre Air Monitoring

As highlighted in the “Code of Practice - How to Safely Remove Asbestos” air monitoring is mandatory for works involving friable material and is recommended for non-friable removal. It assists in assessing exposure to asbestos and the effectiveness of implemented control measures.

Air monitoring will be undertaken on a daily basis during the duration of the works to ensure that the control measures in place are adequate.
Air monitoring will be conducted by a licenced asbestos assessor in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust 2nd Edition [NOHSC:3003(2005)].
The results will be sent for analysis to a NATA-accredited laboratory. On a daily basis the assessor will report on the outcome of the results and any improvements that may need to be made to the work method. Results will be displayed in the lunchroom.

### Note for Non-Friable Removal Work

In the case of non-friable (bonded) removal works the air monitoring and clearance inspections can be carried out by a competent person. A licenced asbestos assessor is only required for friable removal works

### Details of Licenced Asbestos Assessor/Competent Person.

Name: Paul Brown
Contact Number: 02 9621 8851
Assessor Number: LAA001011

## Health Monitoring

In accordance with the WHS Regulation 2017 health monitoring will be provided to all workers prior to carrying out any asbestos removal work and at least every 2 years thereafter.
The examination will be conducted by a registered medical practitioner and include the following:

- Consideration of the workers demographic, medical and occupational history;
- Consideration of records of the workers personal exposure;
- A physical examination of the worker with emphasis on the respiratory system including a standardised respiratory function test.

Medical reports will be provided to each worker after obtaining them from the medical practitioner

## Site Clearance

### Clearance Inspection

On completion of the asbestos removal works the following will occur:

- The asbestos removal work area will be thoroughly checked for any residual asbestos materials.
- If any remaining asbestos materials are located they will be placed into asbestos labeled bags, sealed and placed in the disposal bin.
- If applicable, remaining surfaces will be cleaned by wet wiping and/or vacuuming.
- The licenced assessor/competent person will undertake a comprehensive visual inspection of the asbestos removal works area to ensure that all visible asbestos has been removed.
- A final clearance certificate will be issued based on the visual inspection to confirm that all the works have been carried out in accordance with the Code of Practice and in line with SafeWork NSW regulations.
- The clearance will specify that all prescribed asbestos containing materials have been removed to a practical industry standard and the removal work area is now safe for re-occupation

### Dismantling Work Area

Once the final clearance certificate has been issued the following will occur:

- Materials used to construct the containment/exclusion zones will be removed/dismantled and placed into asbestos labeled bags and disposed of as asbestos contaminated waste.
- A final inspection by the supervisor and licenced assessor/competent person will be conducted to ensure the removal area is asbestos free and left in a satisfactory condition.
- Barriers and signage surrounding the asbestos removal area will be removed.

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# Procurement of Materials, Plant, Equipment & Maintenance

### Electrical equipment

All electrical equipment will to be inspected, tested and tagged prior to its arrival on site by a ticketed and competent person. At monthly intervals electrical equipment will be again inspected, tested and tagged.

### HEPA Vacuums

HEPA vacuums will be serviced as per the Pure Contracting Maintenance Schedule (6 month intervals). All units will be inspected and tagged prior to their arrival on site.

HEPA vacuums are to be cleaned externally by wet wiping and the contaminated content within the vacuum bags is to be removed and placed in 200um plastic bags within the asbestos removal work area at the completion of works.

All cleaning works or inspections of the HEPA vacuums is to be conducted within the asbestos removal work area wearing full PPE.

Before removing HEPA vacuums from the asbestos removal work area the HEPA vacuums are to be placed in 200um bags.

### Plant

All plant will be inspected prior to its arrival on site. All plant will be inspected at regular intervals whilst on site and log books to be filled in as required.

Only tools, equipment and plant listed in the SWMS's will be used for asbestos removal activities.

# Document Control

### Record Keeping

All HSE records will be maintained within the Site File which will be located within the work area.

The Supervisor will be responsible for:

- Establishing and maintaining a record system for the project to contain all records that may be used to provide objective evidence of conforming work and the effectiveness of the management system
- Ensuring records are filed in facilities that minimise deterioration or damage and prevent loss
- Ensuring records are legible
- Ensuring records are readily retrievable
- Ensure that all tipping dockets and tipping receipts are kept and submitted to the project manager
- Making records available to the client's representative when requested.

The Project Manager will be responsible for:

- Providing the required documents to the supervisor
- Providing assistance on record keeping to the supervisor
- Advising the supervisor on what records are to be kept
- Completing the Records register (IMS-SP02-F01) at the end of the project
- Providing tipping information to the client.

### Project Records Maintenance

Pure Contracting is committed to ensuring that all records required to manage the project according to the contract requirements, as well as our own requirements are created, stored and managed in accordance with our management system - refer to IMS-SP-02 Records Control.

Project records are any record generated to document the execution of the project but not including records that are commercial-in-confidence or relate to staff confidential matters.

## Incident Management

### Site Emergency Evacuation Procedure

As per clients procedure

### Asbestos Removal Area Emergency Evacuation Procedure

The supervisor is the first point of contact when an incident or accident occurs. He can be contacted 24 hours a day. Back up for the supervisor is provided by the project manager, the names and contact numbers of these people will be placed at the entry point of the works.

If an incident or accident occurs within a non-friable asbestos removal work area the injured person is to be removed from the asbestos removal work area as soon as possible and first aid is to be administered. If required emergency services will be contacted.

During an emergency situation decontamination procedures can be wavered.

All incidents and accidents are to be recorded using our CAPA system. Recorded CAPA's are to be investigated, rectified and closed off within a responsible time frame by the supervisor and the project manager.

# Appendices

## Appendix A – Friable Asbestos Licence

# FRIABLE ASBESTOS REMOVAL LICENCE

Issued under the *Work Health and Safety Regulation 2011* (NSW). This licence is not transferable.

**Licence:** AD210803

**Licence class:** Class A

**Licence period:** From: 08/12/2013 To: 07/12/2018

**Licence holder name:** Pure Contracting Pty Ltd

**ABN:** 54 154 400 950

**ACN:** 154 400 950

**Address:** U 4 33 Nyrang St LIDCOMBE NSW 2141

### Description of the work that can be undertaken under this licence

- All friable asbestos removal work.
- All non friable asbestos removal work.

### Licence Holder Obligations

A nominated supervisor must be present at the site whenever licensed friable asbestos removal work is being carried out and is readily available to attend the site when licensednon friable asbestos removal work is being carried out.

This licence document must be available for inspection.

All licensed asbestos removal work is to be notified to WorkCover NSW at least 5 days prior to the work commencing.

The licence holder must notify WorkCover NSW in writing of any changes in licence or supervisor details within 14 days.

WC03116 0611

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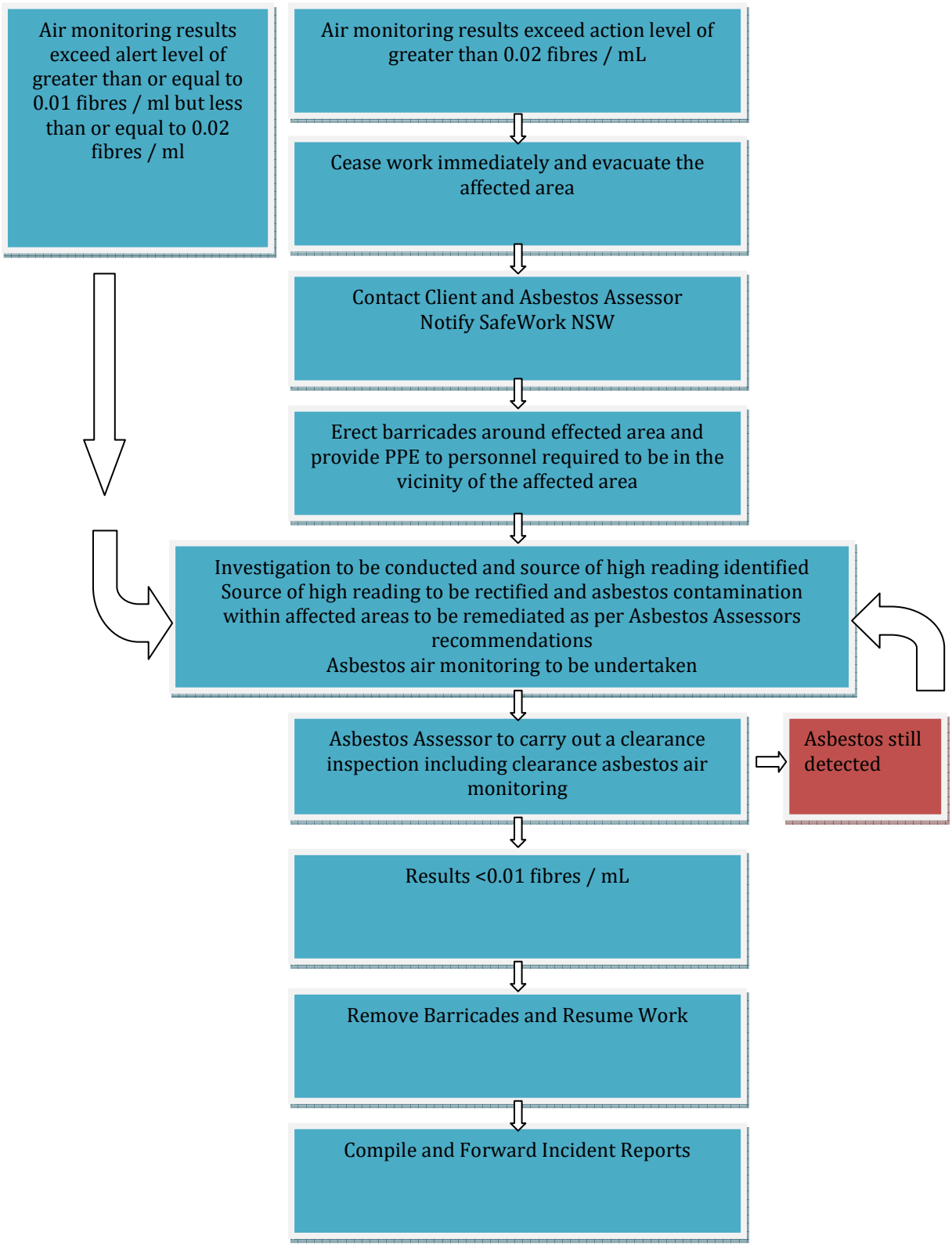
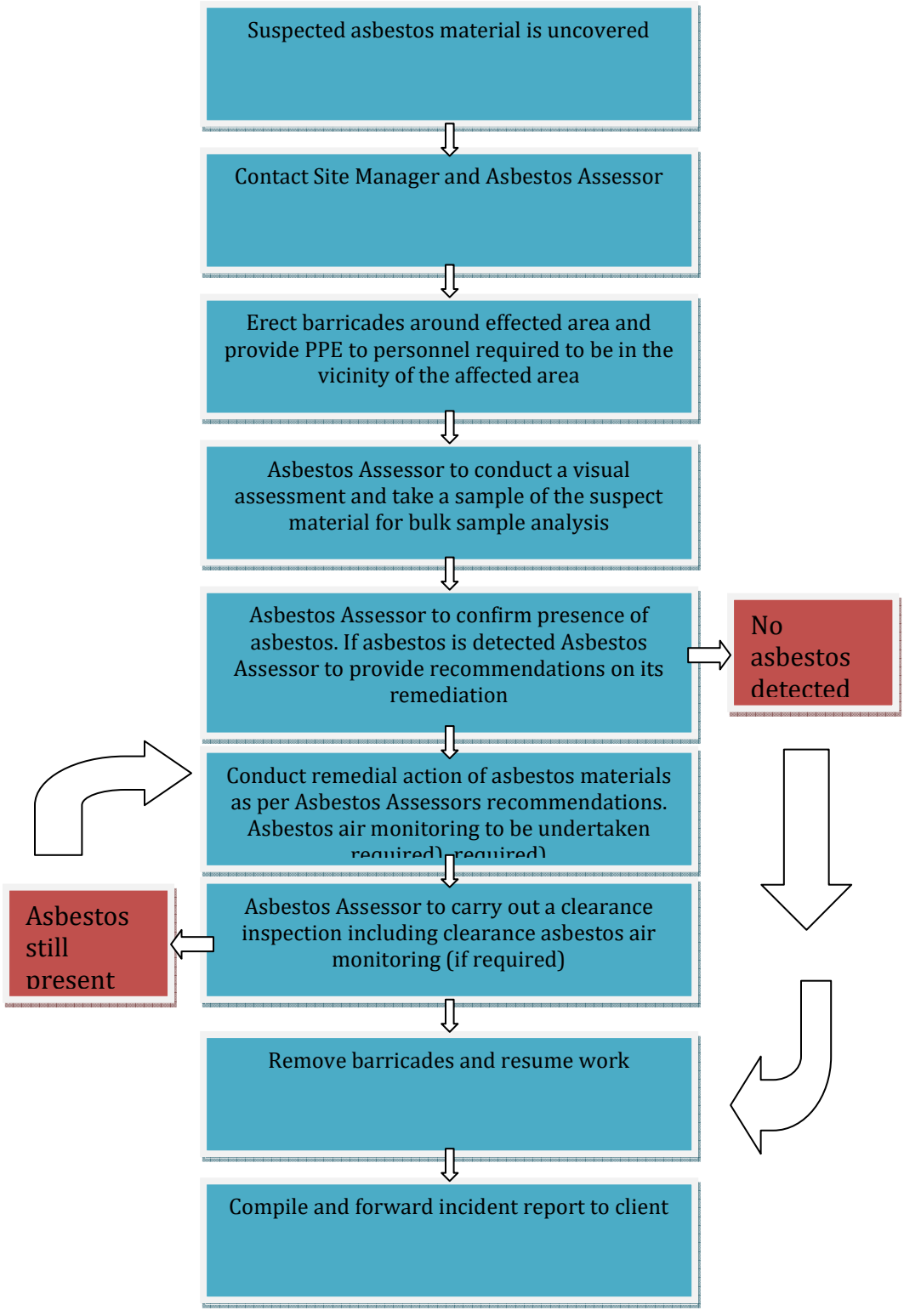
## Appendix B – Procedure for Exceeding Exposure Limits



## Appendix C – Procedure for Uncovering Suspect Asbestos Material



# Appendix F Construction Traffic Management Plan

# Construction Traffic Management Plan

| | |
|---|---|
| **Project:** | Taylors Construction – Lindfield Learning Village |
| **Project Job Number:** | 1829 |
| **Project Address:** | 100 Eton Road, Lindfield |
| **Proposed Work:** | Development of Lindfield Learning Centre |
| **Project Duration:** | Approximately 4 Months |
| **Prepared for:** | Taylors Construction |
| **Prepared by:** | Bridget Diggins – Commercial Traffic |
| **Authors Accreditation:** | 0026675150 |
| **Date:** | 02/10/2018 |

# TMP INDEX

# 1 PROJECT DETAILS

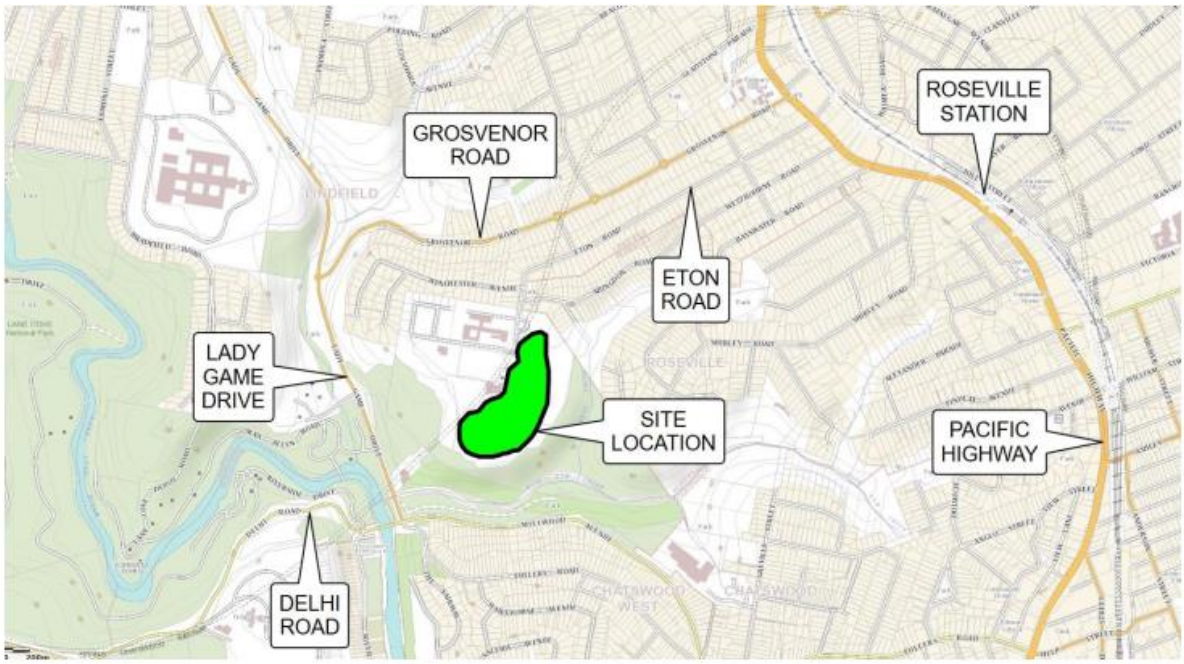
## 1.1 Proposed Works

The development is contained primarily to retrofitting the ex-Lindfield UTS site, as well as: - Demolition of internal fixtures

- Landscaping works
- Remediation
- New waterproofing installed on existing structures
- New fit out

## 1.2 Site Location

The Construction site is located at the former UTS Ku-ring-gai Campus, which has since been vacated in 2015. The site is located at the end of Eaton Road, and is surrounded by national park to the south, and low density housing the north. Key roads that provide access to the site are Pacific Highway (State Road), Lady Game Drive (Regional Road), as well as Grosvenor Road, Westbourne Road, and Eaton Road (all Local Roads).



The Pacific Highway currently operates efficiently during school peak periods and the evening peak periods. During the AM peak, there is a high demand of southbound traffic heading to the city. During the peak hour, a slow rolling queue prevented southbound vehicles from crossing the intersection of Grosvenor Road. The intersection of Lady Game Drive and Grosvenor Road consists of a three-leg roundabout. Lady Game Drive provides access to North Ryde via Delhi Road and to Chatswood via Millwood Avenue. During the AM peak, the high southbound traffic demand creates a queue which extends past the roundabout, starting from the Millwood Avenue intersection. Astral Avenue, Grosvenor Road, and Eaton Road mainly consist of one lane carriageways, forming unsignalized intersections and roundabouts. They provide access to low density residential areas, with Eton Road providing access to medium density residential areas near the learning village.

The existing facilities at the site will be converted into a teaching facility. The teaching facility will reduce the existing strain on schools which are currently facing a high demand of new enrolments. It would also provide community facilities to the public, such as auditoriums and gyms. A public school is a community facility. It provides a real benefit to the community it serves, and it is expected that some burden will be placed on the community to support its operation.

### 1.3 **Purpose**

The purpose of this Traffic Management Plan is to show how Taylors proposes to manage safety in regards to traffic during demolition, evacuation and construction, to meet the requirements of Council and RMS. This TMP is prepared for the purpose to consider the safety of construction site personnel, neighbours, road users and pedestrians. The purpose of this report is to detail traffic management for each stage and seeks to minimise the impact on public amenities and ensure safe practice in accordance with RMS Guidelines.

It is expected that this plan will be updated should any necessary changes to the currently proposed arrangements arise in the future.

### 1.4 **Scope**

The scope includes the provision for the:

- safe movement of vehicular and pedestrian traffic,
- protection of workers on the site and from passing traffic,
- provision for access to the property for delivery of materials and movement of work vehicles located within the limits of the project,
- design, construction, maintenance and removal of any necessary temporary roadways and detours,

- provision of traffic controllers,
- Installation of temporary signs, road markings, lighting and safety barriers.
- Proposed protection of pedestrians adjacent to the site.

It also covers excavation and reconstruction with best route or road corridor for all work activities, including the existing road and road shoulder that may be used for the temporary diversion of traffic, over the duration of the project.

### 1.5 **Plan Objective**

The key objectives of this Traffic Management Plan ("TMP") are :

- To satisfy the key legal requirements related to Traffic, Transport and Access to site
- So that the information can be applied to the planning and implementation of traffic control plans.
- To ensure the safety of its employees, contractors, the public,
- To maximise the value and outcomes of traffic monitoring activities
- To ensure no injuries or property damage to persons or their property on or surrounding the project.
- To actively monitor traffic impacts related to the demolition and construction works on surrounding area
- RTA personnel, pedestrians, cyclists and traffic,
- Minimise delays to traffic and consider the needs of all road users
- Maintain satisfactory property access,
- Minimise disruption to businesses,
- Minimise disturbance to the environment,
- To ensure compliance with relevant specifications and the RMS's – Traffic Control at Work Sites Handbook Version 4
- To guide drivers through changed conditions guide them around the work site.

## 2 **CONSTRUCTION**

### **2.1 . Construction Activity**

Major activities associated with the construction will include (in approximate order of occurrence):

During construction activities on the Linfield Learning Village site, no other related activities shall occur simultaneously.

That is the site will be solely a construction site with no other pedestrian or vehicle access permitted onto or through the

(Construction) site. Residents shall be advised of demolition, excavation, and construction activities.

The construction works essentially involves the following phases, namely:

- Site Establishment
- Strip Out
- Construction
- Road Works
- Tree Removal

Building operations such as brick cutting, washing tools or brushes and mixing mortar shall not be carried out on public roadways or footpaths or in any locations which could lead to the discharge of materials into the storm water drainage system.

All building materials and any other items associated with the development shall be stored within the confines of the property. No materials shall be stored on Council's footpath, nature strip, or road reserve without prior Council approval.

**2.2. Site Working Hours**

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

(a) between 7.00am and 6.00pm, Mondays to Fridays inclusive; and

(b) between 8.00am and 3.30pm, Saturdays.

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

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

Noise from construction activities shall comply with the Protection of the Environmental Operations (Noise Control) Regulation 2000.

## 2.3 Works / Loading Zones

All works associated with this development shall take place onsite, and separate Council / RMS approved works zone applications are not required.

## 2.4 Construction Vehicles movement/Work Zones

Adequate advanced warning and directional signage will be placed around the site. This will direct drivers to the construction site and inform other drivers and pedestrians of upcoming works on their route. Authorised Traffic Controllers shall be on-site ensuring controlled entry and exit in and out of site. This shall ensure movements shall not affect traffic flow or endanger pedestrians, by giving way to pedestrians and cyclists before trucks enter and exit site.

All truck movements shall be carried out taking into consideration the surrounding building and roads. Adequate measures to reduce severity/seriousness of incidents shall be put in place to improve conditions.

All exiting trucks shall be:

- Loaded to their prescribed weight limits.
- All trucks will be covered by tarpaulin or like prior to leaving the site as required.
- All vehicles leaving the site must be free of mud or any other debris. Drivers of vehicles that exit the site must check their vehicles are clean prior to exiting. It is the responsibility of each driver to confirm their vehicles are clean prior to exiting site.

Taylor Construction will ensure that:

- No vehicle shall make deliveries outside Council's approved DA site hours
- All delivery vehicles will arrive at pre-arranged times to site.
- No queuing or marshalling of trucks shall occur for this site. Any vehicles that arrive to site that are unable to be accommodated as outlined in this CVPPM shall be sent back to their origin.
- All vehicles arriving to the construction site shall strictly adhere to the speed limit.
- This CTMP and all relevant plans shall be given to all transport companies associated with the site and expected to pass relevant information to its personnel and truck drivers arriving to site.

Construction vehicles required by the proposed construction activities include:

- Heavy Rigid Vehicles (12.5HR);
- Multi Combination Vehicles (Truck & Dog);
- Infrequent use of semi-trailers for special deliveries;
- Concrete pumper and agitator vehicles during building works;
- Small to medium sized trucks for other deliveries.

At this stage the use of oversized and over mass vehicles is not foreseen. Nevertheless, if it is required at a later stage, approval for each occasion would be sought from the relevant approval authority.

During the strip out phase, it is estimated up to some 5-10 truck movements per day would be taking demolition material from the site.

During the construction phase, peak activity would occur during concrete pours with a number of concrete trucks per day requiring to delivery concrete mix to the site. The number of concrete trucks per day has been estimated at 5 movements per day.

It is expected that the peak truck generation during the construction phase shall be in the order of 5-10 truck movements per day.

**2.5 Arrival & Departure of Vehicles**

Adequate advanced warning and directional signage will be placed around the site. This will direct drivers to the construction site and inform other drivers and pedestrians of upcoming works on their route. Authorised Traffic

Controllers shall be on-site ensuring controlled entry and exit in and out of site. This shall ensure movements shall not affect traffic flow or endanger pedestrians, by giving way to pedestrians and cyclists before trucks enter and exit site.

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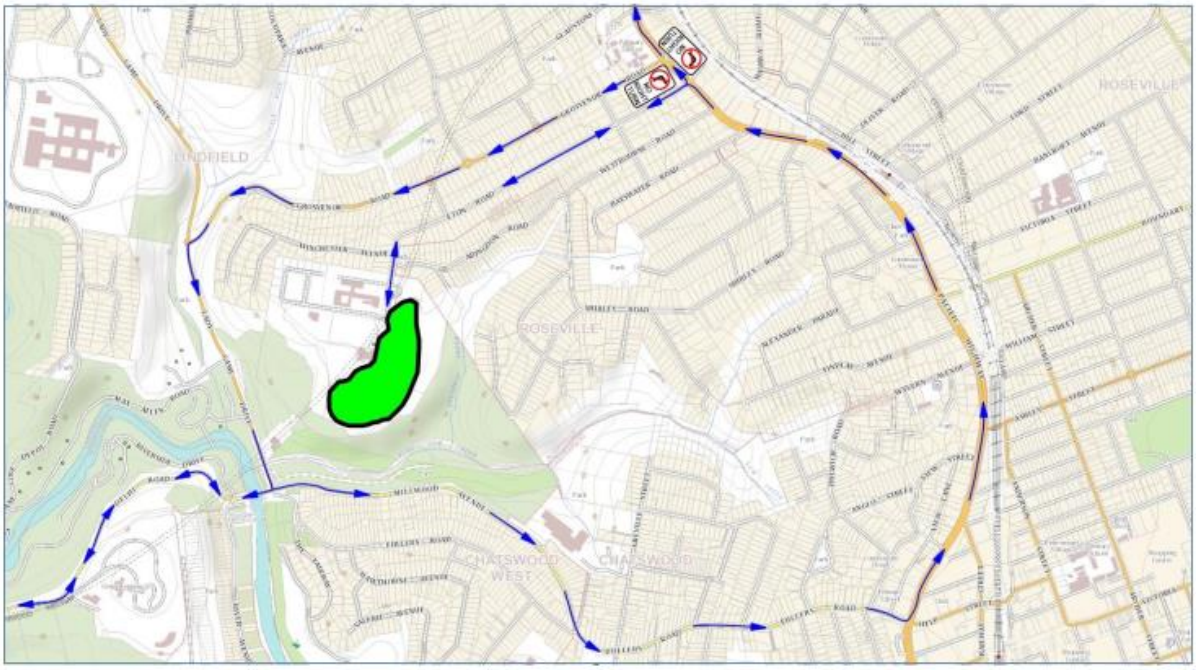
**Arrival Route to site**

It is illegal to park a truck exceeding 4.5 tonnes on a roadway for more than one (1) hour unless signs are installed allowing such and illegal to barricade/ reserve a section of roadway without the prior approval of Council. Vehicles shall leave site in a forward direction with the assistance of Authorised Traffic Controllers. Under no circumstances will vehicles be permitted to leave site in reverse.



- A Truck Arrival Route (Arriving M2 / Epping Road / Northbound Pacific Highway)

Exit M2 Motorway / Epping Road onto Delhi Road

Follow Delhi Road for 2.2km and cross Lady Game Drive

Delhi Road changes name to Millwood Avenue, and then to Fullers Road

Turn left onto the Pacific Highway

Follow Pacific Highway for 2km

Turn left onto Eton Road

Follow Eton Road to the end and enter site

- Truck Arrival Route (Southbound Pacific Highway)

From Pacific Highway heading southbound, turn right onto Grosvenor Road

At the T-intersection turn left onto Lady Game Drive
At the T-intersection turn right onto Millwood Avenue

Millwood Avenue changes name to Fullers Road

Turn left onto the Pacific Highway,

Follow Pacific Highway for 2km,

Turn left onto Eton Road,
Follow Eton Road to the end and enter site.

**Departure Route from Site**

It is illegal to park a truck exceeding 4.5 tonnes on a roadway for more than one (1) hour unless signs are installed allowing such and illegal to barricade/ reserve a section of roadway without the prior approval of Council. Vehicles shall leave site in a forward direction with the assistance of Authorised Traffic Controllers. Under no circumstances will vehicles be permitted to leave site in reverse

- Truck Departure Route (M2 / Epping Road / Pacific Highway).

Exit site and follow Eton Road,

At the T-intersection turn left onto Pacific Highway,

Continue along Pacific Highway to the north, or turn left onto Grosvenor Road,

At the T-intersection turn left onto Lady Game Drive,

At the T-intersection turn left onto Millwood Avenue / Fullers Road toward Pacific Highway,
Or turn right onto Delhi Road for access to M2 and Epping Road

**Construction Vehicles and Plant**

All loading and unloading of materials shall be done within the site. Trucks are not to queue on the driveway or on public roads; traffic controllers shall manage the ingress and egress. Trucks unable to immediately enter site shall que at a remote location. All drivers of trucks and construction vehicles shall be issued this CTMP and shall be made aware of the truck and vehicle routes.

All plant and heavy machinery will be placed or parked within the site. No plant or machinery shall be placed on the street. No vehicles to be left on local roads unless approval has been obtained for a one-off occasion from Council. All vehicles, plant, and equipment shall be operated in accordance with NSW Road Rules 2014.

## 3. Dust

Taylors Construction is responsible for the mitigation of all dust generated on site or as a result of undertaking the works. Taylors is to allow for the provision of 'sticky mats', floor protection, wetting down, cleaning and the like to ensure that dust is not tracked through the building or the building surrounds. Taylors shall protect all existing services from dust by covering or sealing the likes of existing air conditioning units, ductwork, intakes, distribution boards, and the like. This extends to providing and maintaining a dust free environment for the installation of any communications and telephone equipment.

## 4. Fencing, Barriers & Hoarding

Hoarding shall be erected along Dunstan Grove around the elevated pedestrian walkway near the gym. Traffic Control shall be in place during the erecting of the hoarding. The standard stop / slow condition Traffic Control Plan located in the appendix shall be used for these works.

Where the hoarding is to be erected over the footpath or any public place, the approval of Council must be obtained prior to the erection of the hoarding.

Any openings in the existing perimeter fencing shall be secured with fencing and hoardings to keep the site secure and any new fencing shall be temporary (such as cyclone wire) and at least 1.8 metres high. All fencing is to be maintained for the duration of construction to ensure that the work area is secured.

A sign shall be displayed on the site indication the name of the person responsible for the site and a telephone number of which that person can be contacted during and outside normal working hours, or when the site is unattended.

The sign must be erected in a predominant position shall display the following:

- Name, address, and telephone number of the principle certifying authority for the works
- Name of principle contractor (if applicable) for any building work and a telephone number on which that person may be contacted out of hours
- Unauthorised access to the work site is prohibited

No portion of the proposed fence, including the footings, is to encroach beyond the boundaries of the subject property.

Alternatively, documentary evidence that the owner of the adjoining property has no objection to the construction of the party fence wall on the common boundary between these properties is to be submitted to Council prior to the issue of a Construction Certificate

## 5. Waste Management and Recycling

A formal Construction Waste Management Plan will be produced by Taylors prior to works commencing. All material that cannot be recycled or reused will be disposed to an approval landfill facility. Waste will be minimised and that generated will be separated to maximise recycling. The highest waste production will be will be during the demolition of existing buildings onsite.

Dangerous goods (such as petrol, diesel, oxy-acetylene, oils, etc) will be stored in a lockable compound with sufficient ventilation in accordance with relevant codes of practice and standards. Material safety data sheets on all flammable and potentially harmful liquids will be provided by the contractor undertaking the works.

## 6. Removal and storage of Rubbish or spoil.

All industrial rubbish bins will be stored on site and in a position for easy access for removal by trucks. All removal trucks will have the load covered by tarpaulin or other means to secure load. All excavations and backfilling shall be executed safely and in accordance with the relevant Australian Standards.

Council expects demolition and excavated material to be reused and/or recycled wherever possible. No materials shall be placed, dumped, of left on any Council road or footpath. Removed or damaged street furniture, including parking and street signs, shall be replaced immediately. Copies of demolition and construction waste dockets that verify the facility that received the material for recycling or disposal and the quantity of waste received, must be retained on site at all times during construction.

## 7. Responsibility

It is the responsibility of Commercial Traffic to ensure that these traffic measures are disseminated, implemented and maintained in accordance with the principles in the project, Occupational Health, Safety & Rehabilitation Management Plan: and; it is the responsibility of every worker involved with this work site to comply with the guidelines set down in this plan

## 8. Emergency Response

- Commercial Traffic will provide traffic control by qualified traffic controllers for emergencies such as accidents and spillages on the maintained network.
- Commercial Traffic will use an appropriate standard plan drawn from the RMS Traffic Control at Work Sites Manual (Appendix D), adjusting it as needed to suite the site conditions.
- For all other planned and scheduled maintenance and other works under the contract, Commercial Traffic will prepare Traffic Control Plans as required.
- Nearest Police Station – Chatswood Police Station (02) 9414 8499
- Nearest Fire Station - Willoughby Fire & Rescue (02) 9958 4016
- Nearest Hospital – Macquarie Hospital, (02) 9812 5500
- Nearest Medical Centre – Belmont Medical Practice 02 9416 1214
- All other Emergency numbers CALL 000

## 9. Time Management

- Commercial Traffic aims to meet its time related obligations. Among them are:

- Notifying emergency services and relevant sections of the community and transport industry of work which results in significant traffic disruption. Provide to the RTA a draft of an appropriate advertisement 3 weeks before the proposed placement of the advertisement. See RTA M1 Clause 4.3.2.

- Notifying residents and businesses affected by disruption to property access or by night works in built up areas. A letter will:

    - be “letter-box-dropped” at least three Business Days before the proposed date and

    - Detail the dates and times of the proposed access restrictions and contact details. See RTA M1 Clause 4.3.4.

    - Performing work and Services only in the times permitted.

- Lodging early as possible (at worst no less than 10 Business Days before the work) a road occupancy application. See RTA G10 (2.6). Noting, however, the exemptions for emergencies and hazards set down at RTA G11 (8).

- Promptly advising the TMC of delays to traffic which are, or are anticipated to be, longer than 15 minutes.

## 10. PROPOSED STRATHEGY OF TRAFFIC MANAGEMENT

### A. Road/Lane Closure

- The proposed works will not require any road or lane closures. If at any stage the work does require these closures all permits will be applied for through Council prior to the commencement of works. If a partial road closure, temporary driveways or mobile cranes are required appropriate application will be made to Council prior to commencement of such works.
- No roadworks will be undertaken on state roads or within 100 m of traffic signals for this project. If the need occurs to undertake such works a Road Occupancy Licence will be made to NSW Transport Management Centre and a copy will be provided to Council.
- Approval from RMS will not be required for any work activity as vehicles are entering/exiting the job site from the rear gates.
- All traffic control plans (TCPs) associated with this CTMP will comply with relevant Australian Standards and RMS Traffic Control at Worksites Manual.

### B. Parking for Site Workers

- While a limited amount of onsite car parking will be available for construction personnel, workers will be encouraged to use public transport when travelling to and from the site. It is noted that is a bus route within two hundred metres (200m) walking distance of the site.
- The number of construction personnel on site per day will vary depending upon the stage of development. However, it is estimated that in the order of some 50-100 construction personnel could be on site at any one time during peak activity.
- There is all day parking (southern carpark) for approximately sixty-three (63) vehicles, with an overflow carpark (north) available before 3pm for approximately fifty-seven (57) vehicles.
- It is recommended that an onsite tool drop off and storage facility is included in the construction site management such that construction personnel can drop tools to the site by vehicle and then store them on site for the duration of works, thus enabling them to travel on public transport without needing to transport heavy tools each day.

**C. Public Transport.**

- The works shall not impact the local public transport network. While the site is within close proximity to public transport routes, there shall be no impact to the designated bus route. The proposed construction activities would not require the relocation of any existing bus stops or bus routes in order to accommodate the construction activities.

- The Linfield Learning Village is located approximately two kilometres (2km) southwest of Roseville Station. A bus stop is located just north of the site, providing convenient access to future patrons. Bus route 565, which operates hourly, services Chatswood and Macquarie University. It predominantly travels along the Pacific Highway and services the residential area around the site. Typical bus travel times during the morning 8am peak is shown in Table 3. The bus route currently serves Beumont Road Public School. The closest bus stop to the site is located along Eton Road. Eton Road bus bay forms a loop, allowing buses to enter, exit and drop off passengers efficiently.

- The site is located about a 2km (approximately 20-minute walk) from both Lindfield and Roseville Station. Trains to Lindfield Station run frequently during peak hours along the T1 North Shore Line. Patrons to the site would likely catch the train followed by the bus. However, given that bus 565 only operates on an hourly basis, scheduling would be difficult.

**D. Pedestrians and Cyclists**

- When the works are affecting footpaths traffic controllers will ensure to provide an exclusion zone around the work area.

- Only authorised personnel will be permitted within the building site unless accompanied by site management, if not inducted to the site. Whilst within the confines of the building site, all personnel will attire in correct PPE to ensure that they are visible to moving traffic

- When trucks are entering/exiting the worksite, an RMS accredited traffic controller will be employed to manage pedestrian movement and temporary stop pedestrians while there is truck movement. If any work is taking place on the footpath, traffic controllers will have to ensure there is a pedestrian pathway in place to direct pedestrians safely around the work area. Outside of construction hours the footpath will be free of any barricades or building materials.

### E. Emergency Vehicle

- The construction activities of the proposed project would not adversely impact on the accessibility or operation of emergency services for access to the site or surrounding properties as all existing roads and individual property accesses would remain open and accessible during the construction activities associated with the site works. If the case, any emergency vehicle required for site will be given priority and when practicable, assisted by Authorised Traffic Control.

### F. Access to properties and Noise

- The works will not affect access to properties. Regarding noise impacts, Taylors Construction will strive to keep all noise associated with the works is kept to a minimum. Likewise, no noise will be made outside the approved hours for site.

- Where there is a strong community reaction to noise associated with demolition, excavation and/or construction, council may require respite periods by restricting the hours that the specific noisy activity can occur.

- If this is imposed, council will consider
  - Times identified by the community when they are less sensitive to noise.
  - If the community is prepared to accept a longer period of construction in exchange for restriction on construction hours.

- Prior to commencement of the site preparation works, it is recommended that Taylors Constructions inform the local community regarding the traffic control and management arrangements that will be implemented and the timing/duration of works. It is envisaged that the requirements for community consultation will be set out in the conditions of consent, and all the community notification.

- Notification of any work affecting any properties or residents will be notified in the form of a letter will be made by letter box drop two weeks prior then again, the day before the work starts.

## 11. **Traffic Controllers**

RMS Accredited Traffic Controllers. will be on-site ensuring controlled entry and exit into site that does not affect traffic flow or endanger pedestrians by giving way to pedestrians and cyclists before trucks enter and exit site. Traffic controllers will wait for a suitable gap in traffic and pedestrian movement before assisting construction vehicles entering or leaving the site.

## 12. Community & Motorists Consultation/Notification

A Taylors representative is available to meet with any neighbours affected by the site works to discuss the proposed measures mentioned within this construction traffic management plan. Notification of construction activity will be sent to properties near the work site. This notification in the form of a letter will be made by letterbox drop two weeks prior to work commencing and again the day before works commences. Temporary advance warning signs will advise motorist of their approach to the work site.

Regular consultation to be held with Council's manager for social and community services

## 13. **Permits and Road Occupancy Licence**.

A work zone permit will need to be applied for through council where any work zones are required for deliveries or loading zones outside of the site boundary. A Road Occupancy Licence will not be required for this job as vehicles enter/exiting on Wonga Road which is not an RMS road. The builder and traffic control company will adhere to any and all conditions expressed on any licences required.

## 14. Workplace Health & Safety

Taylors Construction will access the risk and will incorporate the traffic control plans and the traffic management plan into the site safety plan.

This CTMP must be included in site inductions to ensure all new employees are aware of the construction management obligations.

Belmont Medical Practice
132 Pacific Hwy, Roseville NSW 2069
(02) 9416 1214
Exit site and head north on Eton Rd towards Abingdon Rd
Turn left onto Austral Ave
At the roundabout, take the 1st exit onto Grosvenor Rd
At the roundabout, take the 1st exit onto Lady Game Dr
Turn left onto Millwood Ave/A38
Turn left onto Pacific Hwy/A1/A38
Continue to follow Pacific Hwy/A1
Destination will be on the left

Nearest Route to Hospital
Macquarie Hospital
Wicks Rd, North Ryde NSW 2113

(02) 9812 5500
Exit site and head north on Eton Rd towards Abingdon Rd
Head north on Eton Rd towards Abingdon Rd
Turn left onto Austral Ave
Continue on Grosvenor Rd. Take Delhi Rd to Wicks Rd in North Ryde
At the roundabout, take the 1st exit onto Grosvenor Rd
At the roundabout, take the 1st exit onto Lady Game Dr
Turn right onto Delhi Rd/A38
Continue straight onto Delhi Rd
Use the left lane to turn right onto Epping Rd
Turn left onto Wicks Rd

## 15. Traffic Control Plans

Traffic control plans, Vehicle movement plan and pedestrian movement plans for this project are included in this document. The TCP is a diagram showing signs and devices arranged to warn traffic and guide it around, past or, if necessary through the work site or temporary hazard. Taylors will ensure authorised traffic controllers will be present on site to assist access of trucks in and out of the site ensuring the safety of pedestrians cyclists and all other vehicles. The Land uses surrounding the site are residential. The site is located within close proximity to Wairoa School which attracts significant vehicles during morning and afternoon drop off and pic up periods during the week.

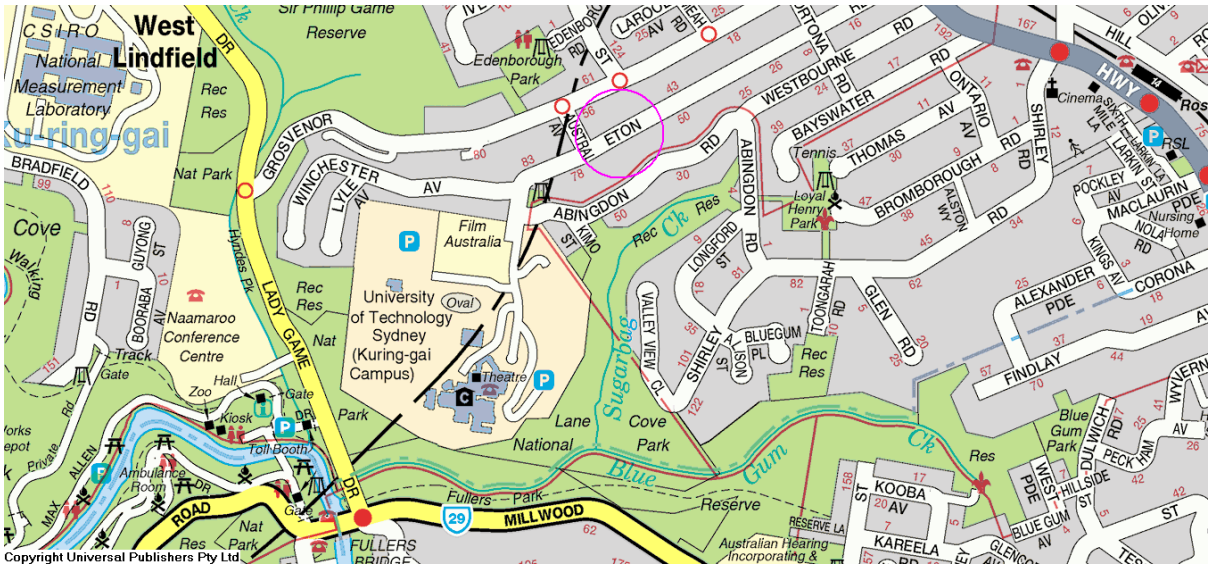
The TCPs were designed to address the following issues where applicable:

- Use of traffic control devices
- Speed limit requirements
- Provisions for pedestrian traffic and their safety
- Provisions for cyclists and their safety
- Provision for vehicle and plan movement
- Parking restrictions and parking facilities
- Provision for trade vehicles and plant movement
- Informing all site personnel of any high-risk areas, and
- Providing adequate signage within the Construction site for access and egress of vehicles.

## 16. Out of Working Hours Contacts

Brent Kendall – Site Manager – Taylors
0488 022 764

## 17. Map


West Lindfield
C S I R O
National Measurement Laboratory
Kuring-gai
Sir Phillip Game Reserve
Edenborough Park
Nat Park
Rec Res
GROSVENOR
WINCHESTER
LYLE AV
ETON
AUSTRAL
ABINGDON
WESTBOURNE
BAYSWATER
THOMAS
ONTARIO
SHIRLEY
BROMBOROUGH
ALSTON
Tennis
Loyal Henry Park
RSL
HWY
Cinema
Film Australia
University of Technology Sydney (Kuring-gai Campus)
Oval
Theatre
Naamaroo Conference Centre
Track
Gate
Hall
Zoo
Kiosk
Toll Booth
Ambulance Room
Lane Cove National Park
Sugarloaf
Blue Gum Ck
Rec Ck Res
Fullers Park
Reserve
MILLWOOD
29
ROAD
FULLERS BRIDGE
Australian Hearing Incorporating &
LONGFORD ST
VALLEY VIEW CL
BLUEGUM PL
TOONGARAH RD
GLEN RD
ALEXANDER PDE
FINDLAY
CORONA
MACLAURIN PDE
Nursing Home
POCKLEY AV
KINGS AV
NOLA RD
DULWICH RD
PECK
YAM
WEST PDE
HILLSIDE ST
BLUE GUM AV
KOOBA AV
KAREELA
RESERVE LA
Blue Gum Park
Res
Copyright Universal Publishers Pty Ltd


Eton Rd
AUSIMAGE © Sinclair Knight Merz Pty Ltd

## 18. Appendix A - Traffic Controllers' Tickets

| Surname | First Name | Contractor Name | Certificate Number | Expiry Date |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# TRAFFIC CONTROL PLANS

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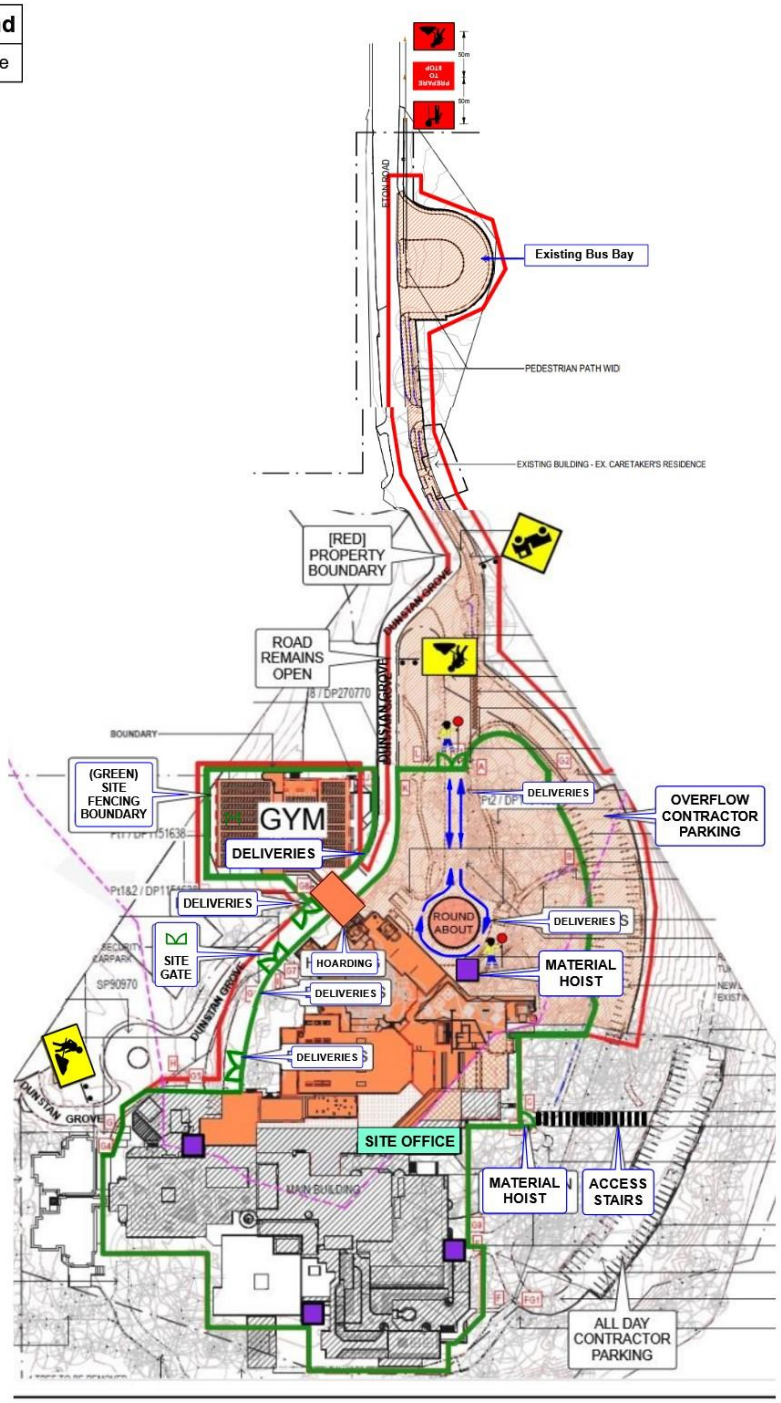
| | | | |
|---|---|---|---|
| DATE: | 03/10/2018 | TRAFFIC CONTROL PLAN | |
| LOCATION CUSTOMER | 100 Eton Road, Lindfield | NAME: Bridget Diggins<br>Licence No: 0026675150 | This traffic control plan is drawn to AS1742.3 and the R.T.A worksite manual for traffic control at worksites,it is to be implemented as such. This traffic plan is a GUIDE ONLY and can be altered on site but must be signed by an R.T.A accredited person.<br>Approach speeds = up to 80km<br>day/night- stess1 signs to be used<br>all personal to wear Hi Vis Clothing<br>vehiises to park within the worksite<br>R.T.A certified traffic controllers to be employed. |
| TCP No. | Traffic Management- UBD Ref: 195 A6 | | |

**Legend**

Cone



www.invarion.com

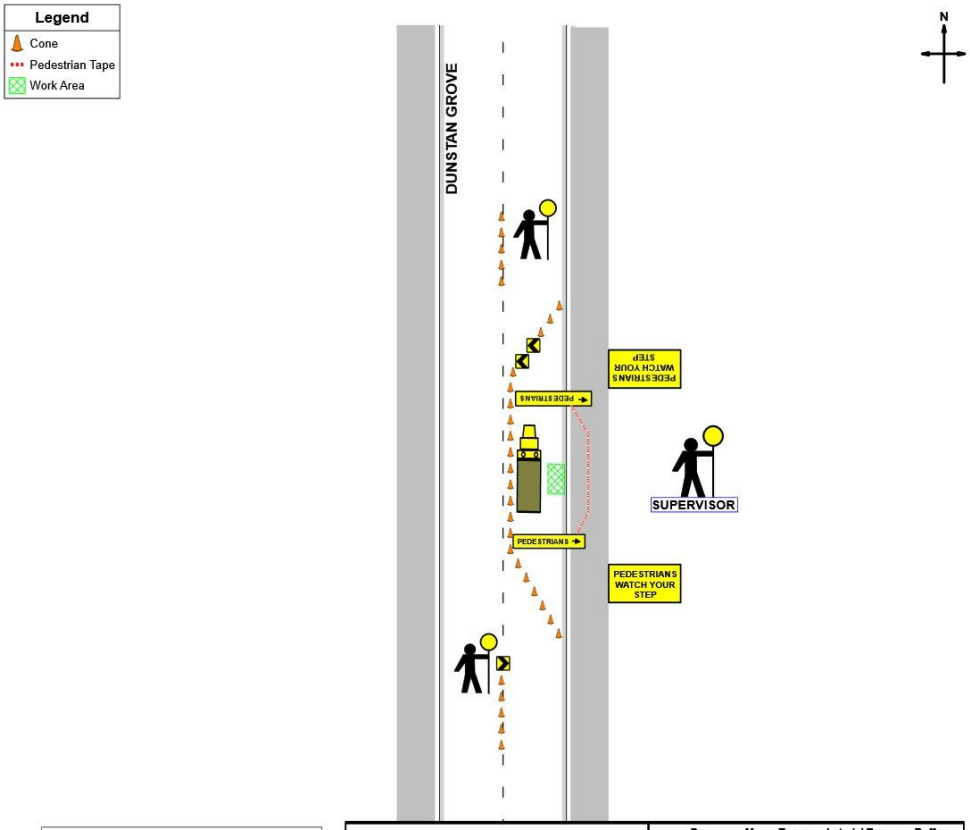
commercial TC PTY LTD

# TRAFFIC CONTROL PLAN

| | | | |
|---|---|---|---|
| DATE: | 03/10/2018 | | |
| LOCATION CUSTOMER | 100 Eton Road, Lindfield | NAME: Licence No: | Bridget Diggins 0026675150 |
| TCP No. | VARIOUS LOCATIONS - LANE CLOSURE - STOP SLOW SCENARIO TCP | | |

This traffic control plan is drawn to AS1742.3 and the R.T.A worksite manual for traffic control at worksites,it is to be implemented as such. This traffic plan is a GUIDE ONLY and can be altered on site but must be signed by an R.T.A accredited person.
Approach speeds = up to 60km
day/night- class1 signs to be used
all personal to wear Hi Vis Clothing
vehicles to park within the worksite
R.T.A certified traffic controllers to be employed.

**Legend**
- Cone
- Pedestrian Tape
- Work Area




**Red Card Holder**

**Name:**

**Signature:**

**Cert No:**

**Amendments Required ? Y/N**

* All sign spacing & taper lenghts are in accordance with Australia Standards AS 1742.03 & RMS TCWS manual 4.0. Distances between signs may vary due to onsite constraints i.e. parked vehicles/vegetation etc. [plan not to scale]
* Traffic Controller to conduct Stop/Slow procedures to assist with work vehicle movements as required
* Traffic Controller are to assist Pedestrian around work area as required
* Pedestrian signs to be installed as required

PEDESTRIANS | PEDESTRIANS | USE OTHER FOOTPATH

| Dm [Speed Limit] | Merge Taper Length | Lateral Taper Length | Buffer Length |
|---|---|---|---|
| 45 or Less | 15 | | 30 |
| 46 to 55 | 30 | 15 | 30 |
| 56 to 65 | 60 | 30 | 30 |
| 66 to 75 | 115 | 70 | 30 |
| 76 to 85 | 130 | 80 | 40 |
| 86 to 95 | 145 | 90 | 40 |
| 96 to 105 | 160 | 100 | 50 |
| Greater Than 105 | 180 | 110 | 50 |

Based on As 1742.3 - 2009

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commercial TC PTY LTD

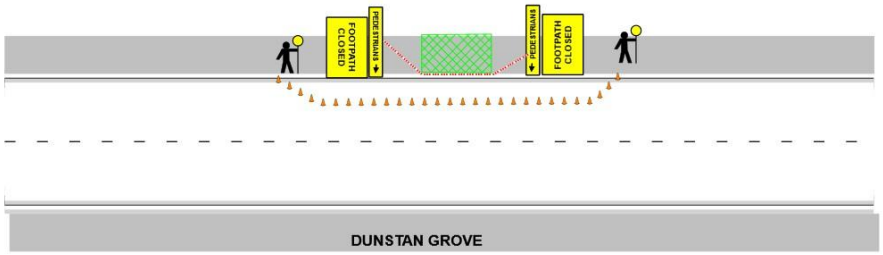
| | | | |
|---|---|---|---|
| DATE: | 03/10/2018 | **TRAFFIC CONTROL PLAN** | This traffic control plan is drawn to AS1742.3 and the R.T.A worksite manual for traffic control at worksites,it is to be implemented as such. This traffic plan is a GUIDE ONLY and can be altered on site but must be signed by an R.T.A accredited person. Approach speeds = up to 60km day/night- class1 signs to be used all personal to wear Hi Vis Clothing vehicles to park within the worksite R.T.A certified traffic controllers to be employed. |
| LOCATION CUSTOMER | 100 Eton Road, Lindfield | NAME: Bridget Diggins Licence No: 0026675150 | |
| TCP No. | VARIOUS LOCATIONS - SHOULDER CLOSURE - FOOTPATH CLOSURE | | |

**Legend**
- Cone
- Pedestrian Tape
- Work Area

N

TRAFFIC CONTROLLERS TO PROVIDE TAPED OFF EXCULSION ZONE SET UP AROUND EACH WORK LOCATION

IF THIS CANNOT BE PROVIDED TCS TO STOP ALL TRAFFIC TO ASSIST WITH PEDESTRIANS USING THE FOOTPATH ON THE OPPOSITE SIDE OF THE ROAD




**Red Card Holder**

**Name:**

**Signature:**

**Cert No:**

**Amendments Required ? Y/N**

* All sign spacing & taper lenghts are in accordance with Australia Standards AS 1742.03 & RMS TCWS manual 4.0. Distances between signs may vary due to onsite constraints i.e. parked vehicles/vegetation etc. [plan not to scale]
* Traffic Controller to conduct Stop/Slow procedures to assist with work vehicle movements as required
* Traffic Controller are to assist Pedestrian around work area as required
* Pedestrian signs to be installed as required

PEDESTRIANS | PEDESTRIANS | USE OTHER FOOTPATH

| Dm [Speed Limit] | Merge Taper Length | Laterial Taper Length | Buffer Length |
|---|---|---|---|
| 45 or Less | 15 | | 30 |
| 46 to 55 | 30 | 15 | 30 |
| 56 to 65 | 60 | 30 | 30 |
| 66 to 75 | 115 | 70 | 30 |
| 76 to 85 | 130 | 80 | 40 |
| 86 to 95 | 145 | 90 | 40 |
| 96 to 105 | 160 | 100 | 50 |
| Greater Than 105 | 180 | 110 | 50 |

Based on As 1742.3 - 2009

# Appendix G Construction Noise and Vibration Management Plan

DIRECTORS
MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

20160433/3/1005A/R0/TT

5/10/2018

DesignInc Sydney Pty Limited
Level 12
77 Pacific Highway
NORTH SYDNEY NSW 2060

**Lindfield Learning Village Stage 1 – Construction Noise Management Sub-Plan (Condition of Consent B31).**

## 1 INTRODUCTION

We have been asked to comment on potential noise and vibration emitted from proposed construction works in the Stage 1 works of the Lindfield Learning Village development.

This report has been prepared to address condition of consent B31.

The primary works proposed in Stage 1 are:

- Internal fit out works. This will include some demolition (typically strip out as opposed to structural demolition) and installation of new partitions and finishes.
- Installation of new plant and equipment, including externally located plant (typically on roof tops).
- External works typically involve:
    - Some civil works.
    - Works to new external spaces (roof top play areas).

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MASCOT 2020
T: (02) 8339 8000

SYDNEY MELBOURNE BRISBANE CANBERRA
LONDON DUBAI SINGAPORE GREECE

ABN: 11 068 954 343

## 2 CONDITION OF CONSENT B31

Condition of consent B31 states:

B31. 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; and

(e) describe the community consultation undertaken to develop the strategies in condition B31(d).

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

# 3 ACOUSTIC CRITERIA

## 3.1 CONSTRUCTION NOISE

Construction noise is typically assessed with reference to the EPA Interim Construction Guidelines (the ICG).

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected"/"Noise Management" level*. For standard construction hours, the Noise Management Level requires that construction noise not exceed background noise levels by more than 10dB(A). Where construction noise is predicted to exceed the "noise effected" level at a nearby residence, reasonable/feasible work practices should be undertaken to minimise noise impacts.

- *"Highly noise affected level"*. Where noise emissions are such that nearby properties are "highly noise effected", noise controls such as respite periods should be considered. For residential properties, the "highly noise effected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

A summary of noise emission goals for standard hours of construction is presented below.

**Table 1 – Construction Noise Emission Goals**

| Location | "Noise Affected"/"Noise Management Level" - dB(A)$L_{eq(15min)}$ | "Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$ |
|---|---|---|
| Residences – Tubbs View | 54 (Standard Construction Hours) (44BG level +10dB(A)) | 75 |
| Residences – Dunstan Gove | 52 (Standard Construction Hours) (42BG level +10dB(A)) | 75 |

## 3.2 CONSTRUCTION VIBRATION

## 3.3 VIBRATION CRITERIA

Vibration associated with demolition and excavation activities on the site will be assessed in conjunction with the following guidelines:

**For human exposure to vibration -** Department of Environment and Conservation NSW "Assessing Vibration: A Technical Guideline" (Feb 2006) is based on the guidelines contained in BS 6472:1992 *Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz)* for low probability of adverse comment.

**For structural damage vibration -** German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures; and*

### 3.3.1 Assessing Amenity (Human Comfort Guidelines)

Vibration goals for the amenity of nearby land users are those recommended by the EPA document *Assessing Vibration: A technical guideline.* These levels are presented below:

**Table 2 – Vibration Goals**

| Location | Time | Peak velocity (mm/s) | |
|---|---|---|---|
| | | Preferred | Maximum |
| **Continuous Vibration** | | | |
| Residences | Daytime | 0.28 | 0.56 |
| **Impulsive Vibration** | | | |
| Residences | Daytime | 8.6 | 17 |

### 3.3.2 Structure Borne Vibration (Damage Criteria)

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table 1.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

**Table 3 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration**

| TYPE OF STRUCTURE | | PEAK PARTICLE VELOCITY ($mms^{-1}$) | | | |
|---|---|---|---|---|---|
| | | At Foundation at a Frequency of | | | Plane of Floor of Uppermost Storey |
| | | < 10Hz | 10Hz to 50Hz | 50Hz to 100Hz | All Frequencies |
| 1 | Buildings used in commercial purposes, industrial buildings and buildings of similar design | 20 | 20 to 40 | 40 to 50 | 40 |
| 2 | Dwellings and buildings of similar design and/or use | 5 | 5 to 15 | 15 to 20 | 15 |
| 3 | Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order) | 3 | 3 to 8 | 8 to 10 | 8 |

In this case, the buildings closest to the site (Dunstan Grove and T View apartments) would be considered a type 2 structure.

# 4 EQUIPMENT/ACTIVITY NOISE LEVELS

The primary noise generating work activity will be from the use of powered hand tools in external areas, in particular for any civil/compacting/asphalting works.

Primary construction activities and the associated sound power levels are presented below. These sound power levels are then used to predict the noise level generated by the construction works at nearby development (discussed in section 5).

The noise levels presented in the above table are derived from the following sources:

- Table A1 of Australian Standard 2436-2010.
- Data held by this office from other similar studies.

**Table 4 – Sound Power Levels of Proposed Equipment**

| EQUIPMENT /PROCESS | SOUND POWER LEVEL dB(A) | TIME OF WORK |
|---|---|---|
| Jackhammer | 115 | Intermittent usage |
| Compactor/Asphalter | 110 | Intermittent usage |
| Bobcat with bucket attachment | 105 | Intermittent usage |
| Hand tools – angle grinders, drills, rattle guns etc | 95-100 | Entire Duration |

# 5 DISCUSSION / ANALYSIS

The nearest noise sensitive development to the site are the residential apartments to the north-west (Dunstan Grove apartments) and north-east (Tubbs View Apartments).

We note:

- The proposed works identified in section 1 are generally located internally. As such, the existing building shell will provide significant noise screening.
- Use of hand tools or similar in internal areas would be expected to produce noise levels of less than 50dB(A)$L_{eq}$ at the nearest residences, which is compliant with the Noise Management Level identified in section 3.1.
- Intermittent use of tools outside would result in intermittent exceedances of the 52-54dB(A), but would not reach the Highly Noise Affected level of 75dB(A).
- Use of more noise intensive equipment items (concrete saws, jackhammers if required) in internal areas would be likely to intermittently create noise levels of over 54dB(A) (the Noise

Management Level) but will not reach the Highly Noise Effected threshold identified above. Given this type of work is expected to be infrequent, further management is not warranted.

- Use of jackhammers, compactors and asphalting equipment in external areas within 40m of the Dunstan Grove/Tubbs View apartments (if required) will have a risk of an exceeding the 75dB(A) Highly Noise Effected threshold.

- It is unlikely that vibration levels approaching the limits set in table 2 and 3 will be reached.

# 6 RECOMMENDATIONS

## 6.1 SPECIFIC NOISE CONTROLS

In light of the above, we recommend:

- Notification should be provided prior to civil works involving rock excavation, asphalting or compaction within 40m of the Grove or Tubbs View apartments (see section 6.2.1).

- In the event that sustained noise complaint is generated as a result of these activities, we recommend that respite periods for these activities be considered. Typically, avoiding these activities prior to 8am is of the most benefit, as after this time the majority of residences would not be occupied.

- Use of an electric crane (as opposed to diesel) if feasible.

- Trucks to be located as far south on the site as practicable.

- Ensure that trucks are not left idling when stationary (unless required to do so, in the case of a concrete truck).

- In the event that use of a hydraulic hammer or compactor is required within 15m of a residential apartment or electrical substation is required, it is recommended that vibration monitoring is conducted during this period. Any monitor should have an SMS notification system that enables the builder to be immediately notified in the event that an exceedance of vibration criteria is likely.

- In the event of complaint, the procedures identified in section 6.3 are to be adopted.

## 6.2 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

### 6.2.1 Community Consultation

In order for any construction noise management programme to work effectively, communication is required between all parties (builder and noise impacted person).

Communication of days when high levels of noise/vibration are expected, and their likely duration, is typically the most effective method to minimise noise complaint.

We recommend that the Dunstan Grove and Tubbs View Apartments are notified (letter box drop) at least 5 days prior to works that have the potential to create significant impact (civil works involving rock excavation, days of concrete pours, compacting or asphalting).

Notification should advise of:

- The proposed activity in question.
- The estimated start and finish date of the activity.
- Contact details to make a noise compliant.

### 6.2.2 Dealing with Complaints

Should ongoing complaints of excessive noise or vibration criteria occur immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices. In the case of exceedances of the vibration limits all work potentially producing vibration shall cease until the exceedance is investigated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided);
- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;

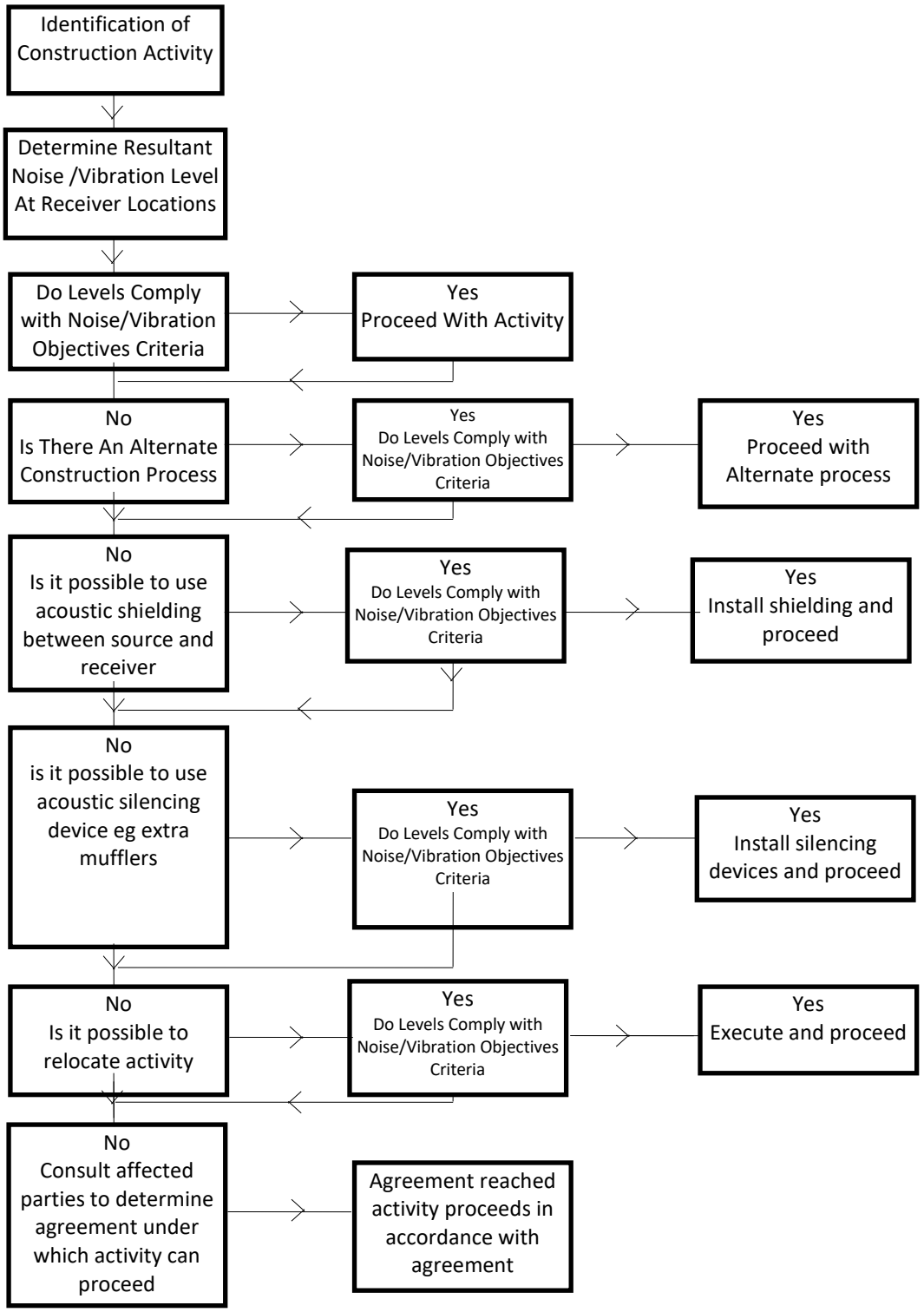
A permanent register of complaints should be held.

All complaints received should be fully investigated and reported to management. The investigation of a complaint shall involve where applicable;

- Noise measurements at the affected receiver;
- An investigation of the activities occurring at the time of the incident;
- Inspection of the activity to determine whether any undue noise is being emitted by equipment; and
- Whether work practices were being carried out either within established guidelines or outside these guidelines.
- Additional noise control measured to be adopted, if necessary.

## 6.3 CONTROL OF CONSTRUCTION NOISE AND VIBRATION – PROCEDURAL STEPS

The flow chart presented below illustrates the process that will be followed in assessing construction activities.



# 7 CONCLUSION

Provided that the recommendations in section 6 of this report are adopted, noise and vibration generation by the proposed construction works will be minimised and the requirements of condition of consent B31 will be minimised.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Thomas Taylor

# Appendix H Flora and Fauna Management Plan

KLEINFELDER
Bright People. Right Solutions.

# Construction Flora and Fauna Management Sub-Plan

## DesignInc Pty Ltd

Lindfield Learning Village
Eton Road, Lindfield NSW

October 2018

# Construction Flora and Fauna Management Sub-Plan

Lindfield Learning Village

Eton Road, Lindfield NSW

**Kleinfelder Document Number:** NCA18R82665

**Project No:** 20191317



**Prepared for:**

**DESIGNINC PTY LTD**

Only DesignInc its designated representatives or relevant statutory authorities may use this document and only for the specific project for which this report was prepared. It should not be otherwise referenced without permission.

**Document Control:**

| Version | Description | Date | Author | Technical Reviewer | Peer Reviewer |
|---|---|---|---|---|---|
| 1.0 | Draft for client review | 16 August 2018 | D Pedersen | D Pedersen | Kristy Peters |
| | | | | | |

**Kleinfelder Australia Pty Ltd**

95 Mitchell Road
Cardiff, NSW 2285
Phone: 02 4949 5200
ABN: 23 146 082 500

# Contents

# 1. INTRODUCTION

The proposed redevelopment of the old University of Technology Sydney (UTS) Campus and attendant Development Application (DA) are being administered for the Department of Education (DoE) by DesignInc Sydney Pty Ltd.

## 1.1 SCOPE

Kleinfelder have been engaged to prepare a Construction Flora and Fauna Sub-Plan (FFMSP) as part of development condition B34.

Condition B34.

The Applicant must prepare a Construction Flora and Fauna Management Sub-Plan (FFMSP) in consultation with OEH. The plan must address, but not be limited to, the following:

a) measures to minimise the loss of key fauna habitat, including tree hollows

b) measures to minimise the impacts on fauna on site, including conducting fauna preclearance surveys prior to vegetation clearing, building/structure demolition

c) engagement of an appropriately qualitied ecologist with experience in capturing native wildlife to be on site for all vegetation removal activities

d) controlling weeds and feral pests

e) an Unexpected Finds Procedure detailing procedures and management measures to be implemented in the event that flora and fauna is uncovered in any area not identified in the updated Biodiversity Assessment (BAR)

f) measures to ensure biodiversity values not intended to be impacted are protected, including barriers and mapping of protected/ 'no-go' areas

g) a program to monitor the effectiveness of the measures in the FFMSP for the Phase 1 development plan for the new school development.

This FFMSP is a management plan for APZ construction and initial works (Phase 1) only. Kleinfelder has prepared this FFSMP for the site in October 2018 prior to commencement of construction.

The scope of our FFSMP has focused on the subject site (DoE land) and extended out to the study area (including the pathway extension to the bus stop).

The study areas includes:

- Establishment of APZ around Phase 1 for the entirety of the DoE owned Land;
- Construction of a small footpath to the bus stop area north-east of the subject site.

The FFSMP had been developed in consideration of the Landscape Management Plan (LMP) and its associated directions and recommendations (i.e. tree retention, soil protection, fauan management). Further to this the FFSMP details the actions required for weed management plan as directed by EcoPlanning Weed Management Strategy (2018).

## 1.2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The study area lies within the Ku-ring-gai Local Government Area (LGA).

The study area is bounded by Lane Cover River National Park to the south, east and west, and existing residential development to the northern perimeters. The bushland on the study area is contiguous with Lane Cove National Park, being used for recreation and educational purposes.

The majority of the site is mapped as the Hawkesbury soil landscape. The northern part of the study area is mapped as the Lucas Heights soil landscape. Shallow soils and exposed sandstone are common surface features.

The subject site has existing UTS buildings within a natural bushland environment.

The proposed development would require the management of the bushland environment to meet the prescribed standards for Asset Protection Zones (NSW RFS 2005).

A tree survey has been prepared to ascertain the trees on site, their density, connectivity and selection for removal to meet the NSW RFS standards (LMP).

## 1.3 VEGETATION CLASSIFICATION

Vegetation types are considered for the purpose of this FFSMP. The study area contains two natural vegetation communities and one area of modified vegetation:

1. Smooth-barked Apple - Red Bloodwood open forest on enriched sandstone slopes around Sydney and the Central Coast (ME64; PCT1776)
2. Dwarf Apple - Broad-leaved Scribbly Gum - Sydney Peppermint low open woodland on sandstone ridges with subtle enrichment in northern Sydney (ME67; PCT1782).
3. Cleared land exotics and exotic/non-indigenous plantings.

For any further information please see *Biodiversity Assessment Report (*Ecoplanning 2017).

# 2. FFSMP OBJECTIVES AND ZONES

## 2.1 MANAGEMENT AIMS AND OBJECTIVES

The primary aim of this FFSMP is to provide a working document for the Construction of the APZ that will outline the actions and procedures required to meet the relevant Consent Condition B34.

### 2.1.1 APZ Management Zones

The site has been divided into management zones based on the landscape characteristics and planned APZ management and outcomes:

- **Management Zone (IPA Parkland):** This Management Zone will follow the same guidelines as IPA management (*an IPA should provide a tree canopy cover of less than 15% and should be located greater than 2 metres from any part of the roofline of a dwelling. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground (NSW RFS 2006). The vegetation for landscaping within IPA will eliminate potential fire ignition and spread sources by using/retaining specific species and total native tree and shrub cover should be retained as clumps or islands and should maintain a covering of no more than 20% of the total area. Tree removal will take place to come into line with the standards of the NSW Rural Fire Services*). Specifically, **the trees will be removed including stumps and ground roots to 150mm below finish level**, and ground cover within the IPA Parkland will be highly modified to a mown grassy parkland standard and garden beds with specific plant species to eliminate ignition and spread sources. This area will form part of the landscaped area to the north of the building for an outdoor play area.

- **IPA Management Zone (IPA):** The remaining IPA will provide a tree canopy cover of less than 15% and should be located greater than 2 metres from any part of the roofline of a dwelling. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground (NSW RFS 2006). The ground layer will be managed to less than 10cm on a regular (as-needed) basis. The vegetation for landscaping within IPA will eliminate potential fire ignition and spread sources by using/retaining specific species and total native tree and shrub cover should be retained

as clumps or islands and should maintain a covering of no more than 20% of the total area. Tree removal will take place to come into line with the standards of the NSW Rural Fire Services. Specifically, **the trees will be removed by cutting at ground level and leaving root structures in place.**

- **Pathway Management Zone (PMZ):** The proposed path to the bus stop is on adjacent landholding. Within the pathway to the north all trees within the study area will be retained until clarification of this area is received in regards to tree removal. One tree has been highlighted for removal (tree #38, Brush Box).

### 2.1.2 Tree Clearing Zones

These zone will be further divided into tree clearing management zones in consultation with the tree clearing contractor. This will ensure works are done to the required standard before leaving a zone and proceeding to the next zone. Each zone will be inspected and signed off by the Bushfire Consultant prior to moving to next zone.

## 2.2 WEED MANAGEMENT

Weed management is considered in this FFSMP. EcoPlanning have drafted a weed management strategy which has been incorporated into this FFSMP (**Appendix 3**). Exotic flora species are found in low number across the subject site, except in areas of planting. Where exotic species have naturalised or planted specimens have escaped garden beds into the bushland, they should be treated in accordance with the methods detailed in **Appendix 3**.

## 2.3 THREATENED SPECIES AND FAUNA MANAGEMENT

No threatened fauna species have been recorded in the subject site (EcoPlanning 2017), however management in accordance with this FFSMP includes mitigation measures for threatened species that potentially utilise the site (e.g. Powerful Owl) (see **Appendix 4**).

Further to threatened species, all fauna potentially impacted from the APZ implementation will be managed through the fauna displacement protocol (see **Appendix 4**).

### 2.3.1 Nest Boxes and Hollow Bearing Trees

The subject site has several trees with nest boxes installed and a potential hollow bearing tree present. These fauna habitat features were identified in the tree survey (**Appendix 1**), and will be adequately protected through the retention of that tree and the provision of a project ecologist supervision throughout the APZ clearing.

# 3. IMPLEMENTATION OF CONSTRUCTION FFMSP

Clearing for APZ is expected to commence in the months October-November 2018. The following section detail how the construction and implementation of the APZ will managed the Condition B34 requirements.

The key requirements of the FFMSP are:

1. All clearing works of native vegetation within the APZ area will be conducted under the direct supervision of a qualified and experienced Project Ecologist engaged by the Project Manager.

2. All Clearing Contractor staff will be inducted by the project ecologist prior to commencing works, to understand the sensitivities and expectations associated with the ecology while clearing at this site.

3. The project site will be sectioned into management zones in consultation with the contractor. Works will be conducted within management zones until completion and sign off, before entering next management zone.

4. Exclusion or protection fencing will be installed for habitat protection, tree protection and unexpected finds.

## 3.1 MEASURES TO MINIMISE THE LOSS OF KEY FAUNA HABITAT

No key habitat has been determined on the site.

Fauna habitat generally refers to shelter and foraging (feed).

Shelter includes tree hollows, loose bark, nest boxes, nests and possum dreys, fallen timber, hollow logs and fallen timber, shrub/ground layer vegetation, leaf litter, rocks and sandstone, water soaks or drainage lines, and any other features deemed by the experienced project ecologist.

Feed habitat refers to flowering trees and shrubs, water holes, Allocasuarina fruit (Black Cockatoos), and any other potential features deemed by the experienced project ecologist.

All hollow bearing trees have been identified and conserved in the LMP. However, there is scope that fauna habitat may still be adversely impacted, particularly sandstone and rocks, fallen timber and leaf litter.

To mitigate any further impact on site, the project ecologist will be aware of the clearing procedures and locations at all time. Pre clearing surveys will be conducted every morning in the specified clearing zone (specified in consultation with the clearing contractor) and throughout the day as required (i.e. when clearing moves to a new specified zone).

If a habitat feature is identified, it will be either:

1. Checked for presence of fauna before removal, and possible relocation of the habitat feature into adjacent or selected location (based on approvals sandstone rocks and hollow logs can be moved, shrubs can be excavated and moved).
2. Retained in-situ (in consultation with the Project Manager and stakeholders) if the feature is considered exceptional and does not pose additional risk (e.g. tree hollow or sandstone shelf can be retained).

## 3.2 MEASURES TO MINIMISE THE IMPACTS ON FAUNA ON SITE

To minimise impact to fauna on site, the project ecologist will be aware of the clearing procedures and locations at all time. Pre clearing surveys will be conducted every morning in the specified clearing zone (specified in consultation with the clearing contractor) and throughout the day as required (i.e. when clearing moves to a new specified zone).

**Appendix 2** describes the pre-clearing protocol and the fauna displacement protocol (Kleinfelder LMP 2018).

The Project Ecologist will have the following qualifications and experience:

- A fauna spotter catcher qualification AHCFAU301A: **Response to Wildlife Emergencies (including relocation)**: A spotter catcher is a person licensed to detect, capture, care for, assess, and release wildlife disturbed by vegetation clearance activities.
- Minimum 2 years handling fauna and working on construction sites.

## 3.3 ENGAGEMENT OF AN APPROPRIATELY QUALITIED ECOLOGIST

Kleinfelder are an appropriately qualified ecologist and have capacity to provide experienced project ecologists for the purpose of APZ clearing at this site. All our staff used on this project will have the fauna spotter catcher qualification AHCFAU301A: Response to Wildlife Emergencies and minimum 2 years handling fauna and working on construction sites that involve clearing of native vegetation.

## 3.4 CONTROLLING WEEDS AND FERAL PESTS

The site has a generally low weed infestation and no recognised pests. The intent of this measure is to ensure no new weeds or pests are introduced to the site. This will be managed by the project ecologist through:

1. The site induction process, ensuring all contractors understand the site expectations regarding clean vehicles, equipment and plant and
2. By checking all equipment and plant used on the site during clearing. All vehicles to enter the site will be inspected by the project ecologist, targeting material such as wood chip and mulch, dirt etc.
3. By zoning out designated work areas so weeds are not transported from one zone to another zone across the site.

Weed managemet will follow the Weed Management Strategy (Ecoplanning 2018) as per **Appendix 3.**

Feral pests (likely rats, rabbits, foxes) will be managed through general tidiness and housekeeping (such as provision of lunch room).

Any feral pest captured will be appropriately managed with by the project ecologist.

## 3.5 UNEXPECTED FINDS PROCEDURE

Often when clearing works for construction for APZ commences, unexpected finds occur, which are difficult to be predicted in the planning process. Examples are (but not limited to): small tree hollows not previously identified, sandstone areas of habitat value exposed after

vegetation removed, new nests or possum dreys identified, new threatened fauna species identified, seasonality issues associated with flora species (i.e. threatened flora species identified), retained feature compromised by clearing works.

The direct supervision of a qualified and experienced Project Ecologist, and the pre clearing surveys will provide the acceptable procedure to identify any unexpected flora or fauna issue.

To suitably manage the issue in in the event that flora and fauna is uncovered in any area (not being identified in the updated Biodiversity Assessment Report), the project ecologist would cease works in that area (direct contractor to another pre-cleared zone), and inform the Project Manager. The area of interest would be delineated as a no go area until the liaison and direction for action has been provided by the Ecoplanning Consultant (author of the BAR) or other relevant authority.

## 3.6 MEASURES TO ENSURE SPECIFIC BIODIVERSITY VALUES ARE PROTECTED

Biodiversity values to be protected are essentially the retained trees and potentially sandstone outcrops and any unexpected finds.

Trees will be protected from disturbance by tree protection fencing. This will include protection of the tree root zone, preferably out to a distance of 5m from the tree stem or the drip line. Where this separation is not possible or practical, the Project Ecologist will consult with the Project Manager and provide an alternate solution for tree protection (in some cases consulting with the qualified arborist).

The sandstone outcrop areas are unique values that should avoid direct impact. These areas should be fenced off for the duration of the tree clearing.

To suitably manage the issue in in the event that unexpected flora and fauna finds in any area (not being identified in the updated Biodiversity Assessment Report), the project ecologist would cease works in that area (direct contractor to another pre-cleared zone), and inform the Project Manager. The area of interest would be delineated as a no go area until the liaison and direction for action has been provided by the Ecoplanning Consultant (author of the BAR) or other relevant authority.

## 3.7 MONITORING PROGRAM

This FFSMP is a management plan for construction and initial APZ installation works only. No ongoing monitoring is required under this FFSMP.

The monitoring associated with the FFMSP will include:

1. Ensuring contractor has been inducted and aware of site environmental constraints
2. Monitoring vehicles to ensure they are clean when arriving on site
3. Ensuring works are conducted within each specified work zone
4. Prior to leaving a work zone, the quality of APZ works will be monitored by the Bushfire Consultant, who will sign off that that specific zone has been established to suitable standard
5. Monitoring the condition tree protection fences and exclusion zone fencing
6. Monitoring the site to ensure works do not extend into surround areas
7. Monitoring the tree retention data set.

All future monitoring post APZ construction will be conducted under the direction of the Alphitonia VMP (2016).

## 3.8 REPORTING

The APZ construction will be recorded as follows:

- A detailed daily log will be kept by the project ecologist, detailing where clearing occurred and any relevant information associated (unexpected finds, tree protection standrds, completion of zone etc.);
- If/when issues arise and alternate actions have been approved, a brief report detailing the modifications will be prepared by the supervising ecologist; and
- Vegetation Clearing: Upon the completion of clearing, the project ecologist supervising clearing works will provide a final letter/ report including the daily log.

# 4. REFERENCES


Alphitonia Environmental Construction Services (2016) *Vegetation Management Strategy* UTS Ku-ring-gai Campus, Eton Road, Lindfield (0982)

EcoPlanning (2017) *Biodiversity Assessment Report, Framework for Biodiversity Assessment – Lots 1, 2 and 4 // DP 1151638,* University of Technology, Ku-ring-gai Campus, Lindfield.

NSW Rural Fire Service (2005). *Standards for Asset Protection Zones.*

NSW Rural Fire Service (2006). *Planning of Bush Fire Protection 2006: A Guide for Councils, Planners*, Fire Authorities, and Developers.

EcoPlanning (2018). Weed Management Strategy – draft for DA submission.

Kleinfelder (2018). Landscape Management Plan for Lindfield Learning College Redevelopment

# APPENDIX 1. TREE RETENTION SURVEY

# APPENDIX 2. TREE CLEARING PROTOCOLS

## PRE-CLEARING PROTOCOL

Prior to the commencement of any clearing within the site, extent and delineation of the clearing area will be consulted by the Project Ecologist to the Contractor, to ensure there are no accidental incursions.

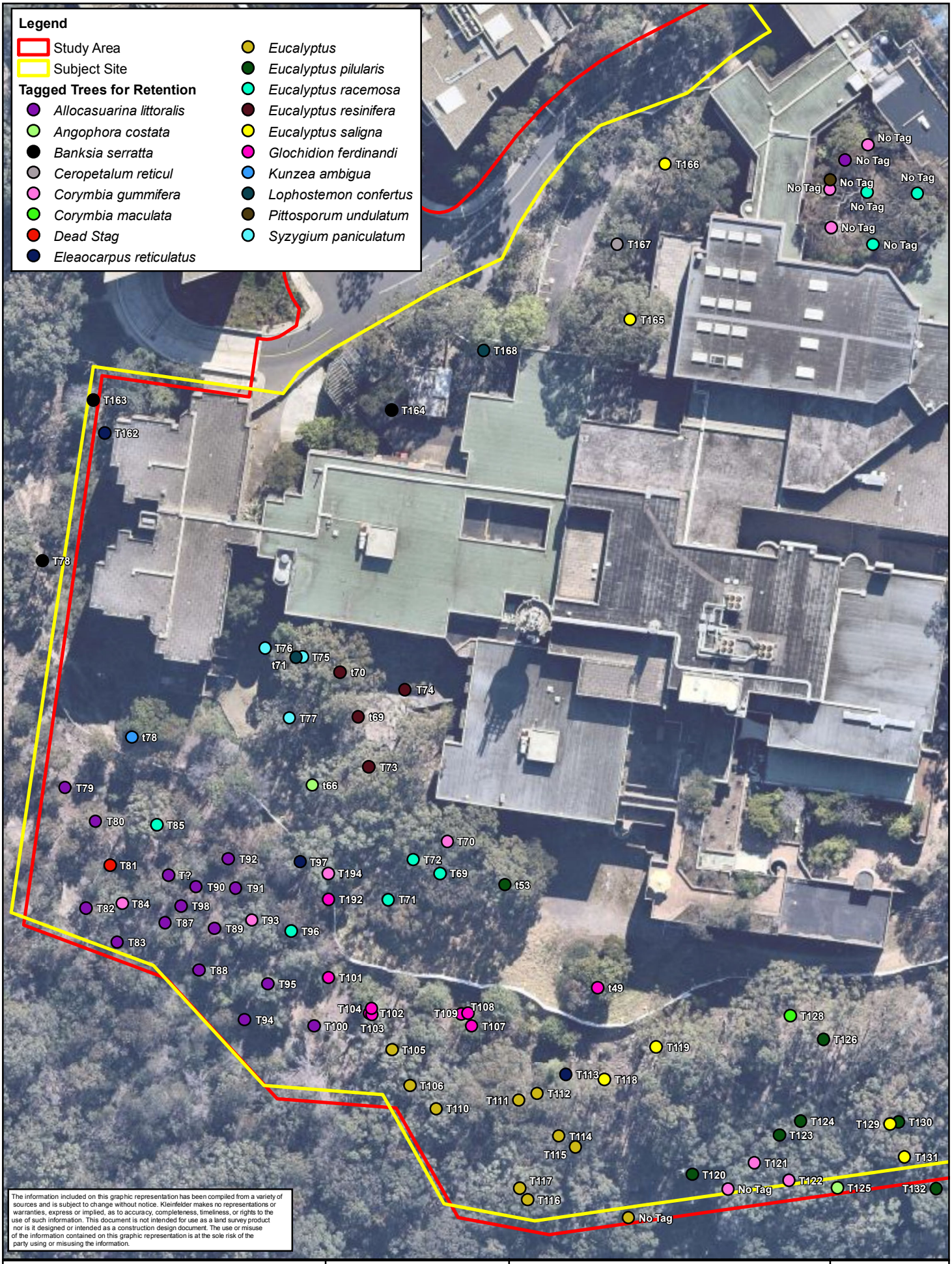
The Project Ecologist will perform a physical search of that zone and approve for works to commence.

## FAUNA DISPLACEMENT PROTOCOL

Displacement of fauna may occur as part of the clearing process. All clearing will be supervised by a suitably qualified and experienced ecologist engaged by the project manager (Project Ecologist or fauna spotter catcher). The following protocol will be followed:

- If possible any fauna should be allowed to self-relocate if safe to do so, if necessary and safe to do so the animal will be captured, assessed and, if appropriate, released into a pre-agreed area;
- All fauna will be handled in such a way as to prevent injury to the animal and people and if necessary the animal should be kept in an appropriate container (calico bag, hessian sack, pet pack etc.) and nocturnal species released at dusk;
- Any microbats can be soft released, that is put in a nest box and allowed to self-relocate at dusk;
- If any animal is injured during the construction process, a veterinarian will be contacted immediately for professional advice on the best course of action;
- If any native animal is injured during other operational/ construction processes while an ecologist, environmental representative or animal handler is not present, they must be contacted immediately; and

- If during clearing any protected species are injured or killed, the Project Ecologist will inform Ku-ring-gai Council immediately (same day as injury/ death).


Legend
Study Area
Subject Site
Tagged Trees for Retention
Allocasuarina littoralis
Angophora costata
Banksia serratta
Ceropetalum reticul
Corymbia gummifera
Corymbia maculata
Dead Stag
Eleaocarpus reticulatus
Eucalyptus
Eucalyptus pilularis
Eucalyptus racemosa
Eucalyptus resinifera
Eucalyptus saligna
Glochidion ferdinandi
Kunzea ambigua
Lophostemon confertus
Pittosporum undulatum
Syzygium paniculatum
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PROJECT REFERENCE: 20191317
DATE DRAWN: 14/09/2018 13:19 Version 6
DRAWN BY: GJoyce
DATA SOURCE:
NSW DFSI - 2017
nearmap - 2018
Tagged Trees for Retention
Within Main Site (West)
DesignInc Sydney Pty Ltd
Lindfield Learning Village
FIGURE:
1
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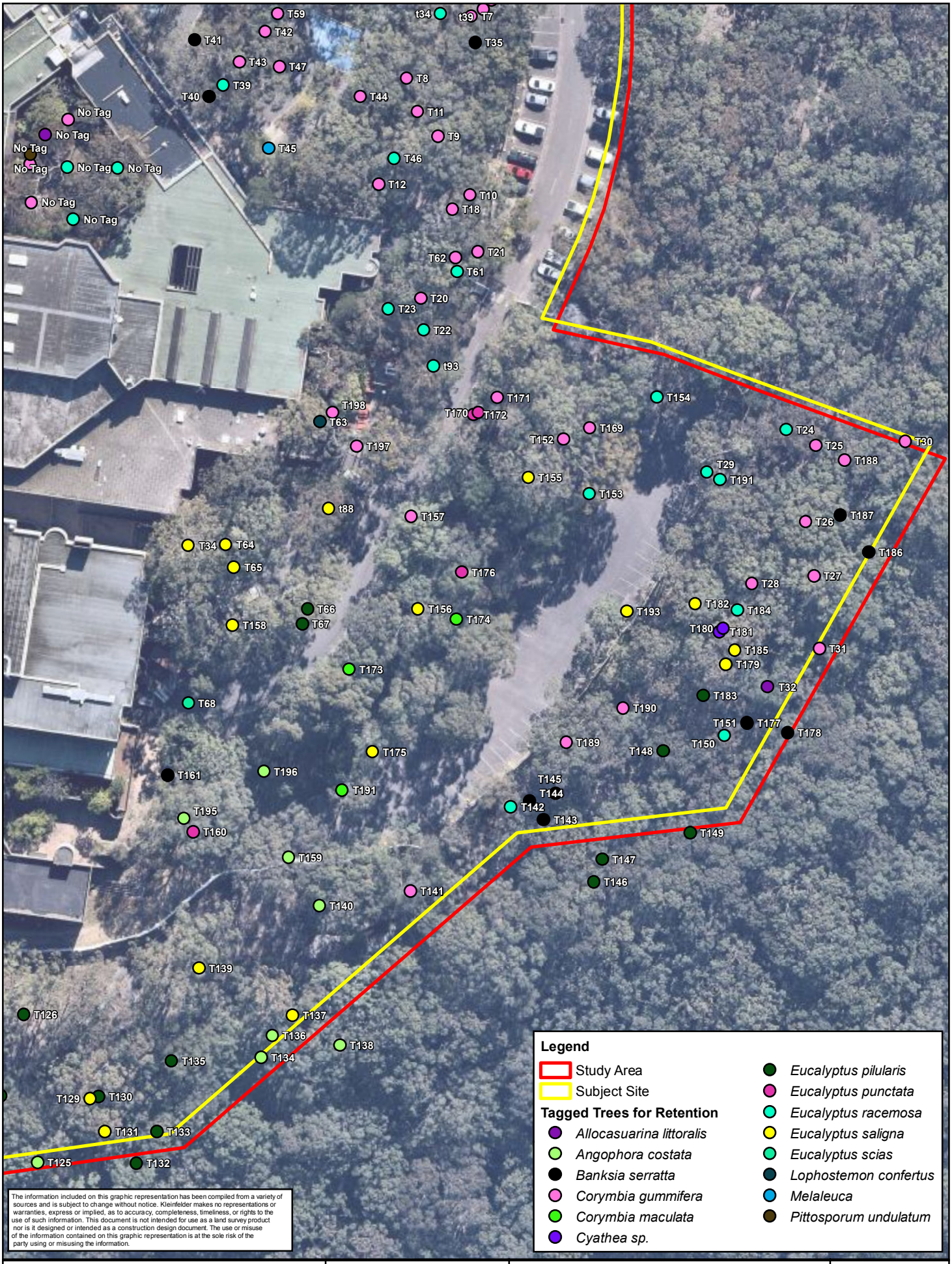




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DATE DRAWN: 14/09/2018 13:18 Version 6

DRAWN BY: GJoyce

DATA SOURCE:
NSW DFSI - 2017
nearmap - 2018

# Tagged Trees for Retention Within Main Site (East)

DesignInc Sydney Pty Ltd
Lindfield Learning Village

FIGURE:

**2**

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| SciName | CommName | Tag_No | | SciName | CommName | Tag_No |
|---|---|---|---|---|---|---|
| Eucalyptus | stringybark | No Tag | | Angophora costata | Smooth apple | T19 |
| Eucalyptus racemosa | scribbly | No Tag | | Corymbia gummifera | bloodwood | T190 |
| Eucalyptus racemosa | scribbly | No Tag | | Corymbia maculata | spotted gum | T191 |
| Eucalyptus racemosa | scribbly | No Tag | | Eucalyptus racemosa | scribbly | T191 |
| Corymbia gummifera | bloodwood | No Tag | | Glochidion ferdinandi | cheese tree | T192 |
| Allocasuarina littoralis | casuarina | No Tag | | Eucalyptus saligna | Blue gum | T193 |
| Corymbia gummifera | bloodwood | No Tag | | Corymbia gummifera | bloodwood | T194 |
| Corymbia gummifera | bloodwood | No Tag | | Angophora costata | Smooth apple | T195 |
| Pittosporum undulatum | pittosporum | No Tag | | Angophora costata | Smooth apple | T196 |
| Corymbia gummifera | bloodwood | No Tag | | Corymbia gummifera | bloodwood | T197 |
| Allocasuarina littoralis | casuarina | T | | Corymbia gummifera | bloodwood | T198 |
| Corymbia gummifera | bloodwood | T1 | | Corymbia gummifera | bloodwood | T2 |
| Corymbia gummifera | bloodwood | T10 | | Corymbia gummifera | bloodwood | T20 |
| Allocasuarina littoralis | casuarina | T100 | | Corymbia gummifera | bloodwood | T21 |
| Glochidion ferdinandi | cheese tree | T101 | | Eucalyptus racemosa | scribbly | T22 |
| Glochidion ferdinandi | cheese tree | T102 | | Eucalyptus racemosa | scribbly | T23 |
| Glochidion ferdinandi | cheese tree | T103 | | Corymbia gummifera | bloodwood | t23 |
| Glochidion ferdinandi | cheese tree | T104 | | Eucalyptus racemosa | scribbly | T24 |
| Eucalyptus | stringybark | T105 | | Corymbia gummifera | bloodwood | T25 |
| Eucalyptus | stringybark | T106 | | Corymbia gummifera | bloodwood | T26 |
| Glochidion ferdinandi | cheese tree | T107 | | Corymbia gummifera | bloodwood | T27 |
| Glochidion ferdinandi | cheese tree | T108 | | Corymbia gummifera | bloodwood | T28 |
| Glochidion ferdinandi | cheese tree | T109 | | Eucalyptus racemosa | scribbly | T29 |
| Corymbia gummifera | bloodwood | T11 | | Corymbia gummifera | bloodwood | T3 |
| Eucalyptus | stringybark | T110 | | Corymbia gummifera | bloodwood | T30 |
| Eucalyptus | stringybark | T111 | | Corymbia gummifera | bloodwood | T31 |
| Eucalyptus | stringybark | T112 | | Allocasuarina littoralis | casuarina | T32 |
| Eleaocarpus reticulatus | Blueberry Ash | T113 | | Eucalyptus racemosa | scribbly | t34 |
| Eucalyptus | stringybark | T114 | | Eucalyptus saligna | blue gum | T34 |
| Eucalyptus | stringybark | T115 | | Banksia serratta | banksia | T35 |
| Eucalyptus | stringybark | T116 | | Corymbia gummifera | bloodwood | T37 |
| Eucalyptus | stringybark | T117 | | Corymbia gummifera | bloodwood | T38 |

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|---|---|---|---|---|---|---|
| Eucalyptus saligna | blue gum | T118 | | Corymbia gummifera | bloodwood | t38,T5 |
| Eucalyptus saligna | blue gum | T119 | | Corymbia gummifera | bloodwood | t39 |
| Corymbia gummifera | bloodwood | T12 | | Eucalyptus racemosa | scribbly | T39 |
| Eucalyptus pilularis | blackbutt | T120 | | Eucalyptus racemosa | scribbly | T4 |
| Corymbia gummifera | bloodwood | T121 | | Corymbia gummifera | bloodwood | t40 |
| Corymbia gummifera | bloodwood | T122 | | Banksia serratta | banksia | T40 |
| Eucalyptus pilularis | blackbutt | T123 | | Banksia serratta | banksia | t41 |
| Eucalyptus pilularis | blackbutt | T124 | | Banksia serratta | banksia | T41 |
| Angophora costata | Smooth apple | T125 | | Corymbia gummifera | bloodwood | T42 |
| Eucalyptus pilularis | blackbutt | T126 | | Corymbia gummifera | bloodwood | T43 |
| Corymbia maculata | spotted gum | T128 | | Corymbia gummifera | bloodwood | T44 |
| Eucalyptus saligna | blue gum | T129 | | Corymbia gummifera | bloodwood | t44 |
| Eucalyptus pilularis | Blackbutt | T130 | | Melaleuca | paperbark | T45 |
| Eucalyptus saligna | blue gum | T131 | | Eucalyptus racemosa | Scribbly | T46 |
| Eucalyptus pilularis | Blackbutt | T132 | | Corymbia gummifera | bloodwood | T47 |
| Eucalyptus pilularis | Blackbutt | T133 | | Eucalyptus saligna | blue gum | T48 |
| Angophora costata | Smooth apple | T134 | | Eucalyptus racemosa | scribbly | T49 |
| Eucalyptus pilularis | Blackbutt | T135 | | Glochidion ferdinandi | cheese tree | t49 |
| Angophora costata | Smooth apple | T136 | | Glochidion ferdinandi | cheese tree | T50 |
| Eucalyptus saligna | blue gum | T137 | | Allocasuarina littoralis | casuarina | T51 |
| Angophora costata | Smooth apple | T138 | | Corymbia gummifera | bloodwood | T52 |
| Eucalyptus saligna | blue gum | T139 | | Eucalyptus racemosa | scribbly | T53 |
| Angophora costata | Smooth apple | T14 | | Eucalyptus pilularis | blackbutt | t53 |
| Angophora costata | Smooth apple | T140 | | Angophora costata | Smooth apple | T54 |
| Corymbia gummifera | bloodwood | T141 | | Angophora floribunda | Rough Barked Apple | T55 |
| Eucalyptus racemosa | scribbly | T142 | | Eucalyptus racemosa | scribbly | T56 |
| Banksia serratta | banksia | T143 | | Eucalyptus racemosa | scribbly | T57 |
| Banksia serratta | banksia | T144 | | Angophora costata | Smooth Barked Apple | T58 |
| Banksia serratta | banksia | T145 | | Corymbia gummifera | bloodwood | T59 |
| Eucalyptus pilularis | blackbutt | T146 | | Corymbia gummifera | bloodwood | T6 |
| Eucalyptus pilularis | Blackbutt | T147 | | Corymbia gummifera | bloodwood | T60 |
| Eucalyptus pilularis | Blackbutt | T148 | | Eucalyptus racemosa | Scribbly | T61 |
| Eucalyptus pilularis | Blackbutt | T149 | | Corymbia gummifera | bloodwood | T62 |

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| Eucalyptus microcarpa | Grey Box | T15 | | Lophostemon confertus | brush box | T63 |
| Eucalyptus racemosa | scribbly | T150 | | Eucalyptus saligna | blue gum | T64 |
| Banksia serratta | banksia | T151 | | Eucalyptus saligna | blue gum | T65 |
| Corymbia gummifera | bloodwood | T152 | | Angophora costata | Smooth apple | t66 |
| Eucalyptus racemosa | scribbly | T153 | | Eucalyptus pilularis | blackbutt | T66 |
| Eucalyptus racemosa | scribbly | T154 | | Eucalyptus pilularis | blackbutt | T67 |
| Eucalyptus saligna | blue gum | T155 | | Eucalyptus scias | Eucalyptus scias | T68 |
| Eucalyptus saligna | blue gum | T156 | | Eucalyptus resinifera | red mahogany | t69 |
| Corymbia gummifera | bloodwood | T157 | | Eucalyptus racemosa | scribbly | T69 |
| Eucalyptus saligna | blue gum | T158 | | Corymbia gummifera | bloodwood | T7 |
| Angophora costata | Smooth apple | T159 | | Eucalyptus resinifera | red mahogany | t70 |
| Corymbia gummifera | bloodwood | T16 | | Corymbia gummifera | bloodwood | T70 |
| Eucalyptus punctata | Grey Gum | T160 | | Lophostemon confertus | brush box | t71 |
| Banksia serratta | banksia | T161 | | Eucalyptus racemosa | scribbly | T71 |
| Eleaocarpus reticulatus | Blueberry Ash | T162 | | Eucalyptus racemosa | scribbly | T72 |
| Banksia serratta | banksia | T163 | | Eucalyptus resinifera | red mahogany | T73 |
| Banksia serratta | banksia | T164 | | Eucalyptus resinifera | red mahogany | T74 |
| Eucalyptus saligna | blue gum | T165 | | Syzygium paniculatum | magenta lilly pilly | T75 |
| Eucalyptus saligna | blue gum | T166 | | Syzygium paniculatum | magenta lilly pilly | T76 |
| Ceropetalum reticul | Black Wattle *2 | T167 | | Syzygium paniculatum | magenta lilly pilly | T77 |
| Lophostemon confertus | brush box | T168 | | Banksia serratta | banksia | T78 |
| Corymbia gummifera | bloodwood | T169 | | Kunzea ambigua | Tick Bush | t78 |
| Corymbia gummifera | bloodwood | T17 | | Allocasuarina littoralis | casuarina | T79 |
| Eucalyptus punctata | Grey Gum | T170 | | Corymbia gummifera | bloodwood | T8 |
| Corymbia gummifera | Bloodwood | T171 | | Allocasuarina littoralis | casuarina | T80 |
| Eucalyptus punctata | Grey Gum | T172 | | Dead Stag | dead stag | T81 |
| Corymbia maculata | spotted gum | T173 | | Allocasuarina littoralis | casuarina | T82 |
| Corymbia maculata | spotted gum | T174 | | Allocasuarina littoralis | casuarina | T83 |
| Eucalyptus saligna | blue gum | T175 | | Corymbia gummifera | bloodwood | T84 |
| Eucalyptus punctata | Grey Gum | T176 | | Eucalyptus racemosa | scribbly | T85 |
| Banksia serratta | banksia | T177 | | Allocasuarina littoralis | casuarina | T87 |
| Banksia serratta | banksia | T178 | | Eucalyptus saligna | blue gum | t88 |
| Eucalyptus saligna | blue gum | T179 | | Allocasuarina littoralis | casuarina | T88 |

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|---|---|---|---|---|---|---|
| Corymbia gummifera | bloodwood | T18 | | Allocasuarina littoralis | casuarina | T89 |
| Eucalyptus saligna | blue gum | t18 | | Corymbia gummifera | bloodwood | T9 |
| Cyathea sp. | fern | T180 | | Allocasuarina littoralis | casuarina | T90 |
| Cyathea sp. | fern | T181 | | Allocasuarina littoralis | casuarina | T91 |
| Eucalyptus saligna | blue gum | T182 | | Allocasuarina littoralis | casuarina | T92 |
| Eucalyptus pilularis | blackbutt | T183 | | Eucalyptus racemosa | scribbly | t93 |
| Eucalyptus racemosa | scribbly | T184 | | Corymbia gummifera | bloodwood | T93 |
| Eucalyptus saligna | blue gum | T185 | | Allocasuarina littoralis | casuarina | T94 |
| Banksia serratta | banksia | T186 | | Allocasuarina littoralis | casuarina | T95 |
| Banksia serratta | banksia | T187 | | Eucalyptus racemosa | scribbly | T96 |
| Corymbia gummifera | bloodwood | T188 | | Eleaocarpus reticulatus | Blueberry Ash | T97 |
| Corymbia gummifera | bloodwood | T189 | | Allocasuarina littoralis | casuarina | T98 |

# APPENDIX 3. WEED MANAGEMENT STRATEGY

This Weed Management Strategy has been prepared by EcoPlanning, and to be included into this FFSMP under instruction by DesignInc.

Exotic flora species are found in low number across the subject site, except in areas of planting. Where exotic species have naturalised or planted specimens have escaped garden beds into the bushland, they should be treated in accordance with the following methods.

| Weed type | Treatment |
|---|---|
| Tall annual herbaceous weeds | Tall herbaceous weeds are to be kept at low levels and treated prior to seeding where possible. Treatment of herbaceous weeds prior to seeding will ensure the gradual reduction of the sites weed seed bank over the management period. Techniques considered appropriate in controlling herbaceous weeds onsite include (as required and appropriate):<br>• Spot spraying<br>• Slashing<br>• Hand removal |
| Woody weeds | Primary and secondary woody weeds are to be treated by cut/scrape and painting with neat Roundup Biactive®, accordingly. *Rubus fruticosus* should initially be removed in areas of high resilience, and where it is smothering native mid-storey growth. Woody weeds should be treated in degraded areas as a lower priority.<br>All woody weed biomass should be neatly piled and retained onsite as habitat. Large expanses of woody weeds should be evaluated for their habitat values prior to primary removal. Juveniles woody weeds are to be treated by hand removal or careful spot spraying with a Metsulfuron-methyl based herbicide where appropriate. |
| Exotic grasses and monocots | Exotic grasses are to be treated throughout the site, with areas of high resilience receiving first priority. A combination of hand removal, careful spot spraying and broad scale blanket spraying will be utilised. *Ehrharta erecta* should be sprayed with a low glyphosate solution (e.g. 0.2%), which will allow for careful spot spraying amongst native species. |

| Weed type | Treatment |
|---|---|
| Exotic vines | Exotic vines are to be maintained at low levels and skirted from all mid-storey and canopy species throughout the site. Techniques considered appropriate in controlling exotic vines weeds on site include (as required and appropriate):<br>• Hand weeding<br>• Scrape and painting<br>• Spot spraying |

The following species have been recorded during field survey at the subject site (see Ecoplanning 2018).

| Family | Genus | Species | Common name | Native/Exotic | Form |
|---|---|---|---|---|---|
| Alliaceae | *Agapanthus* | *praecox* | African Lily | Exotic | Herbaceous – lily |
| Asparagaceae | *Asparagus* | *aethiopicus* | Ground Asparagus | Exotic | Herbaceous – shrub |
| Asteraceae | *Bidens* | *pilosa* | Cobblers Peg | Exotic | Woody – shrub |
| Fabaceae - Caesalpiniodeae | *Senna* | *pendula var. glabrata* | Senna | Exotic | Woody – shrub |
| Lauraceae | *Cinnamomum* | *camphora* | Camphor Laurel | Exotic | Woody – tree |
| Lomariopsidaceae | *Nephrolepis* | *cordifolia* | Fishbone Fern | Exotic | Herbaceous – fern |
| Moraceae | *Morus* | *alba* | White Mulberry | Exotic | Woody – tree |
| Ochnaceae | *Ochna* | *serrulata* | Mickey Mouse Plant | Exotic | Woody – shrub |
| Oleaceae | *Ligustrum* | *lucidum* | Large-leaved Privet | Exotic | Woody – shrub/tree |
| Oleaceae | *Ligustrum* | *sinense* | Small-leaved Privet | Exotic | Woody – shrub/tree |
| Phyllanthaceae | *Phyllanthus* | *tenellus* | Hen and Chicken | Exotic | Herbaceous – forb |
| Poaceae | *Andropogon* | *virginicus* | Whisky Grass | Exotic | Grass |
| Rosaceae | *Rubus* | *fruticosus* | Blackberry | Exotic | Woody – shrub |

 

| Family | Genus | Species | Common name | Native/Exotic | Form |
|---|---|---|---|---|---|
| Solanaceae | *Solanum* | *mauritianum* | Wild Tobacco Bush | Exotic | Woody – shrub/tree |
| Solanaceae | *Solanum* | *nigrum* | Black-berry Nightshade | Exotic | Woody – shrub |

# APPENDIX 4. THREATENED SPECIES MANAGEMENT

Although no threatened fauna has been surveyed on the subject site, the site has potential to provide habitat for such species. The Powerful Owl is a known species for this location, and many micro-bats utilise the habitat provided. The fauna displacement protocols in **Appendix 2** provide an overall management strategy for all fauna species potentially occurring on site during the APZ implementation works. Further, for the additional management of threatened fauna:

- No clearing should occur during the early evening or at night (i.e. when most fauna species are active and likely to be active);
- Hollow-bearing trees that have been identified will be protected through the actions of the Clearing Protocol (**Appendix 2**);
- On all occasions, trees having potential habitat hollows, nest boxes, or nests will be protected from impacts.

Threatened flora has not been surveyed on the subject site, however Darwinia biflora is recorded adjacent to the site, and has potential to occur due to habitat values. This species can be identified through its foliage, and the attending Project Ecologist will be aware and familiar with the plant for identification purposes.

Although highly unlikely, if any threatened species are found on site, the Project ecologist would appropriately manage through either relocation (fauna) or seeking advice from the Project Manager of resolution of a threatened flora being identified.

# APPENDIX 5. LICENSING

Kleinfelder employees involved in the current study are licensed or approved under the *Biodiversity Conservation Act 2016* (License Number: SL100730, Expiry: 31 March 2019) and the *Animal Research Act 1985* to harm/trap/release protected native fauna and to pick for identification purposes native flora and to undertake fauna surveys.

# Appendix I Bushfire and Flood Emergency Plan

# Flood Emergency Management Sub-Plan.

## UTS Lindfield Facility

## 100 Eton Road

## Lindfield NSW 2070


| | |
|---|---|
| Document: | Flood Emergency Management Sub-Plan |
| Project: | UTS Lindfield Facility 100 Eaton Road Lindfield |
| Location: | UTS Lindfield Facility 100 Eaton Road Lindfield |
| Revision: | B |
| Date: | 18/10/2018 |
| Project Reference: | 21151-001 |
| Prepared for: | Design Inc. |

| | |
|---|---|
| **Document Title** | Flood Emergency Management Sub-Plan |
| **Project** | UTS Lindfield Facility 100 Eaton Road Lindfield |
| **Project Address** | 10 Eaton Road Lindfield NSW 2070 |
| **Client** | Design Inc. |
| **Document version** | B |
| **Date** | 18/10/2018 |
| **EWFW Project Reference** | 21151-001 |
| File path: | W:\205xx\20551 – UTS Ku-ring-gai Campus Development\001\Admin\Reports |

| Document Version Control | | | | | |
|---|---|---|---|---|---|
| Rev | Date | Description of Release | Prepared By | Checked By | Approved By |
| A | 10/10/2018 | Original Issue | Stefan Bahrow | D Stephen | D DeGioia |
| B | 18/10/2018 | Original Issue | Stefan Bahrow | D Stephen | D DeGioia |
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# EXECUTIVE SUMMARY

EWFW is pleased to provide you with this Flood Emergency Management Sub-Plan report, which have investigated all pertinent aspects, to the extent that can be identified, for proposed school.

The purpose of this BFEMSP is to promote a situational awareness of expected flooding behaviour and risks, identify measures to become flood prepared, and recommended a course of action during and after flood events.

Contained herein is a description of the methodology used to prepare this report, a summary of the likely flooding behaviour, recommendations for flood preparation and response during a flood event.

Within the report, your attention is drawn to the calculated stormwater runoff values using ARR2016. The current report still complies with the DCP 47 (April 2005) and Part 24R.7 of Ku-ring-gai Council.

The primary objective of the BFEMSP was to define the flood behaviour within the Lindfield Facility and surrounding catchments through the establishment of an appropriate numerical model. The principal outcome of this report is an understanding of flood behaviour surrounding school that will be used to assess appropriate flooding and evacuation risk.

# CONTENTS

# 1. INTRODUCTION

## 1.1. PURPOSE

The preparation of this Flood Emergency Management Sub-Report is based on our understanding of the existing topography and our understanding of the local conditions of council DCP Part 24R.7 and constraints surrounding this property.

The Construction for this phase of the refurbishment is being broken into two, Stage 1 and Stage 2 for the Department of Education (DoE). The original proposal has been amended to provide a school of 350 students to be opened for the commencement of Term 1, 2019. The amended proposal involves:

Removal of the childcare centre from the SSD application; and the Creation of the following phases within Construction Stage 1:

- Phase 1: School for 350 students accommodating a 100m Asset Protection Zone (APZ).
- Phases 2a and 2b: Phase 2a includes the remaining area of Construction Stage 1 as previously proposed (minus the childcare centre), while Phase 2b includes the repurposing of the Phase 1 area. Phase 2 will accommodate 1,000 students (inclusive of the 350 students in Phase 1) in three home-bases.

The NSW government is committed to opening the school in term 1 2019.

Our BFEMSP investigation report is based on the following assumptions and exclusions, which must be carefully considered.

In undertaking the preparation of this report, EWFW hereby advised that it has no control over any approvals, additional 3rd party requirements, competitive development costs, nor does it have any control over any increase in statutory fees or future availability of external drainage services capacity.

This flood report produced by EWFW will therefore be provided on a as is basis of its best judgement. Stefan Bahrow Drainage Engineer as an experienced and qualified engineering, to certify this information with years of experience in the industry.

The assessment, modelling, calculations and evacuation process has been provided by a qualified Drainage engineer with experience in all aspects of Flood, Drainage and Stormwater Design. Consultation for this phase with: Taylors (Construction), Blackash (Bushfire), Design Inc and Birzulis(Structural).

This is for the Stage 1 of the Evacuation Route for Stage 1 in the construction phase. The roll of EWFW in this project is for the Flood and Stormwater investigation for the whole site and to satisfy and adhere to the Ka-ring-gi Local Government Area (LGA), National Parks and Wildlife, Department of Planning and Environment (OEH) and Department of Education. There is further Modelling to be completed once all knowledge of the existing infrastructure has been obtained which will be able to complete Music modelling, 12d design and calculations to provide all information for outputs of (if any) changes to the site and the completion of a CEMP report of the site as per requested. Further survey is being completed but this will not prevent the Construction of Stage 1.

## 1.2. CURRENT SITE LOCATION

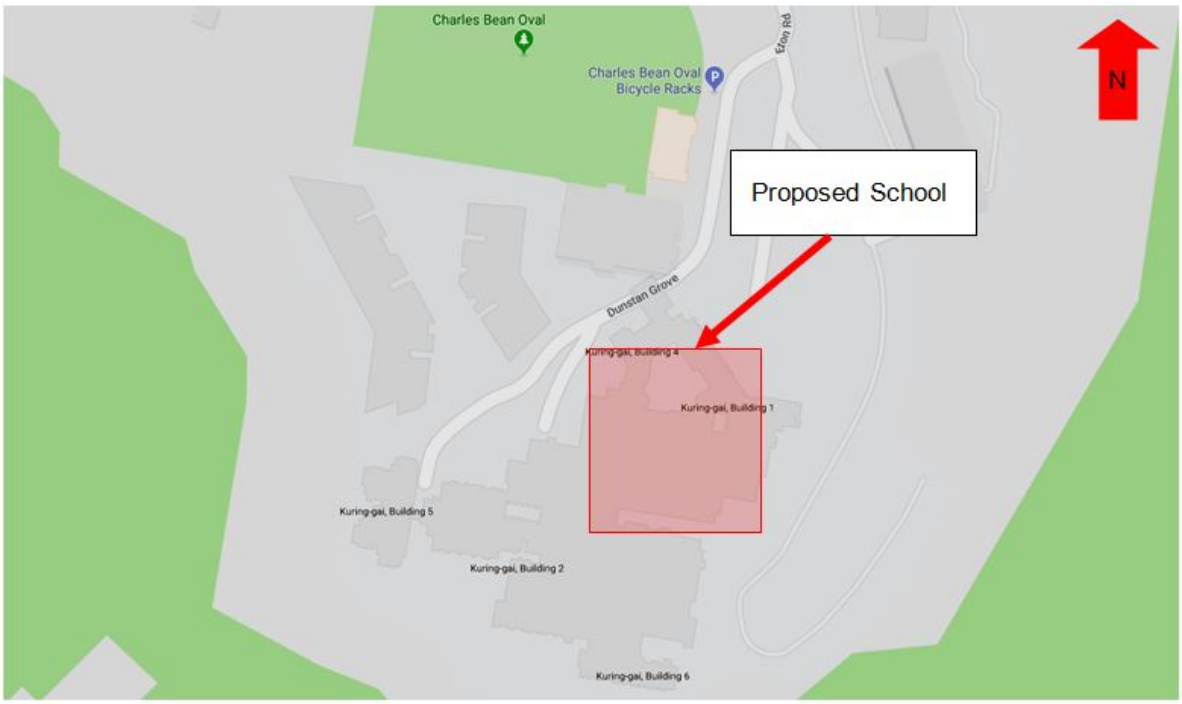


**Figure 1.1 Site Location image**

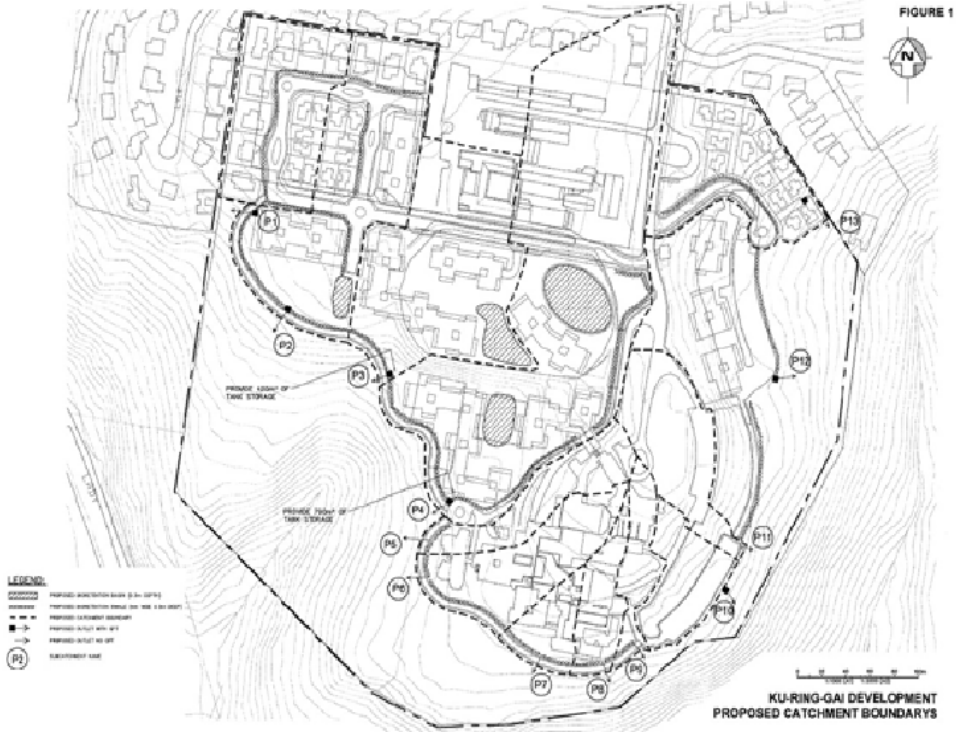


**Figure 1.2 Existing Site Survey & Catchments**

(Original from Patterson Britton Report)

### 1.3. AUTHORITY

Authority to undertake this report was provided by Design Inc..

### 1.4. GOVERNING AUTHORITIES

The following Governing Authorities and Regulations shall have jurisdiction over the services:

| **Authority** |
|---|
| Local Council – Ku-ring-gai Council |
| Department of Education |
| Emergency Services - SES – Police – Bushfire – Fire - Ambulance |
| Department of Environment Climate Change and Water |

## 1.5. GLOSSARY OF TERMINOLOGY

**Table 1.1 Glossary Table**

| | |
|---|---|
| Annual Exceedance Probability (AEP) | The chance of a flood of a given size (or larger) occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 m3/s has an AEP of 5%, it means that there is a 5% chance (i.e. a 1 in 20 chance) of a peak discharge of 500 m3/s (or larger) occurring in any one year. (see also average recurrence interval) |
| Australian Height Datum (AHD) | National survey datum corresponding approximately to mean sea level. |
| Astronomical Tide | Astronomical Tide is the cyclic rising and falling of the Earth's oceans water levels resulting from gravitational forces of the Moon and the Sun acting on the Earth. |
| Attenuation | Weakening in force or intensity. |
| Average recurrence interval (ARI) | The long-term average number of years between the occurrence of a flood as big as (or larger than) the selected event. For example, floods with a discharge as great as (or greater than) the 20 year ARI design flood will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event. (see also annual exceedance probability) |
| Calibration | The adjustment of model configuration and key parameters to best fit an observed data set. |
| Catchment | The catchment at a particular point is the area of land that drains to that point. |
| Design flood event | A hypothetical flood representing a specific likelihood of occurrence (for example the 100 year ARI or 1% AEP floods). |
| Development | Existing or proposed works that may or may not impact upon flooding. Typical works are filling of land, and the construction of roads, floodway's and buildings. |
| Discharge | The rate of flow of water measured in terms of volume per unit time, for example, cubic meters per second (m3/s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, meters per second (m/s). |
| Flood | Relatively high river or creek flows, which overtop the natural or artificial banks, and inundate floodplains and/or coastal inundation resulting from super elevated sea levels and/or waves overtopping coastline defences. |
| Flood behaviour | The pattern / characteristics / nature of a flood. |
| Flood fringe | Land that may be affected by flooding but is not designated as floodway or flood storage |
| Flood hazard | The potential risk to life and limb and potential damage to property resulting from flooding. The degree of flood hazard varies with circumstances across the full range of floods. |
| Flood level | The height or elevation of floodwaters relative to a datum (typically the Australian Height Datum). Also referred to as "stage". |
| Flood liable land | see flood prone land |

| | |
|---|---|
| Floodplain | Land adjacent to a river or creek that is periodically inundated due to floods. The floodplain includes all land that is susceptible to inundation by the probable maximum flood (PMF) event. |
| Floodplain management | The co-ordinated management of activities that occur on the floodplain. |
| Floodplain risk management plan | A document outlining a range of actions aimed at improving floodplain management. The plan is the principal means of managing the risks associated with the use of the floodplain. A floodplain risk management plan needs to be developed in accordance with the principles and guidelines contained in the NSW Floodplain Management Manual. The plan usually contains both written and diagrammatic information describing how particular areas of the floodplain are to be used and managed to achieve defined objectives. |
| Flood planning levels (FPL) | Flood planning levels selected for planning purposes are derived from a combination of the adopted flood level plus freeboard, as determined in floodplain management studies and incorporated in floodplain risk management plans. Selection should be based on an understanding of the full range of flood behaviour and the associated flood risk. It should also take into account the social, economic and ecological consequences associated with floods of different severities. Different FPLs may be appropriate for different categories of land use and for different flood plans. The concept of FPLs supersedes the "standard flood event". As FPLs do not necessarily extend to the limits of flood prone land, floodplain risk management plans may apply to flood prone land beyond that defined by the FPLs. |
| Flood prone land | Land susceptible to inundation by the probable maximum flood (PMF) event. Under the merit policy, the flood prone definition should not be seen as necessarily precluding development. Floodplain Risk Management Plans should encompass all flood prone land (i.e. the entire floodplain). |
| Flood source | The source of the floodwaters. |
| Flood storage | Floodplain area that is important for the temporary storage of floodwaters during a flood. |
| Floodway | A flow path (sometimes artificial) that carries significant volumes of floodwaters during a flood. |
| Freeboard | Factors of safety usually expressed as a height above the adopted flood level thus determine the flood planning level. Freeboard tends to compensate for factors such as wave action, localised hydraulic effects and uncertainties in the design flood levels. |
| Geomorphology | The study of the origin, characteristics and development of land forms. |
| Gauging (tidal and flood) | Measurement of flows and water levels during tides or flood events. |
| Historical flood | A flood that has actually occurred. |
| Hydraulic | Relating to water flow in rivers, estuaries and coastal systems; in particular, the evaluation of flow parameters such as water level and velocity. |
| Hydrodynamic | Pertaining to the movement of water. |
| Hydrograph | A graph showing how a river or creek's discharge changes with time. |
| Hydrographic survey | Survey of the bed levels of a waterway |
| Hydrologic | Pertaining to rainfall-runoff processes in catchments |

| | |
|---|---|
| Hydrology | The term given to the study of the rainfall-runoff process in catchments |
| Hyetograph | A graph showing the distribution of rainfall over time. |
| Intensity Frequency Duration (IFD) Curve | A statistical representation of rainfall showing the relationship between rainfall intensity, storm duration and frequency (probability) of occurrence. |
| Isohyets | Equal rainfall contour. |
| Morphological | Pertaining to geomorphology |
| Peak flood level, flow or velocity | The maximum flood level, flow or velocity that occurs during a flood event. |
| Pluviometer | A rainfall gauge capable of continuously measuring rainfall intensity |
| Probable maximum flood (PMF) | An extreme flood deemed to be the maximum flood likely to occur. |
| Probability | A statistical measure of the likely frequency or occurrence of flooding. |
| Riparian | The interface between land and waterway. Literally means "along the river margins" |
| Runoff | The amount of rainfall from a catchment that actually ends up as flowing water in the river or creek |
| Stage | See flood level. |
| Stage hydrograph | A graph of water level over time. |
| Sub-critical | Refers to flow in a channel that is relatively slow and deep. |
| Topography | The shape of the surface features of land |
| Velocity | The speed at which the floodwaters are moving. A flood velocity predicted by a computer flood model is quoted as the depth averaged velocity, i.e. the average velocity throughout the depth of the water column or velocity across the whole river or creek section, or roadway. |
| Validation | A test of the appropriateness of the adopted model configuration and parameters (through the calibration process) for other observed events. |
| Water level | See flood level. |

# 2. METHODOLOGY

## 2.1. SCOPE OF METHODOLGY

This BFEMSP report was based on flood information obtained from the Ku-ring-gai Council through a Flood Enquiry Application and subsequent correspondence with Council.

A HECRAS model hydraulic engine was also built for the 1%AEP and PMF events to compare velocity profiles and behaviour at all locations across the subject site.

Approvals should be obtained WHS officers from the Department of Education has to be obtained in regarding their standard emergency management protocols and evacuation drills for this site.

Dialogue with Lindfield Primary School also been commenced to obtain their approval for the external refuge on their property.

# 3. FLOOD BEHAVIOR

## 3.1. FLOOD SOURCE

The UTS FACILITY catchment is split into 11 sub catchments within the Eaton Road site. The upper section is relatively flat and primarily comprises of low to high density residences and the Lane Cove National Park. The lower portion consists of bushland and has steeper terrain, which is susceptible to high flooding velocities contained within the roadways.

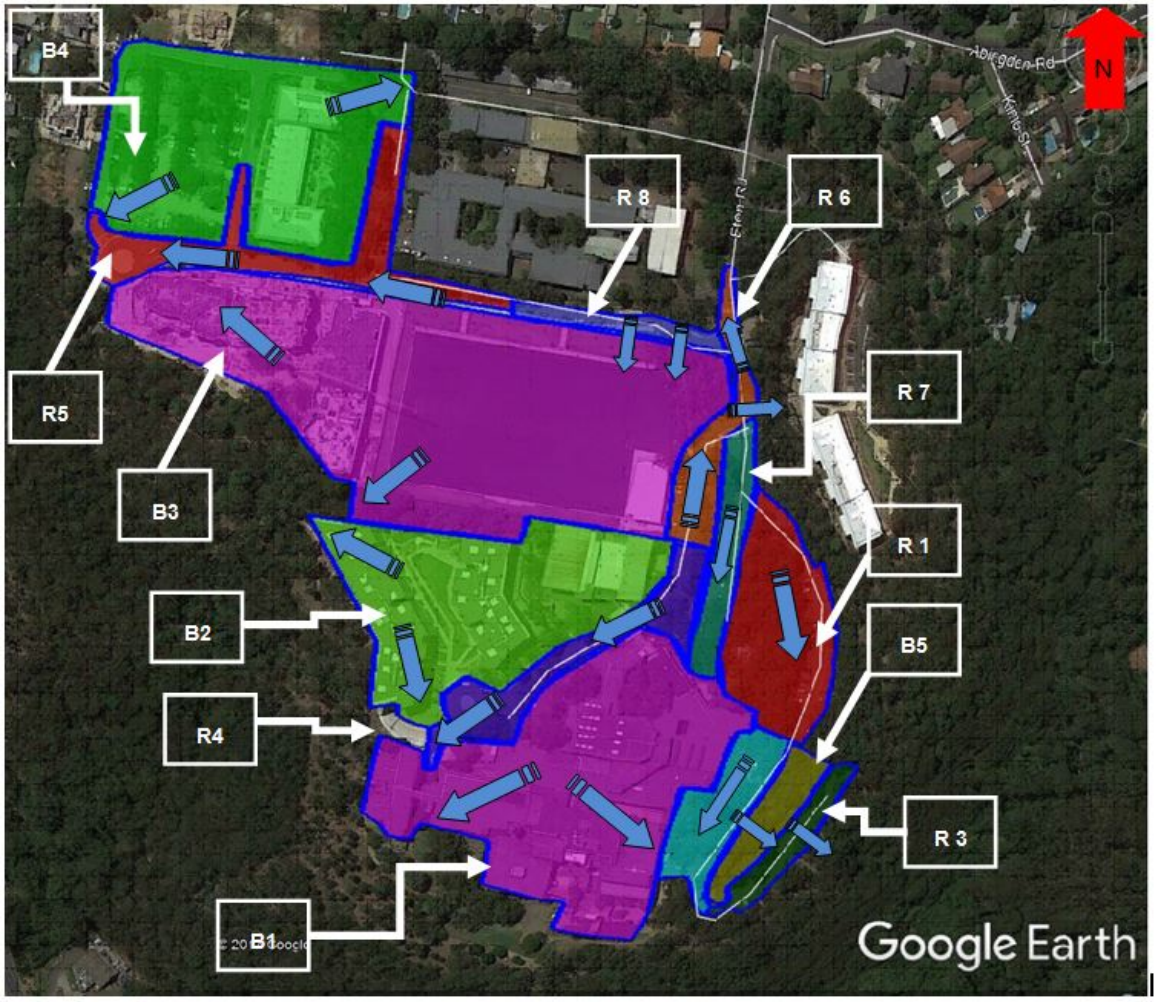


**Figure 3.1 Slope Directions of Catchments**

**Tables 3.1, 3.2 and 3.3**

### 3.2. EXISTING DRAINAGE SYSTEM

The original natural drainage system comprised pits and pipes that in this study are assumed all of them would be blocked in a 1% AEP.

In rainfall events where flows exceed the piped system capacity, surface water runoff is generally conveyed within the road system as uncontrolled flow. When this occurs, there is potential for high hazard flooding conditions resulting from combined high flow velocities and depths.

There were no open channels within the study area to assist with drainage.

### 3.3. CATCHMENT SPECIFICATIONS & PEAK FLOOD LEVELS AND VELOCITIES

Below is a table of catchments, attention should be drawn catchments R4 & R8 as these catchments are the potential hazard catchments for the proposed school, 7 escape routes. (Refer Figure 3.1).

| Catchment No. | Name | Area (ha) | Upstream Level (m) | Downstream Level (m) | Length of biggest runoff (m) | General Slope (%) |
|---|---|---|---|---|---|---|
| 1 | R 1 | 0.53 | 66 | 61 | 135 | 3.7 |
| 2 | R 2 | 0.26 | 61 | 54 | 105 | 6.7 |
| 3 | R 3 | 0.17 | 54 | 52 | 75 | 2.7 |
| 4 | R 4 | 0.28 | 66 | 53 | 165 | 7.9 |
| 5 | R 5 | 0.37 | 69 | 63 | 210 | 2.9 |
| 6 | R 6 | 0.2 | 67 | 65 | 150 | 1.3 |
| 7 | R 7 | 0.19 | 67 | 66 | 125 | 0.8 |
| 8 | R 8 | 0.1 | 67 | 63 | 100 | 1.0 |
| 9 | B 1 | 1.54 | | | - | |
| 10 | B 2 | 1.1 | | | - | |
| 11 | B 3 | 2.41 | | | - | |
| 12 | B 4 | 1.25 | | | - | |
| 13 | B 5 | 0.18 | | | - | |

**Table 3.1 Catchment Specifications**

Peak flood levels have been adopted from the HECRAS developed model result table reproduced below. The property is located between Eaton Road (upstream) and Blue Gum Creek (downstream).

| Catchment No. | Name | Area (ha) | Upstream Level (m) | Downstream Level (m) | Length of biggest runoff (m) | General Slop (%) | AEP 1% (Cu.m/s) |
|---|---|---|---|---|---|---|---|
| 1 | R 1 | 0.53 | 66 | 61 | 135 | 3.7 | 0.378 |
| 2 | R 2 | 0.26 | 61 | 54 | 105 | 6.7 | 0.185 |
| 3 | R 3 | 0.17 | 54 | 52 | 75 | 2.7 | 0.121 |
| 4 | R 4 | 0.27 | 66 | 53 | 165 | 7.9 | 0.193 |
| 5 | R 5 | 0.37 | 69 | 63 | 210 | 2.9 | 0.264 |
| 6 | R 6 | 0.2 | 67 | 65 | 150 | 1.3 | 0.143 |
| 7 | R 7 | 0.19 | 67 | 66 | 125 | 0.8 | 0.136 |
| 8 | R 8 | 0.1 | 67 | 63 | 100 | 1.0 | 0.071 |
| 9 | B 1 | 1.54 | - | - | - | - | 0.989 |
| 10 | B 2 | 1.1 | - | - | - | - | 0.552 |
| 11 | B 3 | 2.41 | - | - | - | - | 1.12 |
| 12 | B 4 | 1.25 | - | - | - | - | 0.584 |
| 13 | B 5 | 0.18 | - | - | - | - | 0.084 |

**Table 3.2 Runoff Values**

| Catchment No. | Name | Area (ha) | AEP 1% (Cu.m/s) | Maximum Depth (mm) | Maximum Velocity (m/s) |
|---|---|---|---|---|---|
| 1 | R 1 | 0.53 | 0.378 | 134 | 1.9 |
| 2 | R 2 | 0.26 | 0.185 | 159 | 3.1 |
| 3 | R 3 | 0.17 | 0.121 | 198 | 1.9 |
| 4 | R 4 | 0.27 | 0.193 | 184 | 3 |
| 5 | R 5 | 0.37 | 0.264 | 216 | 2.2 |
| 6 | R 6 | 0.2 | 0.143 | 110 | 1.2 |
| 7 | R 7 | 0.19 | 0.136 | 118 | 0.9 |
| 8 | R 8 | 0.1 | 0.071 | 92 | 0.9 |

**Table 3.3 Runoff vs. Velocity**

### 3.4. FLOOD BEHAVIOUR AND HAZARD CATEGORY

Water will travel along catchment R4 that flows along Dunstan Grove. The water is expected to flow from Eaton Road to Blue Gum Creek.

Due to the depth and velocity depth product, the North face of property is defined as a high hydraulic hazard area in the 1%AEP – resulting in a **Low Flood Risk Precinct, but with a high hydraulic hazard with velocities in excess of 3m/sec**.

Response time from beginning of rain to the peak water level is expected to be in the order of 1 to 3 hours. **It is imperative prompt action is taken to avoid adverse exposure to flood hazards.**

Evacuation, should be the last priority, due to water velocities is likely to cause a loss of footing, and being swept downstream. Velocities greater than 2m/sec is in the High Hazard range

***Figures below Provisional flood hazard categorisations***

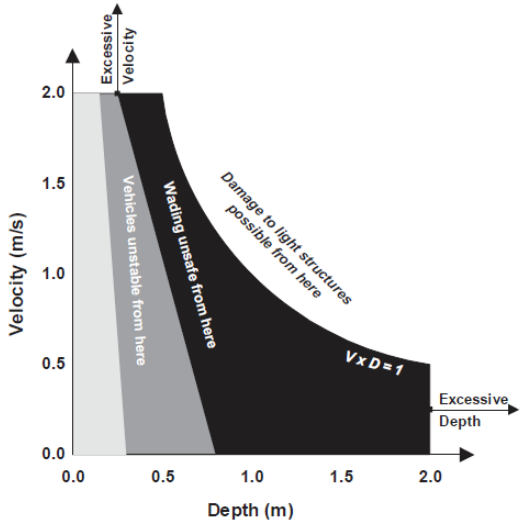


***Figure 3.2 Velocity Depth Relationships***

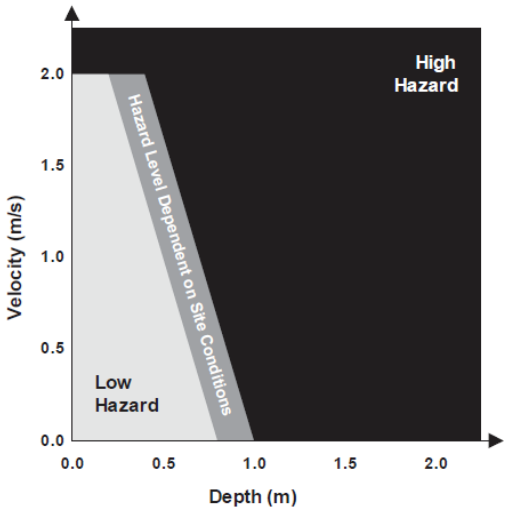


***Figure 3.3 Provisional Hazard Categories***

# 4. FLOOD AND EVACUATION WARNINGS

A network of rainfall gauge stations is maintained throughout the greater Watsons Bay catchment. These provide information to the Bureau of Meteorology as one source of information informing their flood warning system. The Bureau should issue one of five types of warnings through local radio, television and through their website *http://www.bom.gov.au*. In addition, the SES may issue a flood bulletin, evacuation warning or evacuation order. Due to the sensitive nature of this location, the Department will also register for automatic text and email notifications from the Early Warning Network which filters and passes on BoM warnings, and install a Dipstick Flood Alert System onsite to alert designated staff when flooding has reached a certain level.

The warning types are as follows;

### 4.1. SEVERE WEATHER WARNING

Severe weather warnings are issued by the Bureau for potentially dangerous weather conditions. The description of the threat will be included in the warning along with the time for next issue. It is noted that a severe weather warning does not imply that flooding will eventuate. Warnings are generally updated every six hours, or as the event dictates.

This type of warning should be accompanied with predicted extreme rainfall depth as discussed in Section 10, as well as observed values from around the state.

### 4.2. SEVERE THUNDERSTORM WARNING

A severe thunderstorm warning will be issued if there is strong evidence that a severe thunderstorm will develop, or if a severe thunderstorm is reported. Flash flooding may occur during severe thunderstorms. Warnings are generally updated every three hours or shorter as required.

### 4.3. FLOOD ALERT/WATCH/ADVICE

A flood alert/watch/advice will be issued if flood producing rain is expected. This provides an early warning that flooding may occur.

### 4.4. GENERALISED FLOOD WARNING

A generalised flood warning is to be issued when flooding is expected to occur in a given area. Three hours warning time is expected from issue of warning to peak flood level as per the “Service Level Specification for Flood Forecasting and Warning Services for New South Wales – Version 2.0” (Bureau of Meteorology, 2013).

This is the most likely warning type for the subject site should evacuation need to occur.

### 4.5. MINOR/MODERATE/SEVERE FLOOD WARNING

A more detailed flood warning may be issued based on any additional information available. Three hours warning time is expected from issue of warning to peak flood level.

Real time river and harbour height data is available from the Bureau of Meteorology website. As at January 2017, this link was *http://www.bom.gov.au/nsw/flood/*.

All warnings will be issued through the website, radio and television. Radio frequencies include ABC Sydney (702AM, 92.9FM, 206.352MHz digital), Triple J (105.7FM), 2DayFM (104.1FM), Triple M (104.9FM), Nova (96.9FM), KIIS (106.5FM), 2GB (873AM), 2UE (954AM). All public and commercial television stations should broadcast warnings.

### 4.6. SES FLOOD BULLETINS

The SES may issue a flood bulletin providing information of the likely flood consequences and recommended actions.

### 4.7. EVACUATION WARNING

The SES/Police may issue an evacuation warning which allows time to prepare for evacuation.

### 4.8. EVACUATION ORDER

The SES will issue an Evacuation Order if evacuation is required. If this occurs evacuation **must** be undertaken. Broadcast will be via radio/TV, door knock, automated telephone message or SMS.

### 4.9. EARLY WARNING NETWORK AUTOMATED TEXT AND EMAIL SERVICE

The property can register for automatic alerts with the Early Warning Network (www.ewn.com.au) which will filter the above BoM warnings and send texts and emails to the Chief Flood Warden or property owners to notify them of the situation.

### 4.10. ON-SITE EMERGENCY TONE

The PA system will have an uninterrupted power supply and be configured to sound an emergency tone meaning all visitors and staff shall assemble in the designated assembly point ('A') on Figure 6.2 under the direction of flood wardens.

This tone will be tested every drill, or once a term. Should it be inoperable in the event of an emergency, an air horn and hand held loudspeaker is located within the Flood Emergency Kit.

### 4.11. DIPSTICK FLOOD ALERT SYSTEM

The Dipstick Flood Alert System by Tuftec (http://tuftec.com.au) will provide a failsafe for notification on-site in the event that no warnings are issued by either the Bureau or the SES. This device senses when water reaches a pre-determined level, and sends a text with an alert and rate of rise to nominated stakeholders including Council and all Flood Wardens.

# 5. FLOOD RESPONSE PERSONNEL

Summarised below in Table 5.1 are school personnel, their location and responsibilities in managing flood response.

Table 1 - School Flood Response Personnel

| | Location | Responsibilities |
|---|---|---|
| **Department of Education WHS Directorate** | Blacktown | Coordinate preparation of school specific Emergency Management Plan implementing recommendations of this report. |
| **Chief Flood Warden – Principal** | On-site | - Coordinate flood evacuation drills - one on the first school day,<br>- Monitor weather at 4pm daily for upcoming extreme rainfall events,<br>- Receive notifications from Early Warning Network and Dipstick Flood Alert System, (if installed).<br>- Decide when Evacuation required,<br>- Liaison with SES or Emergency Services personnel if they attend site. |
| **First Aid Officer** | On-site | - Prepare and maintain Flood Emergency Kit,<br>- Manage student Individual Health Care Plans,<br>- Coordinate assistance for staff and students with mobility difficulties. |
| **Deputy Chief Flood Warden** | On-site | - Undertake Chief Flood Warden duties when Chief Warden unavailable,<br>- Receive text notifications from EWN and Dipstick. |
| **Floor Wardens** | On-site | - Receive text notifications from EWN and Dipstick.<br>- Assist Chief Flood Warden with evacuations. |
| **Staff** | On-site | - Maintain calm and staff through evacuation process. |
| **Primary Refuge** | On-site | - Refer to 'A' on Figure 6.2 |
| | | |
| **Off Site Refuge** | Lindfield Construction Site | - Flood Warden - Nominated contact for offsite refuge point. |

# 6. ASSEMBLY POINT AND EVACUATION ROUTES

## 6.1. EMERGENCY ASSEMBLY POINT

The Auditorium has been nominated as the emergency assembly point. Levels in this area range from approximately 59m AHD to 63m AHD, above the 1%AEP flood level would be about 200 to 250mm above the exiting levels.

This location is central and provides a functional response for the widest variety of situations –during Construction of Stage 1.

Once everyone is accounted for, evacuation will be undertaken to the agreed refuge under the control of the Flood Wardens and guidance of staff. One emergency egress points have been nominated for flooding which are located on the high side of the site as shown as 'A' on the Bushfire and Flood Evacuation Plan- Lindfield Leaning Village, Figure 6.1 page 22.

**Assembly Point and Evacuation Routes Figure 6.1**

# Bushfire and Flood Evacuation Plan- Lindfield Learning Village


**Figure 1**-The Emergency Assembly Area for Bushfire and Flood is located at Abingdon Road Reserve at the corner Eton and Abingdon Rd, Lindfield.

Assesmbly Point - Refer Figure 1

Second Flood Evacuation Route following the same route as Bushfire Route

Initial Assembly Point - Refer Figure 2

First Flood Evacuation

9 / DP270770

SP90969

EXISTING SECURITY OFFICE TO BE REMOVED (T.B.A.)

PEDESTRIAN ENTRANCE GATES

8 / DP270770

PEDESTRIAN ENTRANCE GATES

BOUNDARY

13 PARKING BAYS FOR CHILDCARE (14 REQUIRED)

SWING SECURITY GATE TO CARPARK

REMOTE CONTROL SLIDING SECURITY GATE TO ROUNDABOUT

ROADWAY MAY REQUIRE WIDENING (T.B.A)

10 DROP OFF BAYS

4 ACCESSIBLE CAR SPACES

PEDESTRIAN ENTRANCE GATES

NEW LINEMARKING TO EXISTING PARKING BAYS

Pt1 / DP1151638

GYM

Pt2 / DP1151638

Pt1&2 / DP1151638

VEHICULAR SECURITY GATE TO LOADING DOCK

REMOTE CONTROL SLIDING SECURITY GATE TO UNDERGROUND CARPARK

SP90970

VEHICULAR SECURITY GATES TO LOADING DOCKS

MAIN BUILDING

BOUNDARY

4M WIDE FIRE TRAIL OPTION THROUGH NATIONAL PARK SHOWN DASHED

ADDITIONAL TURNING BAY IF FIRE TRAIL INTO NATIONAL PARK NOT POSSIBLE

TURNING BAY FOR CAT 1 TANKER

4M WIDE FIRE TRAIL FOR CAT 1 TANKER

4 / DP1151638

BOUNDARY

Initial Assembly Point during construction in case of Flood and/or heavy rain - Refer Figure 2

**Legend**

Evacuation Route

Flood Evacuation Route

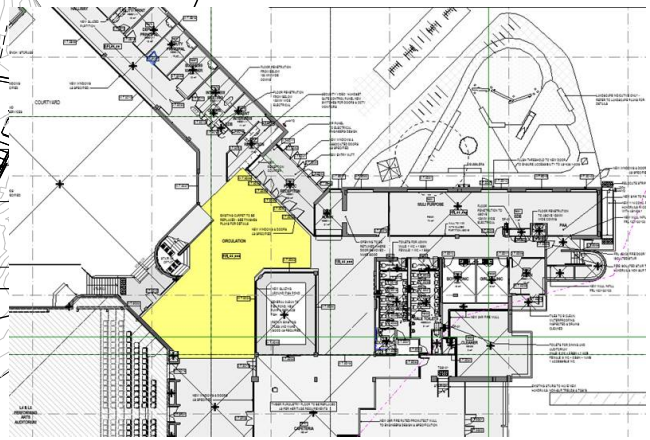

Figure 2- Initial Assembly Point

# 7. FLOOR LEVELS AND ONSITE REFUGE

Minimum floor levels on this site have been nominated at **RL66.28m AHD** which is approximately **500mm above the 1%AEP flood level (66.79m AHD).** The second storey has a finished floor level of **RL75.43m AHD** which is approximately **8.54m below the PMF level (66.89 AHD).**

Notwithstanding the above, **on-site refuge is recommended for this site.** Evacuation will be undertaken in accordance with Section 11 well in advance of the flood peak.

Should you be isolated on-site, move to the second storey units and do not try to evacuate by foot or vehicle through rising flood water. **Call 000 immediately.**

# 8. EMERGENCY CONTACT

For emergency assistance during flood events, please call the SES on 132 500.

If you are in a life-threatening situation please call Police, Fire or Ambulance on 000.

Once the decision has been made to activate call;

Flood Response Preparation

It is the responsibility of the Construction Company to prepare the property for a flood event. This will be achieved through; induction training, education of flood risks and behaviour, and the preparation and maintenance of a Flood safe Emergency Kit.

The information presented above is a summary of the flood behaviour and considered key to understanding the risks associated with flooding. This should be displayed in conjunction with other emergency information (such as fire, flood, etc) throughout the property.

## 8.1. EVACUATION DRILLS

Evacuation drills are designed to increase flood awareness within the residents. These drills are to be undertaken twice yearly to familiarise residents of the procedures when responding to a flood event.

It is also an opportunity to outline expected flood levels and the dangers of entering flood water. Lessons held after drills could be based on material designed by the SES available from http://www.floodsafe.com.au.

For new staff, it is expected they will be familiar with the standard emergency tone and assembly response and to familiarise them with the emergency tone and response procedure.

## 8.2. FLOOD EMERGENCY KIT

Potential items for a flood emergency kit are outlined at www.floodsafe.com.au and reproduced below.

- A copy of the construction emergency management plan,
- Chemical register,
- Air horn and hand held loudspeaker,
- Portable radios with spare batteries,
- A torches with spare batteries,
- A first aid kits,
- Candles and waterproof matches,
- Waterproof bag for valuables,
- A copy of emergency numbers.

When leaving or evacuating add the following items;

- **Sign in Book** for visitors and contractors,
- **Individual Health Care Plans** including asthma puffers, diabetic medication and epi pens,
- **Drinking water** and **non-perishable food items.**

The kit should be kept in a location within the house in a high position for easy deployment in the event of an evacuation. The contents of the kit and management during a flood event will be the responsibility of the Owner / Resident.

## 8.3. MONITORING OF WEATHER SITUATION

It is the responsibility of the Chief Flood Warden (to be appointed) to monitor the weather situation of is aware if a warning has been issued. This will be achieved through automatic text messages and emails from the Early Warning Network and checking of local radio station and the Bureau website.

If heavy rain has commenced they are also responsible for monitoring the river level adjacent to the school and coordinating a response accordingly should the Dipstick device be triggered.

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# 9. FLOOD RESPONSE ACTIONS

## 9.1. CANCELLATION OF CONSTRUCTION IF EXTREME RAINFALL PREDICTED

In order to eliminate the risk to life of staff, it is recommended work to be cancelled or delayed on any day there is a chance of rainfall up to 150mm (i.e. 30% chance of rain 100-150mm). This number represents approximately the amount of rainfall required to produce the 1%AEP flood.

The Chief Flood Warden is responsible reviewing the weather forecasts daily and distributing notification of cancellation to parents and guardians via text, email and to public radio

Consideration should also be given to;

- Blocking floor wastes and toilets,
- Securing objects that are likely to float and cause damage,
- Turning off mains power, water and gas,
- Relocating chemicals above the predicted water level,
- Packing Individual Health Care Plan requirements into the Emergency Kit,

## 9.2. EVACUATION DURING CONSTRUCTION HOURS

Once a Flood Warning or Flood Bulletin for the Parramatta has been issued, or the Dipstick has been triggered;

- **Sound** evacuation tone**.**
- **Chief Flood Warden** goes to the Emergency Assembly Point.
- **Staffs directs** all staff to the **Emergency Assembly Point**.
- **Flood wardens** clear all rooms within the buildings.
- **Roll call** to ensure everyone is accounted for.
- **Call ahead** to make sure refuge point is ready to accept staff, if not already done so.
- **Leave signage** undercover that evacuation has occurred, and to where.
- **Control** evacuation to higher ground.
- **Wait it out** at the designated refuge point.
- **Maintain regular communication** with staff providing updates to the situation.

## 9.3. EVACUATION OUTSIDE CONSTRUCTION HOURS

Should the construction and facilities be undertaken outside normal hours?

- **Maintain** register of all persons on-site**.**
- **Nominated Flood Warden** who receives all text message and email notifications to be present on-site at all times**.**
- **Sound Emergency Tone and Make Announcements over PA system**.
- **Direct** everyone to **Emergency Assembly Point.**
- **Roll call** to ensure everyone is accounted for.
- **Call ahead** to make sure refuge point is ready.
- **Leave signage** undercover that evacuation has occurred, and to where.
- **Control** evacuation to higher ground.
- **Wait it out** at the designated refuge point.

## 9.4. EMERGENCY SERVICES ATTENDING SITE

It is noted self-motivated evacuation, such as that proposed in this plan, is consistent with the plan. There is a possibility that emergency services such as Police, Fire, Ambulance or SES may attend site and assume control from the Chief Flood Warden. Once this has occurred, they are in control of the site and any response operations.

## 9.5. AFTER A FLOOD EVENT

. Once a Final Flood Warning or SES “All Clear” has been received;

- Workers to either return to work or to close site if safe to do so from refuge points.
- A thorough check of services such as electricity, sewer, water and gas should be undertaken by qualified persons.
- Advice should be sought from a suitably qualified engineer as to the structural integrity of buildings prior to their use.
- Personal protective equipment should be worn during the clean-up and disinfectant used.

# 10. REVISION OF THE FLOOD EMERGENCY RESPONSE PLAN

This plan should be revised if the flood study for the Blue Gum Creek Catchment is revised to capture changes in the catchment since the last study and the new design rainfall patterns developed as part of Australian Rainfall and Runoff 2016.

The Chief Flood Warden shall be responsible for contacting Council every three months during the period of operation to ensure the latest flood data is being used.

# 11. CONCLUSION

The subject site at UTS Facility is not currently susceptible to flooding from Blue Gum Creek. The proposed development is situated in a location outside the 1% AEP flood extent and low hazard area in the 1% AEP.

It would be safer to assemble in the nominated preferable assembly point 'A' nominated within this report, until the threat has passed and stormwater flows has subsided.

The site is impacted by up to 360mm of water in the PMF event and evacuation offsite to nominated refuge points is recommended as a last resort.

Storm water flows is predicted, along Dunstan Grove. But not inundate or enter the building, with the water travelling along the roadway.

The high water velocities, travelling along the road would be hazardous, and dangers of being swept downstream.

The site Construction Company to nominate a number of flood wardens to monitor and control the flood situation as well as undertaking two evacuation drills per year. This will provide an opportunity to raise awareness of the flood behaviour around the site and what to do in the event of an emergency.

It is considered therefore the proposed development adequately minimises the flood risks. The recommendations contained herein are considered to assist in managing the risk to life of the staff and visitors to the subject site.

In reference to the Ku-ring-gai DCP 47 (April 2005) and DCP Part 24R.7 this report confirms has been assessed and meets the criteria within the framework of this DCP for this site.

***Declaration***

We have examined the site, existing improvements and proposed development. This is In accordance with accepted engineering practices for the Construction of Stage 1 to begin and for the occupation to the first 350 students of the Term 1 2019.

Further modelling is to be prepared to complete a full CEMP is ongoing for the whole site Stage 1 and Stage 2.

We declare that the proposed development will be safeguarded from flooding and flood damage associated with the design flood standard as defined in Ku-ring-gai DCP 47 (April 2005) and DCP Part 24R.7 of the and will not adversely affect any other structures or properties..

# 12. REFERENCES


| | | |
|---|---|---|
| SES | (2016) | *Flood safe Website*<br>accessed from http://www.floodsafe.com.au 17th January 2017 |
| SES | (2016) | *Emergency Business Continuity Plan*<br>accessed from<br>http://www.sesemergencyplan.com.au/business/index.php 17th January 2017 |
| Bureau of Meteorology | (2013) | Service Level Specification for Flood Forecasting and Warning Services for New South Wales – Version 2.0 |
| Ku-ring-gai Council<br>DCP Part 24R.7 | (2015) | Flood Study Requirements |
| Ku-ring-gai Council<br>DCP 47 | (April 2005) | Flood Plan Development |

# 13. APPENDICIES

## 13.1. APPENDIX A

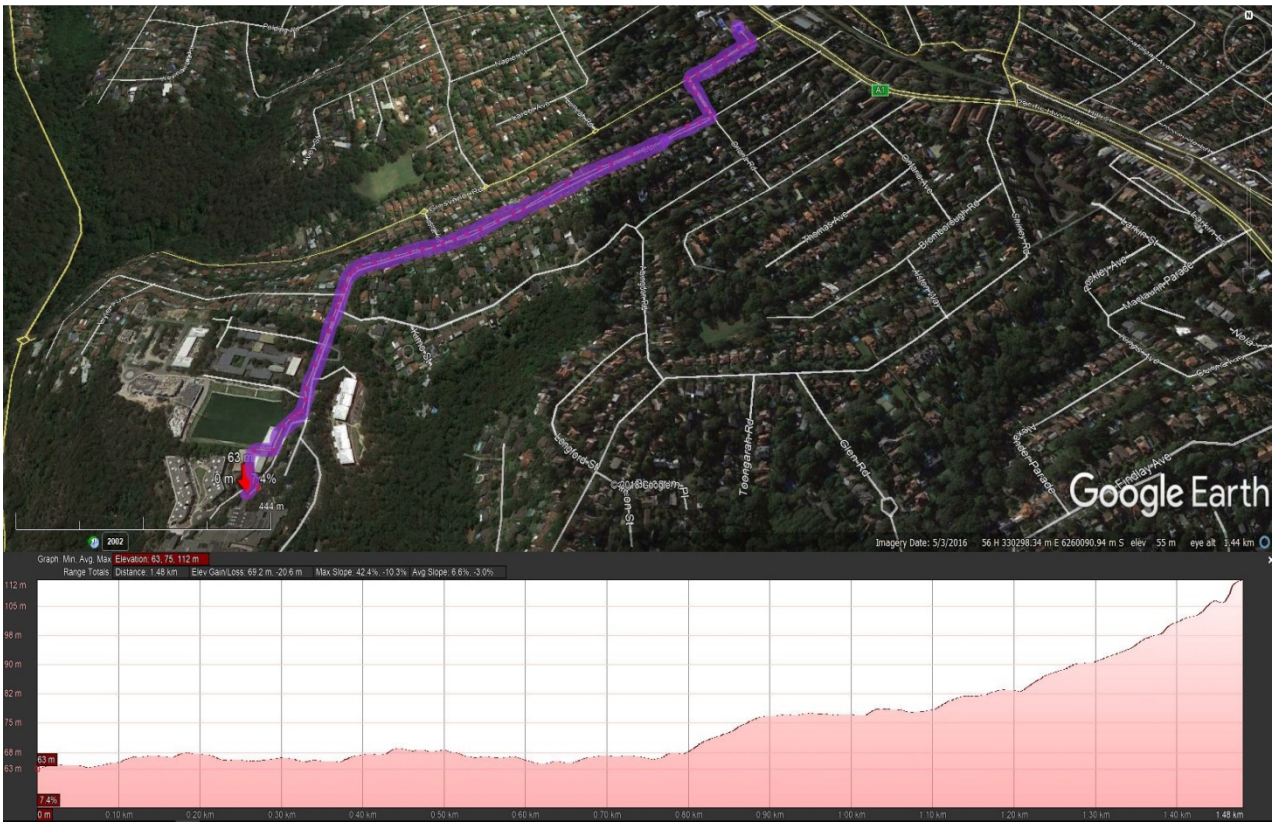


**Figure 2.13 Flood Escape Route to Eaton St Plan**

The Flood Escape Route from the site would be from the assembly area to Eaton St being at the top of the ridge and on solid ground. The Flood Warden would have to final say and also the following of the North West Metropolitan Emergency Management District Plan (DISPLAN).

## 13.2. APPENDIX B

| WHEN | WHAT | BY WHO |
|---|---|---|
| Prior to Flooding | Assemble Emergency Kit | First Aid Officer |
| | Check Kit every three months | First Aid Officer |
| | Coordinate Evacuation Drills twice per year | Chief Flood Warden |
| | Post Evacuation drills and lesson on flood risks | Staff |
| | Monitor weather situation at 4pm every evening | Chief Flood Warden |
| | Apply to Council every three months for updated flood information | Chief Flood Warden |
| When Extreme Rainfall is Likely | Rainfall predicted to be **150mm or greater.** | Chief Flood Warden |
| | Make decision that **Work is Cancelled.** | Chief Flood Warden |
| | | |
| | | |
| During School Evacuation | **Text / Email from Early Warning Network received or Dipstick Flood Alert activated** | Chief Flood Warden |
| | **Pack Individual Health Care Plan** requirements into the Emergency Kit trolley | First Aid Officer |
| | **Sound Evacuation Tone** and Chief Warden to Emergency Assembly Point | Chief Warden |
| | Staff to Emergency Evacuation Point | Staff |
| | Flood wardens to **Clear Buildings & Class Rooms** | Flood Wardens |
| | **Roll Call**. Ensure everyone is accounted for prior to leaving site. | Staff, Flood Wardens, Chief Warden |
| | **Leave Signage** undercover at main entries detailing refuge point | Chief Flood Warden |
| | **Turn off** mains gas, electricity and water | Chief Flood Warden |
| | **Control** evacuation to higher ground | Staff |
| | **Wait it out** at refuge point | All |
| | Maintain regular communication with staff and students | Flood Wardens |
| | **Do not attempt to drive or walk through floodwaters. If stranded on-site, move to top level and call 000 immediately.** | All |
| Once Risk has Passed / After a Flood | | |
| | Check all services and structural stability of school. | Qualified persons |

Example: Flood Response Summary and Evacuation Routes to Off-site Refuge.

# Appendix J Unexpected Finds Protocols