Environmental Management Plan

CLIENT NAME:	Taronga Conservation Society Australia
PROJECT NAME:	Taronga Zoo Upper Australia Precinct Early Works Phase 2
SITE ADDRESS:	Bradleys Head Rd, Mosman NSW 2088
REVISION:	0
ISSUE DATE:	19/07/2021

ABBREVIATIONS

ABBREVIATION	DEFINITION
The Organisation	Lloyd Group
BDM	Business Development Manager
CA	Contract Administrator
Critical Incident	A critical incident is any incident in the workplace that results in death; major structural damage, or serious/permanent disability or injury
CM	Construction Manager
DIR	Director/s
EMP	All Company Employees
EST	Estimator
ESTM	Estimating Manager
FAI	First Aid Injury
HIRAC	Hazard Identification, Risk Assessment & Controls
HSE	Health Safety & Environment
HSR	Health & Safety Representative
IMS	Integrated Management System
HSEQ	Health Safety Environment and Quality
HSEQC	HSEQ Coordinator
HSEQM	HSEQ Manager
HSEQA	HSEQ Administrator
Lloyd Group	Lloyd Group/the Organisation
LTI	Lost Time Injury – At least one full shift lost due to injury
LTIFR	Lost Time Injury Frequency Rate = No. (LTI's/hours worked) x 1,000,000
MD	Managing Director
MTI	Medical Treatment Injury
MTIFR	Medical Treatment Injury Frequency Rate
NTL	National Team Leader – Safety & Compliance
OM	Office Manager
PPE	Personal Protection Equipment
PM	Project Manager
SDS	Safety Data Sheet (Formally referred to as MSDS)

ABBREVIATION	DEFINITION
Senior Management	Directors / General Managers / Construction Managers / HSEQ Managers / Procurement Managers
SM	Site Manager
SSC	Site Safety Committee

REGISTER OF REVIEW - MASTER				
REVISION	**DATE**	**SECTION**	**DESCRIPTION OF AMENDMENTS**	**AMENDED BY**
1	31/3/21	All	Initial issue	S Willoughby

REGISTER OF REVIEW - PROJECT				
REVISION	**DATE**	**SECTION**	**DESCRIPTION OF AMENDMENTS**	**AMENDED BY**

APPROVALS			
NAME	**POSITION**	**SIGNATURE**	**DATE**
Matthew Licuria	Construction Manager	Matthew Licuria	19/7/21
Scott Willoughby	HSEQ Manager	S Willoughby	19/7/21
Joseph Elley	Project Manager	Joseph Elley	` 19/7/21
Dean Turnbull	Site Manager	Dean Turnbull	19/7/21

SITE PERSONNEL INDUCTION

Project team personnel are to be inducted into this plan before starting work on the project. Insert your name and role in the register below, then sign and date to acknowledge that you have read and understood the company requirements and agree to implement the procedures as applicable to your role. Note: Nominated approvers who have signed above are not required to sign below.

NAME	POSITION	SIGNATURE	DATE
Dean Turnbull	Site Manager	Dean Turnbull	09/08/21
Joseph Elley	Project Manager	Joseph Elley	09/08/21
Jordan Ling	Contracts Administrator		09/08/21
Hirak Das	Project Coordinator	Hirak Das	09/08/21

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1. Company Information

1.1. Company Background

Established in 1979 by Trevor Lloyd as a small contracting business, Lloyd Group (The Organisation) was built on strong family values and a relentless commitment to personalised service. Since then, Lloyd Group has experienced controlled and steady growth, having established longstanding relationships with many repeat clients and superior contractors.

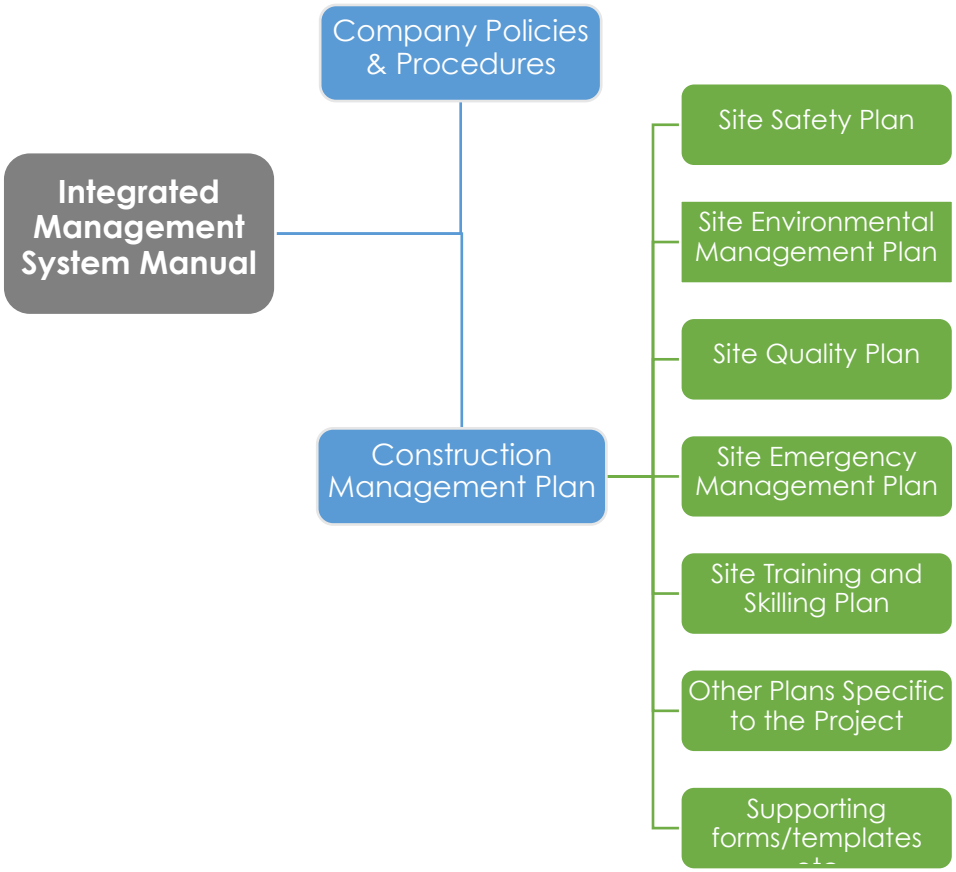
Today, Lloyd Group delivers high quality commercial construction projects across Victoria and New South Wales. Our team of over 60 exceptional people delivers projects up to $30M in value across a variety of sectors that includes education, childcare, health, aged care, community, ecotourism, industrial and retail.

Accredited in ISO4801 (safety), ISO9001 (quality) and ISO14001 (environment) and compliant to ISO45001, our systems support professional construction practices that allow our clients a positive experience with transparency and communication at the forefront of our practices.

We will always strive to grow and develop our business through our constructive thinking, never forgetting the quality of the personalised service we provide our clients.

1.2. Integrated Management System

The Organisation has documented, implemented and continues to maintain an Integrated Management System (IMS). This Management System provides guidance to all aspects of safety, environmental and quality management applicable to all operations. The following diagram provides an overview of the IMS interaction.



1.3. Project Overview and Scope

In December 2020 development consent was issued for the on the subject site at redevelopment of the Upper Australia Precinct at Taronga Zoo. The project is a state significant development: SSD 10456. This Environmental Management Plan (Plan) has been developed specifically for SSD 10456 and will be maintained and updated for the duration of this project and in accordance with development consent issued 21/12/2020.

The Upper Australia Precinct is to be one of the key projects in Taronga Zoo intending create a unique Australian Wildlife experience allowing visitors to immerse themselves in the cultural landscape of the Australian wilderness.

The area designated as the project site is the old existing Australian Habitat which previously housed a large number of the Australian animal collection and included the nocturnal house and commercial Koala Encounter venue. Currently the project site is vacated of all animals with only the Wildlife Ropes operation in place. Wildlife Ropers operation is due to demobilize ready for Phase 2 of Upper Australia works on 13th July 2021. The project scope includes but is not limited to the following:

- Clearing of vegetation on the site.
- Re-shaping the site, earthworks.
- Construction of sediment and erosion control devices.
- Demolition of Heritage & non-heritage attractions.
- Demolition & Structural Modification to Nocturnal House

Demolition works to comply with *Australian Standard AS 2601-2001* The demolition of structures (Standards Australia, 2001). The work plans required by AS 2601-2001 must be accompanied by a written statement from a suitably qualified person that the proposals contained in the work plan comply with the safety requirements of the Standard.

The scope for the works in the early works package is reliant on the following documentation:

- Site survey documentation, prepared by Warren Smith & Partners.
- Civil documentation, prepared by Warren Smith & Partners.
- Architectural drawings, prepared by Lahznimmo Architects Pty Ltd.
- Preliminary Construction Management Plan, prepared by RPS Group.
- Construction Programme, prepared by Lloyd Group Pty Ltd.

The purpose of this document is to broadly outline how the above works will be managed, including nature of measures likely to be used, control measures and environmental responsibilities. It will assist in ensuring:

- Best practice environmental management procedures are applied.
- Environmental risks associated with the project are properly identified and managed, and provide protection to workers, visitors and the general public from traffic and environmental hazards and risks that may arise as a result of the construction activity.
- To ensure that corrective actions, when required, are completed in a timely manner.
- Provide a safe environment for all surrounding residents, road users and workers on-site.
- Compliance with all current, relevant environmental legislation.
- Compliance with the requirements of the development consent.

In regard to the latter dot point above, SSD 10456 Development Consent condition B30 requires the preparation of management plans that must include the following:

- Detailed baseline data: condition B30(a). Refer to Section 2.
- Details of statutory requirements and the like: condition B30(e). Refer to Sections 2 and 3, and other relevant sections of this Plan.

- Measures to be implemented in order to comply with relevant statutory requirements: condition B30(f). Refer to Section 3 and other relevant sections of this Plan.
- Details of the monitoring program to be implemented: condition B30(a). Refer to other relevant sections of this Plan.
- A program to investigate and implement ways to improve environmental performance: condition B30(h). Refer to other relevant sections of this Plan.
- Protocols for managing and reporting incidents, non-compliance, complaints and any failure to comply with statutory requirements: condition B18. Refer to other relevant sections of this Plan.

Requirement for this Construction Environmental Management Plan (CEMP)	Where this requirement has been addressed in this CEMP
Details of hours of work: condition C2, C3, C5, C6	Refer to section 4.2
24 hour contact details of site manager: condition B19	Refer to section 3.4
Stormwater controls and discharge: condition C32	Refer to section 9
Measures to avoid tracking of sediment etc. onto local roads: condition C25	Refer to section 9
External lightings: condition C37	Refer to section 4.4
Community consultation and complaints handling: condition B19	Refer to section 10
Construction Traffic and Pedestrian Management Sub-Plan: condition B12(c)(il)	Refer to section 7
Construction Waste Management Sub-Plan: condition C28	Refer to section 8
Construction Soil and Water Management Sub-Plan: condition B33	Refer to section 9
Unexpected finds protocol for contamination: condition B30(q)	Refer to section 5
Unexpected finds protocol for Aboriginal and non-Aboriginal finds: condition B30(p)	Refer to section 5
Waste classification for materials removed/remaining: condition C18(h)	Refer to section 6

The above requirements are addressed in the following.

B30 requires the preparation of a Construction Environmental Management Plan that includes the following, summarised in the following table.

This Plan sets out the framework for safety and environmental planning on this project consistent with Organisation Policies and Procedures. It outlines the projects safety and environmental management structure, delegation of responsibilities and

site safety rules. Handover of responsibilities to operational managers will occur at the completion of the contractual maintenance periods for construction works.

The requirements of this plan apply to all construction and associated work activities undertaken by Organisation. This includes all activities of subcontractors, suppliers and consultants. We note that the preliminary plans, SSDA and some of the project documents refer to all stages of the Upper Australia Precinct for Taronga Zoo. This Plan covers only our scope of works which is the early works to enable construction of future phases of the Upper Australia Precinct Preliminary Construction Management Plan-refer to accompanying **Figures 1.1 to 1.4** summarising the extent of these early works.

All Organisation employees are inducted into this plan and are made aware of its location should they wish to refer to it at any time. Revisions of the plan are notified to relevant personnel.

1.4. Project Team

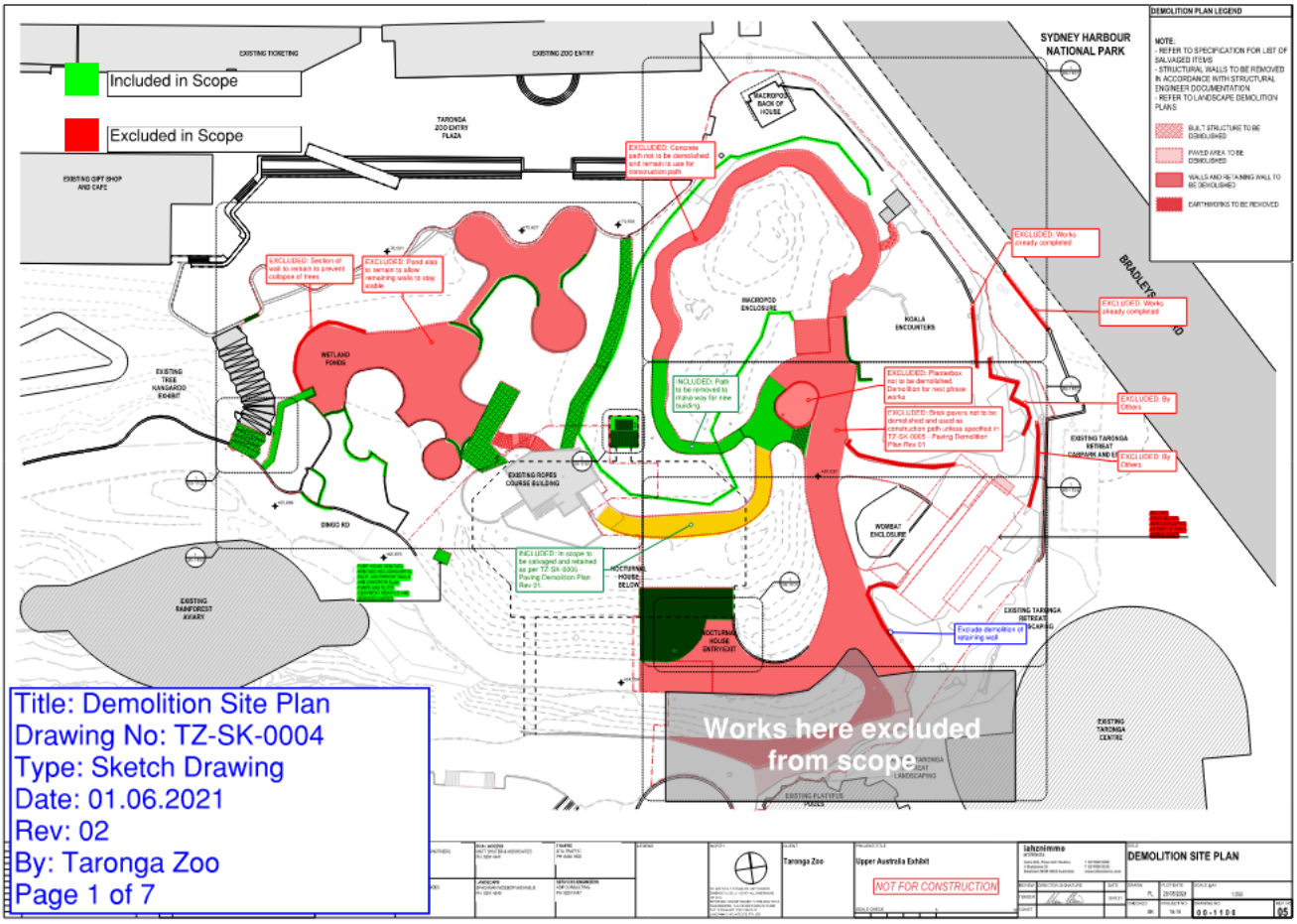
ROLE	NAME	CONTACT
General Manager	Matthew Licuria	0419 258 448
Construction Manager:	Marcus Smith	0423 249 111
Project Manager	Joseph Elley	0408 848 050
Site Manager:	Dean Turnbull	0498 228 958
HSEQ Manager	Scott Willoughby	0423 154 092
HSEQ Advisor	Scott Willoughby	0423 154 092
Contract Administrator:	Jordan Ling	0424 068 388
Project Coordinator	Hirak Das	0435 130 440
Workers Comp/Return to Work Coord:	Amy Parker	0413 455 261

1.5. Scope of Works

PROJECT NAME	Taronga Zoo Upper Australia Precinct Early Works Phase 2
PROJECT LOCATION	Bradleys Head Rd, Mosman NSW 2088
ORGANISATION ROLE	Head Contractor
START DATE	TBC
PEAK NUMBER OF WORKERS	15
DESCRIPTION OF THE WORKS	Early Works associated with phase 2 of Upper Australia Precinct.

Table 1 - Roles and Responsibilities

Role	Responsibilities
Project Manager	► Managing the delivery of the project including overseeing the implementation of noise and vibration control measures ► Ensuring appropriate resources are available for the implementation and maintenance of appropriate noise and vibration management measures
Environment Manager	► Providing assistance and advice to all Project personnel to fulfil the requirements of this CNVMP ► Undertaking and assessing data from inspections, monitoring and reporting ► Ensuring appropriate training and awareness programs are developed and implemented ► Liaising with relevant authorities and organisations as necessary ► Preparing and submitting applications for Out of Hours Work (OOHW) in accordance with the Out of Hours Work Protocol
Senior Project Engineer	► Liaising with the Environmental Manager to ensure appropriate corrective and preventative actions are developed and implemented ► Provide EM approval to submit applications for OOHW
Community Liaison Officer	► Liaison and notification of construction activities including timeline, out of hours work and traffic management issues such as changes to access and property issues
Superintendent and Supervisors	► Ensuring personnel are fully briefed on the relevant noise and vibration management requirements prior to work commencing ► Managing and / or minimising impacts on noise and vibration sensitive land uses as a result of construction activities
Project and Site Engineers	► Ensuring that appropriate noise and vibration management measures are implemented and maintained on site ► Developing Activity Method Statements and Task Risk Assessments in consultation with the EM
Construction Personnel	► Responsible for following mitigation measures when undertaking site work ► Informing the supervisor of any noise and vibration management issues



2. Project Site, Baseline Data

The zoo is located at Bradleys Head Road at the southern end of Mosman on the Bradleys Head Peninsula. The zoo is approximately 28 ha and is legally described as Lott 22 in DP 843294. The zoo is located within the Mosman Local Government Area. The site is bounded by:

• Whiting Beach Road to the north.

• Bradleys Head Road to the east;

• Athol Wharf Road and Sydney Harbour to the south; and

• Little Sirius Cove to the west

The Zoo consists of several state heritage items, and the register states the zoo is: A major social facility and entertainment and recreational venue for Sydney, with international prominence. Recognised as the leading Australian zoo facility. It contains some remarkable and unusual structures, many of them deliberately exotic or grand in their presentation. It demonstrates present and past zoological practices, both for the exhibits and the manner in which they are displayed. It remains a prominent landscape feature in Sydney Harbour. Access is from Bradleys Head Road which extends alongside the entire eastern boundary of the zoo grounds.


TA-AF08
TZ-AF22
TZ-AF11
TZ-AF10A
TZ-AF21
Southern
Hairy
Nose
TZ-AF25
Floral
Clock
TZ-AF28
Meerkats
Enclosure

3. Regulatory Approvals & Contact Details

3.1. Overview

Lloyd will conform with the construction requirements set down in the Development Consent for SSD 10456 and early works tender package, and in particular relating to:

- Site notices.
- Operation of plant and equipment.
    - Maintained in a proper and efficient condition
    - Operated in a proper and efficient manner
- Construction hours.
- Implementation of management plans.
- No obstruction of public roads.
- Any damage to the public way, including trees, footpaths, kerbs, gutters, road carriageway and the like, must immediately be made safe and functional by Lloyd Group.
- Any relevant audit.
- Survey information provided.
- Unexpected finds protocols.

3.2. Pre-construction Investigations

It is a requirement that prior to construction works being undertaken on site, the following investigations will be undertaken in order to identify risks, and to mitigate and control impacts arising from the works:

- Existing condition and dilapidation survey of roads, light poles, and other government infrastructure. These dilapidation reports have been prepared, by Lloyd (for private infrastructure) – both pre and post construction.
- Infrastructure investigations in order to locate existing services. Prior to commencing any works, Lloyd will carry out a "dial before you dig" for a services search. Arrangements will then be made for all services to be physically located, identified and clearly marked within the works area prior to the commencement of any work. Lloyd shall be responsible for the repair of any damage caused to such services during the course of the works.
- Obtain approvals and permits, discussed below.

3.3. Permits and Approvals

In regard to the latter dot point above, various approvals and permits must be obtained including but not limited to the following:

- Notice to be given to Mosman Council at least two (2) days prior to works commencing in accordance with Clause 104 of the EP&A Regulation 2000, the notice to include details relating to: the nature of the works to be undertaken; contact details; address of the land; details of the cc issued and relevant statement by the PCA; and the date on which the works will commence.

3.4. Signage

A sign is to be erected and maintained in a prominent position on the site in accordance with Clause 98A(2) of the *Environmental Planning and Assessment Regulation 2000* , as outlined in Development Consent condition D1 which states as follows:

"*D1.A site notice(s):*

(a) must be prominently displayed at the boundaries of the site during construction for the purposes of informing the public of project details including, but not limited to the details of the Builder, Certifier and Structural Engineer is to satisfy the following requirements;

(b) minimum dimensions of the notice must measure 841mm x 594mm (A1) with any text on the notice to be a minimum of 30-point type size;

(c) the notice is to be durable and weatherproof and is to be displayed throughout the works period;

(d) the approved hours of work, the name of the site/ project manager, the responsible managing company (if any), its address and 24-hour contact phone number for any inquiries, including construction/ noise complaint must be displayed on the site notice; and

(e) the notice(s) is to be mounted at eye level on the perimeter hoardings/fencing and is to state that unauthorised entry to the site is not permitted."

On the same signage a complaint contact number will be displayed at the construction site entrances, enabling complainants to contact the Head Contractor in a prompt manner. Lloyd will appoint a contact officer who register, address and respond to any complaints received during each stage of construction.

The Site Manager will notify the Project Manager immediately of any safety notices/instructions served by a statutory authority. Any notice served by a statutory authority is included in the next Project Report.

4. Early Works Operation and Responsibilities

4.1. Site Clearing and Earthworks

All works undertaken must be in accordance with the issued development consent for SSD 10456, including all reports and plans accompanying the consent, as well as plans and technical prepared by Lahznimmo, consulting engineers and Warren Smith and Partners and all other plans and guidelines forming a part of the early works tender package/specifications.

A pre-construction meeting is to be held between representatives of Taronga Zoo the project engineer, Lloyd, and all other relevant parties to discuss earthworks and excavation and related requirements.

Site clearance and earthworks will include but not be limited to the following:

- Excavation and earthworks. Any excavation and/or backfilling associated with the development shall be executed safely and in accordance with appropriate professional standards, with any excavation properly guarded and protected to prevent such work being dangerous to life or property. Includes earthworks associated with provision for drainage facilities, as well as for sediment and erosion control measures.
- Remediation of any unexpected finds contamination.
- Importation of fill.

Lloyd will ensure that:

- All earthworks are to be undertaken in accordance with *THE GUIDELINES FOR EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS AS 3798*.
- All excavation works comply with the NSW Work Cover *Code of Practice: Excavation 2000*. Earthworks shall include the excavation, placing and compaction of cut materials to the levels and profiles as detailed on the bulk earthworks plans prepared by consulting engineers forming a part of the early works tender package. project plans and specifications are to be read in conjunction with all geotechnical engineering advice regarding the site. Insite density testing is required in accordance with engineering requirements. All earthworks are to be reinstated in accordance with engineering requirements.
- Works areas shall be stripped of pavements and other deleterious material. Topsoil is to be stockpiled on site for re-use. Stockpiles are to be in accordance with the soil erosion and sediment control plan, consulting engineers accompanying the early works tender package.

- Temporary sedimentation and erosion controls are to be constructed prior to commencement of any work to eliminate the discharge of sediment from the site. All works must be performed in accordance with the Erosion and Sediment Control Plan.
- Excavation work to account for salinity potential.
- Soils permitted to be imported into the site must comply with the requirements of consent conditions, namely: that only VENM, ENM, or other material approved in writing by EPA is brought onto the site; to keep accurate records of the volume and type of fill to be used; and to make these records available to the Certifier upon request.
- Prior to the commencement of construction Lloyd will implement the unexpected finds protocol for contamination as stated in SSD 10456 clause B25.

4.2. Hours of Operation

The hours of operation on site will be as per the prescribed hours outlined by the Upper Australia Precinct Development Consent (SSD 10456), Section C, as set out in the following.

Except with the written consent of the responsible authority, demolition or construction works will only be carried out between 7.00am & 6.00pm from Monday to Friday (excluding public holidays) and 8.00am to 1.00pm on Saturdays. No works will be carried out on Sundays or public holidays without a specific permit.

Where out of hours works are required, permits shall be sought in accordance with the requirements Mosman Council. It is anticipated that permits shall only be required sporadically for items such as service shutdowns and connections, transport, using canes, of large plant items, delivery & removal of piling rigs, or for other reasons that we may not be able to anticipate at this stage.

In accordance with the Upper Australia Precinct Development Consent (SSD 10456), condition C2, notification of such construction activities as referenced above must be given to affected residents before undertaking the activities or as soon as is practical afterwards.

In accordance with the Upper Australia Precinct Development Consent (SSD 10456), condition C6, rock breaking, rock hammering, sheet piling, pile driving and similar activities will only be carried out between the following hours:

a) 9:00am to 12:00pm (noon), Monday to Friday;

b) 2:00pm to 5:00pm Monday to Friday; and

c) 9:00am to 12:00pm (noon), Saturday.

4.3. Responsibilities

Personnel are provided with a Position Description upon commencement with the Organisation. The following responsibilities apply at an Organisation level. Project specific responsibilities are outlined in each Safety Plan developed for the project. The delegation of authority is related to the Organisational Chart.

GREEN = Primary Responsible Person

YELLOW = Secondary Responsible Person

ORANGE = Supporting Responsible Person

RESPONSIBILITIES	Director	General Manager	Construction Manager	PM	SM	HSEQ Manager	HSEQ Coordinator
Responsibility to ensure compliance to environmental processes in this plan							
Preparing, reviewing & maintaining the Environmental Management Plan including - establishment and upkeep of objectives and targets / aspect and impact register / document control / records							
Managing the Implementation of site environmental Control measures							
Coordinate Communications with Interested parties, including complaints							
Train employees & Communicate importance of environmental management i.e. Induction							
Communicate with subcontractors on Environmental expectations							
Comply with applicable regulatory requirements							
Maintain equipment/tools/spill kit to control environmental impact							
Coordinate emergency response efforts							
Manage Environmental Incidents & Reporting Requirements							
Internal Inspections							

RESPONSIBILITIES	HSEQ Administrator	CA	EMP	S/C
Responsibility to ensure compliance to environmental processes in this plan				
Preparing, reviewing & maintaining the Environmental Management Plan including - establishment and upkeep of objectives and targets / aspect and impact register / document control / records				
Managing the Implementation of site environmental Control measures				
Coordinate Communications with Interested parties, including complaints				
Train employees & Communicate importance of environmental management i.e. Induction				
Communicate with subcontractors on Environmental expectations				
Comply with applicable regulatory requirements				
Maintain equipment/tools/spill kit to control environmental impact				
Coordinate emergency response efforts				
Manage Environmental Incidents & Reporting Requirements				
Internal Inspections				

4.4. Site Offices and Amenities

All site facilities including lunchrooms, change, first aid & toilets will be located within the site boundary. Initial site setup up will consist of portable sheds, accommodating a site office, amenities for the workers, First Aid room etc. Refer to the Traffic Control Plan, prepared by Lloyd Group, for details including locations of these facilities.

All site offices and amenities will be positioned according to the relevant stage of the development. They shall be neat, clean, well-constructed and well maintained at all times, as well as being in compliance with applicable statutory requirements and industrial agreements. It is proposed to provide the following site offices and amenities on the project site over the life of the project:

- Toilet facilities for the workers on-site.
- Administration office, with a separate meeting room for carrying out site meetings.
- Separate area set aside for changing facilities, first aid and OH&S facilities.
- External lighting in compliance with AS 4282-2019 *Control of the obtrusive effects of outdoor lighting* for site entry and site accommodation only. Refer to the diagram below for more information.

4.5. Flora and Fauna Management

In accordance with the Upper Australia Precinct Development Consent, condition D20, prior to commencement of works for the relevant construction stage, a survey plan to identify whether tree hollows or active nests are present, must be prepared. If tree hollows and/or active nests are present, a nest box installation and active nest relocation plan must be prepared by a suitably qualified person. In accordance with the Upper Australia Precinct Development Consent, condition D18, for the duration of the construction works: The Zoo's Vegetation Management Plan is to be updated to include the approved development and associated landscaping, including a proposed schedule of maintenance to ensure the provisions of fire and asset protection management zones as an Outer Protection Area (OPA) in accordance with Appendix 4 of Planning for Bushfire Protection 2019. When establishing and maintaining an OPA the following requirements apply:

(a) tree canopy cover should be less than 30%;

(b) canopies should be separated by 2-5 metres;

(c) shrubs should not form a continuous canopy;

(d) shrubs should form no more than 20% of ground cover;

(e) grass should be cover mown to a height of less than 100 mm; and

(f) leaf and other debris should be removed.

During construction, trees must be managed in accordance with the site-specific tree protection plan in the **CEMP**. This report should be read in conjunction with the Arboricultural Impact Assessment prepared by Sydney Arbor Trees dated 18 June 2020.

A copy of the updated plan demonstrating compliance with the above requirements shall be submitted to NSW RFS, FRNSW and the Planning Secretary, prior to the commencement of use. Any variations to the above requirements must be made to the satisfaction of NSW RFS.

The landscaping and revegetation within the proposed exhibit should incorporate the principles of Appendix 4 of Planning for

Bushfire Protection 2019, including:

(a) A species list of all plantings including estimated size at maturity and a preference for species with low

flammability;

(b) a maintenance regime that provides for ongoing adequate canopy separation between trees i.e. thinning

and regular pruning to avoid adjoining canopies, and provides for ongoing pruning of lower limbs of trees;

(c) adequate spacing between plantings to avoid continuous vegetation pathways resulting in the creation of

fire paths toward vulnerable buildings;

(d) regular removal of fine fuels to maintain a fuel reduced landscape;

(e) suitable impervious areas are provided immediately surrounding the building such as pathways;

(f) grassed areas, mowed lawns or ground cover plantings are provided in close proximity to the building;

(g) species are avoided that have rough fibrous bark, or which keep flash shed bark in long strips or retain dead

material in their canopies;

(h) smooth barks species of trees are chosen which generally do not carry fire up the bark into the crown; and The following protocols will also be applied on site:

- Plans and construction procedures shall clearly outline limit of works and flora/fauna exclusion areas.
- All work areas shall be located within the area of contract.
- Movement of vehicles and plant shall be restricted to designated access corridors and work areas.

Tree Protect Zones are to be created where excavators and/or other plant come into close contact with trees to be protected with the use of temporary fencing to shield the trunks from damage as per Tree Protection Guidelines dated April, 2018.

- Erect fences to identify and protect the Total Exclusion Zones and maintain for the duration of the works. Do not remove, alter or relocate without the approval of the RP.
- Construct the fence using Temporary fencing similar to that which is used to secure the site. The fence should be supported by concrete blocks and bolted together to ensure stability and security of the area around the extremities of trees to be retained or adjacent to the building works
- Temporary haul or access roads must pass over the Primary Root Zone or Primary Root Corridors then approval by the R.P is to be obtained and a layer of road base of 150mm of mulch or gravel is to be used to protect these areas. Maintain the bed at a minimum thickness of 150mm whilst in use. The use of a boardwalk in some cases may be appropriate upon approval of the RP.
- Minimise construction activity in Primary Root Corridors and carry out activities by hand.
- If it is necessary to excavate within a Total Exclusion Zone and around trees to be retained in areas adjacent to the site, obtain the approval of the RP and use hand methods such that root systems are preserved, intact and undamaged Do not fill around the tree trunks to a height greater than 50mm above the zone surrounding the tree.
- Do not remove or sever roots of trees shown to be retained that have a diameter exceeding 50mm without the approval of the RP. If approved, prune roots with a sharp saw and cut into clean healthy material. Open up excavations under tree canopies or in Primary Root Zones for as short a period as possible.
- Install underground utilities and drainage or irrigation lines outside Tree Protection Zones. If lines must traverse a Tree Protection Zone, obtain the approval of the RP and install by hand excavation or boring under the tree roots.

- Use an Approved Arborist to assess the placement or construction of any below ground installation that may affect sub-surface drainage within a Tree Protection Zone. If below ground installations affect the movement of ground water within the Primary Root Zone, notify the RP, seek advice from the Approved Arborist regarding appropriate horticultural requirements and obtain approval of the RP, and implement the recommendations before carrying out the works affected.
- Do not add or remove topsoil within the drip line of trees (or in the Primary Root Zone) without approval of the RP. Any change in gradient within the Total Exclusion Zone should notify the TCSA representative before work commences.
- Remove any downed plant material (from trees) from a Tree Protection Zone either by hand or with equipment situated outside the Zone. Extract material by lifting out and not by dragging it across the ground.
- Install erosion control devices such as silt fencing, debris basins and water diversion structures to prevent siltation and/or erosion outside the Total Exclusion Zone.
- Prevent damage to trees. Do not attach stays, guys and the like to trees. For trees of high significance identified on the drawings or where barriers or fences cannot be constructed, armour tree trunks with timber slats located vertically around the tree fixed with fencing wire.
- Report any damage to trees immediately to the RP demonstrate the following remedial actions are undertaken and record:
- Where branches are damaged an Approved Arborist is to rectify in accordance with AS 4373 - 2007. Alert RP to damage within 24 hours of the event
- Where roots are damaged, have an Approved Arborist cut back roots to clean tissue. Alert RP to damage within 24 hours of the event Monitor tree health for the duration of the Contract ensuring the root zone does not dry out;
- For other damage seek advice from an Approved Arborist and approval of the RP for required remedial work.
- Ensure construction trailers, vehicles and equipment remain outside Total Exclusion Zones at all times.
- Do not locate storage areas within Total Exclusion Zones. Do not deposit or store materials of any kind, spoil, contaminants, waste or washout water within Total Exclusion Zones.
- In the event of a spill, containing contaminants, that affects a Total Exclusion Zone, immediately notify the RP, isolate and contain the spill and carry out a cleanup procedure. Dispose off site all materials used in an appropriate clean up procedure

As per the Site Specific Tree Protection Strategy sited as 'Sydney Arbor Trees 2021 – Upper Australia Site Specific Tree Protection Strategy Stage 2' the following guidelines are to be put in place by Lloyd Group:

- The Tree Protection Strategy shall be kept onsite, and form part of the site-specific induction. All contractors and site workers shall receive a copy of these specifications prior to commencing work on-site. Any works conducted within the 'Tree Protection Zones' shall be supervised by the project Arborist.
- The project Arborist shall undertake a site inspection prior to works being started onsite to certify that tree protection is in place, in accordance with this strategy and the conditions of consent.
- Compliance documentation shall be prepared by the project Arborist following any inspections. Compliance documentation shall include documentary evidence of compliance with the tree protection measures and methods as outlined within this strategy.
- Where compliance has been breached, the project manager will be notified immediately and then in writing where a 'Stop Work Order will be issued to the contractor responsible for the development and the principal certifying authority until tree protection has been established and or damage to protected trees has be remediated under direction from the project Arborist.

- The project Arborist shall conduct monthly compliance inspections with written certification or statements delivered to the project manager.
- The project Arborist shall conduct a final assessment of the protected trees and site to assess any adverse influences from the development and complete a final certification once works have been completed, with future recommended management strategies implemented as required.

4.6. Environmental and Safety Controls

Environmental and safety controls will need to be established on the site prior to work being undertaken. These will include, but not be limited to the following:

- Security measures (fencing and gate access). Appropriate signage will be placed on areas at the entrance to each (progressive) work zone, indicating the works area and restricted access to the site. Security fencing is already in place, surrounding the entire work area.
- Occupational health and safety measures (personal protective equipment, first aid supplies, signage and barriers if needed). All works will be undertaken in accordance with the requirements of Work Cover NSW as well as the relevant standards and codes of practice to ensure the safety of personnel on and around the site. It will be the Loyd Group's responsibility to ensure that work, health and safety (WHS) practices are implemented and revised where necessary to reduce the occurrence and impact of work place accidents and incidents. WHS monitoring and review operations will be programmed on a daily basis, to minimise work place incidents and accidents. WHS issues shall be continually monitored. Consultation with employees, subcontractors and visitors as required will also be required to ensure WHS accidents and incidents are kept to a minimum.
- Personal protective equipment to be provided to all workers on the site.
- Environmental management measures are to be put into place.
- Toilet facilities shall be provided on the site.
- Daily monitoring of work site by Lloyd Group personnel.
- Site induction. Anyone entering that part of the zoo site where construction activities are being undertaken will be required to undergo a site induction. The induction will include parking and access, deliveries, emergency procedures, WHS and standard environmental requirements. The induction will cover aspects relating to safety and amenity; including access, emergency evacuation procedures, location of first aid facilities, location of amenities, site hours, material handling, noise and dust policies and environmental management. Lloyd Group is required to provide adequate training of its employees, subcontractors and site visitors including mandatory site inductions. The site induction should make all parties aware of their site responsibilities.
- All workplace amenities, offices, workshops, vehicles, plant and storage facilities including those of contractors will have a suitable type and number of fire extinguishers available for use in the event of a fire. AS2444 provides details on the various extinguishers available, use and effectiveness for various types of fire. All bulk storage of fuels, oils or other products should be in accordance with the relevant Australian standard. Signage will be located at all extinguisher locations on site to indicate the extinguisher type and suitability for the fuels, oils or other products stored on site.

4.7. Environmental Authority Notification & Site Visits

Contact with the relevant government agency should be conducted via the Site Manager and/or HSEQ Manager. Depending on the significance of the issue, the Project Manager will determine whether the notification of Organisation Legal Counsel or other Organisation senior management is required.

Communication from the relevant government agency must be documented (as a minimum) in the site diary. It is recognised that depending on the nature of the communication, other supporting documentation may need to be compiled. In the event that a representative (Officer) of the relevant government agency representative arrives on site, the following procedure should be followed:

- The Officer should be taken to the Site Office to meet the Site Manager or his representative. Before any site inspection, the purpose of the government agency's visit should be determined.
- Particular care must be taken to ensure that visitors are signed in and inducted to an appropriate standard depending on the nature of their visit.
- Under legislation, officers of the EPA or Council have the right to enter any site for the purposes of evaluating the nature and extent of potential pollution.
- The Officer should be escorted around the site under the full-time supervision of the Site Manager or a suitable Organisation representative.
- Before the Officer leaves the site, the Site Manager should obtain a debriefing from the Officer to identify the findings of the inspection.

4.8. Quality Assurance and Occupational Health & Safety

Lloyd Group will implement a quality assurance and occupational health and safety protocols, as summarised below.

Lloyd Group will maintain a quality assurance system which complies with the requirements of AS 9001 (2000) and AUS-SPEC COC & COS. The protocols in this system include but are not limited to the following. Further details are to be found in the technical notes prepared by Warren Smith and Partners forming a part of the tender documents and accompanying this Plan- refer **Appendix A** for details.

- The quality system will include the keeping of all records relating to all aspects of the early works. At the completion of each stage of the early works, Lloyd Group will certify that the works have been undertaken in accordance with the plans and technical notes prepared by consulting engineers Warren Smith and Partners, and any other instructions or drawings issued during the course of the contract works. A copy of the approved and certified plans, specifications and documents incorporating conditions of approval and certification shall be kept on the Site at all times and shall be readily available to any officer of the Department, Council or the Certifier.
- Material safety data sheets to be kept on site at all times, and be readily accessible to personnel at all times. All material to be transported, stored, imported, used or disposed of shall be in accordance with the material safety data sheets.
- The work site and surrounds are to be kept in a clean and tidy condition at all times. Litter and rubbish shall be placed in containers and removed from the site. A waste storage container is to be provided at the commencement of the building work.
- The engineering drawings prepared by consulting engineers Warren Smith and Partners shall be read in conjunction with all other drawings, specifications and written instructions that may be issued during the course of the contract. Lloyd Group shall ensure that they have the latest drawing revision prior to commencing any works. All set out dimensions shall be verified by the contractor on site before work commences. Drawings shall not be scaled for dimensions. All levels are in metres and all dimensions are in metres unless noted otherwise.

4.9. Risk Management

Risk Management is key to delivering the Upper Australia Precinct Early works successfully. By planning prior to works commence and identifying risks early we can ensure that the best possible outcome is secured. Our risk register for the project is located in Appendix A.

5. Unexpected Finds Protocols & Built Heritage

5.1. Unexpected Finds Protocol – Contamination

Previous investigations on the project site have identified the potential presence of contaminated fill materials in the surface and sub-surface. Those parts of the site so affected have been remediated.

The unexpected finds and site conditions that may arise at the site include:

- Finding contamination in areas not previously surveyed or the uncovering of currently unknown types of contamination.
- The uncovering of greater amounts of ground contamination than currently identified.
- The uncovering of Asbestos containing materials.
- The uncovering of any suspect or unacceptable odour containing materials. This material is typically identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos, ash material, etc.

Should any of the above be encountered during any stage of works (including earthworks, site preparation or construction works, etc.), such works shall cease immediately until a qualified environmental specialist has be contacted and conducted a thorough assessment. Refer to step by step guide below for details. The following steps will apply.

Any unexpected finds that may be identified as a result of site activity will be actioned in accordance with the Unexpected Finds Protocol, as well as in accordance with the original Construction Management Plan (CMP) prepared by RPS Group Pty Ltd, Construction Management Plan - SSD 10456, dated 12 June 2020, where modified by the consent.

a) Identified finding by worker

b) Cease work as soon as safe to do so and move clear of the finding.

c) Do not tamper or attempt to remove the finding.

d) Contact Lloyd Management immediately.

e) Site Management to delineate an exclusion or quarantine zone around the area using fencing and or appropriate barriers and signage.

f) If not already done, Site Manager is to notify the Project Manager and or Construction Manager.

g) Cover area with tarps if practicable to preserve finding.

h) A suitable person (Site Manager) will initially assess the potential risk to health or the environment by the finding and asses if evacuation or emergency services need to be contacted.

i) Project Manager will arrange inspection by an external Environmental / Heritage Consultant to assess the finding and provide advice as follows:

    - Preliminary assessment of the find and need for immediate management controls.
    - What further assessment and/or remediation works are required and how such works are to be undertaken in accordance with contaminated site regulations and guidelines.
    - Preparation of a remedial action plan for large scale contamination or specification for smaller or minor volumes of material.
    - Remediation works required.
    - Validation works required following remediation works

j) Works will not to recommence in the affected area until appropriate advice has been obtained from the consultant or suitably qualified person with approval to recommence.

k) Any excavation works will not recommence until the extent of any contamination has been assessed and, if necessary, a remedial action plan (RAP) will be prepared.

l) Air monitoring requirements are to be advised by the consultant and implemented as required.

m) If safe to do so, the consultant will provide clearances for words to proceed in the affected area (subject to conditions). If it is not considered to be safe, works will remain on hold until appropriate approval is provided.

n) As soon as practically possible, record the events associated with the unexpected find.

o) Excavated material from remedial activities will be separated from other materials and stockpiled for assessment. Sampling of the materials will be undertaken in accordance with the relevant guidelines or professional judgement

where justification is applied. Samples will be analysed for a range of analytes as required for beneficial reuse or offsite disposal.

p) For materials requiring offsite disposal, laboratory results will be assessed to determine the appropriate waste classification of the material in accordance with the NSW EPA Waste Classification Guidelines. Depending on the classification, materials will be transported to an appropriate waste facility that is licensed to accept waste of the relevant classification or beneficially reused if appropriate.

q) A waste tracking system recording the volume of material, waste classification / beneficial reuse status, removal documentation and truck and receiving landfill facility det aids will be recorded to ensure all waste is accounted for and disposed or appropriately in accordance with NSW EPA requirements.

r) Any unexpected finds must be documented, and records of volumes and types of materials identified removed from the site must be kept on file.

s) Keep a record of the unexpected find. The record must include exact location of the find. Documentation on the removal of any contaminated materials from the site must be kept on file

    a. Volume of material removed,

    b. The type (classification) of material,

    c. Licensed facility that the material was disposed to,

    d. Receipt documentation from the licensed facility confirming volume received.

In accordance with the Unexpected Finds Protocol, the Project Manager/HSE Manager, in consultation with the relevant General Manager, will notify regulatory authorities as required. The Project Manager/HSE Manager will also ensure that the find is reported to the Principal.

In the case of unexploded ordnance:

a) Do not touch or disturb;

b) Contact Police immediately.

In the case of unexpected services, which may include power, gas or fuel:

a) Do not touch or further disturb.

b) The area must be immediately designated a non-smoking and “no naked flames” area.

c) All nearby machinery should be turned off.

d) Contact relevant governing authority.

e) Contact appropriate trade supervisor.

In the case of unexpected finds of material containing asbestos, including Products made from asbestos cement not only include fibro sheeting (flat and corrugated), but items such as water, drainage and flue pipes, roofing shingles and gutters etc.:

a) Do not touch or further disturb.

b) Isolate area (10 metre isolation zone required for asbestos).

c) Contact hygienist. Implement hygienist’s recommendations.

d) If persons have been exposed arrange medical advice/consultation i.e. possible asbestos fibre exposure will require lung function test & chest x-ray. Note: This applies more specifically to friable type asbestos rather than non friable asbestos containing material however if any doubt exists treat as friable.

e) Obtain clearance from hygienist prior to re-entering area.

Before re-commencing works in or near the source of the unexpected find the following actions will be followed:

a) Approval will be required from the contamination consultant to allow for the re-commencement of works or part thereof.

b) The extent of the unexpected find must be delineated.

c) Review the need, if any, to amend or update the Remediation Action Plan as necessary to include the additional remediation and validation of the unexpected find, and to update if required.

5.2. Unexpected Finds Protocol – Aboriginal Heritage

In accordance with the Upper Australia Precinct Development Consent (SSD 10456), condition B22, in the event that surface disturbance identifies a new Aboriginal object, all works must halt in the immediate area to prevent any further impacts to the object(s).

A suitably qualified archaeologist and a registered Aboriginal representatives must be contacted to determine the significance of the objects.

As the works being conducted on site by Lloyd Group are in areas of the Taronga Zoo built post 1970 (refer to Historical Archaeological Assessment) there is a very minimal chance of an Aboriginal Heritage Item/Items being encountered, however Lloyd Group will proceed with caution and follow the required procedures if an item is uncovered.

In the unlikely event that human remains are uncovered during any site works, the following must be undertaken:

a) All works within the vicinity of the find immediately stop.

b) Site supervisor or other nominated manager must notify the NSW Police and the Aboriginal Cultural Heritage Regulation Branch of the Department of Premier and Cabinet.

c) The find must be assessed by the NSW Police, and may include the assistance of a qualified forensic anthropologist.

d) Management recommendations are to be formulated and applied in consultation with the Police, The Aboriginal Cultural Heritage Regulation Branch of the Department of Premier and Cabinet and site representatives.

e) Works are not to recommence until the find has been appropriately managed.

Unexpected Finds Procedures are most effective when accompanied by comprehensive archaeological induction of all contractors to ensure they are familiar with the appearance of artefactual materials, and the process to follow should they be encountered. All contractors are to be provided with the opportunity to attend the archaeological induction and are to familiarise themselves with the content provided by Urbis to ensure that should archaeological resources be encountered, they can be correctly identified and the UFP followed.

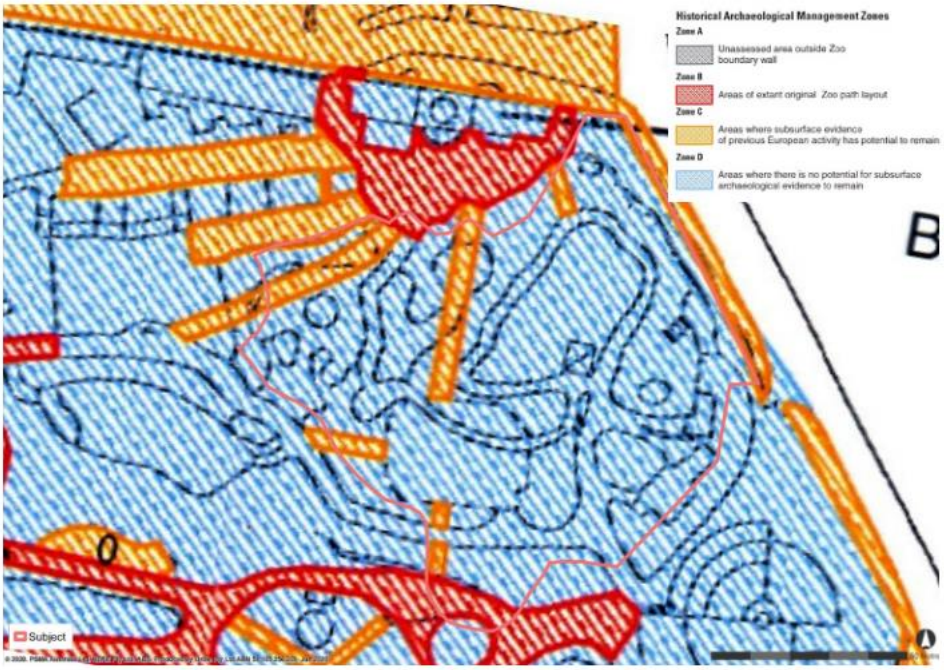
5.3. Unexpected Finds Protocol – Historic Heritage

In accordance with Upper Australia Precinct Development Consent (SSD 10456), condition B20, if any unexpected archaeological relics are uncovered during the work, then all works must cease immediately in that area and the Heritage NSW contacted. Depending on the possible significance of the relics, an archaeological assessment and management strategy may be required before further works can continue in that area. Works may only recommence with the written approval of the Heritage NSW.

In the event that any archaeological feature be disturbed in Zone 3(C), work should cease immediately so that appropriate controlled archaeological investigation can take place. No works are proposed to occur within Zone 3 areas as part of this stage. Therefore, no monitoring is required and works associated with this stage can proceed with the Unexpected Finds Procedure & induction. An assessment of the archaeological feature should be undertaken. if any unexpected archaeological relics are uncovered durieng the work, then all works must cease immediately in that area and a suitably qualified archaeologist contacted to assess the finds. This may require consultation with Heritage NSW, and works may only recommence with the written approval of the Heritage NSW.

A short Archaeological Methodology should be prepared for the monitoring detailing research questions, objectives and actions during the process.

Unexpected Finds Procedures are most effective when accompanied by comprehensive archaeological induction of all contractors to ensure they are familiar with the appearance of artefactual materials, and the process to follow should they be encountered. All contractors are to be provided with the opportunity to attend the archaeological induction and are to familiarise themselves with the content provided by Urbis to ensure that should archaeological resources be encountered, they can be correctly identified and the UFP followed.



5.4. Built Heritage

Fabric comprised in the wall to the west of the Nocturnal House entry, to the path to the Nocturnal House and some sandstone walls of the Wetlands Ponds are approved for removal for future reuse. The below methodology is to be adopted by Lloyd Group:

Carefully remove 2 courses of bricks from retaining wall to west of Nocturnal House entry using handheld methods only. The dismantling should begin from the top of the form and proceed downwards by carefully chiselling the mortar from the underside of the brick until the bond is broken. Carefully remove all mortar, clean bricks of dirt or mortar. Stack by hand on a timber pallet in an orderly manner allowing safe storage without risk of collapse and damage.

Heritage Consultant to inspect sample quantity of bricks. Bricks to be retained will be whole and free of structural defects with minimal chipping and surface damage. Heritage Consultant to advise whether the bricks are appropriate for salvage and reuse based on sample quantity provided. If instructed, proceed with removing and salvaging all other bricks in area as approved. Retain sample courses approved by Heritage Consultant on site for quality control until all mortar removal has been completed.

Carefully salvage all brick and sandstones from pathway and wetlands ponds walls all approved in same manner. All masonry from these areas to be cleaned and stacked on pallet. All palettes to be stored on site in designated storage area to avoid disturbance and damage until required for reinstatement. The salvaged materials must remain secure from theft or vandalism.

6. Waste Classifications of Materials to be Removed from Site

In accordance with the Upper Australia Precinct Development Consent (SSD 10456), the waste classification (for materials to be removed) and validation (for materials to remain) be undertaken to confirm the contamination status in these areas of the site is to be specified. No works will commence onsite until the classification report is completed.

In the event that contaminated spoil is encountered onsite, we will follow our waste disposal guidelines documented in the Environmental Impact Statement.

Further details to be adhered to in regard to the above are contained in the engineering drawings and requirements prepared by consulting engineers provided with the early works tender package.

As stated in the Douglas & Partners Preliminary Site (Contamination) Investigation Report, December 2018 - the fill as described in Section 9 within the site is preliminarily classified in situ as General Solid Waste (non-putrescible).

7. Construction Traffic and Pedestrian Management

7. Introduction

a) Overview

The traffic management objectives for this project are as follows:

i. Ensure the safety of employees, contractors, the general public, Taronga Zoo personnel, pedestrians, cyclists and traffic in and around the site.

ii. Maintenance of satisfactory access to the site during construction.

iii. To minimise environmental nuisance and impact as a result of construction traffic, and to keep traffic delays on Bradley's Head Road to a minimum.

iv. Minimise disturbance to the environment and to minimise the risk of noise, dust complaints or complaints in relation to construction traffic from neighboring property owners or residents in the immediate local area.

v. The above approach and report has been provided with consultation with council (refer to attached correspondence with Mosman Council)

b) Construction Access

The access requirements for construction traffic for the early works is illustrated in the accompanying engineering drawings and requirements prepared by consulting engineers provided with the early works tender package. The authorized access points comprise the following:

vi. Access to the site from Bradleys Head Road

c) Mitigation measures

Where required, Lloyd Group will engage suitably qualified and approved traffic controllers in order to undertake works in a safe and responsible manner. Traffic controllers are to carry license tickets at all times.

Other specific traffic controls and measures would include the following:

vii. All transport vehicles to have proper noise attenuation and to be maintained in good order.

viii. Queuing will be forbidden in local streets. Truck movements will be staggered to prevent queuing occurring.

ix. Oversize truck movements (predominantly floats) will only occur during approved hours 10.00am to 2.00pm.

x. All construction vehicles (excluding worker vehicles) are to be contained wholly within the site, except if located in an approved on-street work zone, and vehicles must enter the site before stopping.

xi. Adequate off-road parking will be provided for construction vehicles and construction workforce vehicles.

xii. All trucks and earthmoving machinery on site will have fitted, and will maintain, suitable reversing lights and reversing alarms for on site safety.

xiii. All construction vehicles (including site personnel vehicles) are to be contained wholly within the site, except if located in an approved on-street work zone, and vehicles must enter the site before stopping.

xiv. Prior to the commencement of work, suitable measures are to be implemented to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site. It is an offence to allow, permit or cause materials to pollute or be placed in a position from which they may pollute waters.

d) Monitoring and Corrective Actions

Construction roads will be inspected to ensure road conditions support safe working and driving. Following periods of heavy rain or adverse conditions, on-site construction roads will be inspected prior to heavy vehicle traffic use to ensure driver and vehicle safety.

In the event of a traffic incident, the relevant sub-contractor shall stop the vehicle involved in the incident and clear any spills. In the event of a complaint the Head Contractor or their representatives will investigate the complaint promptly and initiate appropriate action to reduce impact. All incidents are to be reported to Taronga Zoo.

The early works will be of limited duration, given that no building works are proposed. Lloyd Group will be responsible for providing to Taronga Zoo details of the operations undertaken, including results of any and all noise or vibration monitoring, details of discussions with the local council and the community, unexpected finds, incidents and accidents, complaints and actions taken in response to complaints, as well as details of material removed from or imported into the site.

e) Updates to this Traffic and Pedestrian Management Plan

This Traffic and Pedestrian Management Plan only applies to the early works ender package only. The Plan will

need to be revised accordingly for any other future construction stages.

7.1. Purpose

This Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) has been prepared to outline and describe how Lloyd Group will, during the construction of the Project, comply with the NSW Minister for Planning's Conditions of Consent (CoC). This CTPMSP is to be used during construction of the Project. This plan is applicable to all staff and Subcontractors associated with the construction of the Project.

The purpose of this CTPMSP is to detail the specific mitigation measures and controls to avoid, mitigate and/or manage potential impacts and minimise disruption to, and ensure the safety of the wide range of stakeholders potentially affected by the works, including but not limited to: motorists, pedestrians; cyclists; public transport users, local residents and property owners; business owners; and workers/staff engaged on the Project.

7.2. Legislative requirements

Legislation relevant to traffic and transport management for this project includes:

- Environmental Planning and Assessment ACT 1979
- Roads Act 1993
- Local Government Act 1993
- Road Transport (Safety & Traffic Management) Act 1999
- Work Health and Safety Act 2011 (NSW)

7.3. Industry Standards and Guidelines

Additional guidelines and standards relating to the management of traffic and access include:

- Roads and Maritime Services (RMS) Traffic Control at Worksites (Ver: 5.0 27/07/2018 or any subsequent revision / technical direction from RMS)
- RMS Specification DCM G10 – Control of Traffic
- Transport Management Centre Road Occupancy Manual (2012 or any subsequent revision / technical direction from RMS)
- RTA – NSW Speed Zoning Guidelines (2004)
- AS 1742: Manual of Uniform Traffic Devices: o Part 1 - General Introduction and Index of Signs o Part 2 - Traffic Control Devices for General Use o Part 3 - Traffic Control Devices for Work on Roads o Part 4 - Speed Controls o Part 10 - Pedestrian Control and Protection o Part 11 - Parking Controls o Part 13 - Local Area Traffic Management.
- NSW Bicycle Guidelines
- Relevant Austroads Guides and TfNSW (RMS) Supplements
- The NSW Rural Fire Service Bush Fire Management Plan
- TfNSW TDT 2010/07 Use of Variable Message Signs
- RTA – Delineation Guidelines (2008) • Environmental Management Plan Guideline: Guideline for Infrastructure Projects (DPIE, April 2020)

7.4. Project Summary

This report provides an assessment of a State significant development (SSD) application for a redevelopment located inside Taronga Zoo for the Upper Australia Precinct (SSD-10456) located at Bradleys Head Rd, Mosman – BULK EARTHWORKS & DEMOLITION (EARLY WORKS). Lloyd Group has been awarded with job to complete Early Works on the project, including: site preparation including demolition, excavation/earthworks to create the area required for future stages of the Upper Australia Precinct.

Figure 1 – Site Location

7.5. Site Description

2A Bradleys Head Road, Mosman is a block of total size 2736.3sqm. Lloyd Group Pty Ltd has a won a public tender to demolish existing structures and prepare site for a new construction, the works will include, demolishing of structures inside of site and construction of new structures.

Figure 4 – Lloyd Group Site Management Plan

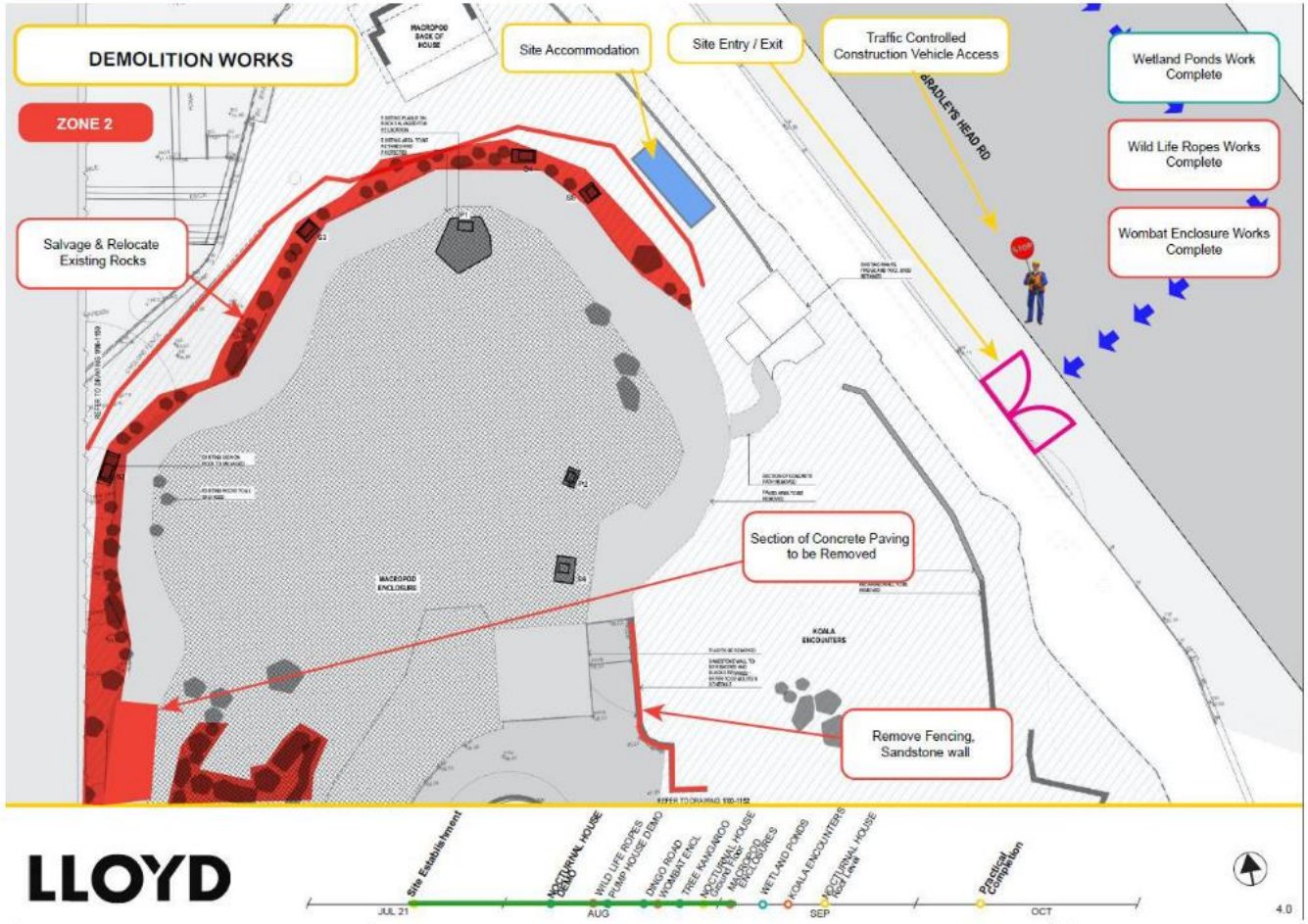


Figure 2 – Demolition Plan

7.6. Staging Plan - Commencement Dates and Duration

Please see staging plan in table provided below, project commencement date is scheduled to be on 10th of May 2021:

Stages	Activity	Start Date	Finish Date
01	Site Establishment	02/08/2021	6/08/2021
02	Demolition	09/08/2021	24/08/2021
03	Structural Modifications to Nocturnal House	09/08/2021	24/08/2021
04	Earth Removal Works	25/08/2021	13/09/2021
05	Completion of Early Stage Works	14/09/2021	25/09/2021

7.7. Hours of Work

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

(a) between 7am and 6pm, Mondays to Fridays inclusive; and
(b) between 8am and 1pm, Saturdays.

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

Construction activities may be undertaken outside of the hours in condition above if required:

(a) by the Police or a public authority for the delivery of vehicles, plant or materials; or
(b) in an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or
(c) where a variation is approved in advance in writing by the Planning Secretary or nominee if appropriate justification is provided for the works.

Notification of such construction activities must be given to affected residents before undertaking the activities or as soon as is practical afterwards. Rock breaking, rock hammering, sheet piling, pile driving and similar activities may only be carried out between the following hours:

(a) 9:00am to 12pm (noon), Monday to Friday;
(b) 2:00pm to 5:00pm Monday to Friday; and
(c) 9:00am to 12pm (noon), Saturday.

7.8. Daily Onsite Workforce

Average daily workforce of approximately 15 people (tradesmen).

7.9. Subject Road – Bradleys Head Road

Bradleys Head Road is a local 2 way 1 lane council road. It connects with Rickard Road on the northern end and with Heath Road on southern end. Road primary carries residential traffic and it is not used by through fare traffic. It is considered as a medium traffic volume road.

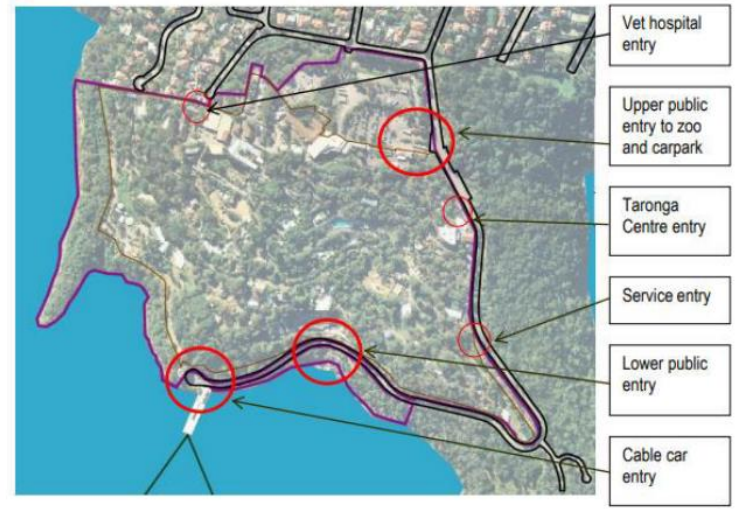
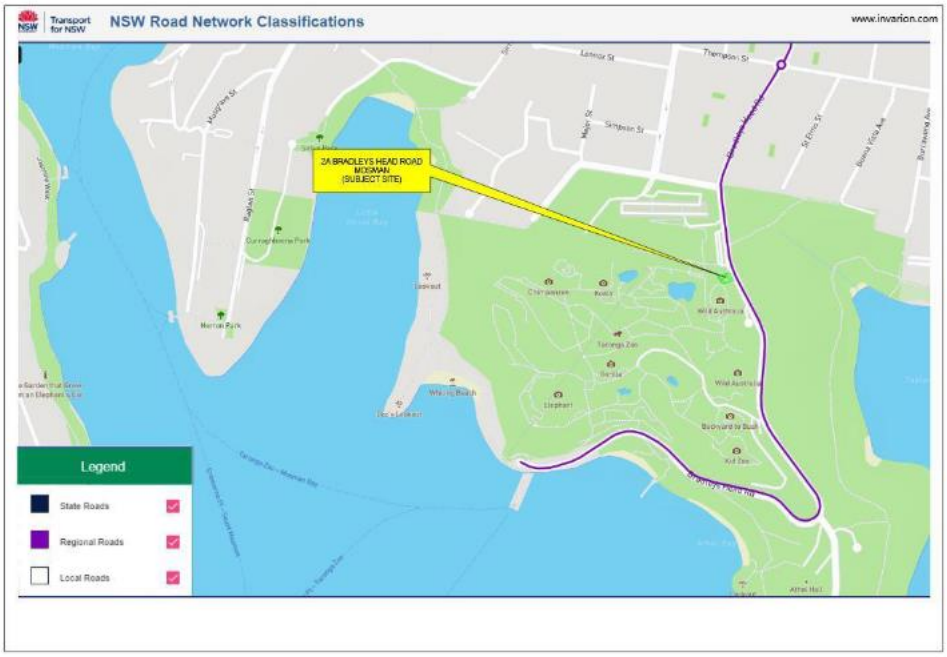


Figure 4 – Site Access



7.10. Public Transport Facilities

The nearest bus stops are 50m away at the entrance of Taronga Zoo on Bradleys Head Road.

Figure 6 – nearest bus stop with services to Balmoral Beach and City QVB – Taronga Zoo, Bradleys Head R
Stop ID: 208855

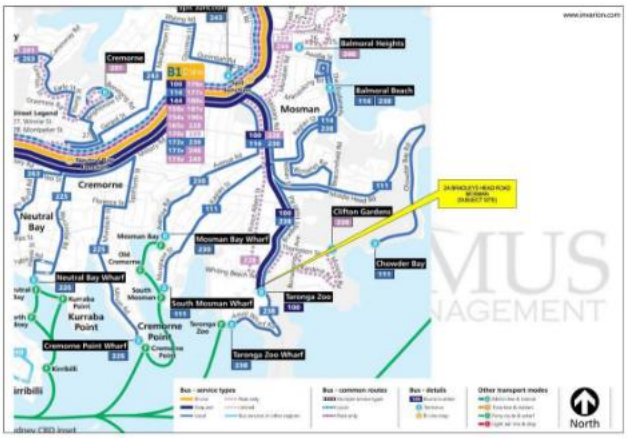
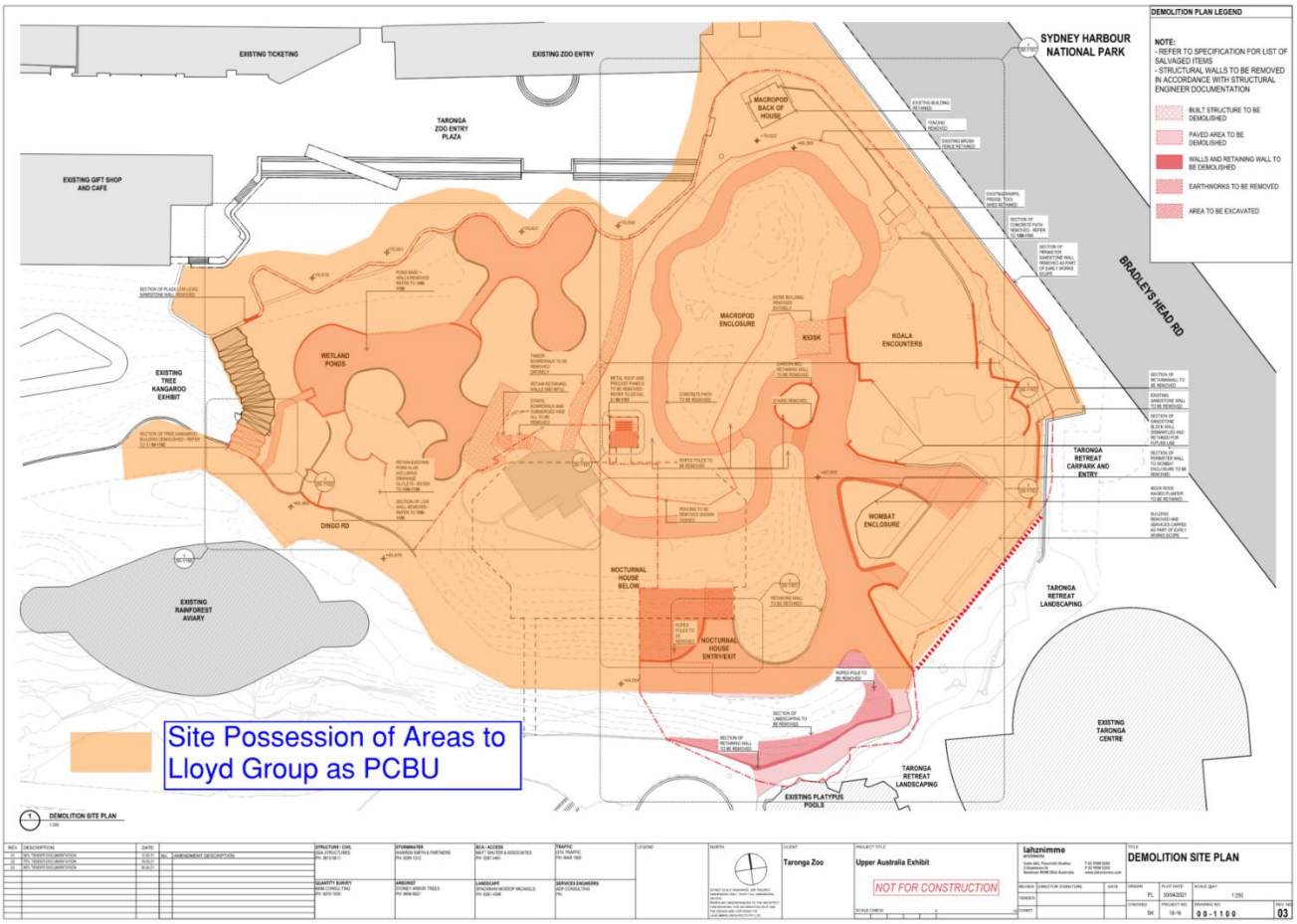


Figure 7 – Bus Network in the area

7.11. Location of Proposed Hoardings

Construction fence & timber hoardings will cover permitter of the site (with Taronga Zoo supplied Shadecloth, no third party advertising), for further information please refer to site traffic management plan/site layout diagram in the appendix of this document – **Appendix A Figure 8**. Site gates will be used to secure the construction site from unauthorised access.

This will be done in accordance with SafeWork NSW requirements to protect the safety of work personnel and the public, the work site must be adequately secured to prevent access by unauthorised personnel as well as in line with Narla Biodiversity Assessment Report, June 2021.



7.12. Location of proposed Crane Standing Zone

Lloyd Group proposes no crane use for Early Stage of the project.

7.13. Location of proposed Work (Construction Work) Zone

Lloyd Group proposes no construction zones for this project**.**

7.14. Concrete Pour Work Zones

Lloyd Group proposes no concrete pours on roadway for the project, all concrete pours are within site boundary.

7.15. Loading / Unloading Zones

All loading and unloading activities will be done within the construction site boundaries as shown on **Figure 8 of Appendix A.**

7.16. Location of Excavations

2xExcavators (18T) will be used for demolition and earth work purposes within site boundaries, all spoil material removal will be removed by tipper truck and trailers that will have to be loaded/unloaded within work site boundaries. The excavators will be delivered and dropped to site by tilt-tray truck as shown on image below:

7.17. Site Accommodations

All site accommodations will be located wholly within the site compound not on public lands – please refer to **Appendix A – Figure 8.**

7.18. Material, Plant and Spoil Bin Storage Areas

These areas will be allocated within the construction site boundary. Skip bins will be contained wholly within the site boundary (garbage bin area). No storage of materials, plant or spoil will be allowed on public land or public roads. All waste/material will be collected on site in a position for easy access for both use on site and removal by trucks. As previously described, all removal trucks will have the load covered by tarpaulin or other means to secure the load and will adhere to the approved travel routes as described in this CTPMSP.

It is noted that Lloyd Group Pty Ltd must obtain a permit from the Mosman Council regarding the placing of any plant/equipment on public ways, should this ever be required.

7.19. Access Management Arrangements

Dedicated temporary construction site driveway entrance and exit will be signposted and managed by certified traffic controller. This will remain in place to safely manage pedestrians and construction-related vehicles to the Site frontage's roadways and footpaths.

Authorised Traffic Controller will also be in place to assist with vehicle access to any private car spaces if required. It is not expected, but should there be a need to relocate any car spaces due to the spaces being inaccessible, suitable alternative arrangements will be provided to the occupant of the car space.

7.20. Vehicle Movement Plan

A vehicle movement plan has been developed for this project and is located in **Appendix A Figure 9**. VMP has been designed in the way that construction traffic will use minimum of local roads and the main access roads for VMP are State Road Bradleys Head Road.

7.21. Impact to Residents, Businesses and the Public

Most of the works will be carried out within construction site boundaries, this project is not expected to have any significant impacts on residents, public transport and cyclists. It is recommended that high impact works as earth removing works (truck and trailer operation) need to be at off peak hours.

It has been planned that traffic control applications will cause any significant traffic delays. The most significant impact that may cause some delays in traffic flows is turning trucks accessing work site.

The rest of existing access arrangements and services to other transport modes will be maintained comparable to the existing situation. Adequate provision for motorists, pedestrians and cyclists will be made for current movements along all frontages and intersecting streets.

7.22. Neighbouring Properties

Access to neighbouring properties will be maintained at all times. No full Road Closures are planned on this stage. Neighbouring property occupants and local stakeholders will be regularly notified of the timeframes for completion and of any other impacts that may affect the local surrounds.

7.23. Transport Management for Service, Delivery, and Garbage Vehicles

Project is not expected to make any other third party truck operation impacts.

7.24. Public Transport Impacts

This project is expected to have nil impact on public transport (buses) timetables. All truck movement works will be done away from public transport routes and bus stops.

7.25. On Site Parking

No onsite parking.

7.26. Emergency Services

For any works on the roadway (not proposed at this moment), a 3.2m isle is to be maintained at all times during any road works to ensure emergency vehicle can pass if required.

7.27. Pedestrians

Project will make nil impact on pedestrian movements, as there are no footpaths in the project area along Bradleys Head Road.

7.28. Cyclists

Cyclists will be subject to the same Traffic Management Controls as registered road users and will always have the right of way over construction works and vehicles accessing the site. At current condition proposed construction traffic movement will make no impact on cyclist traffic as closest designated cyclist route is located at Bradleys Head Rd. (please see **Figure 7** for your information).

7.29. Driver Code of Conduct

Lloyd Group will include the following in all subcontract procurement packages:

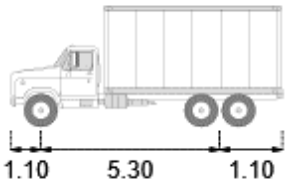
- A copy of the approved truck routes as detailed in Figure 9
- Adhering the approved maximum truck sizes
- Operation High Impact Truck and Trailer Operation at off peak times
- Elimination use of compression breaking on the approach to work site on Bradleys Head Road
- Contracted Truck Drivers to have courteous and positive attitude towards other motor users
- Truck Drivers to use flashing amber lights within 100m approach distance to site
- Any other entry restrictions, or site access restrictions as agreed to by the authorities.

Lloyd Group will be responsible for managing all site access points and monitoring subcontractor behaviour and subcontractor truck access arrangements to ensure compliance with conditions of contract. Lloyd Group will be responsible for managing for all the site gate access to ensure there is no access to or from the site before or after approved construction hours. Drivers are to be particularly vigilant when entering/exiting Bradleys Head Road. Vehicles are not to queue on the road network and must enter and exit work site in a forward direction. All deliveries will be pre-booked and are to check in at the site office on arrival.

7.30. Types of Trucks Approaching Site

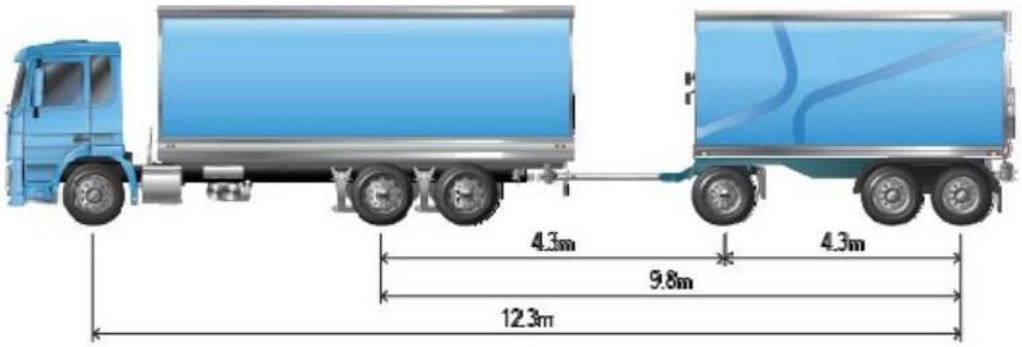
There will be a combination of small rigid vehicles (SRV's 5.2m), heavy rigid vehicles (MR's 7.5m) pantech and flatbed, and concrete trucks accessing and egressing from the site. Site Surrounding Roads were designed to carry vehicles with short wheel base, hence there are no plans to use vehicles longer than 8m.

Vehicle dimensions



Single unit truck/bus

Length: 7.50 m
Width: 2.50 m
Lock to lock time: 4.0 s
Max steering angle: 36.65°
Turn radius (curb to curb): 9.91 m
Turn radius (wall to wall): 10.54 m



6 axle Truck and Dog Combination
Length: 19.0 metres

16.5t 9.0t 16.5t 6.0t[1]
GML Total Combination Mass: 42.5t[1]
17.0t 9.0t 17.0t 6.0t[1]
CML Total Combination Mass: 43.5t[1,2]
Access:
GML/CML: General Access under HVNL

7.31. Estimated Daily Truck Volumes

The estimated average number of daily truck movements would be 9 per day.

The estimated construction traffic generated by the works is summarized in **Table 3** below.

TABLE 3: CONSTRUCTION VEHICLE MOVEMENTS

STAGE	TRUCKS	TRUCK TYPE	DURATION
Site Establishment and Demolition Material Removal works	10 tipper trucks in total Around 5 trucks a week	**MR Trucks**	2 weeks
Earth Removal	720 truck and trailers in total Around 52 trucks a week	**Truck and Trailers**	14 weeks
Tradesmen Vehicles	20 vehicles per week	**LVs**	12 weeks

Note: Construction vehicle movements have been assumed without the input from a builder and as such is subject to change prior to submission to Mosman Council

7.32. Vehicle Queueing

No queuing or marshalling of trucks is permitted on any public road. If there is no adequate space on-site or in the approved temporary work area. All construction vehicles should be coordinated to site only when sufficient space is available. Circulating construction vehicles on the network will not be tolerated.

7.33. Abnormal and Oversize/Over mass Loads

Oversize and over-mass vehicles are not allowed to travel on Local Roads (unless approval for a one-off occasion is obtained from the Mosman Council Traffic Operations Unit). Requests to use these vehicles must be submitted to Mosman Council 28 days prior to the vehicle's scheduled travel date.

Specific Traffic Management Plan will be developed for each abnormal movement and will be submitted for assessment to the relevant local and regulatory authorities on a case-by-case basis. For more information, please contact the National Heavy Vehicle Regulator (NHVR) on 1300 696 487 or https://www.nhvr.gov.au/

Temporary signposting will be implemented as per the detailed traffic plans. As documented in **Appendix B**

– Traffic Control Plans.

Designed TCPs cover different work scenarios, for further information please see table below:

Event	DESCRIPTION	TCP
1	**Daily Site Access**	#2301

7.34. Risk Assessment

A detailed risk assessment and control method must be documented for each stage of the works. A Safe Work Method Statement is to be developed in consultation with all stakeholders and signed off by all workers prior to commencement of work.

7.35. Stakeholder Works Notifications

Notifications will be provided to all impacted stakeholders. Local community notification and consultation processes will be undertaken with all stakeholders prior to any changes to or impact on the local road network (days of concrete pours, frequent movements of delivery trucks). A copy of the notification letter for general traffic control works to residents is in below (content of letter can be changed in order to suit particular work scenarios):

Bradleys Head Rd, Mosman – Upper Australia Precinct - Lloyd Group Monday 2nd August 2021 – Friday 15th May 2021
07:00am to 6:00pm

2nd August 2021

Dear Resident

We are writing to inform you that Lloyd Group have been appointed as Head Contractor for the Upper Australia Early Works project that will be commencing work on site at Taronga Zoo in Early August 2021. We are proud to have been selected for this project and look forward to contributing to this significant community project.

The works include the demolition and civil works for the Upper Australia Precinct at the Taronga Zoo. Whilst we will be working to minimise impacts to the local neighbourhood as a local resident from time to time there may be some disruption to traffic and noise around the site.

There are Development Consent Conditions and Government guidelines for how Lloyd Group must operate on site at Taronga. These can be found at https://www.planningportal.nsw.gov.au/major-projects/project/32596. As part of these works, we as the Head Contractor will work to minimise the impacts and disruption to you during construction.

For the duration of the works, we will continue to monitor and control the noise levels by using noise barriers for static equipment to monitor and control noise. We will be providing shade cloth to the perimeter of the site and conducting works within the approved construction hours described above to mitigate disruption to the local community. We have developed a traffic management plan which will strictly control the movement of trucks to minimise the impact on the local community.

Based on the acoustic report by Marshall Day Acoustics, entitled Upper Australia Habitat - SSDA Acoustic Assessment dated 15/06/2020 the applicable construction noise criteria are:
- LAeq,15 min (daytime) ≤ 43 dB, for residential premises near Site Location 1 and
- LAeq,15 min (daytime) ≤ 55 dB, for residential premises near Site Location 2

As per NSW Government Regulations for Covid-19, Lloyd Group will ensure that the strict guidelines are adhered to at all times inside and around our site for the safety of our workers and general public. Contractors from the Locked down LGAs will not be attending site, daily updates will be provided to Taronga showcasing who will be coming to site the following day including the LGA they live in and where they have travelled to in the past 7 days. Social distancing will be adhered to on site and all contractors are to wear masks while working. There will also be a Service NSW QR code that will be signed into daily. Amendments and updates will continue as new information/updates in health advice come from NSW Health.

I invite you as a local resident to provide feedback to Lloyd Group to ensure we engage and fulfill our responsibilities while working in your local area.

This can be done by contacting myself Joseph Elley, Lloyds Project Manager.

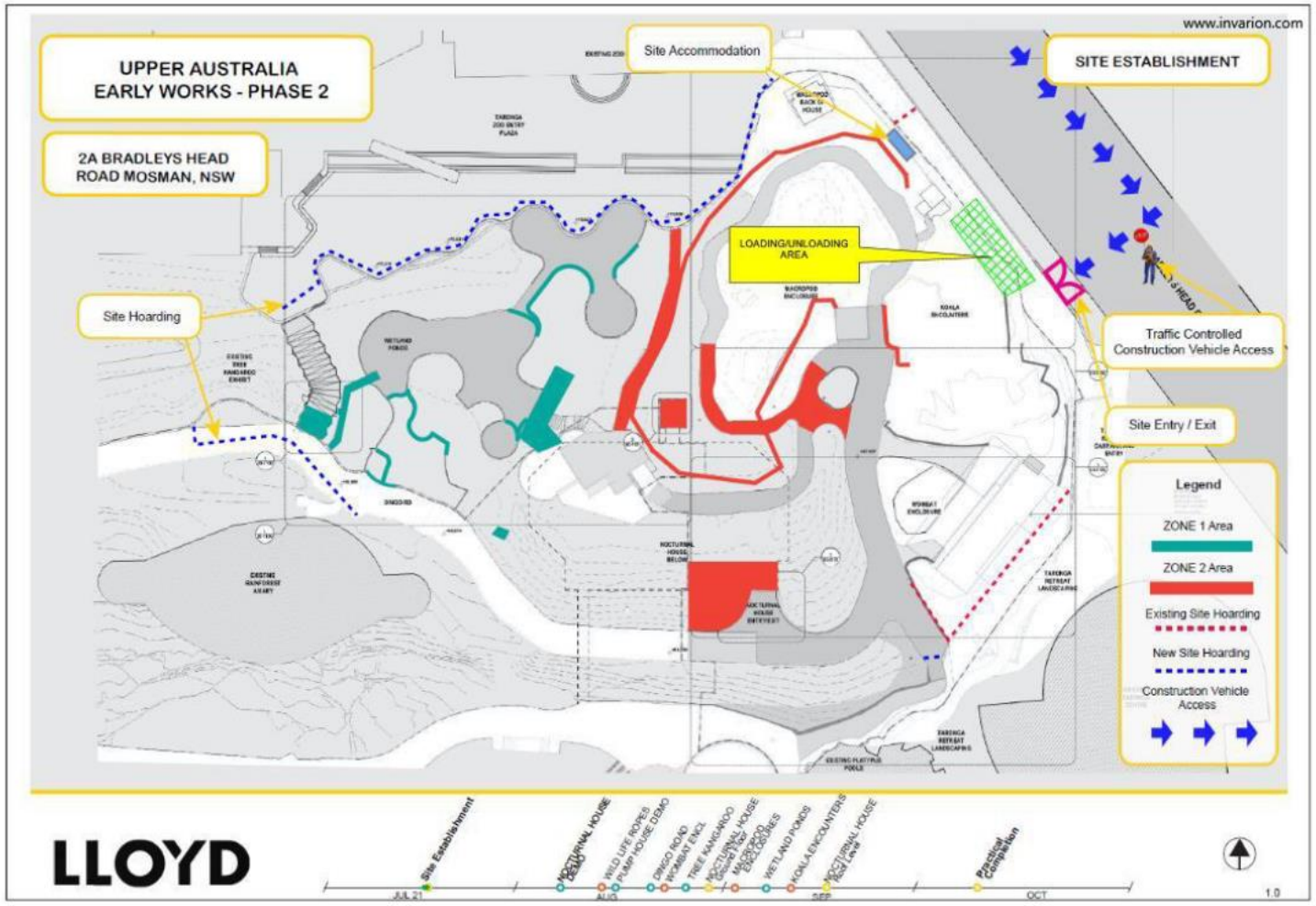
Regards,

JOSEPH ELLEY
PROJECT MANAGER
A: 14 Harvey Street, Pyrmont, Sydney, NSW 2009
P: (02) 8565 6777
E: Joseph.Elley@lloydgroup.com.au

7.36. Emergency Services Notification

Emergency Services will be informed in a timely manner of relevant activities proposed within this CTPMSP that affect the use of the roadway. It is noted that it is a condition of the Mosman Council Construction Regulation Unit that emergency services be notified prior to obtaining Mobile Hoisting, Temporary Works, Road Opening or Road Closure permit from the Construction Regulation Unit.

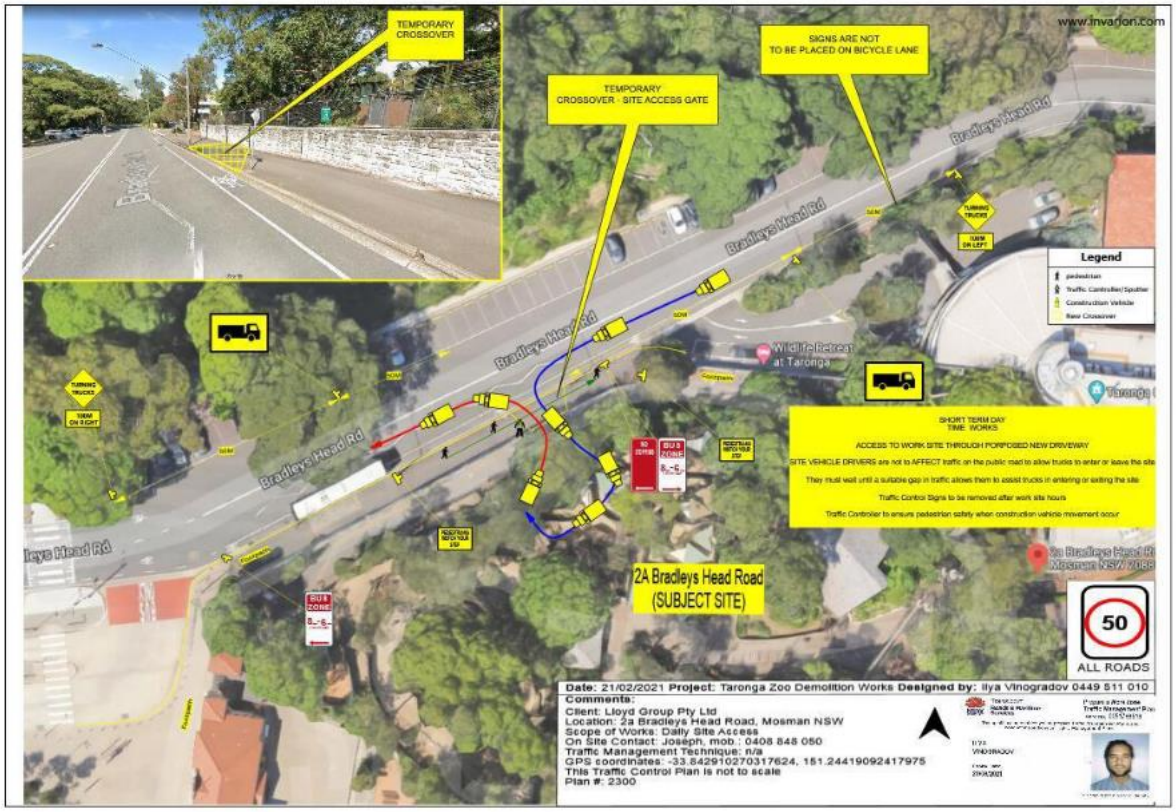
APPENDIX A
Site Traffic Management Plan/Site Layout – Figure 8



Vehicle Movement Plan for Construction Vehicles – Figure 9

APPENDIX B

TRAFFIC CONTROL PLANS - TCP #2300 – DAILY SITE ACCESS ON BRADLEYS HEAD ROAD



APPENDIX C

SWEPT PATH ANALYSIS – CONSTRUCTION VEHICLE U-TURN AT TARONGA ZOO WHARF TURNING CIRCLE

SWEPT PATH ANALYSIS – CONSTRUCTION VEHICLE ACCESSING AND EGRESSING CONSTRUCTION SITE AT BRADLEYS HEAD ROAD

8. Construction Waste & Other Impacts Management

8.1. Overview: Waste Management Generally

Lloyd Group is committed to reducing the amount of waste generated onsite and uses the EPA wastes hierarchy to achieve this aim. The wastes hierarchy is an order of preference and states that waste should be managed in accordance with the hierarchy, with avoidance being the most preferred option and disposal being the least.

- No littering of the Project Site will be tolerated.
- Brief all employees on waste minimisation, management, and disposal prior to works proceeding as part of the Site Induction.
- Brief all suppliers on waste minimisation, management, and disposal of packaging. Where possible suppliers to provide products free of packaging.
- Provide appropriate waste storage containers with secure lids to prevent fauna access.
- Construction waste such as concrete, steel, brick rubble and wood is to be separated for recycling.
- Putrescible waste to be regularly disposed of to landfill.
- Cigarette butts are to be disposed of in bins appropriately.
- Residues and containers to be stored in designated areas protected from stormwater drains.
- Chemical residues, packaging, and used containers are to be disposed of in accordance with the relevant SDS.
- Portable toilets are to be emptied regularly and waste disposed off site by a licensed Contractor in accordance with local Council and EPA requirements.
- Contaminated materials (e.g. soil contaminated with oils) to be appropriately stored and contained on site and disposed or relocated at the direction of the Environmental Delegate. NB: such material may require laboratory testing prior to determining where it can be disposed.
- Spent absorbent materials will be bagged and stored in a suitable storage container labelled accordingly. Full containers will be removed by a licensed contractor to a licensed landfill.
- Stormwater collected in bunds is to be visually inspected for contamination (i.e. a sheen) prior to release onto a hardstand area away from stormwater pits.
- No on-site dumping and burning is permitted.
- All vehicles carrying loads of dry soil, rock, concrete or vegetation will be loaded to a level and then appropriately covered such that spillage and dust dispersal during travel is minimised.
- Upon removal of site facilities, areas are to be left clean and tidy.
- Debris & sediment collected behind sediment controls is to be re-used where possible (e.g. rehabilitation works) or disposed of to a designated spoil site.

8.2. Contaminated Waste Management

All materials generated on site during either demolition or excavations are to be fully evaluated for potential contamination. This process is to be scheduled with the Project Manager and/or Site Manager on an as needs basis.

Should contaminated wastes be evident (e.g. asbestos, hydrocarbons, etc.), the client will be advised so that arrangements can be made for the engagement of appropriately qualified specialists in hazardous materials handling.

Any contaminated waste will be managed in accordance with the Site WHS Plan requirements.

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

Disposal of prescribed waste/contaminated materials, including contaminated spoil shall be under the following controls:

- Use of licensed prescribed waste contractors and vehicles;
- Advising waste contractors of waste composition and any special hazards associated with the waste;
- Retention of waste transport certificates.

8.2.1. Asbestos

If asbestos is identified on this site a qualified hygienist may be engaged to provide advice on the management procedures required to effectively manage asbestos onsite. The client will be asked to provide a report showing all known locations for existing asbestos within the site boundary. The following controls will be implemented:

- Areas already identified as containing asbestos will be identifiable on site via appropriate signage. All employees working on site will be briefed of the presence of asbestos in these areas via a toolbox meeting and/or in the site induction.
- Where required an Asbestos Management Plan may be developed as a subsidiary document to this Environmental Management Plan.
- Any grey fibrous cement materials observed on site, and not previously identified as an asbestos contaminated area, must be treated as asbestos-cement materials, or sampled for asbestos fibres.
- Any pipe or other lagging or insulation identified on site that cannot be positively identified as synthetic mineral fibre (SMF) material, polystyrene foam or brown hessian organic fabric should be treated as asbestos lagging.
- If asbestos is suspected of being found during construction activities, works in the immediate vicinity are to cease immediately. Works are not to recommence in that area until confirmation by the way of a hygienist report that has confirmed the type of material. The department will also be notified immediately.

8.3. Waste Water/Washout Areas

Washout processes and facilities for paint and/or finishing trades are to be minimised and water recycling for these activities are encouraged where possible. Finishing trades washout facilities should **NOT** be plumbed to any building services and will be of a stand-alone nature. The maintenance of these facilities should be the subcontractor's responsibility and should comply with all appropriate Environmental Legislation and local authority guidelines.

8.4. Packaging

All suppliers of building materials will be encouraged to nominate packaging minimisation and reuse initiatives, which have been implemented, as part of product supply to the project. Bulk handling and reusable transport containers will be encouraged. Methods can include:

Original Packaging	Recyclable Packaging
Shrink wrapping	Metal strapping
Plastic packaging	Paper packaging
Foam packaging	Shredded paper

8.5. Recycled Materials

Suppliers will be encouraged to nominate products that include a recycled component (e.g. using concrete with recycled aggregate) and ability/opportunity for recycling of unused components in accordance with the specified 80% waste reduction target. aspect and Impact Register

At the start of each project a Project Safety & Environmental Risk Assessment is completed. It includes environmental aspects and impacts.

8.6. Contaminated Material Disposal

In accordance with the Upper Australia Precinct Development Consent, prior to the commencement of the removal of any waste material from the site, Lloyd Group will notify the TfNSW Traffic Management Centre of the truck route(s) to be followed by trucks transporting waste material from the site.

- Fuelling, maintenance and cleaning of vehicles and construction plant will not be carried out in areas from which fuel or oil may be discharged to street gutters or storm water drainage systems. The location of such activities needs to be fully considered so as to minimise the potential for spillage into sensitive receptors.
- Storage of fuel, oils, chemicals on site will be held to an absolute minimum. No such materials shall be stored on site without the permission of the Site Manager. The location of these shall be well clear of trafficable areas in case of collision. A spill kit will be kept in close proximity.
- Where practical impervious bunds (or a similar retention system) may be constructed around all fuel or oil storage areas to ensure retention of not less the 110 per cent of the capacity of the largest tank in each bund. Drums and tanks containing oil or other pollutants will be stored within impervious bunds. Suitable barriers shall be erected along bund walls to prevent elevated storage tanks and drums stored more than 2 drum heights, from falling outside of bunded areas. Adequate absorption materials shall be readily available to collect and recover any liquid spillages.
- Dry methods of spillage clean-up will be used wherever possible. Bunded fuel areas will not be fitted with valves or drains but shall be graded to pump out sump. Oil contaminated storm water and/or soil will be disposed of to a licensed disposal site where relevant.
- Fuelling construction plant will not be carried out without an operator or driver being in attendance at all times. Road going vehicles will not be fuelled on site.

- All spillage on to sealed areas will be cleaned up as quickly as practical and placed into suitable receptacles for reclamation or disposal in a manner that does not cause pollution of the environment.

8.7. Hazardous Materials (Fuels & Chemicals) Transport, Storage & Handling

- The storage and handling of fuels and chemicals will comply with all relevant legislation
- SDS's will be obtained when purchasing chemicals and will be available to all personal on-site for all chemicals stored and handled.
- Contaminated soils that are Prescribed Industrial Wastes (PIW) must be transported by appropriately permitted trucks with a relevant Waste Transport Certificate, or local authority equivalent, completed for each load, and disposed of at a suitably licensed site in accordance with the local Environmental Regulatory Authority.
- Minimal volumes of fuels and chemicals will be stored onsite. If required to be stored in the work area, liquid chemicals will be bunded to 110% of the total volume stored.
- Batteries are to be located in clearly defined areas. Batteries are to be sealed units to prevent acid spills (where possible). Batteries are to be charged in well ventilated areas.
- Spill response equipment will be located at various locations around the site during the construction and must be carried in all fuel transport vehicles/trailers.
- Inspection of fuel and chemical storage areas are to be undertaken daily.
- Drivers of fuel and chemical transport vehicles to the sites will be trained in the procedures for emergency response for spills.
- Persons handling chemicals will be provided with appropriate training and personal protective equipment. The operator must be present during re-fuelling operation.
- Vehicles carrying fuel for the purpose of refuelling other vehicles shall be clearly identifiable, have the fuel stored in approved containers and have a hydrocarbon spill kit on board.
- Re-fuelling areas will not be within 100m of any natural drainage line and will be within bunded areas (where possible).
- Products to be stored in designated areas only such that soil/water is not contaminated (e.g. cement products to be stored in weather proof area).
- Flammables are to be stored in approved storage areas and placarded appropriately.
- All drums/containers for use must be adequately labelled and made of appropriate material.
- Fire extinguishers to be available at storage areas where flammables are stored.
- In the event of a spill, a spill kit will be used to clean up immediately. If this is not possible the relevant authorities will be contacted.

8.8. Site Facilities Management

- Sediment control will be implemented in temporary laydown areas as required.
- All areas of the site are to be left neat and tidy, uncluttered with debris, random construction materials, plant and equipment etc.
- Vehicle, plant, and equipment laydown areas are to be established within designated areas only.
- Office, workshop and storage areas are to be maintained at regular intervals.

- Dust suppression by water sprays to be undertaken in site facility areas (as required). Where possible dewatering water or recycled water will be utilised as dust suppression.
- Fuel and chemical storage areas managed and maintained.
- Products to be stored such that soil / water are not contaminated (e.g. fuel and chemical storage and cement products to be protected from weather).
- No trapping of animals is to occur.

8.9. Noxious Weeds Management

- Mitigation measures will be implemented to prevent the spread of listed noxious weeds both on and off site.
- Vehicles and plant will be isolated from heavily affected areas if the area is not within the construction footprint in the form of fencing/barricading that will be affixed with signage.
- Fencing/barricading and signage will be inspected as part of the environmental Inspection to ensure appropriate segregation is maintained.
- Vehicles/plant to stick to designated crushed rock haul roads.
- Topsoil on site will not be transported offsite without being treated first.
- Plant/machinery will be inspected prior to entering and exiting site to ensure weed seeds are not being transported on or off site.

9. Construction Soil and Water Management Plan

9.1. Overview

Soil and water management controls are to be effectively maintained at all times during the course of construction of all stages of the project and are not to be removed until each stage is satisfactorily completed as per Narla Biodiversity Assessment Report, June 2021. The following overarching objectives apply to the prevention of erosion and sediment run-off from the project site:

- To ensure that the water quality of the downstream environment is not worsened by the site development.
- Minimise sediment transport in surface water runoff. In this regard it is proposed to install storm water drains and sediment basins in and around the project site.
- Adequate provisions to be made to collect and discharge stormwater as required by Upper Australia Precinct Development Consent.
- There must be no increase in stormwater runoff from the site to downstream properties Upper Australia Precinct Development Consent.
- All earthworks, drainage and erosion and sediment controls must be undertaken in accordance with the engineering drawings and technical notes prepared by project engineers accompanying the early works tender package.

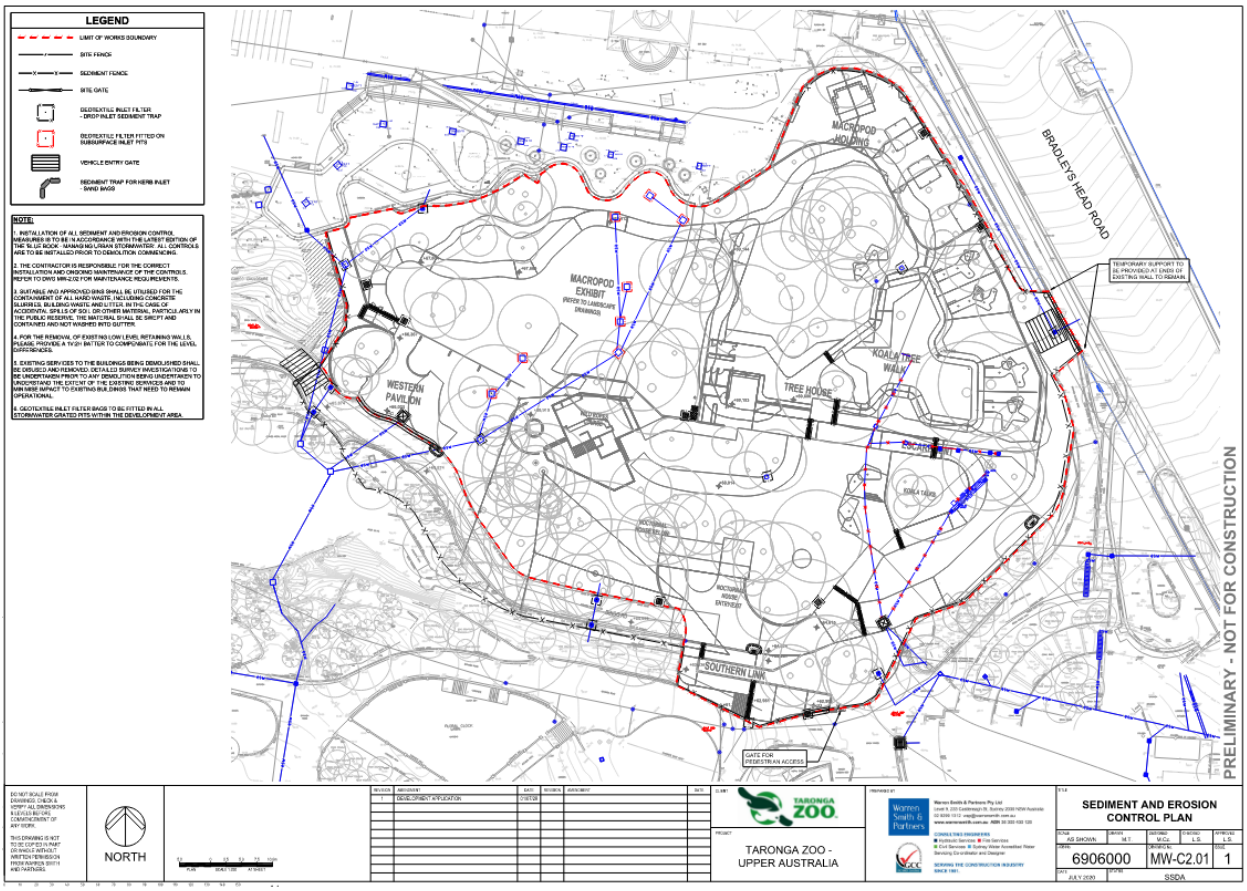


FIGURE 10.2: Early Works Rehabilitation Areas

9.2. Soil Management Generally

At all stages of the works are to comply with the Warren Smith and Partners Civil documents control plans for the early works program and the Narla Biodiversity Assessment Report, June 2021.

During excavation works the following controls will be implemented:

- Excavated spoil will be stockpiled in 2m high mounds and covered or grass seeded to minimised dust generation.
- Stockpiles will be located away from hazards such as areas of concentrated flow, waterways, channels, gutters, drains, and steep slopes. Spoil will not be placed where it is likely to fall or wash into roads, gutters or drains.
- Topsoil will be stockpiled separately from general excavated material so that it may be used when rehabilitating the site.
- Any soil to be excavated and disposed offsite, that is known to be contaminated, will be done so in accordance with relevant Environmental Authority Guidelines.
- Contaminated soils must be transported by appropriately permitted trucks where relevant, with a Waste Transport Certificate (Australia only) completed for each load, and disposed of at a suitably licensed site in accordance with the relevant Environmental legislation.
- The number and size of soil stockpiles will be minimised. Stockpiling areas are to be placed away from any areas of native vegetation that is proposed to be retained.
- Soil stockpiles will not impede natural or constructed surface drainage channels or access tracks and will be confined to designated areas within the construction corridor and will be appropriately separated based on soil layers and contamination status.
- Soil stockpiles to be monitored and environmental controls installed as appropriate;
- Every attempt will be made to re-establish vegetation as soon as practicable after reinstatement earthworks to stabilise exposed soils. Erosion and sediment control structures will be retained during reinstatement until vegetation is established.
- Any vegetation clearing or wetland dewatering works should be conducted under the supervision of a suitably qualified person such as an Ecologist or Zoo Keeper, to safely relocate any fauna that may be present
- Excavation within identified acid sulphate soil areas will be avoided in the first instance. If avoidance is not possible or an unexpected encounter occurs work will be temporarily postponed in the area until management measures can be implemented.
- Any soil to be disposed off-site (regardless of whether it is contaminated or otherwise) will be classified according to Environmental Regulator Guidelines and consigned to the appropriately licensed facility.
- If asbestos fragments are identified within excavated soil a qualified removalist will be engaged to remove the asbestos or the soil will be transported offsite.

9.3. Road Maintenance

- Road cleaners will be engaged to clean roads as required.
- Cattle grates are to be installed where required.

- Wheel wash facilities may also be implemented where required.

9.4. Storm Flows

Storm flow calculations and details are contained in Drawings, prepared by consulting engineers Warren Smith and Partners. The calculations have been based on an assessment of storm flows and sediment basin capacities for the catchments illustrated in accompanying.

Assessment will be made of the site area ground water catchments. Temporary dish drains may be established to direct water runoff. The drains will have straw bales and gravel to retain silt at intermittent points.

At any discharge point to the site stormwater system the pit lids are to be covered with shade cloth, filter fabric or silt socks.

The downhill sides of the site fence may have shade cloth filter fabric to a height of 300mm if the directional flow of water travels through the fence enclosure.

The new stormwater system will be installed and commissioned as early as possible to minimise the period of uncontrolled roof and road water. The fence and drainage controls will be maintained on a regular basis to ensure effectiveness.

During wet weather events plant activity will be slowed on site, care to wash down vehicles prior to exiting site will take place, any mud on the road will be cleaned regularly as well as street sweeping after the event to ensure roads remain clean of debris.

During a flood event all plant activities on site would stop, leading up to the event all sediment controls would be reviewed and reinforced where possible including temporary sand bagging over site entry to maintain where possible full barrier from inside the site to the outside.

All stormwater works are to be completed with the advice from the Narla Biodiversity Assessment Report, June 2021.

10. Environment Management Framework

The following section outlines the framework that will be used by Organisation to manage, document, and report on environmental issues at the site. Lloyd Group will provide the Council and the Department a 24-hour telephone number to be operated for the duration of the construction works.

10.1. Subcontractor Management

Sub-contractors are required to comply with the provisions of the Environmental Management Plan at all times. This will be documented by each sub-contractor or the nominated site representative for each organisation by the Site Induction Form which forms part of the HSEQ compliance system. Sub-contractor's environmental performance obligations shall be incorporated into sub-contractor's contract for works to be undertaken at the site.

10.2. Monitoring and Inspections

Monitoring and inspection of the site will be carried out by means of weekly site meetings and site safety and environmental walk. These measures will be used to identify areas of non-conformance and / or opportunities for improvement. Monitoring and / or inspections required on a more frequent basis by the Environmental Management Plan will be conducted as required and reviewed in the weekly site meeting.

10.3. Non-conformances

Non-conformance to the environmental procedures identified at the site must be addressed as soon as is practical. The member of staff and/or sub-contractor responsible for the non-conformance must be notified immediately and provided with guidance on the method of rectification of the problem, where practicable.

The non-conformance must be documented as outlined in the relevant company procedure.

10.4. Environmental Measuring and Test Equipment

Measuring and test equipment used on site to monitor the environment is to be appropriately identified, calibrated, maintained and stored. Such equipment includes, but is not limited to:

- Air monitoring equipment;
- Noise monitoring equipment;

Records of current calibration for such equipment are to be provided by the service provider prior to use on site. Equipment found to be out of calibration will be removed from service until recalibrated.

Items used for indicative purposes only (e.g. applications on smartphones) will not be calibrated. These items may be used to identify the need for formal monitoring or the introduction of specific controls.

Workers using measuring and test equipment used for monitoring the environment will be trained in its use.

10.5. Community Relations and Emergency Site Contacts

Where complaints are made by the community or other third parties directly to Organisation or sub-contractors directly under its control, these will be forwarded to the Project Manager, Site Manager and/or HSEQ Manager. The complaint will be recorded on HammerTech.

NAME	POSITION	EMAIL	PHONE
Joseph Elley	Project Manager	Joseph.Elley@lloydgroup.com.au	0408 848 050
	Site Manager		

10.6. Training

All personnel working on the site during the construction activities will receive a site induction to explain the relevant environmental and safety hazards, environmental and safety protocols, sensitivities and emergency procedures for the site. The content of the induction program will be specific to the project and endorsed by the Organisation Site Manager responsible for the site and will be presented by the Site Manager or a delegated representative.

Each subcontractor is responsible for providing their employees with the relevant training and supervision so they have the necessary competency and skills to undertake their responsibilities.

10.7. Environmental Complaints

Any environmental complaints that are received are logged in the Site Manager's Diary. All complaints are investigated and consultation with the complainant will occur. The resolution of the complaint is documented and communicated back to the complainant. Full co-operation is given to any Regulatory Authorities that may be involved in investigating a complaint by an external party.

10.8. Tendering

During the contract tendering phase the project environmental requirements will be addressed and noted within the Tender Interview document which forms part of the Purchase Order engaging the Subcontractor. This includes, as appropriate, information about potential significant environmental impacts associated with the transportation or delivery, use, end-of-life treatment and final disposal of products and services.

The contract documentation issued to the Tenderer will include all relevant parts of the Project Contract Documents, including relevant sections of Preliminaries and General Requirements.

10.9. Environmental Emergency Management

An environmental incident may include a spillage or major leak, failure of a pollution control device such as a bund, major settlement, collapse of a bank or embankment, impact to water quality, fire and/or impact to soil quality.

In an emergency all works will cease and the approved Emergency Response Plan will be activated.

ENVIRONMENTAL MANAGEMENT PLAN

Refer: Emergency Management Plan

The HSEQ Manager is responsible for reviewing changes and instructing the relevant Organisation representative as to the document updates required. Relevant changes will then be communicated across the organisation.

Information regarding updates to legal and other requirements will be gathered from the following sources:

- Regulatory Authority Alerts;
- Master Builders Association (membership).
- Environmental Protection Agency

Relevant information will also be reviewed on the following web sites:

10.10. Access to Legislation

Workers on site have access to relevant Health and Safety Acts, Regulations, Australian Standards, Codes of Practice and other documentation relevant to health and safety. This is communicated to each worker at the time of induction.

11. Appendix A – Risk Register

Lloyd NSW Risk Register

LLOYD
MELBOURNE | SYDNEY | BRISBANE

Project Name	Taronga Zoo Upper Australia Habitat Early Works
Project #	1456
Project Manager	Joseph Elley
Client	Taronga Conservation Society Australia
Revision Number	1
Revision Date	19/07/2021

Note 1. Safety & Health risk scores of HIGH or above must complete this additional SFAIRP assessment;
Note 2: Significant Environmental Hazards scored HIGH or above, must complete this additional assessment;
Note 3: No activity can be undertaken where a SFAIRP risk score of:
- EXTREME (19 - 25) is recorded: DO NOT PROCEED a safer way must be found;
- HIGH (15-18) is recorded: risk is unacceptable- controls must be implemented
- MEDIUM (7-14) is recorded: risk is undesirable. SWMS must be produced
- LOW (8 - 11) is recorded: risk considered acceptable. SWMS to be produced

Most to Least Effective Controls →

				Uncontrolled Risk Assessment					Hierarchy of Controls										Residual Risk Assessment								
Trade Reference	**Activity (chronological order)**	**Hazard Aspect/Source**	**Risk/Impact**	**Likelihood**	**Consequence**	**Risk Rating**	**Company Controls (These are applied across all projects as per Lloyd Procedures)** **1. Management System Controls.** ***PPE IS A MANDATORY CONTROL FOR ALL WORK ACTIVITIES ON SITE*** **2. All training requirements.**	**Project Specific Controls** ***PPE IS A MANDATORY CONTROL FOR ALL WORK ACTIVITIES ON SITE***	Elimination	Substitution	Isolation	Engineering	Administrative	PPE	**Is an acceptable Control Measure utilised**	**Is this High Risk Construction Work**	**Is a SWMS document required.**	**Is a permit required for these works**	**Likelihood**	**Consequence**	**Risk Rating**	**Further Action Required**	**Control Owner**	**Controls Implemented Type/frequency**	**Risk Status Open/Closed**	**Comments Notes/Instructions**	**Statutory Reference**
LLOYD	Planning high risk activities	Planning and coordination of high risk activities.	Unplanned and uncoordinated work poses a risk to workers and the public.	Possible	Catastrophic	E-22	**1.** a) SWMS to be developed and approved by the site manager/supervisor prior to commencing work on site. b) SWMS to be included in all coordination meetings - Coordination plan and SWMS to form the core of work scheduling and management. **2.** N/A	1. CRAW Workshops to be undertaken with all stakeholders to identify risks and discuss controls. 2. Key stakeholder to attend coordination meetings. 3. Minutes of meetings to be distributed before work activities commence.	✓	✓	✓	✓	✓	✓	Yes	Yes	Yes	No	Unlikely	Moderate	M-9		Site Manager		Open		Clause 299-303 of the Work Health & Safety Regulation 2017 [NSW] Construction Work - Code of Practice
LLOYD	Emergency management.	Workers not aware of emergency processes.	Emergency events not adequately managed	Unlikely	Catastrophic	E-22	**1.** a) Site Emergency Management Plan to be developed. b) Emergency procedures shall be communicated to all subcontractors and employees at Inductions, advising of location of fire extinguisher, first aid kit, spill kits and who is the first aider on site. c) Emergency Evacuation Procedure shall be displayed d) List of emergency contacts (including phone numbers) to be displayed e) Spill containment & fire fighting equipment must be available. f) Incident notification & investigation procedures apply. **2.** Emergency drills undertaken at the indicated frequency. Site Supervisors and other identified personnel to have Emergency Response Training First Aid Training for appropriate personnel.	1. Site Specific Emergency Plan to be developed 2. Site Manager to have First Aid Training	✓	✓	✓	✓	✓	✓	Yes	Yes	Yes	No	Unlikely	Moderate	M-9		Site Manager		Open		Clause 43 of the Work Health & Safety Regulation 2017 [NSW] Construction Work - Code of Practice First Aid in the Workplace - Code of Practice Managing the Work Environment and Facilities - Code of Practice
LLOYD	Emergency planning & response	Lack of Communication. Not knowing contact details of emergency service personnel. Unaware of evacuation procedure	Unprepared for emergencies	Unlikely	Catastrophic	E-22	**1.** a) Site Emergency Management Plan to be developed. Provide Site Layout with Assembly points and map to nearest medical centre. b) Provide list of emergency contacts (including phone numbers) c) Spill containment & fire fighting equipment must be available. d) Incident notification & investigation procedures apply. e) Lloyd Group is to consult at the earliest conveinence with Wilkins Public School for all emergency drills, emregency situtaions that may occur on site to aviod any confusion within the school. **2.** Emergency drills undertaken at the indicated frequency. Site Supervisors and other identified personnel to have Emergency Response Training First Aid Training for appropriate personnel.	1. Site Specific Emergency Plan to be developed 2. Site Manager to have First Aid Training	✓	✓	✓	✓	✓	✓	Yes	Yes	Yes	No	Unlikely	Moderate	M-9		Site Manager		Open		Clause 43 of the Work Health & Safety Regulation 2017 [NSW] Construction Work - Code of Practice First Aid in the Workplace - Code of Practice Managing the Work Environment and Facilities - Code of Practice
LLOYD	First Aid	No first aider available whilst work is undertaken on site. First aid equipment and facilities not suitable to the type of works being undertaken.	Inadequate first aid personnel / facilities and equipment for the project	Likely	Major	E-21	**1.** a) A First Aider must be on site when works are being undertaken. b) First aider names to be posted in various locations with contact details. c) Standard type first aid kit required, suitable to the following types of injuries: Cuts and scratches; Bruises and sprain type injuries; foreign objects in eyes, dust, dirt, etc; insect bites, snake bites, minor burns (Construction Industry Standard). d Burns and Eye modules required if hot works are to be undertaken. **2.** Site Supervisors are to be first aid trained. At least 1 first aider for every 25 personnel working on site	1. Site Manager to have First Aid Training					✓		Yes	Yes	No	No	Likely	Minor	M-12		Site Manager		Open		Clause 42 of the Work Health & Safety Regulation 2017 [NSW] First Aid in the Workplace Code of Practice Managing the Work Environment & Faciities Code of Practice
LLOYD	Establishment of construction site boundaries.	Unauthorised entry onto the construction site. Entry onto site without the correct PPE	Members of the public entering work areas. Subcontractors, clients, delivery personnel entering the site with inadequate PPE.	Likely	Major	E-21	**1.** a) Site is to be completely barricaded with temporary perimeter fencing and hoarding, ensure there are no gaps or opening in the fence. b) Danger' Do Not Enter' signs are to be placed at the established site entry and around the perimeter fence approx. 30m apart. c) Establish sign at entry indicating that all personnel are to go to the site office prior to entering the work areas d. Establish signs at the entry point indicating the mandatory personal Protective Equipment e) Sit fencing is to be installed througout the project to prevent any run off exiting the site. f) There is to be a maximum of 150mm gap between the ground and the bottom of all hoardings, if the gap is greater than 150mm, it must be closed by plywood or an addition of extra lower fence infill panels. **2.** N/A				✓		✓		Yes	Yes	Yes	No	Rare	Moderate	L-6		Site Manager		Open		Managing the Work Environment and Facilities Code of Practice
LLOYD	Site Fencing & Gate Security - Unwanted Ingress	Unauthorised access to the work site by children (School Pupils) Unwanted events from contact between workers and children / the public. Unauthorised access by persons or vehicles	Harm or injury to children or the public due to entering site without authorisation resulting in injury e.g. Injury from mobile plant Injury from falls etc	Likely	Major	E-21	**1.** a) Site Fencing to be installed around the construction zone. b) Site set up with secure protection including access restrictions and warning signage c) Establish sign at entry indicating that all personnel are to go to the site office prior to entering the work areas d) Establish signs at the entry point indicating the mandatory personal Protective Equipment. **2.**	1. Temporary fencing and timber hoarding around work site with adequate signage to ensure the worksite is secured with warning. 2. Plywood hoarding at 2.4 metres high will reduce any chance for unwanted site entries; as well as lockable gates 3. Separate personnel gate to be installed. Gates to be fitted with latches & springs 4. Requirement to shut gates is to be included in the Induction. 5. Regular checks to ensure the ongoing integrity of site fencing. 6. Procedure for notification of the school should a child get in. a. Worker to immediately notify the Site Manager. b. All works to be stopped c. Site Manager to call the Emergency School contact number provided (Ross Angus, PWPS school principal - 0428 952 061) d. School representative is to arrange to have the child removed. e. Work not to resume until after the child has been removed. f. Site manager to file an incident report, determine the method of ingress and implement corrective actions. 7. Ensure keys are removed from all items of plant / machinery at the end of the shift to prevent unauthorised operation 8. Ensure all pits are covered and signage is in place. 9. Ensure barriers are placed around excavations with danger signage in place 10. Ensure caps are placed on all exposed reo 11. Ensure hazardous chemicals are locked away 12. Ensure power tools are locked away 13. Place signage on scaffolding warning of unauthorised access 14. Lloyd Group must ensure that the gate to site are locked at all times to prevent any unauthroised access to site, in particualar school children.			✓		✓		Yes	Yes	Yes	No	Rare	Moderate	L-6		Site Manager		Open		Managing the Work Environment and Facilities Code of Practice
ALL	Working outdoors	Exposure to ultra violet light/ heat conditions	Skin disease/cancer, heat exhaustion/stroke, dehydration	Likely	Moderate	H-17	**1.** a) Wear sunscreen min. SPF 50+ and re-apply maximum every 2 hours. b) Wear broad brimmed (8-10cm) hat or flap to hard hat (close-weave fabric of UPF 50+). c) Wear sunglasses complying with AS1067. d) Regular breaks to be taken to allow for water intake and shade **2.** Display information regarding dehydration and sun protection Conduct toolbox talks with regard to working safely in the heat	1. Use of appropriate PPE as per SDS and SWMS. 2. Ensure plenty of water is available at all times. 3. Assess weather conditions prior to commencement of works and only work outdoors and on the roof when safe. 4. Provide covered/ air-conditioned area for break times			✓		✓	✓	Yes	No	No	No	Unlikely	Minor	L-5		Site Manager		Open		Clause 41 of the Work Health & Safety Regulation 2017 [NSW] Managing the Work Environment and Facilities - Code of Practice

LLOYD	Traffic management access, egress and onsite.	Traffic management during construction activities Work related noise including pumps, agi trucks etc. Vehicle emissions / odour generated	Injuries to general public/pedestrians/ traffic whilst delivering product to site and during construction activities. Neighbour complaints	Possible	Catastrophic	E-22	1. a) Ensure that a detailed Traffic Management Plan for the Project has been implemented highlighting appropriate separation between the general public and vehicles entering and exiting the site b) Appropriate signs, Barricading and Stop Go Signs are to be in place as per the traffic management plan c) Ensure speed limit signage (max 10km) is installed across site d) Comply with council permitted hours of work. Where no controls are in place, for work in the metropolitan area, comply with the State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) by: • meeting the noise limits prescribed by regulation, or if this is not feasible, by, • implementing an EPA-approved environmental improvement plan (prepared in accordance with Clause 17B of the Policy, which includes community involvement). e) As per the CC requirements, a detailed Traffic Management Plan must be developed and signed off by an authorised 3rd party. This TMP is to be followed at all times. 2. Ensure only competent and ticketed traffic controllers are used	1. Temporary Fencing surrounding a high risk areas. 2. Traffic Controllers on site when needed to assist in Student and Employee movements, as well as site deliveries. 3. Traffic management plans to be discussed as part of the induction of subcontractors and periodically at toolbox meetings. 4. Vehicle movements to occur before and after school. Any vehicle movements during school need to be minor deliveries. Avoid deliveries during break times 5. Spotters required for all vehicle movements, and with this job at all times. 6. Slowing down truck movements 7. Clear communication with school and neighbourhood regarding deliveries 8. Drop off/ pick up points for parents – clearly marked out, communicated and implemented by all parties 9. Allocated delivery drop off and pick up zones 10. An internal TMP must be developed to mitigate the risk of vehicle movement and workers. Lloyd Group must delinate clear access for workers to enable them to move around the site safely at all times.			✓		✓		Yes	Yes	Yes	No	Unlikely	Major	M-14		Site Manager		Open	Clause S6-59 of the Work Health & Safety Regulation 2017 [NSW] Traffic Management Guide for Construction Work
ALL	Use of Tools and Equipment for General Tasks.	Workers using tools.	Noise, eye injuries, dust inhalation, electric shock, electrocution	Unlikely	Catastrophic	E-19	1. a) All electrical equipment to have a current test and tag b) All tools and equipment must be in good serviceable condition. Damaged equipment will not be allowed on site c) Guards must be fitted, and not tampered with. d) Equipment must be plugged into a RCD protected outlet. e) Where necessary; workers must be trained in the correct use of the tools and equipment f) Correct use of appropriate eye, hearing and respiratory protection as per the contractors SWMS. g) Electrical leads must be suspended off the floor on cable stands / hooks	1. Weekly safety walks to be completed to capture testing and tagging. If there is no tag or the tag is past its expiry date it is to be tagged 'out-of service' and removed from use until tested. 2. Consult with site workers at toolbox meeting's to remind them to check tags				✓		✓	Yes	No	No	No	Unlikely	Major	M-14		Site Manager		Open	Clause 148-165 of the Work Health & Safety Regulation 2017 [NSW] Hazardous Manual Tasks - Code of Practice Manage Electrical Risks - Code of Practice AS/NZS 3760:2010
ELECTRICAL CONTRACTOR	Providing temporary power to site	Electricity	Incorrect power supply to site results in the electrocution of workers. Disruption of power supply. Fines by the regulator.	Possible	Catastrophic	E-22	1. a) Isolation of electrical supply by qualified Grade A electrician. b) Electricity supplied via Residual Current Device that has been tested (minimum monthly) c) Electrical leads, plugs, and power tools to be tested and tagged three monthly d) Electricity tools and equipment tested and tagged in line with AS/NZS 3760: In-service safety inspection and testing e) Cables over site sheds to be minimum 500mm above shed f) Switchboards fireproofed - cable entries to be capped e) Mandatory PPE to be worn at all times. Insulated gloves and tools to be used where required f) Tradesman trained in high risk electricity work are to be on site at all times. g) Compliance Certificates (CCEW) for temp power boards required to be kept on site h) Ensure work is being carried out in accordance with the SWMS i) Site Manager is to sight and document all relevant qualification for all electrical contractors at site induction j) All electrical works is to be conducted as per the requirements of AS:3012:2020 k) An electrical works permit must be obtained from Lloyd Group prior to the commencement of any works. 2.	No work to be carried out on energised electrical equipment*, unless: 1) it is necessary in the interests of health and safety that the electrical work is carried out while the equipment is energised, or 2) it is necessary that the electrical equipment to be worked on is energised in order for the work to be carried out properly, or 3) it is necessary for the purposes of testing to ensure the equipment is de-energised, or 4) there is no reasonable alternative means of carrying out the work 5) An electrical works permit must be obtained from Lloyd Group prior to the commencement of any works. *A risk assessment is to be carried out prior to any work commencing			✓		✓	✓	Yes	Yes	Yes	Yes	Unlikely	Major	M-14	No	Site Manager		Open	Clause 148-165 of the Work Health & Safety Regulation 2017 [NSW] Managing Electrical Risks in the Workplace - Code of Practice AS/NZS 3000:2018 AS/NZS 3012:2020 AS/NZS 3760:2010
ELECTRICAL CONTRACTOR	Electrical work	Electrical equipment not tested and tagged. Unprotected power source used.	Electrocution, electric shock, burns	Unlikely	Catastrophic	E-19	1. a) Isolation of electrical supply by qualified Grade A electrician. b) Electricity supplied via Residual Current Device that has been tested (minimum monthly) c) Electrical leads, plugs, and power tools to be tested and tagged three monthly d) Electricity tools and equipment tested and tagged in line with AS/NZS 3760: In-service safety inspection and testing e) Mandatory PPE to be worn at all times. Insulated gloves and tools to be used where required f) Tradesman trained in high risk electricity work are to be on site at all times. g) Compliance Certificates for temp power boards required to be kept on site h) Site Manager is to sight and document all relevant qualification for all electrical contractors at site induction at the time of site induction. i) An electrical works permit must be obtained from Lloyd Group prior to the commencement of any works. j) All extension leads must be properly fed through the access hole in the bottom of all tempoary distribution boards on suite at all times. k) Extension leads must not per 'piggy backed'.	1. Up-to-date test and tag register to be maintained on site at all times 2. Any untagged electrical equipment to be tagged 'out-of-service' and removed from site 3. An electrical works permit must be obtained from Lloyd Group prior to the commencement of any works.			✓		✓	✓	Yes	Yes	Yes	No	Rare	Major	M-10		Site Manager		Open	Clause 148-165 of the Work Health & Safety Regulation 2017 [NSW] Managing Electrical Risks in the Workplace Code of Practice AS/NZS 3000:2018 AS/NZS 3012:2020 AS/NZS 3760:2010
ELECTRICAL CONTRACTOR	Electrical work at height	Working at heights - (Ladders)	Fall from height Falling objects	Possible	Catastrophic	E-22	1. a) Industrial type ladders complying with AS/NZS to be used on site - which are clearly labelled b) Extension or Platform Type Industrial Ladders rated at 120kg (minimum) are to be used and in a serviceable condition- no damage / defects c) A-Frame ladders are not permitted d) Ladder must be fit for purpose e) Ladders to be set up on a solid, secure, flat base f) Three Points of contact at all times g) Only tool that can easily be operated with 1 hand should be used on ladders, h) Work must be carried out facing the ladder at all times i) Do not overreach from ladders j) Do not setup ladders behind or obstructing doorways k) No more than 1 person on a ladder at any time. l) For electrical work insulated ladder are to be used m) Do not use ladders within 3 metres of an exposed edge or guardrail, where a person could fall over that edge n) Extension ladders to be placed on solid flat surface at 4 (vertical) to 1(horizontal) ratio and secured top and bottom from movement. o) The feet of the person using the ladder must never be higher than the third tread from the top plate p) Extension ladders used for access need to extend 900mm above the deck q) Mandatory PPE to be worn at all times r) Tool lanyards / belts should be worn where practical ***ALSO REFER ID: 8733 FOR ELECTRICAL RISKS AND CONTROLS ***	1. Wherever possible, an EWP, scissor lift or mobile scaffold is to be used. 2) The site supervisor is to monitor daily, the use of ladders to ensure compliance and suitability to the task. 3) Height Safety is to be a regular discussion point at toolbox meetings 4) Where necessary, establish exclusion zones around ladder to prevent people coming into contact with ladder - this also serves as a drop-zone ***ALSO REFER ID: 8733 FOR ELECTRICAL RISKS AND CONTROLS ***		✓	✓				Yes	Yes	Yes	Yes	No	Unlikely	Major	M-14		Site Manager		Open	Clause 54 of the Work Health & Safety Regulation 2017 [NSW] Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Clause 148-165 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice Managing Electrical Risks in the Workplace Code of Practice AS/NZS 1892.5:2000 AS/NZS 3000:2018 AS/NZS 3012:2020 AS/NZS 3760:2010
ELECTRICAL CONTRACTOR	Electrical work.	Working at heights - (EWP / Scissor Lift) Mobile Plant	Fall from height Suspended Worker Falling objects Contact by mobile plant	Possible	Catastrophic	E-22	1. a) Positive communication with others around you b) Establish an exclusion zone or utilise a spotter c) Fill out daily pre-start log book prior to operation d) Only operate as per the manufacturers guidelines e) Never lean over, hang off, or climb basket railing f) Harness required for EWP Operator / passenger and the harness must be legged into the site harness register. g) Check harness prior to use (harness to be tagged and free from damage / fraying) h) Heights rescue plan to be in place and all workers must have training in working at heights. 2. Only ticketed / licenced operators to operate mobile elevated working platforms: Boom lift >11m: HRWL (WP) required Boom lift<11m or scissor lift: Yellow Operator Card required	1. Ensure Heights rescue plan is incorporated ion the SWMS. All involved personnel to be briefed on rescue plan prior to commencing work			✓		✓	✓	Yes	Yes	Yes	No	Unlikely	Moderate	M-9		Site Manager		Open	Clause 54 of the Work Health & Safety Regulation 2017 [NSW] Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Clause 214-215 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice Managing Electrical Risks in the Workplace Code of Practice AS/NZS 3000:2018 AS/NZS 3012:2020 AS/NZS 3760:2010
ELECTRICAL CONTRACTOR	Roughing in cable.	Hanging cable. Coiled cable on the floor.	Eye injuries. Slip, trip and falls.	Possible	Minor	M-8	1. a) Ensure all cabling is rolled up and not hanging down at eye level b) All excess cabling on the ground is to coiled and out of walkways. c) Ensure all off-cuts, and other materials are regularly removed and clear of walkways d) Where possible, estcablish exclusion zone to barricade off trip hazards 2. Electrical work to be carried out by appropriately licenced individuals (NSW contractor licence)					✓		Yes	Yes	Yes	No	Unlikely	Minor	L-5		Site Manager		Open	Clause 148-165 of the Work Health & Safety Regulation 2017 [NSW] Managing Electrical Risks in the Workplace Code of Practice AS/NZS 3000:2018
STRUCTURAL STEEL TRADE	Oxy cutting steel	Fire explosions, burns, noxious gases	Burns. Inhalation of fume. Eye injuries.	Unlikely	Catastrophic	E-19	1. a) Flash back arrestors are to be fitted at bottle end b) Arrestors to be tested on a minimum 12 monthly basis c) Ensure Bottles adequately secured in cradle or tied off. d) Identify galvanised or lead painted materials which give off gas toxic fumes when heated (Eliminate where Possible) extraction fans may be required. e) Fire extinguisher within 30 metres and inspected within last 6 months. f) Check the area is free of combustible materials (Site Tidy). g) Hot work permit completed prior to works commencing. h). Proper use of appropriate gloves and goggles and respiratory protection if necessary. i). SDS to be provided j) establish exclusion zone / segregate work area k) Ensure that all bottles are stored correctly and there is adequte seperation of bottles whilst in storage.	1. Supervisor to ensure hot work permits are completed for all hot works. 2. No hot works permitted on total fire ban days			✓		✓	✓	Yes	Yes	Yes	Yes	Unlikely	Moderate	M-9		Site Manager		Open	Clause 392-418 of the Work Health & Safety Regulation 2017 [NSW] AS 4603-1999 AS 4839-2001

ALL	Using lasers.	Use of class 2 laser Use of class 3 laser (class 3a and above are a higher risk rating)	Retinal and other eye damage risk / irradiation	Unlikely	Moderate	M-9	1. a) Caution signage to be in place prior to the works b) Switch laser off when not in use c) Laser to be used as per manufacturers instructions d) Laser Safety Officer Laser used according to Australian Standards 2. Workers operating laser equipment must be trained in the proper use of the equipment					✓		Yes	Yes	Yes	No	Unlikely	Minor	L-5		Site Manager		Open	Clause 223 of the Work Health & Safety Regulation 2017 [NSW] AS 2397:2015
ALL	Handling materials	Sharp materials / manual handling injuries	Cuts and lacerations to workers / crush injury / contusions / sprains / strains	Likely	Moderate	M-12	1. a) Use of cut resistant gloves – equal or better than Ansell Hy-flex Dyneema11/624. b) Cover or remove sharp edges c) Long sleeve shirt and trousers d) Use of mechanical aids to remove waste materials, e.g. wheel barrow or motorised loader e) Use of correct manual handling techniques; avoid twisting, bend your knees and keep your back straight f) Do not attempt to individually lift more than 20kg. g) Team Lifts h Maintain clear walkways; Access routes cleared of trip / slip hazards i) wear gloves	1. Ensure bar caps are placed on all exposed rwo bars			✓		✓	Yes	No	No	No	Unlikely	Insignificant	L-4		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Hazardous Manual Tasks - Code of Practice
STRUCTURAL STEEL TRADE	Crane and hoist movement on site	Plant vs person interaction Suspended Loads Crane failure / rollover Contact with overhead electrical services	Public or other workers struck by plant or falling objects Risk of crush / fatality Electric shock / electrocution	Possible	Catastrophic	E-22	1. a) Documented Traffic Management Plan is to be in place (where required) b) Traffic controllers certified (if required) c) High visibility clothing for all site personnel d) Adequate separation by barricading and using relevant signage to create an exclusion zone around the work area from moving traffic, pedestrians and other workers. e) Barricade is to be put in place to protect existing buildings from damage. f) communicate with other workers the nature of the works and exclusion zones via site meeting (Especially if in a shared area) g) Only tagged and tested lifting gear to be used - check prior to use h) Crane to be operated in accordance with manufacturers instructions i) Outriggers to be fully extended on a firm, stable surface j) Load charts to be adhered to k) Plant pre-starts to be completed l) never move a suspended load over the top of people or plant m) utilise a spotter if working in the vicinity of overhead power lines n) Lifting register reports must be provided by the contractor to Lloyd Group prior to the commencement of any work. o) A geotech report must be undertaken prior to all works where the outriggers of a crance will be placed on unstable ground.	1. Only ticketed Crane Operators and Dogman to be in the exclusion zone. 2. Under no circumstances shall anyone be positioned underneath a suspended load 3. Copies of plant certificates and licences to be recorded by the supervisor 4. Plant to be recorded on the plant register			✓		✓	✓	Yes	Yes	Yes	No	Unlikely	Major	M-14		Site Manager		Open	Clause 81-85 of the Work Health & Safety Regulation 2017 [NSW] Manage Risks of Plant in the Workplace AS 2550.5:2016 AS 4497:2018 Safe Work General Guide for Cranes Guide for Overhead & Underground Electric Lines
STRUCTURAL STEEL TRADE	Lift and position structural steel.	Crane failure, strike overhead, electrical cables, excessive load,, Underground services, recent, earthworks, soft ground	Workers being injured by falling loads or collapsing plant. Electrocution.	Possible	Catastrophic	E-22	1. a) Prior to erecting structural steel all workers should be inducted into a task specific SWMS, the SWMS is to be verified and approved by the site supervisor b) An erecting sequence is to be provided by the Subcontractor prior to any structural steel erection. c) Ensure all lifting devices inspected by a rigger prior to use and documented. d) Lifting attachments (chains, clings etc) inspected by competent person and logged. e) Area of lifting inspected for public access, electrical cables overhead, underground identified and Clearly marked and precautions taken. f) Appropriate signage is in place and easily seen from entry gate. g) The area under which structural steel is being erected should be cordoned off as a No Go Zone for other workers. This also includes the slewing path of the crane h) All Personnel are to use appropriate PPE (e.g.) high visibility clothing Hard hat as a minimum i) The erection design engineer should approve all temporary bracing of structural steel j) Lifting register reports must be provided by the contractor to Lloyd Group prior to the commencement of any work. k) A geotech report must be undertaken prior to all works where the outriggers of a crance will be placed on unstable ground. l) A licenced rigger must be used for the lifting and placement of all structual steel. 2.	1. Only ticketed Crane Operators and Dogman to be in the exclusion zone. 2. Under no circumstances shall anyone be positioned underneath a suspended load 3. Copies of plant certificates and licences to be recorded by the supervisor 4. Plant to be recorded on the plant register			✓		✓	✓	Yes	Yes	Yes	No	Unlikely	Major	M-10		Site Manager		Open	Clause 81-85 of the Work Health & Safety Regulation 2017 [NSW] Manage Risks of Plant in the Workplace AS 2550.5:2016 AS 4497:2018 Safe Work General Guide for Cranes Guide for Overhead & Underground Electric Lines
ALL	Unidentifiable materials.	Coming into contact with unidentified materials	Exposure to hazardous materials.	Possible	Moderate	M-13	1. a) Evacuation Plan to be detailed in the Site Emergency Plan, and communicated to all employees. b) Asbestos and Unidentified Materials Procedure to be implemented if required.	1. Site Manager to be contacted as a priority					✓		Yes	No	No	No	Unlikely	Minor	L-5		Site Manager		Open	Clause 419-529 of the Work Health & Safety Regulation 2017 [NSW] How to Safely Remove Asbestos - Code of Practice Managing Risks of Hazardous Chemicals in the Workplace - Code of Practice
ALL	Hazardous Materials presence in the workplace	Working with and around Asbestos, PCBs and Mineral Fibre. Lead-exposure, disease. Wrongful disposal.	Contact with carcinogens Contact with other hazardous materials and chemicals. Synthetic Mineral fibre exposure. Asbestos, PCBs. lead-exposure, disease, wrongful disposal.	Possible	Major	H-18	1. a) Hazardous Materials Survey to be considered if hazardous materials suspected. b) Exclusion zone to be established and signage established to prevent unauthorised access of contaminated areas. c) Asbestos or other hazardous materials presence must be clarified - management plan may need to be developed by specialist removalists. d) Encapsulation/isolation of hazardous materials during removal processes. e) If hazardous materials are being installed on site (i.e. Rockwool, Fibreglass etc) it shall be handled, stored and installed in accordance with the Product Information Sheet and SDS. f) Task appropriate PPE (long clothing and respiratory protection required) 2. Licensed removalist (controls depend on type of hazardous material).	1. Management Plans to be made available to all subcontractors. 2. SDS folder to be accessible in the site office 3. Asbestos Register to be maintained on site			✓		✓	✓	Yes	Yes	Yes	No	Rare	Moderate	L-8		Site Manager		Open	Clause 419-484 of the Work Health & Safety Regulation 2017 [NSW] How to Safely Remove Asbestos - Code of Practice Managing Risks of Hazardous Chemicals in the Workplace - Code of Practice
EXCAVATION CONTRACTOR	Earthworks	Underground or buried services	Contact with underground or buried services resulting in injuries or disruption to services affecting the community.	Possible	Catastrophic	E-22	a) A site survey is to be undertaken prior to any excavation works to ensure any unidentified services that may exist are identified. b) Identify services using the existing services drawings as well as contacting Dial Before You Dig and clearly define position and depth of all services identified. c) Clearly mark out services. d) Where possible isolate any existing services and hand dig an inspection hole to expose services. e) A Spotter is required to monitor distance from power sources (no-go zone). Positive communication at all times f) Approved excavation and trenching permit required prior to starting work 2. Only competent Excavator Operators allowed to operate excavator (minimum VOC required) Statement of Attainment preferred.	1. The subcontractors SWMS are to identify the hand digging inspection holes to identify depth and position of all services. 2. A toolbox meeting is to be held with the subcontractor to discuss the identification of live services or isolated services and ensure they are clearly identified prior to commencement of work. 3. DBYD plans and existing services drawings to be displayed on site		✓	✓		✓	✓	Yes	Yes	Yes	Yes	Unlikely	Moderate	M-9		Site Manager		Open	Clause 304-306 of the Work Health & Safety Regulation 2017 [NSW] Excavation Work - Code of Practice Managing the Risks of Plant in the Workplace - Code of Practice Guide for Overhead & Underground Electric Lines
ALL	Working in and around power sources	Drilling, holing or other activities in areas where power sources may be present.	Electrocution through contact with live wiring, use of electricity tools and equipment electrocution, electric arc, electric shock, burns.	Possible	Catastrophic	E-22	1. a) Isolation of power as per risk assessment and permit to work completed. b) All services located and marked on drawings c) Electricity supplied by Residual Current Device that has been tested d) Approved excavation and trenching permit required prior to starting work e) A Spotter is required to monitor distance from power sources (no-go zone). Positive communication at all times 2. Only competent Excavator Operators allowed to operate excavator (minimum VOC required) Statement of Attainment preferred.	1. The subcontractors SWMS are to identify the hand digging inspection holes to identify depth and position of all services. 2. A toolbox meeting is to be held with the subcontractor to discuss the identification of live services or isolated services and ensure they are clearly identified prior to commencement of work. 3. DBYD plans and existing services drawings to be displayed on site			✓	✓	✓	✓	Yes	Yes	Yes	Yes	Unlikely		M-10		Site Manager		Open	Clause 166 of the Work Health & Safety Regulation 2017 [NSW] General Guide for working in the vicinity of overhead and underground electric lines Manage Electrical Risks - Code of Practice Manage Risks of Plant in the Workplace - Code of Practice AS/NZS 3760:2010
EXCAVATION CONTRACTOR	Excavation Work - Planning an excavation	Adjacent buildings and structures at risk Work area unsecured - insufficient preparation or site security Materials and loads in proximity to planned excavation	Collapse of adjacent structures and property loss/damage	Unlikely	Catastrophic	H-19	1. a) Develop plan/SWMS in consultation with excavation contractor, plant operator and consult geotechnical advisor regarding design of excavation structure. b) Designer of structure may also need to be consulted depending on the nature and risk of the excavation to neighbouring structures. c) Consult BOM regarding weather effects to ensure safe to proceed. Mandatory: d) Excavation and trenching procedure e) Excavation and trenching permit f) DBYD Dial before you dig must be consulted prior to any excavation works g) Lloyd Group must ensure the delineation of plant and workers by an appropropate means h) For all excavations deeper than 1.5 metres, shoaring must be used, or a geotech report	1. Excavation work is or involves high risk construction work, a person conducting a business or undertaking must prepare a SWMS before the high risk construction work starts.			✓		✓	✓	Yes	Yes	Yes	Yes	Rare	Major	M-10		Site Manager		Open	Clause 81, 304-306 of the Work Health & Safety Regulation 2017 [NSW] Excavation Work - Code of Practice Manage Risks of Plant in the Workplace - Code of Practice
EXCAVATION CONTRACTOR	Excavation & Removal of Contaminated soils - Lead & other	Contact with Hazardous Materials	Worker contact with contaminated soils, Lead exposure	Possible	Moderate	M-13	1. a) Soil testing to be undertaken to determine the extent of the contamination. b) Dust suppression techniques to be used during excavation c) Any stockpiled soil is to be covered d) Waste disposal – licensed transported and landfill and records of disposal. e) Correct PPE to be worn f) Exclusion zone to be established and signage established to prevent unauthorised access of contaminated areas. 2. Only competent Excavator Operators allowed to operate excavator (minimum VOC required) Statement of Attainment preferred.	1. Excavation work is or involves high risk construction work, a person conducting a business or undertaking must prepare a SWMS before the high risk construction work starts. 2. Discuss exclusion zone at daily prestart, and carry out daily checks on exclusion zone			✓		✓	✓	Yes	Yes	Yes	Yes	Unlikely		L-5		Site Manager		Open	Clause 304-306 of the Work Health & Safety Regulation 2017 [NSW] Excavation Work - Code of Practice Manage Risks of Hazardous Chemicals in the Workplace Manage Risks of Plant in the Workplace - Code of Practice

EXCAVATION CONTRACTOR	Excavations and plant movement on site	Contact with overhead services	Electrocution, disruption of power and communication services.	Rare	Catastrophic	H-15	1. a) All above ground services are to be highlighted with Danger Tags, avoid working near above ground services where ever possible. b) Where works are being completed near live above ground services, a spotter is required. - NO GO ZONES c) A spotter who has successfully completed an accredited spotter-training course is required where excavation work is being completed near overhead power lines. d) Plant should never work within the NO GO ZONE distances, unless they have written approval from the relevant power supply company. e) Ensure appropriate signs are in place and barricading (Where Required). 2. Only competent Excavator Operators allowed to operate excavator (minimum VOC required) Statement of Attainment preferred.	1. Site Supervisor is to ensure that: - All above ground services are highlighted with danger tape. - A toolbox meeting is to be held with the contractor prior to any excavation to review their SWMS, ensure the NO GO ZONES are highlighted and the operators are aware of the rules.			✓		✓	✓	Yes	Yes	Yes	Yes	Rare	Moderate	L-6		Site Manager		Open	Clause 304-306 of the Work Health & Safety Regulation 2017 [NSW] Excavation Work - Code of Practice Manage Risks of Hazardous Chemicals in the Workplace Manage Risks of Plant in the Workplace - Code of Practice
EXCAVATION CONTRACTOR	Excavation works	Unknown underground essential services Unstable weather conditions	Hitting underground essential services - local outage, injuries to persons, fire, flood Structural collapse	Unlikely	Catastrophic	E-19	1. a) A site survey is to be undertaken prior to any excavation works to ensure any unidentified services that may exist are identified. b) Identify services using the existing services drawings as well as contacting Dial Before You Dig and clearly define position and depth of all services identified. c) Clearly mark out services. d) Where possible isolate any existing services and hand dig an inspection hole to expose services. e) A Spotter is required to monitor distance from power sources (no-go zone). Positive communication at all times f) Approved excavation and trenching permit required prior to starting work 2. Only competent Excavator Operators allowed to operate excavator (minimum VOC required) Statement of Attainment preferred.	1. The subcontractors SWMS are to identify the hand digging inspection holes to identify depth and position of all services. 2. A toolbox meeting is to be held with the subcontractor to discuss the identification of live services or isolated services and ensure they are clearly identified prior to commencement of work. 3. DBYD plans and existing services drawings to be displayed on site			✓		✓	✓	Yes	Yes	Yes	Yes	Unlikely	Moderate	M-9		Site Manager		Open	Clause 304-306 of the Work Health & Safety Regulation 2017 [NSW] Excavation Work - Code of Practice Manage Risks of Plant in the Workplace - Code of Practice
ALL	Excavation and trenching	Trench collapse.	Engulfment of workers.	Possible	Catastrophic	E-22	1. a) All trenches and excavations (with a depth greater than 1.5 metres) are subject to a risk assessment and made safe by providing a ground support system, a steel shield or all walls battered back at a safe angle (or benched Spoil kept 0.5 m from edge) b) A SWMS is to be developed for all trenching/excavation tasks, The SWMS includes control measures for the safe use of, excavation plant, Employees have been inducted into the SWMS relevant to, their trenching or excavation work c) All trenching and excavation operations should be subject to daily monitoring by the site supervisor to make sure that specific SWMS safety controls and the following safety requirements are observed. d) No person ever enters an unsupported section, trenching supports are appropriate to the conditions (i.e. the need or otherwise for trench shields, close sheeting or benching) e) Spoil heaps are properly positioned at least 0.5 metres from the edges of the trench f) Safe ladder access, with side guarding is provided into the trench g) No person is working alone in an excavation h) persons do not remain in close proximity to where an excavator is operatin (slew zone) i) the excavation is protected by parawebbing barricades j) ensure workers in excavations are not exposed to an accumulation of hazardous fumes including fumes from petrol or diesel vehicles k) Contractos must use shoaring where excavations are more than 1.5 meters deep, unless the geotech report states otherwise. 2. Only competent Excavator Operators allowed to operate excavator (minimum VOC required) Statement of Attainment preferred.	1. Record of inspection and maintenance relevant to the plant. 2. Create an exclusion zone around plant, Reverse alarms and flashing light working, Correct PPE for all site workers e.g. Hard hat, High Visibility Clothing, Establish Eye contact with the Plant operator if entering the area. 3. Consult with other site personnel at toolbox meeting to explain where exclusion zones/barricades will be. 4. Permit to Excavate required before works commence			✓	✓	✓	✓	Yes	Yes	Yes	Yes	Rare	Moderate	L-6		Site Manager		Open	Clause 291-306 of the Work Health & Safety Regulation 2017 [NSW] Excavation Work - Code of Practice Manage Risks of Plant in the Workplace - Code of Practice
FRP CONTRACTOR	Formwork	Storage and handling timber and frames.	Slips, Trips, Falls, Manual Handling Injuries	Possible	Moderate	M-13	1. a) Ensure work areas are free from trip hazards b) Ensure walkways are free from trip hazards c) barricade off materials, maintain a clear path of access to all work areas. d) Ensure materials are laid flat and not leaning up against other items where they could be knocked over	1. Weekly site walk through must be conducted - look specifically at storage and lay down areas. 2. Formworker required to clean deck daily and ensure free from debris.			✓		✓	✓	Yes	Yes	Yes	No	Possible	Insignificant	L-3		Site Manager		Open	Clause 219-226 of the Work Health & Safety Regulation 2017 [NSW] Guide to Formwork
FRP CONTRACTOR	Installing re bars	Starter Bars and other protrusions. Excavations, piling holes.	Impalement, cuts, and abrasions. Engulfment.	Unlikely	Major	M-14	1. a) Exposed re-bar to have ends capped as soon as reasonably practicable b) cut resistant gloves and long clothing to be worn c) ensure any penetrations are covered and warning signs in place d) ensure work area is barricaded.	1. Where practicable, eliminate the need to work above any starter bars etc, 2. Site Supervisor to review the subcontractor SWMS and ensure control measures are in place to prevent possibility of impalement			✓		✓	✓	Yes	Yes	Yes	No	Rare	Moderate	L-6		Site Manager		Open	Guide to Formwork Hazardous Manual Tasks - Code of Practice
FRP CONTRACTOR	Concrete pours	Waste generated through concrete and infrastructure work. Line/pipe failure. Plant failure Workers being struck by concrete	Waste not disposed of in accordance with regulatory requirements creating an environmental hazard. Worker suffers concrete burns by contact with product.	Possible	Moderate	M-13	1. a) Concrete waste to be removed form site & disposed of according to procedures. b)Truck wash out bay contains waste to pit or alternative collective for removal c) Where no washout bay is available, agi trucks to return to base for washout. d) Workers to wear appropriate PPE at all times (including glasses, gloves, gumboots). e) SDS to be kept in site office f) Ensure the work area is barricaded off and No Go Zones are established.	If skin comes into contact with concrete, wash immediately. Change out of clothing that has come into contact with concrete to avoid skin irritation. Refer to the SDS			✓		✓	✓	Yes	Yes	Yes	No	Unlikely	Minor	L-5		Site Manager		Open	Manage Risks of Plant in the Workplace - Code of Practice Guide to Formwork Hazardous Manual Tasks - Code of Practice
FRP CONTRACTOR	Pumping concrete	Concrete pump failure	Workers being struck by concrete / workers being struck by high pressure hose	Unlikely	Catastrophic	H-19	1. a) Plant induction to cover: -Maintenance and servicing. Wall thickness of pipe elbow b) site specific SWMS to be to be developed in consultation with all workers involved in the concrete pour c) Ensure the work area is barricaded off and No Go Zones are established d) Workers to wear appropriate PPE at all times (including glasses, gloves, gumboots) e) Plant to be verified and recorded on the plant register 2. Licenced boom pump operator	1. If skin comes into contact with concrete, wash immediately. Change out of clothing that has come into contact with concrete to avoid skin irritation. Refer to the SDS 2. Ensure concrete pipe / hose has whip-checks installed (e.g. minsup clips)			✓	✓	✓	✓	Yes	Yes	Yes	No	Rare	Moderate	L-6		Site Manager		Open	Manage Risks of Plant in the Workplace - Code of Practice Guide to Formwork Hazardous Manual Tasks - Code of Practice
FRP CONTRACTOR	Pouring concrete at height. Erecting formwork at height.	Working at heights	Fall from height / falling objects	Possible	Catastrophic	E-22	1. a) Live edges with a potential fall height of 2m (but not limited to) or more are protected with guardrail or some other fall prevention strategy b) where practicable exclusions zones are to be established c) Ensure a toolbox meeting is held to inform all site employees of No Go Zones. d) Harnesses to be used within 2 m of a live edged, anchorage point must be able to withstand 1500kgs of force or 2100kgs if 2 persons are attached to 1 anchor point e) Harnesses must be logged in the site harness register f) catch decks to be in place (maximum 2m below working deck) g) Lloyd Group to undertake a high risk workshop for all formwork activites at a height, to run through the methodology. 2. Only competent persons to use a harness (work at heights trainine required)					✓		✓	✓	Yes	Yes	Yes	No	Rare	Major	M-10		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Manage Risks of Plant in the Workplace - Code of Practice Managing the Risk of Falls at the Workplace Code of Practice Hazardous Manual Tasks - Code of Practice
FRP CONTRACTOR	Concrete cutting and coring	Slurry, noise, Dust, silica, machine guarding, Exhaust fumes from machine.	Environmental damage. Hearing loss Respiratory Diseases (lung cancer, silicosis, COPD)	Possible	Major	H-18	1. a) Environmental barriers to capture concrete slurry b) Nearby drains identified and provided with environmental barrier prior to cutting commencing c) Concrete saw or coring machine operator wearing correct eye and hearing protection AND respiratory protection (minimum P2 mask) d) On tool dust suppression (water) or dust extraction (vacuum) required e)Slurries contained and properly disposed of in lined bin or by certified disposal company f) Saw or coring machine fitted with appropriate/standard guarding g) Well Ventilated area, if area not well ventilated, extraction fans or electrical demo saw may be required (a separate risk assessment will be required) h) Check Service drawings to ensure no electrical cabling is running through the concrete, a Survey may be required to identify hidden electrical cabling or other services i) Job rotation to prevent manual handling injuries j) Electrical equipment to be tested and tagged k) Electricity supplied to the equipment must be via an RCD protected out let l) Leads must be protected from damage (suspended) m) Area around and below the cuts and core holing secure from unauthorised access (Exclusion Zone) and spotter used below while coring slab. 2. Workers to have undertaken quantitative fit testing for dust masks	1. Toolbox meetings to be held to inform all workers of the intended works and controls in place. 2. Workplace posters highlighting hazards of construction dust and silica			✓	✓	✓	✓	Yes	Yes	Yes	Yes	Unlikely	Minor	L-5		Site Manager		Open	Clause 44-47, 56-59, 208-209 of the Work Health & Safety Regulation 2017 [NSW] Guide to Formwork AS/NZS 1715:2009

STRUCTURAL STEEL TRADE	Erection of steel at height.	Person Could Fall, falling objects.	Workers falling from heights or being struck by falling objects.	Possible	Catastrophic	E-22	1. a) Elevated work platform, scaffold or other dedicated platform is to be provided and used. b) Pre-start check completed daily by the operators c) Record of inspection and maintenance relevant to the plant is to be provided and documented in the site office d) Exclusion zone established below lifting assembly area at all times e) Suspended load never to be moved above persons / plant f) All connections - rafters, purlins, braces etc. and column sling releases - should be performed out of protected work platforms (scissor lifts, boom lifts, crane boxes, mobile scaffolding, and fixed platforms) g) While working out of a boom lift all employees shall wear a safety harness/lanyard/shock absorber attached to a fixed anchorage point in the basket (harness to be tagged) h) never lean out of the basket, hang items from the basket or stand on the railings of the mobile elevated working platform 2. Only ticketed / licenced operators to operate mobile elevated working platforms: Boom lift >11m: HRWL (WP) required Boom lift<11m or scissor lift: Yellow Operator Card required All licences must be captured at the time of the site induction by the site manager	1. A site wide Toolbox Meeting is to be arranged by the site supervisor to inform all workers on site of the No Go Zones prior to works commencing 2. The daily site pre start must inform all workers of these activities and the appropriate exclusion zones		✓	✓		✓	✓	Yes	Yes	Yes	No	Rare	Major	M-10		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice
ALL	Operation of EWP	Working at heights from an EWP	Roll over, falling out of the EWP - serious injury Falling objects Plant- person interaction	Unlikely	Catastrophic	H-15	1. a) Positive communication with others around you b) If possible establish an exclusion zone or utilise a spotter c) Fill out daily pre-start log book prior to operation d) Only operate as per the manufacturers guidelines e) Never lean over, hang off, or climb basket railing f) Harness required for EWP Operator / passenger g) Check harness prior to use (harness to be tagged and free from damage / fraying) h) Heights rescue plan to be in place i) only use EWP on stable ground 2. Only ticketed / licenced operators to operate mobile elevated working platforms: Boom lift >11m: HRWL (WP) required Boom lift<11m or scissor lift: Yellow Operator Card required Work at heights certificate required for passenger (if doesn't hold a ticket)	1. Project supervisor to confirm licences and competencies. 2. Add the EWP to the Plant Register.			✓		✓	✓	Yes	Yes	Yes	No	Unlikely	Minor	L-5		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice
BRICKLAYERS	Brick and block laying. Working near unsupported wall.	Green or unsecured wall.	Worker being crushed by collapsing wall.	Unlikely	Catastrophic	E-19	1. a) Unsecured walls adequately supported against wind and other lateral loading b) Regular monitoring of work to ensure bracing adequate c) Regulate the height of walls on windy days d) Engineers report required for unsecured walls to identify if additional controls required to secure. e) Secure the area around the wall to ensure no worker access.				✓	✓	✓	✓	Yes	Yes	Yes	No	Rare	Minor	L-4		Site Manager		Open	Hazardous Manual Tasks Code of Practice
BRICKLAYERS	Lifting of bricks, blocks and cement bags. Shovelling.	Strains and sprains, Back injuries	Manual handling type injuries.	Likely	Moderate	H-17	1. a) Mechanicals aids provided to lift bulk materials b) Brick/pallet trolley used to move bulk supplies on the floors c) Materials positioned as close to the work area as possible d) Job Rotation where possible for long periods of sustained or awkward posture work e) Use of correct manual handling techniques: Avoid Twisting, Bending, use Team Lifts				✓	✓	✓	✓	Yes	Yes	Yes	No	Unlikely	Moderate	M-9		Site Manager		Open	Clause 60-61 of the Work Health & Safety Regulation 2017 [NSW] Hazardous Manual Tasks Code of Practice
BRICKLAYERS	Brick or block laying at heights (up to 2m)	Collapse or work platform. Unprotected work at height.	Work platforms overloaded resulting in collapse. Fall from height.	Possible	Catastrophic	E-22	1. a) Trestles or other platforms up to 2.0m high adequately braced b) Bulk bricks/blocks stacked on work platform over the supporting standards c) Work platform with appropriate load bearing capacity for materials d) Work platforms with appropriate guardrails e) Scaffold or perimeter guardrail next to edge (if able to withstand 550N force), other devices more than 1.5 metres from edge f) live edge protected with toe boards, brick guards, chain wire, shade cloth or other protection devices, or overhead protection provided for area below g) Ladders not used within the following distance: height of working tread + person height + 1.5m buffer zone.	1. Check trestles/platforms are in good condition not damaged or rusted through, trestles must be industrial and in line with manufacturers instructions. 2. The contractors SWMS must cover the safe use of trestles/platforms. Appropriate load rating to be to be adhered to at all times, the site supervisor is to monitor the load does not exceed the load rating regularly			✓		✓	✓	Yes	Yes	Yes	No	Unlikely	Moderate	M-9		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice
ALL	Oxy Cutting and/or welding	Welding/ Oxy Acetylene cutting and welding	Burns, Electrocution, Welding Flash (Eyes) Inhalation of toxic Gases	Unlikely	Catastrophic	E-19	1. a) Hot work permit required b) Fire Extinguisher within 10m of welder c)Records of servicing, Welder tested and tagged and within due date d) Correct PPE to be worn (Face shield / Goggles, Gloves, Steel cap boots, and Non Flammable Clothing e) Extension Leads kept off the ground, away from water sources (Tested & Tagged) f) Use appropriate RCD's. g) Adequate ventilation in welding area, Breathing mask where applicable h) Welding screens in place to protect other personnel from welding Flash i) Cylinders secured in trolley j) Flashback arrestors in place and tested every 12 months as stated in the AS-4603 1999, bottles in date	1. No Hot Works on total fire ban days 2. Inform workers regarding exclusion zones at daily pre-start			✓		✓	✓	Yes	Yes	Yes	No	Rare	Major	M-10		Site Manager		Open	Clause 328-345 of the Work Health & Safety Regulation 2017 [NSW] Hazardous Manual Tasks Code of Practice AS-4603 1999 AS/NZS 1715:2009
ALL	Drilling penetrations into working surfaces	Penetrations (grounds, floors and walls) during construction works. risk to other workers.	Trip hazards, impalement, cuts	Unlikely	Major	M-14	1. a) Ensure work area barricaded off b) All penetrations to have fixed covers and clearly marked "Danger Penetration Below" c) Correct use of tools d) Correct PPE				✓		✓	✓	Yes	Yes	Yes	No	Rare	Moderate	L-6		Site Manager		Open	Hazardous Manual Tasks Code of Practice
PARTITIONS	Carpentry - working from platform (900mm)	Falling from the platform	Serious injury resulting from a fall.	Possible	Major	H-18	1. a) Trestles minimum rated at 120kg b) The area around the trestles is to be clear, where there is a risk of falling, where serious injury or death such as uneven ground or impalement, a alternative safer access is to be used. c) trestle to be suitably positioned so worker is not over-reaching d) where possible, establish exclusion zone to isolate work area				✓		✓	✓	Yes	Yes	Yes	No	Rare	Moderate	L-6		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW]
PARTITIONS	Joinery - cutting of MDF board	Inhalation of hazardous materials.	Respiratory irritation and lung disease.	Possible	Major	H-18	1. a) Pre—cut all MDF off site of possible. b) Use low Formaldehyde emission board c) If possible - fully enclosed Cutting Room with warning signs d) On-tool dust extraction e) Use of correctly fitting P2 dust mask f) SDS to be kept in site office 2. Workers to have undertaken quantitative fit testing for dust masks		✓	✓	✓	✓	✓	Yes	Yes	Yes	No	Rare	Minor	L-4		Site Manager		Open	Regulation 49-50 - Managing the Work Environment and Facilities Code of Practice AS/NZS 1715:2009
ALL	Working at height	Working on roofs, panels, near voids, mezzanines and balconies.	Workers falling from heights / falling objects	Possible	Catastrophic	E-22	1. a) Use of adequate edge protection on roof perimeter: Guardrails / Scaffolding (Guardrail able to withstand 550N force) b) Use of a harness / fall arrest system wherever there is a live edge c) Harness to be tagged and inspected prior to use and registered in the site harness register d) Anchorage point must be certified and rated to withstand 1500kgs of force or 2100kgs if 2 persons are attached to 1 anchor point e) Inspection of equipment prior to use by competent person f) An emergency fall arrest retrieval plan is to be provided and understood by all involved g) Edge protection to open edges to prevent falling objects.(where possible) h) where possible, use tool lanyards to prevent dropped objects i) Barricade area below: Unauthorised entry to potential drop zone. h) Penetrations (> 200 x 200 mm) covered with structural plywood that is fixed. Warning sign on cover stating "DANGER, PENETRATION BELOW " j) For brittle roofs – specialist contractor and fall prevention strategy to be developed. k) All Personnel to where appropriate PPE 2. a)Work at Heights training required b) Workers to be trained and competent in the use of a harness c) A working at heights rescue plan must be developed prior to the commencement of all works	1. Rescue Plan to be incorporated in the SWMS 2. Site Personnel to be trained in work at heights rescue 3. Ensure all workers involved are toolboxed in the rescue plan and understand the process involved 4. Roof Access Permit required prior to works commencing			✓		✓	✓	Yes	Yes	Yes	Yes	Rare	Major	M-10		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice

ROOFING	Working on roof.	Fall from heights.	Fall from edge or through penetration or roofing material, falling objects.	Possible	Catastrophic	E-22	1. a) Work on flat roof within 2m of the edge to have fall prevention in place b) Procedures/controls in place to prevent access to unprotected roof edges. c) Use of adequate edge protection on roof perimeter: Guardrails / Scaffolding (Guardrail able to withstand 550N force) d) Use of a harness / fall arrest system whenever there is a live edge e) Harness to be tagged and inspected prior to use f) Anchorage point must be certified and rated to withstand 1500kgs of force or 2100kgs if 2 persons are attached to 1 anchor point g) Inspection of equipment prior to use by competent person h) An emergency fall arrest retrieval plan is to be provided and understood by all involved i) Edge protection to open edges to prevent falling objects.(where possible) j) where possible, use tool lanyards to prevent dropped objects k) Barricade area below: Unauthorised entry to potential drop zone. l) Penetrations (> 200 x 200 mm) covered with structural plywood that is fixed. Warning sign on cover stating "DANGER, PENETRATION BELOW." m) For brittle roofs – specialist contractor and fall prevention strategy to be developed. n) All Personnel to where appropriate PPE 2. a)Work at Heights training required b) Workers to be trained and competent in the use of a harness	1. Rescue Plan to be incorporated in the SWMS 2. Site Personnel to be trained in work at heights rescue 3. Ensure all workers involved are toolboxed in the rescue plan and understand the process involved 4. Roof Access Permit required prior to works commencing			✓		✓	✓	Yes	Yes	Yes	Yes	Rare	Major	M-10		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice
ALL	Working from a ladder	Use of ladders where no alternative is available	Falls resulting in serious injury.	Possible	Catastrophic	E-22	1. a) Industrial type ladders complying with AS/NZS to be used on site - which are clearly labelled b) Extension or Platform Type Industrial Ladders rated at 120kg (minimum) are to be used and in a serviceable condition- no damage / defects c) A-Frame ladders are not permitted d) Ladder must be fit for purpose e) Ladders to be set up on a solid, secure, flat base f) Three Points of contact at all times. g) Only tool that can easily be operated with 1 hand should be used on ladders, h) Work must be carried out facing the ladder at all times i) Do not overreach from ladders j) Do not setup ladders behind or obstructing doorways k) No more than 1 person on a ladder at any time. l) For electrical work insulated ladder are to be used m) Do not use ladders near an exposed edge or guardrail where a person could fall over that edge n) Extension ladders to be placed on solid flat surface at 4 (vertical) to 1(horizontal) ratio and secured top and bottom from movement. o) The feet of the person using the ladder must never be higher than the third tread from the top plate p) Extension ladders used for access need to extend 900mm above the deck q) Mandatory PPE to be worn at all times r) Tool lanyards / belts should be worn where possible	1. Wherever possible, an EWP, scissor lift or mobile scaffold is to be used. 2) The site supervisor is to monitor daily, the use of ladders to ensure compliance and suitability to the task. 3) Height Safety is to be a regular discussion point at toolbox meetings 4) Where necessary, establish exclusion zones around ladder to prevent people coming into contact with ladder - this also serves as a drop-zone			✓		✓	✓	Yes	Yes	Yes	Yes			L-2		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice
ALL	Working at heights	Rescue and retrieval of fallen worker	Inability to provide assistance or rescue of fallen workers - suspension trauma / injury	Rare	Major	E-21	1. a) Height work to be minimized through work planning and scheduling. b) Prior to any work being undertaken at height the SWMS provided for that high risk task shall be subject to verification. This will ensure the emergency rescue and retrieval is specific to site and that equipment required is available and suitable to task.	1. Rescue Plan to be incorporated in the SWMS 2. Site Personnel to be trained in work at heights rescue 3. Ensure all workers involved are toolboxed in the rescue plan and understand the process involved					✓	✓	Yes	Yes	Yes	No	Rare	Minor	L-3		Site Manager		Open	Clause 78-80 of the Work Health & Safety Regulation 2017 [NSW] Managing the Risk of Falls at the Workplace Code of Practice
ALL	Operation of heat guns	Use of heating guns for gluing and other heat generating purposes.	Burns to operator, risk of fire. Risk of setting of fire systems.	Unlikely	Major	M-14	1. a) Fire extinguisher within 30m that has been inspected within the last 6 months. b) Hot work permit completed and displayed in area. c) Use of gauntlet gloves and goggles. d) establish an exclusion zone around works area e) do no leave heat gun switched on if out of sight	1. Area free of combustible materials. 2. SWMS in place including hot work permit controls. 3. Hot works permit signed off prior to works commencing			✓		✓	✓	Yes	Yes	Yes	Yes	Rare	Minor	L-3		Site Manager		Open	Clause 148-165 of the Work Health & Safety Regulation 2017 [NSW] Hazardous Manual Tasks Code of Practice
ALL	Grinding surfaces - dust generation	Grinding stone, marble or other dust and silica containing products	Hearing loss, Eye injury, Respiratory Diseases (lung cancer, silicosis, COPD) , lacerations, Environmental damage	Possible	Major	H-18	1. a) On tool dust suppression (water) or dust extraction (vacuum) required b) Correct eye and hearing protection AND respiratory protection (minimum P2 mask) c) Workers should be fit tested and clean shaven to afford the best fit for their dust mask c) Ensure guards have not been removed or tampered with d) Keep hands out of the line of fire 2. Workers to have undertaken quantitative fit testing for dust masks	1. Toolbox talks and display of material to promote awareness amongst workers about the risks involved with inhaling silica / construction dust. 2. Regular site walks to ensure controls are being implemented			✓	✓	✓	✓	Yes	Yes	Yes	No	Unlikely	Minor	L-5		Site Manager		Open	Clause 49-50 of the Work Health & Safety Regulation 2017 [NSW] Managing the Work Environment and Facilities Code of Practice Manage Noise and Prevent Hearing Loss Code of Practice AS/NZS 1715:2009
ALL	Natural disasters and dangerous environmental events occurring whilst construction site is operational.	Flood event. Bushfire. Earthquake. Weather event - Cyclone. Weather event - Blizzard. Infestation of wasps, flying insects etc.	Events such as natural disasters and dangerous environmental events create hazardous situations with in the workplace including building damage causing injury and/or rendering the workplace unsafe/ or unknown safety status of the workplace.	Rare	Major	M-10	1. a) IMMEDIATE! STOP ALL WORK ACTIVITIES. EMERGENCY WARDEN TAKES CONTROL OF SITE - determines whether to call 000. b) Provide rescue/assistance to injured parties if it is safe to do so. c) Call nearest First Aider or Emergency Coordinator to support injured persons where practical to do so. If multiple persons are injured and it is safe to remain where you are - stay with the injured party until medical assistance arrives (do not put yourself at risk by staying) d) Shut down plant and equipment. e). Contain storage of hazardous chemicals and gas bottles ASAP as long as it is safe to do so. f) EVACUATE. MOVE TO ASSEMBLY AREAS closing doors / shut down areas as you go. g) Await instructions from the Emergency Warden who will determine the nature of the emergency and provide instructions accordingly. h) Should the structure be unsafe - risk of collapse - take instructions from emergency personnel whether the assembly point needs to be moved. Follow instructions. i) Site Supervisor to conduct roll-call from daily sign-on sheet to ensure everyone on site is accounted for j) If safe to do so, conduct a final sweep of site to nobody has been missed 2. Site Manager to have Emergency Warden Training	1. Site Manager to be first aid trained 2. Emergency Equipment maps to be displayed around site 3. Emergency equipment (first aid kit / fire extinguishers) to be signposted 4. Emergency Evacuation Procedure displayed 5. Emergency Contacts info displayed 6. Evacuation drills to take place and be debriefed to workers 7. Regular inspection of emergency equipment - first aid kit to be well stocked / fire equipment to be tagged (6-monthly)			✓		✓	✓	Yes	No	No	No	Rare	Moderate	L-6		Site Manager		Open	Managing the Work Environment and Facilities Code of Practice

12. Appendix B – Site Specific Tree Protection Strategy

SITE-SPECIFIC TREE PROTECTION STRATEGY

Prepared for:
Warren Truong (Project Manager)

Site:
Taronga Zoo (Upper Australia Project Stage 2)

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DOCUMENT TRACKING

Project Name	*Upper Australia Site Specific Tree Protection Strategy Stage 2*
Project Number	*SYD-ARBOR-2109*
Project Manager	Warren Truong
Prepared by	*Mathew Phillips*
Reviewed by	*Greg Thallon*
Approved by	*Mathew Phillips*
Status	*Revision 1*
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Last saved on	*10th August 2021*

This report should be cited as 'Sydney Arbor Trees 2021-Upper Australia Site Specific Tree Protection Strategy Stage 2'.
This report should be read in conjunction with the Arboricultural Impact Assessment prepared by Sydney Arbor Trees dated 18 June 2020.

1.1 Site-Specific Tree Protection Strategy and Guidance Explanation

1.1.1 This 'Site-Specific Tree Protection Strategy' is guided by the Australian Standard *AS-4970 Protection of Trees on Development Sites (2009)* and outlines general principles that must be followed in order to protect trees that have been identified for protection during the proposed development.

1.1.2 This guidance is specifically for all parties associated with the proposed development to help them understand what has been agreed under consent and explain what is required to fully meet their obligations in regard to tree protection.

1.1.3 All personnel working on the site and specifically within 'Tree Protection Zones' must be properly briefed about their responsibilities towards important trees based on this guidance.

1.1.4 This guidance should be kept onsite, form part of the site-specific induction and be used in conjunction with the Tree Management Plan (TMP).

1.2 The Project Arborist

1.2.1 A project Arborist Minimum AQF-5 shall be engaged prior to the commencement of any works on-site.

1.2.2 A pre-start meeting with the project manager and project Arborist shall be conducted to discuss the establishment of tree protection measures prior to demolition and construction.

1.2.3 A written Certificate that certifies the tree protection and documents the current status of the protected trees is to be issued to the project manager and principal certifying authority prior to any works starting onsite.

1.3 Compliance

1.3.1 The Tree Protection Strategy shall be kept onsite, and form part of the site-specific induction. All contractors and site workers shall receive a copy of these specifications prior to commencing work on-site. Any works conducted within the 'Tree Protection Zones' shall be supervised by the project Arborist.

1.3.2 The project Arborist shall undertake a site inspection prior to works being started onsite to certify that tree protection is in place, in accordance with this strategy and the conditions of consent.

1.3.3 Compliance documentation shall be prepared by the project Arborist following any inspections. Compliance documentation shall include documentary evidence of compliance with the tree protection measures and methods as outlined within this strategy.

1.3.4 Where compliance has been breached, the project manager will be notified immediately and then in writing where a 'Stop Work Order will be issued to the contractor responsible for the development and the principal certifying authority until tree protection has been established and or damage to protected trees has be remediated under direction from the project Arborist.

1.3.5 The project Arborist shall conduct monthly compliance inspections with written certification or statements delivered to the project manager.

1.3.6 The project Arborist shall conduct a final assessment of the protected trees and site to assess any adverse influences from the development and complete a final certification once works have been completed, with future recommended management strategies implemented as required.

1.4 Compliance Programming

ARBORICULTURAL ACTION	PROGRAMMING	EXTENT OF ARBORICULTURAL INPUT	SIGNED OFF (Project Arborist)
Pre-start meeting *with Project Manager and Demolition contractor team to discuss any emerging issues and tree protection on establishment.*	*Before any activities start onsite.*	▪ *Meeting with relevant members of the project managers team to explain the extent of tree constraints, i.e., Architect, Site Manager, engineer, landscape architect, Contractors, etc.* ▪ *Review working space requirements to consider fencing and ground protection adjustments to improve site functionality.* ▪ *Review post consent layout changes that may affect trees.* ▪ *Confirm tree protection measures will be acceptable.*	
Installation of Tree Protection Measures *as per this Site-Specific Tree Protection Strategy under agreement with the conditions of consent.*	*Prior to any works being started onsite.*	▪ *Trunk protection to be installed by an AQF-3 Arborist in accordance with Guidance 5.* ▪ *Site fencing can be installed by the contractor as per this specification.*	
HOLD POINT 1			
Tree protection certification *by Project Arborist.*	*Before hand over to contractor and site occupation.*	▪ *Project Arborist to inspect all tree protection measures.* ▪ *Conduct a VTA of all surveyed trees to assess and record Health, Vigour and Condition.* ▪ *Produce a certification document outlining observations and compliance.*	
HOLD POINT 2			
Pre-Demolition *meeting with contractor.*	*Before hand over to contractor and site occupation.*	▪ *Meeting with project managers team i.e., Architect, Site Manager, engineer, landscape architect and Contractor to explain the extent of tree constraints.* ▪ *Review site setup i.e., site office, equipment storage, plant, cranes.* ▪ *Review if any works are proposed in TPZ's.* ▪ *Review post consent layout changes that may affect trees.*	
ONGOING DURING WORKS			
Monthly Site Inspections *by the project Arborist*	*During the demolition or construction phases*	▪ *Project Arborist shall conduct inspections of the site to conduct compliance checks as specified only by the consent authority.*	
HOLD POINT 4			
Final Certification *of tree protection by the project Arborist.*		▪ *Conduct a VTA of all surveyed trees to assess and record Health, Vigour and Condition.* ▪ *Project Arborist to produce a certification document outlining compliance and any recommendations.*	

1.5 GUIDANCE 1 (G1) Tree Removal & Pruning Works

1.5.1 Tree removal works

This guidance is specific to trees **2**, **11**, **90** & **116** which have been identified for removal under an SSDA Amendment and can only be removed under consent from the consent authority when or if approved.

1.5.2 Tree pruning works

No tree species are to be pruned during this stage of works.

1.5.3 Conduct of works

1.5.3.1 The project Arborist shall confirm all tree species identified for removal with the contractor and supervise the tree works.

1.5.3.2 Retained trees shall not be adversely impacted during the removal process.

1.5.3.3 Stump grinding within the TPZ of retained trees shall be conducted on ground protection, and not impact the root system of retained trees.

1.5.3.4 All tree removal works shall be conducted by an AQF-3 Arborist in accordance with:

1.5.3.4.1 AS 4373 – 2007 Pruning of Amenity Trees.

1.5.3.4.2 SafeWork NSW Code of Practice for the Amenity Tree Industry 1998.

1.5.3.4.3 Work Health and Safety (WHS) Regulations 2011.

1.5.3.4.4 Safe Work Guide to managing Risks of Tree Trimming and Removal Work 2016.

1.6 GUIDANCE 2 (G2) Tree Protection Zone (TPZ)

This guidance is specific to trees **2,11-13,15-19,23-26,28,31-33,39,40-44,81-83,85,85a,87,88,90-99,116,117,121,132-137,138-153,155,155a,156,157, 158,161,163,164,165,170,172-174,** which have been identified for retention and protection during the proposed development.

1.6.1 Tree protection shall be installed in accordance with the Tree Protection Plan and their TPZ shall exclude the following activities unless approved by the project Arborist:

1.6.1.1 Modification of existing soil levels.

1.6.1.2 Storage of materials, plant, equipment or site sheds, preparation of building materials, refuelling, disposal of waste and or chemicals.

1.6.1.3 Movement of pedestrians or vehicular access or any other activity that may cause damage to the tree.

1.6.1.4 Temporary or permanent location of services, or the works required for their installation.

1.6.1.5 Run on, shall be limited where practical by the installation of a boundary outside the TPZ.

1.6.1.6 All works in 'Tree Protection Zones' shall be supervised by the project Arborist.

1.7 GUIDANCE 3 (G3) Physical Tree Protection

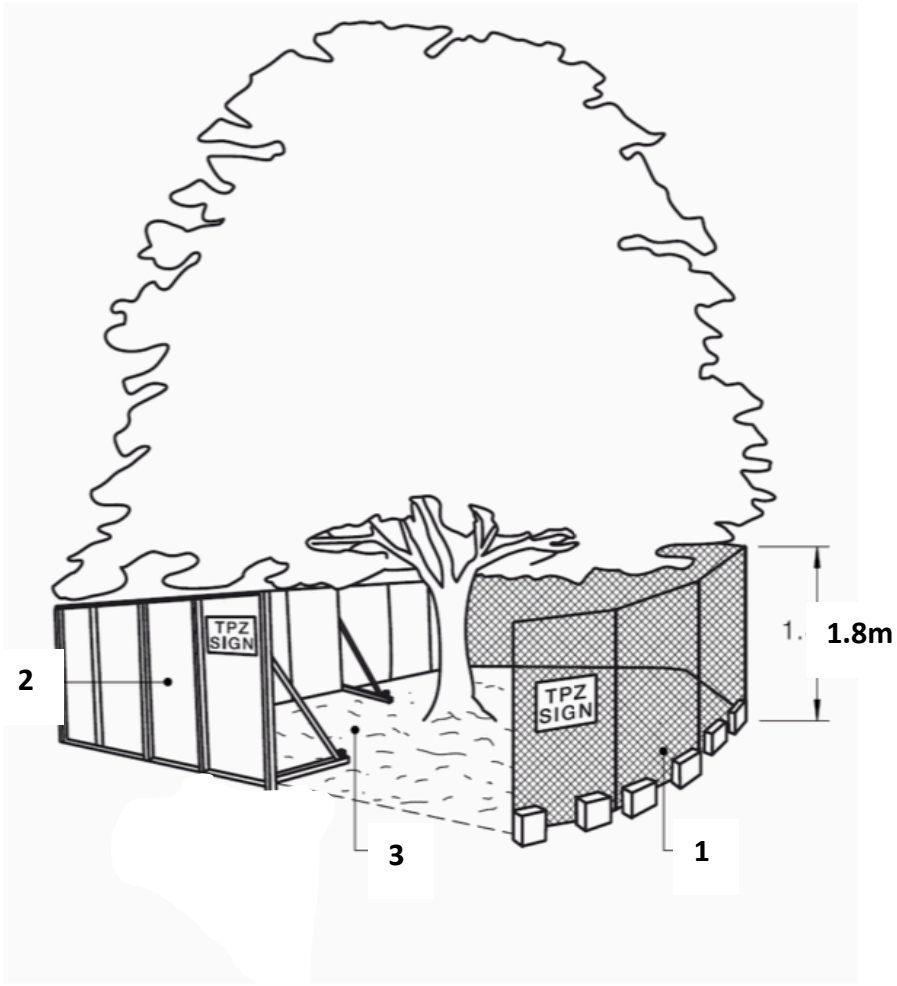


Figure 1

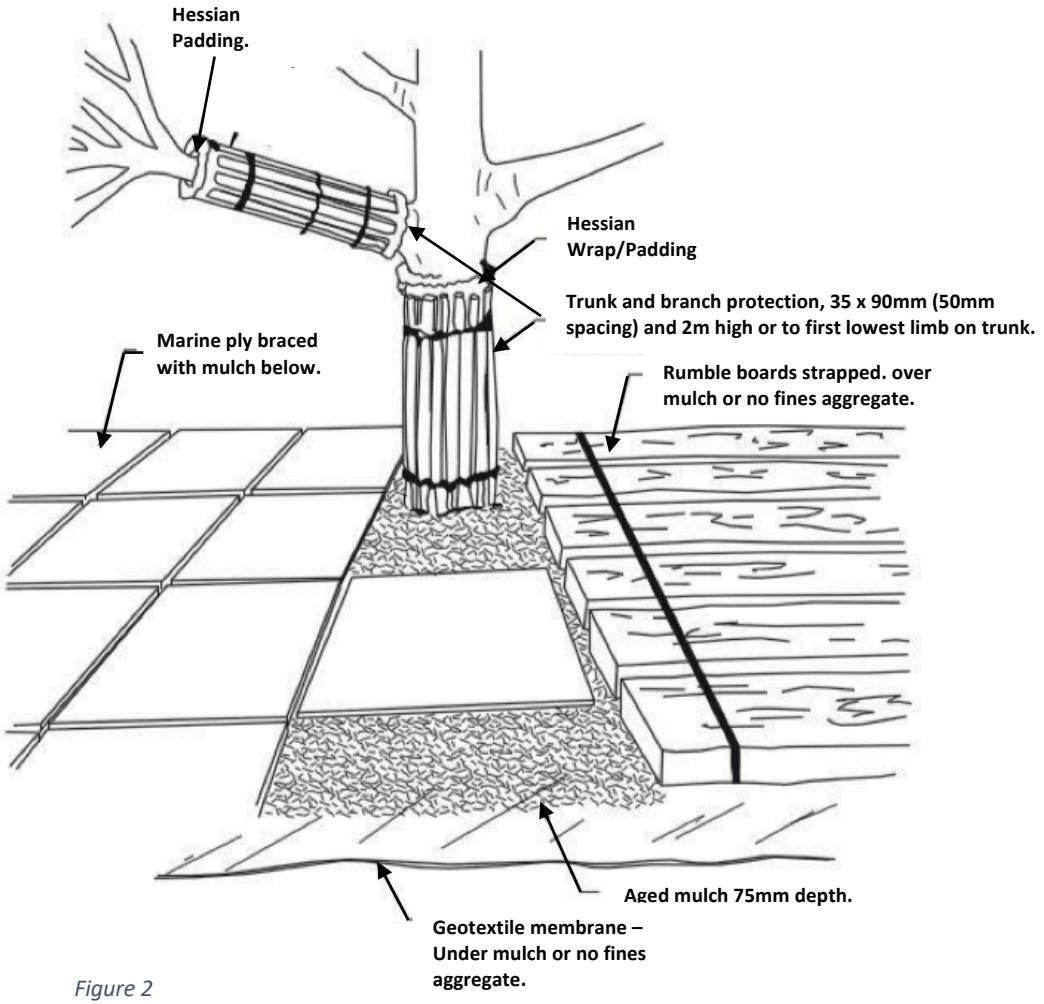


Figure 2

KEY:

1 = Chain link fencing, concrete feet (Shade cloth specified by project Arborist)

2 = Hoarding/timber fencing alternative.

3 = Aged quality mulch (75mm max depth) extent of TPZ where practical, no construction unless supervised by project Arborist. No grade changes, no surface changes, no storage of materials permitted and no excavation to occur as part of the site establishment related to tree protection.

1.8 GUIDANCE 4 (G4) Scaffolding

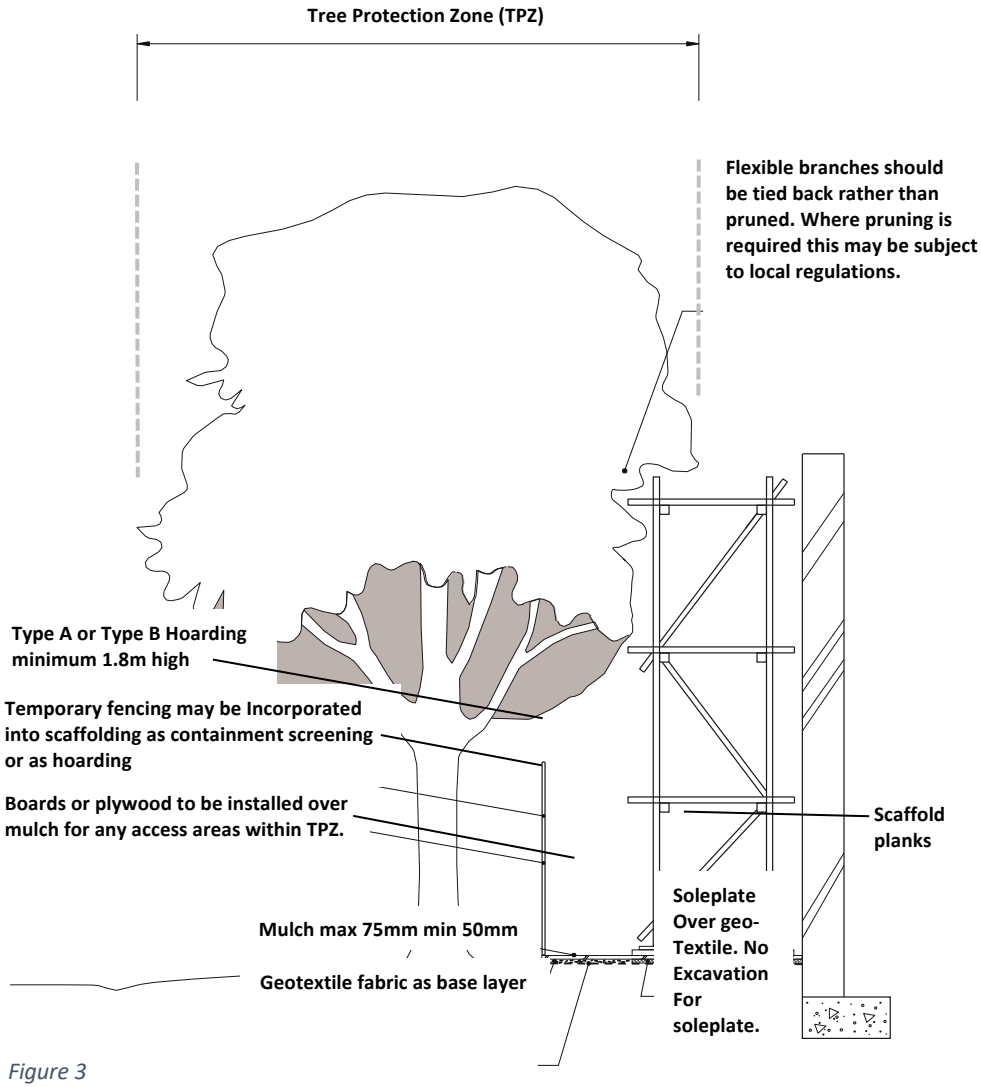


Figure 3

1.8.1 Above ground guidance

Where scaffolding is required it should be erected outside the TPZ. Where it is essential for scaffolding to be erected within the TPZ, branch removal should be minimized. This can be achieved by designing scaffolding to avoid branches or tying back branches. Where pruning is unavoidable it must be specified with a pruning specification by the project arborist in accordance with AS 4373. **NOTE**: Pruning works may require approval from the consent authority.

1.8.2 Below ground level guidance

The ground below the scaffolding should be protected with ground protection (e.g., scaffold board or plywood sheeting) as shown in Figure 3. Where access is required, a boardwalk, or other surface material should be installed to minimize soil compaction. Boarding should be placed over a layer of mulch and impervious sheeting to prevent soil contamination. The boarding should be left in place until the scaffolding is removed.

1.9 Guidance 5 (G5) Trunk Protection

1.9.1 Trunk protection shall be installed to tree **25,114,117,123,125,127,128,129,130,158 & 172** in accordance with Guidance 3.

1.10 GUIDANCE 6 (G6) Tree Protection Fencing

1.10.1 Tree protection fencing shall be installed in accordance with Guidance 3 and the Tree Protection Plan.

1.11 GUIDANCE 7 (G7) Ground Protection

1.11.1 Ground protection shall be installed to tree (**Tree 114, 129 & 130- Part A**) & (**Tree 125 & 126 – Part A**) to access the central ramp/boardwalk. Once the board walk is removed ground protection shall be installed where the ramp was situated and adjacent (**Tree 26 – Part B**), as the boardwalk is demolished ground protection shall be installed for access along its existing footprint in accordance Guidance 3 and the Tree Protection Plan.

1.12 GUIDANCE 8 (G8) Tree Protection Signage

1.12.1 Shall have the project manager & project Arborist contact details applied.

1.12.2 Shall be installed to all tree protection fencing throughout the site and on approaches to the site perimeter.

1.12.3 Shall be laminated, weatherproof and fixed to fencing with wire or zip ties.

1.13 GUIDANCE 9 (G9) Tree Health Care

1.13.1 Nutrient amendments shall be applied to trees species within Irrigation Zones 1,2,3,4,5,6 & 7 once demolition works in that zone have been completed to aid in increasing plant health and reducing stress related to the development.

1.13.2 Nutri-Tech Solutions 'Black Gold' shall be sprayed throughout each zone as works are completed in that zone.

1.13.3 Nutri-Tech Solutions 'Life Force® Gold™ Pellets' a nutrient-rich fertiliser and soil conditioner with diverse & active microbes shall be applied to the extent of each tree TPZ at 50g/m2 within the zone once works are completed in that zone.

1.13.4 Further applications may be required where trees show adverse reaction to the development.

1.14 GUIDANCE 10 (G10) Cyclical Watering Schedule

1.14.1 Irrigation shall be installed to Zones 1,2,3,4,5,6 & 7 as shown on the Demolition Site Plan Tree Protection Plan.

1.14.2 Irrigation shall be run for 15 minutes prior to 10:00am, 15 minutes post 6:00pm or in accordance with current water restrictions.

1.15 GUIDANCE 11 (G11) Application of Mulch

1.15.1 Shall be installed to the TPZ of tree **25,26,28,31,32,33, 87,114,117,121,123,125,126,127,128,129,130,132,133,134,135,136,137,155,155a,156,157 158,161,163,172** once works are completed in that specific TPZ as follows:

1.15.2 Mulch shall be aged, free of extraneous matter, including soil, weeds, rocks and twigs.

1.15.3 Shall be installed to a depth of 50-75mm and shall be setback from the tree trunk 100mm.

1.16 GUIDANCE 12 (G12) Demolition of Surfaces & Structures

Roots frequently grow adjacent to, in conflict with, divergent to or beneath existing surfaces and structures so great care is required to ensure adverse impact does not occur during access and demolition. For the purpose of this guidance **Surfaces** are any hard surface used as a vehicle road, driveway crossover, ribbon driveway, parking bay, pedestrian foot paths not limited to bitumen, concrete, stone, crushed gravel, compacted aggregate and timber decking. For the purpose of this guidance **Structures** are any man-made structure above or below ground including service pipes, walls, gate piers, garden sheds, buildings and foundations. Typically, this would include drainage structures, services, carports, bin stores and concrete slabs that support buildings.

1.16.1 The existing surfaces and structures identified within the Tree Protection Plan should be demolished in accordance with the following guidance:

1.16.1.1 These shall be removed by hand with appropriate tools such as pneumatic breakers, crow bars, sledgehammers, picks, mattocks, spades, shovels, forks and wheelbarrows.

1.16.1.2 Heavy machines with long arms can be used from outside the TPZ or from areas with ground protection but must not create compaction, damage roots or branches.

1.16.1.3 The removal of debris should be conducted manually across existing hard surfaces, alternatively can be lifted out by long arm machinery from outside the TPZ or from on areas of ground protection.

1.16.1.4 These works shall be supervised by the project Arborist.

1.17 GUIDANCE 13 (G13) Tree Root Exposure

1.17.1 Where tree roots are exposed these shall be inspected by the project Arborist and protected.

1.17.2 Roots shall be covered with clean 80/20 soil and or wrapped with hessian and kept moist.

1.17.3 Where tree roots are to be cut by the project Arborist these shall be cleanly cut at the nearest internal lateral root.

1.18 GUIDANCE 14 (G14) Installation of an Underground Service within a TPZ

1.18.1 The installation of service within a TPZ shall be installed using horizontal directional drilling (HDD). The horizontal drilling/boring must be at minimum depth of 600mm below grade or to a depth dictated by the project Arborist or Geotechnical Engineer.

1.18.2 Where HDD is not feasible, excavation through non-destructive excavation (NDE) methods such as hydro-vacuum excavation (sucker truck), air spade and manual excavation shall be used.

1.18.3 Non-destructive means no damage is to occur to roots greater than 40mm DIA and fine feeder roots where possible.

1.18.4 Hydro-vacuum excavation and Airspade compressed air jets shall not exceed 90psi at the attachment head.

1.18.5 Excavated roots should be wrapped in hessian immediately once uncovered to limit adverse impact to the bark or wood of roots.

1.18.6 All works within the TPZ shall be supervised by the project Arborist.

1.19 GUIDANCE 15 (G15) Installation of a Surface within a TPZ

1.19.1 The installation of Surfaces within a TPZ shall not disturb the existing soil level, shall not disrupt the exchange of water filtration, the exchange of gases in and out of the root zone and shall consist of the following:

1.19.2 Shall be permeable pavers, gravel & decomposed granite, decking, porous asphalt, load bearing systems filled with crushed gravel or granite or synthetic hotpour rubber.

1.19.3 Shall capture and channel rainwater in the direction of the tree rootzone.

1.19.4 Would ideally have deep rooted grasses at the perimeter to slow runoff down and retain water within the tree root zone.

1.20 GUIDANCE 16 (G16) Installation of a Structure within a TPZ

1.20.1 The construction of the Structure within a TPZ shall be tree sensitive construction measures such as:

1.20.1.1 Pier and beam, suspended slab, cantilevered building sections, screw piles and contiguous piling in order to minimize the impact of encroachment.

1.20.1.2 Shall not encroach the SRZ of the tree.

1.20.1.3 should be sufficiently flexible to allow the piles or pier holes to be moved if significant roots are encountered in the preferred locations.

1.20.1.4 Should re-direct the flow of water capture into the tree root zone.

1.20.1.5 When the root zone is reactive clay, techniques such as localized pier and beam (bridged), screwpile footings or root and soil moisture control barriers may be appropriate to minimize effects on structures. **NOTE**: Collaboration may be required between the project Arborist and the geotechnical or structural engineer.

1.21 GUIDANCE 17 (G17) Grade Change in TPZ

1.21.1 No grade changes shall occur within the TPZ of trees identified for retention unless approved by the project Arborist.

1.21.2 Where grade changes are proposed within a TPZ these shall be subject to a site-specific construction methodology statement and include the installation of a permanent aeration and irrigation system such as City Green's 'Snorkel' system.

1.22 GUIDANCE 18 (G18) Soft Landscaping in TPZ

For the purpose of this guidance soft landscaping includes a change in the existing soil profile for re-profiling, covering the soil surface with new understory plants, turf or a mulch layer. It does not include the installation of any solid structures or compacted surfacing. The following guidance shall be followed:

1.22.1 No significant excavation, cultivation or planting holes greater than 300mm DIA shall occur within the TPZ.

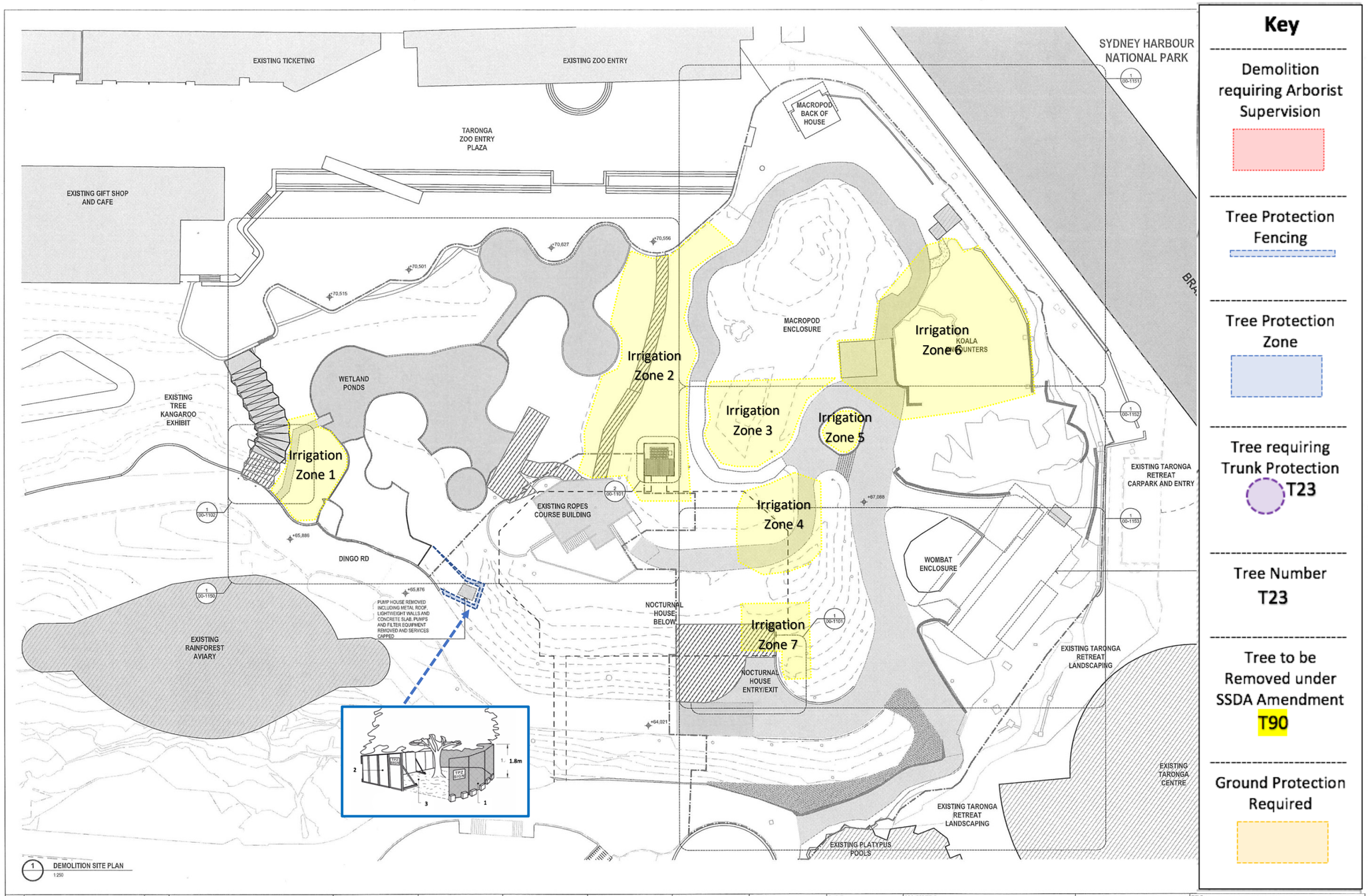
1.22.2 Where new levels are to be increased to tie into new structures or surrounding ground level, good quality and relatively permeable topsoil should be used for the fill, be supplied in accordance with *AS 4419-2003 Soils For Landscape Use*, and have the level specified by the project Arborist based on the depth of roots.

1.22.3 New levels should be firmed into place and not be over-compacted in preparation for turfing.

1.22.4 Levels should not be altered within the SRZ and be finished with a mulch layer installed in accordance with Guidance 11.

1.22.5 The installation of new vegetation within the TPZ shall be conducted by hand and exclude heavy machinery from within the TPZ.

1.23 Tree Management Plan



REV	DESCRIPTION	DATE	No.	AMENDMENT DESCRIPTION
01	50% TENDER DOCUMENTATION	12.02.21		
02	75% TENDER DOCUMENTATION	19.03.21		
03	95% TENDER DOCUMENTATION	30.04.21		
04	ISSUE FOR DEMOLITION WORKS	07.05.21		
05	100% TENDER DOCUMENTATION	28.05.21		
A	ISSUE FOR TENDER	08.07.21		

STRUCTURE / CIVIL: SDA STRUCTURES, PH: 9810 6911
STORMWATER: WARREN SMITH & PARTNERS, PH: 9299 1312
BCA / ACCESS: MATT SHUTER & ASSOCIATES, PH: 9387 4441
TRAFFIC: GTA TRAFFIC, PH: 8448 1800
QUANTITY SURVEY: MBM CONSULTING, PH: 9270 1000
ARBORIST: SYDNEY ARBOR TREES, PH: 9666 6821
LANDSCAPE: SPACKMAN MOSSOP MICHAELS, PH: 9361 4549
SERVICES ENGINEERS: ADP CONSULTING, PH: 8203 5447

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CLIENT: Taronga Zoo

PROJECT TITLE: Upper Australia Exhibit

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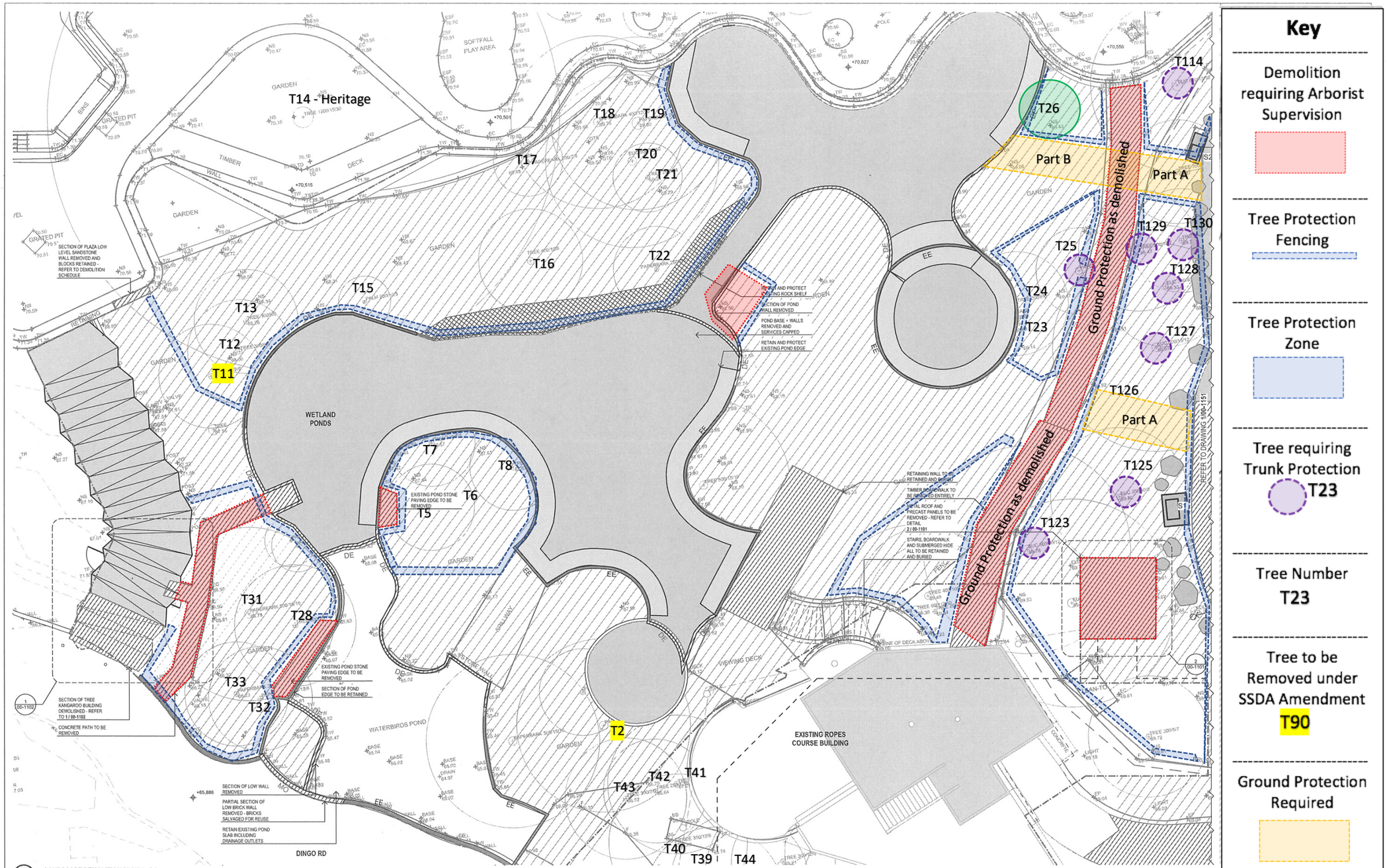
REVIEW	DIRECTOR SIGNATURE	DATE
TENDER		08.07.21
CONST		

TITLE: DEMOLITION SITE PLAN
TREE PROTECTION PLAN

DRAWN	PLOT DATE	SCALE @A1
PL	8/07/2021	1:250
CHECKED	PROJECT NO.	DRAWING NO.	REV. NO
SK	18-16	00-1100	A



Key

Demolition requiring Arborist Supervision

Tree Protection Fencing

Tree Protection Zone

Tree requiring Trunk Protection

T23

Tree Number

T23

Tree to be Removed under SSDA Amendment

T90

Ground Protection Required

REV	DESCRIPTION	DATE
01	95% TENDER DOCUMENTATION	30.04.21
02	ISSUE FOR DEMOLITION WORKS	07.05.21
03	100% TENDER DOCUMENTATION	28.05.21
A	ISSUE FOR TENDER	08.07.21

No.	AMENDMENT DESCRIPTION

STRUCTURE / CIVIL SDA STRUCTURES PH: 9810 6911	STORMWATER IWARREN SMITH & PARTNERS PH: 9299 1312	BCA / ACCESS MATT SHUTER & ASSOCIATES PH: 9087 4441	TRAFFIC GTA TRAFFIC PH: 8448 1800
QUANTITY SURVEY MBM CONSULTING PH: 9270 1000	ARBORIST SYDNEY ARBOR TREES PH: 9666 6821	LANDSCAPE SPACKMAN MOSSOP MICHAELS PH: 9361 4549	SERVICES ENGINEERS ADP CONSULTING PH: 8203 5447

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PROJECT TITLE: Upper Australia Exhibit

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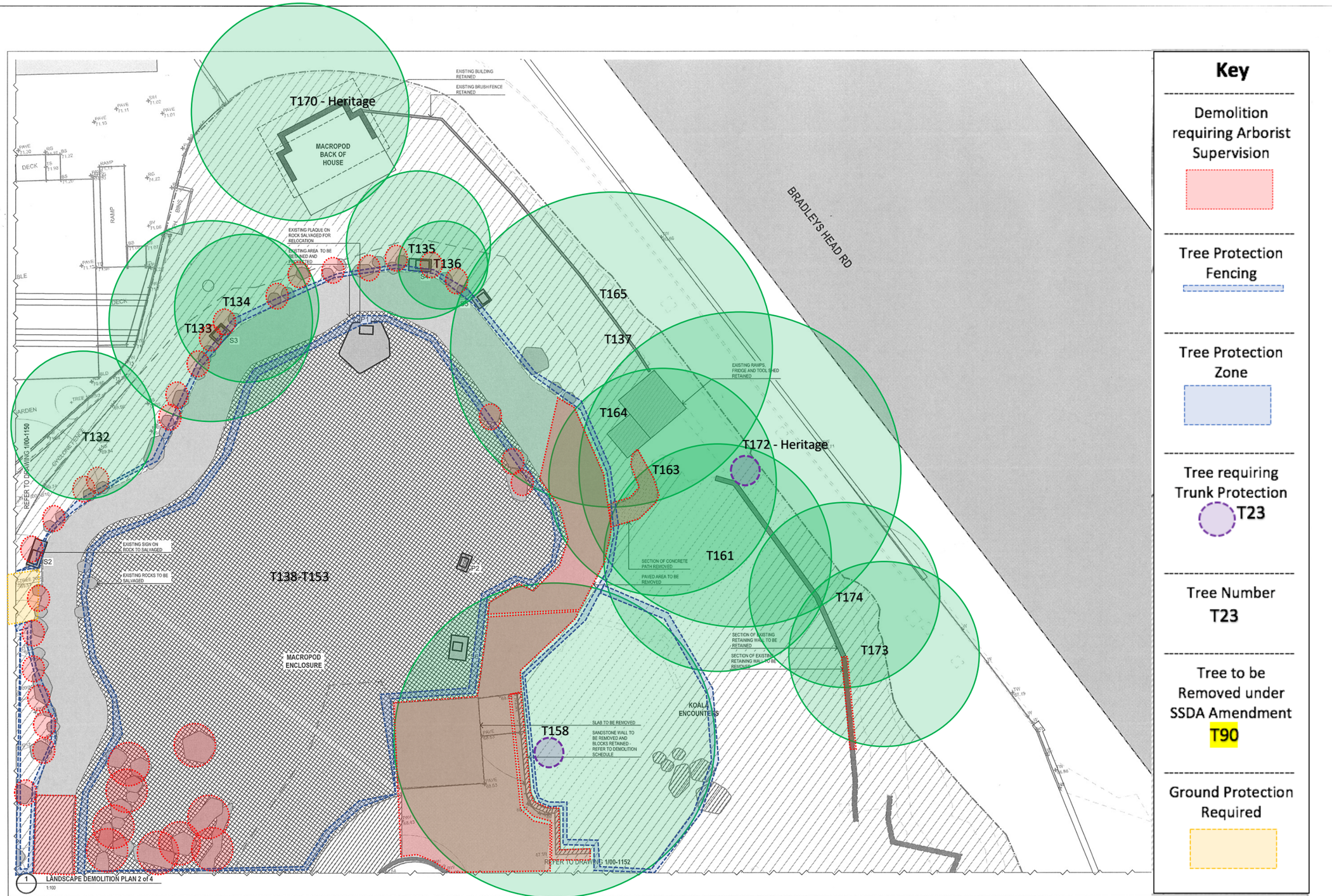
REVIEW	DIRECTOR SIGNATURE	DATE
TENDER		08.07.21
CONST		

TITLE: LANDSCAPE DEMOLITION PLAN 1 of 4 TREE PROTECTION PLAN

DRAWN	PLOT DATE	SCALE @A1
PL	8/07/2021	1:100
CHECKED	PROJECT NO.	DRAWING NO.
SK	18-16	00-1150

REV. NO: A



Key

Demolition requiring Arborist Supervision

Tree Protection Fencing

Tree Protection Zone

Tree requiring Trunk Protection
T23

Tree Number
T23

Tree to be Removed under SSDA Amendment
T90

Ground Protection Required

REV	DESCRIPTION	DATE
01	95% TENDER DOCUMENTATION	30.04.21
02	ISSUE FOR DEMOLITION WORKS	07.05.21
03	100% TENDER DOCUMENTATION	28.05.21
A	ISSUE FOR TENDER	08.07.21

No.	AMENDMENT DESCRIPTION

STRUCTURE / CIVIL SDA STRUCTURES PH: 9810 6911	STORMWATER WARREN SMITH & PARTNERS PH: 9299 1312	BCA / ACCESS MATT SHUTER & ASSOCIATES PH: 9387 4441	TRAFFIC GTA TRAFFIC PH: 8448 1800
QUANTITY SURVEY MBM CONSULTING PH: 9270 1000	ARBORIST SYDNEY ARBOR TREES PH: 9666 6821	LANDSCAPE SPACKMAN MOSSOP MICHAELS PH: 9361 4549	SERVICES ENGINEERS ADP CONSULTING PH: 8233 5447

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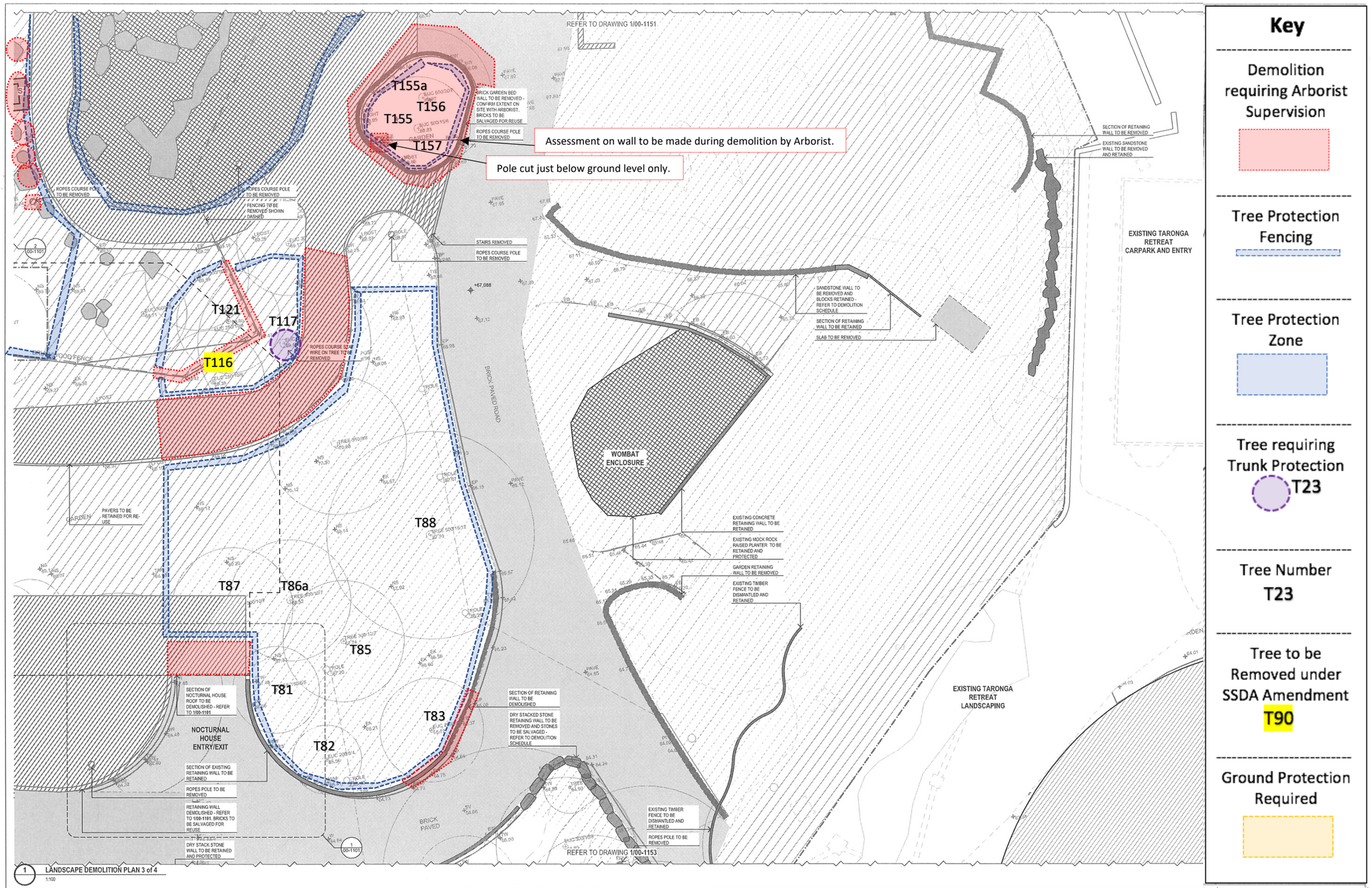
REVIEW	DIRECTOR SIGNATURE	DATE
TENDER		08.07.21
CONST		

TITLE: LANDSCAPE DEMOLITION PLAN 2 of 4 TREE PROTECTION PLAN

DRAWN	PLOT DATE	SCALE @A1
PL	8/07/2021	1:100
CHECKED	PROJECT NO.	DRAWING NO.	REV. NO
SK	18-16	00-1151	A



Key

Demolition requiring Arborist Supervision

Tree Protection Fencing

Tree Protection Zone

Tree requiring Trunk Protection
T23

Tree Number
T23

Tree to be Removed under SSDA Amendment
T90

Ground Protection Required

REV	DESCRIPTION	DATE
01	95% TENDER DOCUMENTATION	30.04.21
02	ISSUE FOR DEMOLITION WORKS	07.05.21
03	100% TENDER DOCUMENTATION	28.05.21
A	ISSUE FOR TENDER	08.07.21

No. AMENDMENT DESCRIPTION

STRUCTURE / CIVIL: SDA STRUCTURES PH: 9810 6911
STORMWATER: WARREN SMITH & PARTNERS PH: 9299 1312
BCA / ACCESS: MATT SHUTER & ASSOCIATES PH: 9387 4441
TRAFFIC: GTA TRAFFIC PH: 8448 1800
QUANTITY SURVEY: MBM CONSULTING PH: 9279 1000
ARBORIST: SYDNEY ARBOR TREES PH: 9666 8821
LANDSCAPE: SPACKMAN MOSSOP MICHAELS PH: 9361 4549
SERVICES ENGINEERS: ADP CONSULTING PH: 8203 5447

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CLIENT: Taronga Zoo

PROJECT TITLE: Upper Australia Exhibit

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SCALE CHECK: 5 10

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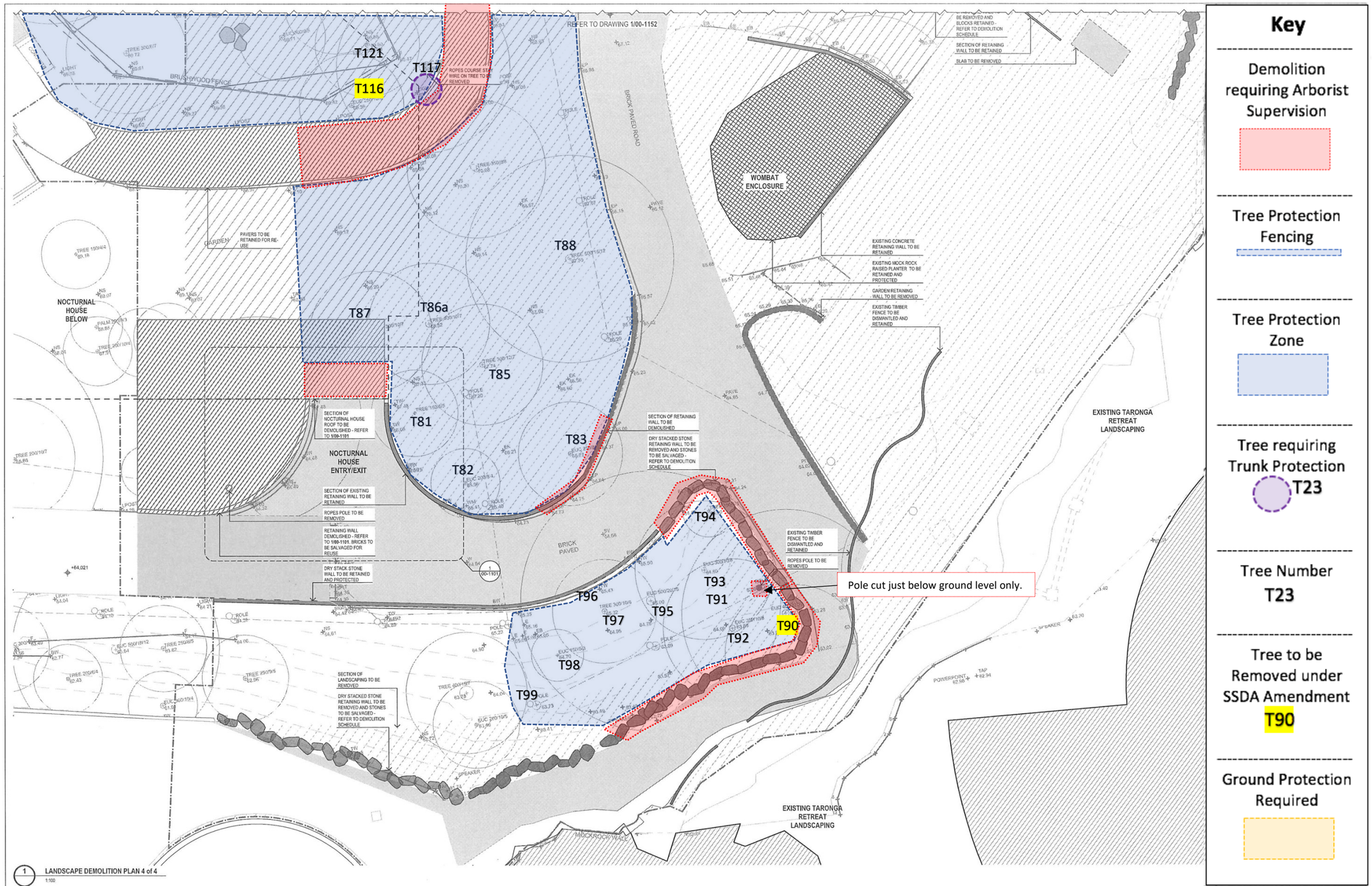
REVIEW	DIRECTOR SIGNATURE	DATE
TENDER		08.07.21
CONST		

TITLE: LANDSCAPE DEMOLITION PLAN 3 of 4 TREE PROTECTION PLAN

DRAWN	PLOT DATE	SCALE @A1
PL	8/07/2021	1:100
CHECKED	PROJECT NO.	DRAWING NO.	REV. NO
SK	18-16	00-1152	A



Key

- Demolition requiring Arborist Supervision
- Tree Protection Fencing
- Tree Protection Zone
- Tree requiring Trunk Protection — T23
- Tree Number — T23
- Tree to be Removed under SSDA Amendment — T90
- Ground Protection Required

REV	DESCRIPTION	DATE
01	95% TENDER DOCUMENTATION	30.04.21
02	ISSUE FOR DEMOLITION WORKS	07.05.21
03	100% TENDER DOCUMENTATION	28.05.21
A	ISSUE FOR TENDER	09.07.21

No.	AMENDMENT DESCRIPTION

STRUCTURE / CIVIL
SDA STRUCTURES
PH: 9810 6911

STORMWATER
WARREN SMITH & PARTNERS
PH: 9299 1312

BCA / ACCESS
MATT SHUTER & ASSOCIATES
PH: 9387 4441

TRAFFIC
GTA TRAFFIC
PH: 8448 1800

QUANTITY SURVEY
MBM CONSULTING
PH: 9270 1000

ARBORIST
SYDNEY ARBOR TREES
PH: 9666 6821

LANDSCAPE
SPACKMAN MOSSOP MICHAELS
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SERVICES ENGINEERS
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CLIENT
Taronga Zoo

PROJECT TITLE
Upper Australia Exhibit

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SCALE CHECK

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REVIEW	DIRECTOR SIGNATURE	DATE
TENDER		09.07.21
CONST		

TITLE
LANDSCAPE DEMOLITION PLAN 4 of 4 TREE PROTECTION PLAN

DRAWN	PLOT DATE	SCALE @A1
PL	8/07/2021	1:100
CHECKED	PROJECT NO.	DRAWING NO.	REV. NO
SK	18-16	00-1153	A

1.24 Tree Schedule

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
1	*Hymenosporum flavum*	Native Frangipani	1	5-10	<5	150	200	2	1.68	Fair	Fair	Semi-mature	25-50	<5	Deadwood <-5cm diam. Dieback-general	Low	Remove deadwood		Failure Possible	Minor	Frequent	Medium	337440.109	6253863.97	69.58
2	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	10-15	10-15	800	950	9.6	3.17	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam. Included bark Cavity(s)	Medium	Remove deadwood Monitor Further reporting & testing	Ropes course impacting tree. Cavity from ground to 1.5m needs picus testing.	Failure Possible	Minor	Frequent	Medium	337437.423	6253862.555	68.38
3	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	5-10	5-10	400	400	4.8	2.25	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337433.324	6253863.453	66.73
4	Dead Tree	Dead tree	1	5-10	<5	150	200	2	1.68	Dead	Poor	Semi-mature	0	90-100	Deadwood 5 - 10cm diam. Decay	Low	Remove tree	Dead tree will impact pond.	Failure Likely	Minor	Rare	Low	337434.729	6253866.183	68.066
5	*Ficus coronata*	Sandpaper Fig	1	5-10	5-10	400	500	4.8	2.47	Good	Fair	Mature	>50		Included bark	Medium	Monitor	Inclusion base of tree OK this inspection.	Failure Likely	Minor	Rare	Low	337434.39	6253866.428	67.659
6	*Ficus coronata*	Sandpaper Fig	1	5-10	5-10	300	350	3.6	2.13	Good	Fair	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Rare	Very Low	337433.228	6253876.925	68.078
7	*Tristaniopsis laurina*	Kanooka	1	10-15	5-10	500	550	6	2.57	Good	Good	Mature	25-50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over ponds.	Failure Possible	Minor	Rare	Very Low	337427.909	6253877.543	74.312
8	*Tristaniopsis laurina*	Kanooka	1	5-10	5-10	350	500	4.2	2.47	Fair	Fair	Mature	10-15	10-20	Deadwood 5 - 10cm diam. Dieback-general	Low	Remove deadwood	Deadwood over ponds. Ibis nesting in tree.	Failure Likely	Minor	Rare	Low	337435.225	6253877.429	70.402
9	*Casuarina cunninghamiana*	River She-oak	1	15-20	5-10	600	800	7.2	3.01	Good	Poor	Mature	10-15	<5	Deadwood 5 - 10cm diam. Dieback-general Decay Cavity(s) Wound(s)	Low	Remove deadwood Further reporting & testing	Deadwood over ponds. Picus test base of tree. Ropes course impacting tree.	Failure Likely	Serious	Frequent	High	337443.627	6253873.136	70.637
10	Dead Tree	Dead tree	1	5-10	<5	150	200	2	1.68	Dead	Poor	Semi-mature	0	90-100	Deadwood 10cm plus diam.	Low	Remove tree	Dead tree over ponds.	Failure Likely	Minor	Rare	Low	337413.414	6253881.708	72.462
11	*Tristaniopsis laurina*	Kanooka	1	10-15	5-10	350	450	4.2	2.37	Fair	Fair	Mature	15-25	<5	Deadwood <-5cm diam.	Low	Remove deadwood	Deadwood over ponds.	Failure Possible	Minor	Rare	Very Low	337414.833	6253883.514	71.036
12	*Tristaniopsis laurina*	Kanooka	1	5-10	5-10	300	350	3.6	2.13	Fair	Fair	Mature	15-25	<5	Deadwood <-5cm diam. Dieback-tip	Low	Remove deadwood	Deadwood over ponds.	Failure Possible	Minor	Rare	Very Low	337417.27	6253884.252	71.689
13	*Tristaniopsis laurina*	Kanooka	1	5-10	5-10	300	350	3.6	2.13	Fair	Fair	Mature	15-25		Conflicting branches	Low	Crown raise Remove select branches	Branches impacting other tree. Lateral prune.	Failure Likely	Minor	Rare	Low	337418.054	6253886.735	71.883
14	*Ficus obliqua*	Small-leaved Fig	1	15-20	20-30	1500	1800	15	4.24	Poor	Fair	Mature	15-25	5-10	Deadwood <-5cm diam. Dieback-general	High	Remove deadwood Monitor	HERITAGE TREE 05L- Tree is in decline refer to Sydney Arbor report.	Failure Likely	Moderate	Constant	High	337420.835	6253897.678	72.875
15	*Archontophoenix cunninghamiana*	Bangalow Palm	1	10-15	<5	250	350	3	2	Good	Good	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Rare	Very Low	337426.271	6253886.225	72.497
16	*Cupaniopsis anacardioides*	Tuckaroo	1	10-15	10-15	450	550	5.4	2.57	Good	Fair	Mature	25-50		Included bark	Medium	Monitor	Inclusions OK this inspection.	Failure Possible	Minor	Rare	Very Low	337434.726	6253887.477	71.79
17	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	5-10	5-10	300	300	3.6	2	Good	Fair	Semi-mature	15-25		Suppressed growth.	Low			Failure Possible	Minor	Frequent	Medium	337436.263	6253894.05	71.72
18	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	15-20	10-15	700	650	8.4	2.76	Fair	Fair	Mature	15-25	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over play ground.	Failure Likely	Minor	Frequent	Medium	337439.302	6253895.146	71.816
19	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	15-20	10-15	750	950	9	3.24	Fair	Fair	Mature	>50		Fig growing in union.	Medium	Other actions	Remove fig tree.	Failure Unlikely	Minor	Frequent	Low	337442.19	6253894.649	72.403
20	*Eucalyptus robusta*	Swamp Mahogany	1	15-20	15-20	650	750	7.8	2.93	Good	Poor	Mature	15-25	5-10	Deadwood 5 - 10cm diam. Cavity(s) Previous failures Hanger(s)	Medium	Remove deadwood Remove hanging branch Aerial inspection	Deadwood over ponds. Hangers x 2 over ponds. Cavity lower trunk requires aerial inspection at 8m.	Failure Likely	Serious	Frequent	High	337441.613	6253892.734	73.556
21	*Tristaniopsis laurina*	Kanooka	1	5-10	5-10	200	400	2.4	2.25	Fair	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Rare	Very Low	337441.484	6253891.817	72.244
22	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	5-10	5-10	250	300	3	2	Good	Fair	Semi-mature	25-50		Abnormal lean	Low			Failure Unlikely	Minor	Rare	Very Low	337432.294	6253874.755	69.123
23	*Casuarina glauca*	Swamp she-oak	1	5-10	5-10	300	400	3.6	2.25	Good	Poor	Semi-mature	5-10	<5	Deadwood <-5cm diam. Inappropriate location	Low	Remove tree	Tree at edge of pond.	Failure Possible	Minor	Rare	Very Low	337462.311	6253878.625	69.522
24	*Casuarina glauca*	Swamp she-oak	1	5-10	5-10	300	400	3.6	2.25	Good	Poor	Semi-mature	5-10		Abnormal lean Inappropriate location	Low	Remove tree	Tree at edge of pond.	Failure Possible	Minor	Rare	Very Low	337463.64	6253879.121	69.314
25	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	10-15	10-15	450	550	5.4	2.57	Good	Fair	Mature	15-25		Wound(s) Included bark Mechanical damage	Low	Monitor	Wound base of tree OK this inspection.	Failure Possible	Minor	Frequent	Medium	337466.614	6253882.988	70.677

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
26	Dead Tree	Dead tree	1	5-10	<5	200	200	2.4	1.68	Dead	Poor	Juvenile	0	90-100	Deadwood 5 - 10cm diam. Included bark	Low	Remove tree	Dead tree in ponds area.	Failure Likely	Minor	Frequent	Medium	337464.73	6253892.392	71.876
27	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	10-15	10-15	400	500	4.8	2.47	Poor	Poor	Senescent	5-10	5-10	Deadwood 5 - 10cm diam. Dieback-general Epicormic growth Inappropriate location	Low	Remove tree	Tree is in advanced decline. Growing edge of ponds.	Failure Possible	Serious	Frequent	High	337429.004	6253860.651	67.359
28	*Glochidion ferdinandi*	Cheese Tree	1	10-15	10-15	400	500	4.8	2.47	Good	Poor	Mature	5-10	<5	Deadwood <-5cm diam. Root damage Included bark	Low	Remove deadwood Further reporting & testing	Tree is in decline. Growing edge of ponds. Lower trunk needs picus testing. Exposed root plate.	Failure Possible	Minor	Rare	Very Low	337418.411	6253868.584	66.852
29	*Archontophoenix cunninghamiana*	Bangalow Palm	1	10-15	<5	300	350	3.6	2.13	Good	Good	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Rare	Very Low	337419.999	6253873.068	68.967
30	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	5-10	5-10	250	300	3	2	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Rare	Very Low	337419.711	6253873.471	68.564
31	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	15-20	10-15	650	800	7.8	3.01	Good	Fair	Mature	>50	5-10	Deadwood 5 - 10cm diam. Included bark Bird browsing damage Wound(s) Cross/rubbing branches	Medium	Remove deadwood Remove select branches Monitor Aerial inspection	Deadwood over ponds. Lower trunk wounds to be inspected. Areial inspection of inclusions and bird damage.	Failure Possible	Serious	Frequent	High	337416.993	6253868.516	68.293
32	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	10-15	5-10	250	400	3	2.25	Good	Fair	Semi-mature	>50		Cross/rubbing branches	Medium	Remove select branches	Remove cross rubbing branches.	Failure Possible	Moderate	Frequent	Medium	337416.479	6253865.611	66.688
33	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	10-15	5-10	350	600	4.2	2.67	Good	Fair	Mature	>50		Included bark	Low	Monitor	Inclusions in tree OK this inspection.	Failure Possible	Minor	Frequent	Medium	337413.332	6253863.882	68.404
34	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	5-10	<5	100	150	2	1.5	Fair	Fair	Juvenile	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337414.656	6253867.641	70.4
35	*Castanospermum australe*	Blackbean	1	10-15	5-10	400	550	4.8	2.57	Good	Poor	Mature	<5	<5	Deadwood <-5cm diam. Poor pruning Decay Wound(s) Pests/insect damage Root damage	Low	Remove deadwood Further reporting & testing	Borer damage at base compromising trees retention. Picus test base. Ropes course impacting tree.	Failure Likely	Extreme	Frequent	Urgent	337434.449	6253842.933	69.135
36	*Syzygium smithii*	Lilly Pilly	1	5-10	<5	150	150	2	1.5	Poor	Fair	Semi-mature	5-10	<5	Deadwood <-5cm diam. Poor pruning Pests/insect damage	Low	Remove deadwood Monitor	Deadwood over decking.	Failure Possible	Minor	Frequent	Medium	337438.208	6253847.433	67.799
37	Polyscias elegans	Celerywood	1	10-15	5-10	300	400	3.6	2.25	Good	Fair	Mature	25-50		Included bark	Medium	Monitor	Lower trunk inclusion OK this inspection.	Failure Possible	Minor	Frequent	Medium	337440.416	6253848.262	66.719
38	Polyscias elegans	Celerywood	1	15-20	10-15	350	450	4.2	2.37	Good	Fair	Mature	25-50		Damaging infrastructure	Medium	Monitor	Lower platform damaging lower trunk.	Failure Possible	Minor	Frequent	Medium	337436.982	6253848.438	72.229
39	Polyscias elegans	Celerywood	1	15-20	10-15	500	600	6	2.67	Fair	Poor	Mature	5-10		Root damage Included bark	Low	Monitor	Lower platform damaging lower trunk. Inclusions OK this inspection.	Failure Possible	Minor	Frequent	Medium	337440.888	6253850.23	69.898
40	*Syzygium smithii*	Lilly Pilly	1	5-10	10-15	300	400	3.6	2.25	Fair	Fair	Mature	15-25	<5	Deadwood 5 - 10cm diam.	Low	Remove deadwood Monitor	Mid trunk ropes course damage. Impacting steps.	Failure Possible	Minor	Frequent	Medium	337437.74	6253852.007	69.452
41	*Syzygium smithii*	Lilly Pilly	1	10-15	10-15	350	450	4.2	2.37	Good	Fair	Mature	15-25	<5	Deadwood <-5cm diam.	Low	Remove deadwood Monitor	Mid trunk ropes course damaging tree.	Failure Possible	Minor	Frequent	Medium	337438.459	6253855.61	68.384
42	*Syzygium smithii*	Lilly Pilly	1	5-10	5-10	200	250	2.4	1.85	Good	Fair	Mature	15-25		No visual defects sited	Low			Failure Unlikely	Minor	Rare	Very Low	337437.364	6253854.562	69.755
43	*Syzygium smithii*	Lilly Pilly	1	5-10	10-15	250	350	3	2	Good	Fair	Mature	25-50		Soil compaction	Low	Decompact soil		Failure Unlikely	Minor	Rare	Very Low	337434.635	6253855.997	69.157
44	*Elaeocarpus reticulatus*	Blueberry Ash	1	5-10	5-10	200	250	2.4	1.85	Fair	Fair	Semi-mature	15-25		Soil compaction Mechanical damage	Low	Mulching under tree		Failure Unlikely	Minor	Frequent	Low	337445.752	6253851.924	72.219
45	*Eucalyptus saligna*	Sydney Blue Gum	1	20-30	15-20	650	850	7.8	3.09	Fair	Fair	Mature	15-25	<5	Deadwood 10cm plus diam. Decay Root damage Wound(s)	Medium	Remove deadwood Monitor Aerial inspection	Deadwood over decking. Ropes course impacting tree. Aerial inspection. Review rigging around tree.	Failure Possible	Serious	Frequent	High	337446.146	6253850.648	70.682
46	*Hymenosporum flavum*	Native Frangipani	1	5-10	5-10	150	200	2	1.68	Poor	Poor	Senescent	<5	<5	Deadwood 10cm plus diam. Decay Root damage Wound(s) Pests/insect damage	Low	Remove deadwood Monitor	Deadwood over decking. Remove northern dead stem.	Failure Possible	Serious	Frequent	High	337445.452	6253850.273	72.155
47	*Grevillea robusta*	Silky Oak	1	10-15	5-10	250	350	3	2	Good	Fair	Semi-mature	15-25		Wound(s)	Low	Monitor	Decking causing wounds mid trunk.	Failure Possible	Serious	Frequent	High	337447.64	6253849.485	72.804
48	Polyscias elegans	Celerywood	1	10-15	10-15	300	350	3.6	2.13	Good	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Mechanical damage	Medium	Remove deadwood Monitor	Deadwood over ropes course. Ropes damaging tree lower trunk.	Failure Possible	Serious	Frequent	High	337442.99	6253844.373	70.025
49	*Castanospermum australe*	Blackbean	1	15-20	15-20	600	650	7.2	2.76	Good	Good	Mature	>50		Mechanical damage Wound(s) Included bark	Medium	Monitor	Ropes course damaging tree. Inclusions OK this inspection.	Failure Possible	Serious	Frequent	High	337439.6	6253841.378	69.928
50	Polyscias elegans	Celerywood	1	15-20	10-15	500	650	6	2.76	Good	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Wound(s) Mechanical damage	Medium	Remove deadwood Monitor	Ropes course damaging tree. Deadwood over ropes course.	Failure Possible	Serious	Frequent	High	337443.005	6253837.737	69.532

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
51	*Hymenosporum flavum*	Native Frangipani	1	5-10	<5	150	200	2	1.68	Fair	Fair	Semi-mature	15-25	<5	Deadwood <-5cm diam.	Low	Remove deadwood	Deadwood over platform.	Failure Possible	Minor	Frequent	Medium	337446.336	6253845.626	70.255
52	*Hymenosporum flavum*	Native Frangipani	1	5-10	<5	250	350	3	2	Fair	Poor	Semi-mature	5-10	<5	Deadwood <-5cm diam. Root damage Borer/Termites Exposed roots	Low	Remove tree	Deadwood over garden. Tree is in decline, poor tree form.	Failure Possible	Minor	Frequent	Medium	337445.661	6253844.324	71.243
53	*Elaeocarpus reticulatus*	Blueberry Ash	1	5-10	<5	200	350	2.4	2.13	Fair	Poor	Semi-mature	<5		Decay	Low	Remove tree	Decay base of tree has compromised retention of tree.	Failure Possible	Minor	Frequent	Medium	337448.221	6253842.624	70.567
54	*Hymenosporum flavum*	Native Frangipani	1	5-10	<5	150	300	2	2	Poor	Poor	Semi-mature	<5		Decay Dieback-general	Low	Remove tree	Decay base of tree has compromised retention of tree.	Failure Possible	Minor	Frequent	Medium	337451.104	6253841.96	70.093
55	*Hymenosporum flavum*	Native Frangipani	1	10-15	5-10	250	350	3	2	Fair	Poor	Mature	5-10	<5	Deadwood <-5cm diam. Root damage Decay	Low	Remove tree	Decay base of tree has compromised retention of tree.	Failure Possible	Minor	Frequent	Medium	337453.155	6253841.206	70.453
56	*Strelitzia nicolai*	Giant Bird of Paradise	1	5-10	<5	200	200	2.4	1.68	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337447.652	6253840.648	71.286
57	*Podocarpus elatus*	Brown Pine	1	10-15	5-10	250	350	3	2	Good	Good	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Occasional	Very Low	337462.238	6253839.414	70.248
58	*Archontophoenix cunninghamiana*	Bangalow Palm	1	5-10	<5	200	300	2.4	2	Good	Good	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Occasional	Very Low	337462.388	6253839.712	69.977
59	*Brachychiton acerifolius*	Illawarra Flame Tree	1	10-15	5-10	200	250	2.4	1.85	Fair	Good	Semi-mature	>50		Pests/insect damage	Low			Failure Unlikely	Minor	Occasional	Very Low	337464.829	6253838.769	70.001
60	*Eucalyptus sp.*	Eucalypt	1	10-15	5-10	200	300	2.4	2	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337465.142	6253839.342	69.19
61	*Banksia integrifolia*	Coast Banksia	1	5-10	5-10	200	300	2.4	2	Good	Good	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337460.994	6253846.661	72.502
62	*Eucalyptus microcorys*	Tallowwood	1	5-10	5-10	150	200	2	1.68	Good	Fair	Juvenile	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337466.586	6253845.498	70.661
63	*Toona ciliata*	Red Cedar	1	5-10	5-10	200	300	2.4	2	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337467.055	6253838.046	71.033
64	*Pittosporum undulatum*	Sweet Pittosporum	1	5-10	5-10	300	450	3.6	2.37	Good	Fair	Mature	25-50		Hanger(s) Previous failures	Low	Remove hanging branch	Hanger over garden.	Failure Possible	Minor	Occasional	Low	337469.648	6253834.467	69.274
65	*Melaleuca styphelioides*	Prickly-leaved Paperbark	1	5-10	5-10	200	300	2.4	2	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Possible	Minor	Occasional	Low	337468.046	6253840.841	69.757
66	*Melaleuca styphelioides*	Prickly-leaved Paperbark	1	5-10	5-10	200	300	2.4	2	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Possible	Minor	Occasional	Low	337471.47	6253841.051	72.017
67	*Banksia integrifolia*	Coast Banksia	1	5-10	<5	150	200	2	1.68	Good	Good	Mature	>50		No visual defects sited	Low			Failure Possible	Minor	Occasional	Low	337474.788	6253838.665	70.514
68	*Pittosporum rhombifolium*	Queensland Laurel	1	5-10	5-10	250	300	3	2	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Possible	Minor	Occasional	Low	337476.45	6253835.885	79.603
69	*Angophora costata*	Smooth-barked Apple Myrtle	1	5-10	<5	100	150	2	1.5	Poor	Poor	Juvenile	<5	60-70	Deadwood <-5cm diam. Dieback-general	Low	Remove tree	Tree is in advanced decline.	Failure Possible	Minor	Occasional	Low	337475.804	6253841.296	75.111
70	*Ficus benjamina*	Weeping Fig	1	10-15	10-15	700	900	8.4	3.17	Good	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Wound(s) Poor pruning	Low	Remove deadwood Other actions	Deadwood over pathway. Ropes course impacting tree.	Failure Possible	Minor	Frequent	Medium	337447.561	6253832.243	66.573
71	*Archontophoenix cunninghamiana*	Bangalow Palm	1	5-10	5-10	150	200	2	1.68	Good	Good	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337451.602	6253830.617	66.861
72	*Archontophoenix cunninghamiana*	Bangalow Palm	1	5-10	5-10	150	200	2	1.68	Good	Good	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337454.828	6253830.2	68.251
73	*Toona australis*	Red Cedar	1	20-30	20-30	950	1300	11.4	3.69	Good	Good	Mature	>50	<5	Deadwood 5 - 10cm diam. Wound(s)	High	Remove deadwood	Deadwood over ropes course. Platform damaging tree.	Failure Possible	Moderate	Frequent	Medium	337452.753	6253829.887	70.324
74	*Archontophoenix cunninghamiana*	Bangalow Palm	1	5-10	5-10	150	200	2	1.68	Good	Good	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337456.627	6253830.712	69.994
75	*Castanospermum australe*	Blackbean	1	10-15	15-20	250	350	3	2	Good	Fair	Mature	>50		Wound(s)	Medium	Monitor	Ropes course impacting tree.	Failure Possible	Minor	Occasional	Low	337456.008	6253831.201	69.579
76	*Castanospermum australe*	Blackbean	1	10-15	15-20	250	350	3	2	Good	Fair	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Occasional	Very Low	337456.018	6253827.241	73.184

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
77	*Toona australis*	Red Cedar	1	5-10	5-10	150	200	2	1.68	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337461.953	6253832.007	68.357
78	*Archontophoenix cunninghamiana*	Bangalow Palm	1	5-10	5-10	300	350	3.6	2.13	Good	Good	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337463.426	6253830.688	68.572
79	*Elaeocarpus reticulatus*	Blueberry Ash	1	5-10	5-10	200	300	2.4	2	Good	Good	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337466.57	6253828.917	66.342
80	*Acacia fimbriata*	Fringed Wattle	1	5-10	<5	150	200	2	1.68	Good	Good	Mature	5-10		Dieback-general	Low			Failure Unlikely	Minor	Frequent	Low	337472.494	6253830.935	66.383
81	*Elaeocarpus reticulatus*	Blueberry Ash	1	5-10	<5	150	200	2	1.68	Good	Good	Semi-mature	25-50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337478.366	6253830.673	67.179
82	*Eucalyptus maidenii*	Maiden's Gum	1	10-15	5-10	450	550	5.4	2.57	Fair	Fair	Mature	15-25	<5	Deadwood <-5cm diam. Dieback-general	Low	Remove deadwood	Deadwood over garden.	Failure Possible	Minor	Frequent	Medium	337481.174	6253826.688	66.313
83	*Eucalyptus botryoides*	Southern Mahogany	1	10-15	10-15	250	400	3	2.25	Good	Fair	Mature	>50		No visual defects sited	Medium			Failure Possible	Minor	Frequent	Medium	337487.917	6253827.831	66.194
84	*Hymenosporum flavum*	Native Frangipani	1	10-15	5-10	150	200	2	1.68	Good	Fair	Mature	25-50		No visual defects sited	Low			Failure Possible	Minor	Frequent	Medium	337489.63	6253830.532	66.078
85	*Banksia integrifolia*	Coast Banksia	1	15-20	10-15	500	600	6	2.67	Good	Fair	Mature	25-50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over garden	Failure Possible	Minor	Frequent	Medium	337484.253	6253833.987	70.291
86	*Glochidion ferdinandi*	Cheese Tree	1	10-15	5-10	450	500	5.4	2.47	Fair	Fair	Mature	15-25	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over garden	Failure Possible	Minor	Frequent	Medium	337482.279	6253837.195	72.103
87	*Hymenosporum flavum*	Native Frangipani	1	10-15	<5	100	150	2	1.5	Fair	Fair	Semi-mature	25-50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337486.252	6253837.157	70.571
88	*Glochidion ferdinandi*	Cheese Tree	1	10-15	10-15	600	700	7.2	2.85	Fair	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Wound(s). Mechanical damage	Medium	Remove deadwood	Deadwood over garden and pathway. Ropes course damaging tree.	Failure Possible	Moderate	Frequent	Medium	337489.896	6253838.952	68.606
89	*Hibiscus sp*	Hibiscus	1	5-10	5-10	200	300	2.4	2	Fair	Fair	Mature	25-50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337506.209	6253827.666	66.317
90	*Eucalyptus botryoides*	Bangalay	1	15-20	10-15	450	550	5.4	2.57	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	High	Remove deadwood	Deadwood over pathway.	Failure Possible	Moderate	Frequent	Medium	337498.676	6253817.176	64.543
91	*Eucalyptus botryoides*	Bangalay	1	5-10	<5	100	150	2	1.5	Fair	Poor	Juvenile	<5	5-10	Deadwood <-5cm diam. Dieback-general	Low	Remove tree	Deadwood over pathway. Tree is in advanced decline.	Failure Possible	Minor	Frequent	Medium	337497.433	6253817.317	64.784
92	*Eucalyptus robusta*	Swamp Mahogany	1	10-15	5-10	250	300	3	2	Poor	Poor	Mature	10-15	<5	Deadwood 5 - 10cm diam. Dieback-general	Medium	Remove tree	Deadwood over footpath. Earth works in SRZ.	Failure Possible	Moderate	Frequent	Medium	337495.377	6253816.926	65.039
93	*Lophostemon confertus*	Queensland Box	1	10-15	5-10	300	400	3.6	2.25	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over garden.	Failure Possible	Minor	Frequent	Medium	337494.495	6253820.521	65.771
94	*Buckinghamia celsissima*	Ivory Curl Tree	1	5-10	<5	150	200	2	1.68	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337495.161	6253823.895	65.608
95	*Eucalyptus robusta*	Swamp Mahogany	1	15-20	10-15	500	700	6	2.85	Fair	Fair	Mature	>50	5-10	Deadwood 10cm plus diam. Root damage	Medium	Remove deadwood Monitor	Deadwood over pathway.	Failure Possible	Moderate	Frequent	Medium	337491.235	6253819.292	65.914
96	*Hymenosporum flavum*	Native Frangipani	1	10-15	<5	100	150	2	1.5	Fair	Fair	Mature	>50		No visual defects sited	Medium			Failure Possible	Minor	Frequent	Medium	337490.127	6253819.12	65.706
97	*Allocasuarina littoralis*	Black She-oak	1	10-15	10-15	300	400	3.6	2.25	Fair	Fair	Mature	>50		No visual defects sited	Medium			Failure Possible	Minor	Frequent	Medium	337488.467	6253818.937	66.039
98	*Syncarpia glomulifera*	Turpentine	1	5-10	5-10	150	200	2	1.68	Fair	Fair	Semi-mature	15-25		Dieback-general	Low			Failure Possible	Minor	Frequent	Medium	337485.074	6253817.199	66.585
99	*Polyscias murrayi*	Pencil Cedar	10	5-10	5-10	200	250	2.4	1.85	Good	Fair	Semi-mature	25-50		No visual defects sited	Low			Failure Possible	Minor	Frequent	Medium	337481.993	6253814.432	66.18
100	*Eucalyptus punctata*	Grey Gum	1	10-15	5-10	200	250	2.4	1.85	Fair	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Possible	Minor	Occasional	Low	337481.591	6253815.853	65.1
101	*Polyscias murrayi*	Pencil Cedar	1	10-15	10-15	300	450	3.6	2.37	Fair	Fair	Mature	>50		Included bark	Medium	Monitor	Inclusions base of tree.	Failure Possible	Minor	Frequent	Medium	337480.302	6253816.915	64.884

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
102	*Acacia implexa*	Lightwood	1	10-15	5-10	150	200	2	1.68	Fair	Fair	Mature	5-10		Dieback-general	Low			Failure Possible	Minor	Frequent	Medium	337475.808	6253813.908	63.808
103	Flindersia schottiana	Bumpy Ash	1	10-15	5-10	400	500	4.8	2.47	Good	Good	Mature	>50		No visual defects sited	Medium			Failure Possible	Minor	Frequent	Medium	337467.947	6253819.588	64.329
104	*Eucalyptus robusta*	Swamp Mahogany	1	5-10	5-10	250	350	3	2	Fair	Fair	Semi-mature	15-25		Dieback-general Wound(s)	Low	Monitor Aerial inspection	Wound at 8m needs aerial inspection.	Failure Possible	Minor	Frequent	Medium	337465.451	6253819.736	64.061
105	*Toona australis*	Red Cedar	1	10-15	5-10	300	400	3.6	2.25	Good	Fair	Mature	25-50		Damaging infrastructure	Medium	Remove select branches	Branches impacting ropes course.	Failure Likely	Moderate	Frequent	Medium	337464.246	6253823.308	62.36
106	*Eucalyptus robusta*	Swamp Mahogany	1	15-20	10-15	600	700	7.2	2.85	Good	Fair	Mature	25-50		Damaging infrastructure	Medium	Remove select branches	Branches impacting ropes course.	Failure Likely	Moderate	Frequent	Medium	337461.302	6253821.819	67.752
107	*Eucalyptus robusta*	Swamp Mahogany	1	5-10	5-10	250	350	3	2	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337457.997	6253821.641	64.763
108	*Eucalyptus robusta*	Swamp Mahogany	1	10-15	5-10	400	500	4.8	2.47	Good	Fair	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Occasional	Very Low	337455.304	6253823.956	66.759
109	Flindersia schottiana	Bumpy Ash	1	15-20	5-10	350	500	4.2	2.47	Good	Fair	Mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Occasional	Very Low	337449.536	6253822.911	67.022
110	*Podocarpus elatus*	Brown Pine	1	5-10	<5	250	350	3	2	Fair	Fair	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337450.224	6253824.524	66.458
111	*Eucalyptus botryoides*	Southern Mahogany	1	15-20	15-20	550	700	6.6	2.85	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam. Mechanical damage	Medium	Remove deadwood Monitor	Deadwood over garden. Ropes course damaging tree.	Failure Possible	Moderate	Frequent	Medium	337443.726	6253822.787	72.588
112	*Eucalyptus botryoides*	Southern Mahogany	1	15-20	15-20	450	650	5.4	2.76	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam. Excessive end weight	Medium	Remove deadwood Wieght reduction vertical	Deadwood over garden. Reduction pruning long lateral branches southern side.	Failure Possible	Moderate	Occasional	Medium	337435.787	6253825.266	68.779
113	*Angophora costata*	Smooth-barked Apple Myrtle	1	5-10	<5	150	200	2	1.68	Fair	Fair	Semi-mature	15-25	5-10	Deadwood <-5cm diam. Dieback-general	Low	Remove deadwood	Deadwood over garden.	Failure Possible	Minor	Occasional	Low	337475.701	6253898.114	70.974
114	*Lophostemon confertus*	Queensland Box	1	10-15	5-10	800	800	9.6	3.01	Good	Fair	Mature	>50	5-10	Deadwood 5 - 10cm diam.	Medium	Remove deadwood	Deadwood over garden and pathway.	Failure Possible	Moderate	Frequent	Medium	337473.531	6253893.639	71.689
115	*Banksia integrifolia*	Coast Banksia	1	10-15	5-10	500	900	6	3.17	Fair	Fair	Mature	15-25	5-10	Deadwood 5 - 10cm diam.	Medium	Remove deadwood Weight reduction lateral	Deadwood over garden, exhibit and pathway.	Failure Possible	Moderate	Frequent	Medium	337455.628	6253867.139	70.378
116	*Eucalyptus botryoides*	Southern Mahogany	1	5-10	10-15	300	400	3.6	2.25	Good	Fair	Mature	25-50	<5	Deadwood 5 - 10cm diam. Excessive end weight	Low	Remove deadwood Weight reduction lateral	Deadwood over garden exhibit and pathway.	Failure Possible	Moderate	Frequent	Medium	337478.728	6253850.341	70.504
117	*Eucalyptus robusta*	Swamp Mahogany	1	10-15	5-10	500	900	6	3.17	Fair	Fair	Mature	25-50	10-20	Deadwood 10cm plus diam. Previous failures Wound(s) Root damage Excessive end weight	Medium	Remove deadwood Aerial inspection Weight reduction lateral	Deadwood over garden, exhibition and footpath. Large basal growth base of tree. Aerial inspection of upper canopy.	Failure Possible	Moderate	Frequent	Medium	337482.767	6253851.883	70.953
118	*Eucalyptus saligna*	Sydney Blue Gum	1	15-20	10-15	400	450	4.8	2.37	Good	Fair	Semi-mature	25-50	<5	Deadwood 5 - 10cm diam.	Medium	Remove deadwood	Deadwood over garden, exhibition and footpath.	Failure Possible	Minor	Frequent	Medium	337484.564	6253859.156	69.26
119	*Eucalyptus microcorys*	Tallowwood	1	15-20	5-10	350	400	4.2	2.25	Good	Fair	Mature	>50	<5	Deadwood 5 - 10cm diam.	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Minor	Occasional	Low	337480.619	6253855.159	70.17
120	*Eucalyptus microcorys*	Tallowwood	1	15-20	5-10	400	450	4.8	2.37	Good	Fair	Mature	>50	<5	Deadwood 5 - 10cm diam.	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Minor	Occasional	Low	337478.524	6253857.444	71.58
121	*Eucalyptus microcorys*	Tallowwood	1	15-20	5-10	400	450	4.8	2.37	Good	Fair	Mature	>50	<5	Deadwood 5 - 10cm diam.	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Minor	Occasional	Low	337476.059	6253855.879	70.691
122	*Stenocarpus sinuatus*	Fire Wheel Tree	1	10-15	5-10	400	600	4.8	2.67	Good	Poor	Mature	5-10		Wound(s) Previous failures	Low	Remove select branches	Remove 2 south western damaged stems.	Failure Possible	Moderate	Frequent	Medium	337471.285	6253865.253	70.38
123	*Eucalyptus botryoides*	Southern Mahogany	1	20-30	10-15	600	800	7.2	3.01	Fair	Poor	Mature	15-25	<5	Deadwood <-5cm diam. Previous failures Bracket fungi Wound(s)	High	Remove deadwood Further reporting & testing	Deadwood over exhibition and ropes course. Picus test at base of tree and at site of Phellinus sp. fungi.	Failure Likely	Serious	Frequent	High	337463.504	6253862.966	73.122
124	*Eucalyptus botryoides*	Southern Mahogany	1	20-30	15-20	600	850	7.2	3.09	Fair	Fair	Mature	25-50	<5	Deadwood 10cm plus diam. Previous failures Wound(s) Decay Mechanical damage	High	Remove deadwood Further reporting & testing	Deadwood over exhibition and ropes course damaging tree. Picus test base of tree and at site of Phellinus sp. fungi.	Failure Likely	Serious	Frequent	High	337471.549	6253868.585	67.948
125	*Eucalyptus microcorys*	Tallowwood	1	10-15	5-10	300	400	3.6	2.25	Fair	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Wound(s)	Medium	Remove deadwood Monitor	Deadwood over exhibition and pathway.	Failure Possible	Minor	Frequent	Medium	337466.24	6253868.652	69.457
126	*Elaeocarpus reticulatus*	Blueberry Ash	1	5-10	<5	100	150	2	1.5	Fair	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337467.55	6253874.258	70.322

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
127	*Eucalyptus resinifera*	Red Mahogany	1	15-20	10-15	600	850	7.2	3.09	Fair	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Wound(s) Borer/Termites	High	Remove deadwood Aerial inspection Further reporting & testing	Deadwood over exhibition and pathway. Climber to check upper canopy. Picus test base of tree possible termites.	Failure Unlikely	Minor	Occasional	Very Low	337470.714	6253878.171	70.28
128	*Eucalyptus microcorys*	Tallowwood	1	10-15	5-10	300	350	3.6	2.13	Good	Good	Mature	>50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over exhibition and pathway.	Failure Possible	Minor	Frequent	Medium	337471.781	6253881.557	69.667
129	*Melaleuca quinquenervia*	Broad-leaved Paperbark	1	15-20	5-10	500	750	6	2.93	Fair	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Wound(s) Cross/rubbing branches	Medium	Remove deadwood Remove select branches	Deadwood over exhibition and pathway. Remove crossing branches. Multiple wounds base of tree.	Failure Possible	Minor	Frequent	Medium	337470.642	6253883.842	69.749
130	*Casuarina cunninghamiana*	River She-oak	1	5-10	5-10	250	350	3	2	Fair	Fair	Semi-mature	25-50		Abnormal lean	Low		Tree on lean over pathway.	Failure Possible	Minor	Frequent	Medium	337472.998	6253884.08	69.482
131	*Casuarina cunninghamiana*	River She-oak	1	5-10	5-10	250	300	3	2	Fair	Fair	Semi-mature	25-50		Abnormal lean	Low		Tree on lean over pathway.	Failure Possible	Minor	Frequent	Medium	337474.798	6253889.551	70.094
132	*Eucalyptus microcorys*	Tallowwood	1	5-10	5-10	300	400	3.6	2.25	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	Low	Remove deadwood	Deadwood over exhibition and pathway.	Failure Possible	Minor	Frequent	Medium	337476.026	6253892.856	72.32
133	*Corymbia maculata*	Spotted Gum	1	15-20	10-15	500	600	6	2.67	Good	Good	Mature	>50		No visual defects sited	Medium			Failure Possible	Minor	Frequent	Medium	337486.103	6253900.55	70.473
134	*Angophora costata*	Smooth-barked Apple Myrtle	1	10-15	5-10	300	350	3.6	2.13	Good	Good	Semi-mature	>50		No visual defects sited	Medium			Failure Unlikely	Minor	Frequent	Low	337488.943	6253902.959	70.676
135	*Corymbia maculata*	Spotted Gum	1	5-10	5-10	300	350	3.6	2.13	Fair	Fair	Semi-mature	>50	<5	Deadwood <-5cm diam.	Low	Remove deadwood	Deadwood over pathway.	Failure Possible	Minor	Frequent	Medium	337499.819	6253904.355	70.261
136	*Corymbia maculata*	Spotted Gum	1	5-10	<5	150	200	2	1.68	Fair	Fair	Semi-mature	25-50		Borer/Termites	Low	Monitor	Borer damage base of tree.	Failure Possible	Minor	Frequent	Medium	337502.094	6253902.37	68.925
137	*Casuarina glauca*	Swamp she-oak	1	15-20	10-15	600	800	7.2	3.01	Good	Fair	Mature	25-50		No visual defects sited	Medium			Failure Possible	Minor	Frequent	Medium	337507.625	6253896.715	70.394
138	*Eucalyptus microcorys*	Tallowwood	1	15-20	10-15	500	650	6	2.76	Good	Fair	Mature	>50	<5	Deadwood 5 - 10cm diam. Excessive end weight Included bark Exposed roots	Medium	Remove deadwood Weight reduction lateral Monitor	Deadwood over exhibition.	Failure Possible	Moderate	Frequent	Medium	337496.476	6253893.066	70.422
139	*Eucalyptus microcorys*	Tallowwood	1	15-20	10-15	400	500	4.8	2.47	Fair	Fair	Mature	15-25	10-20	Deadwood 5 - 10cm diam. Mechanical damage	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Moderate	Occasional	Medium	337495.337	6253891.431	70.645
140	*Eucalyptus microcorys*	Tallowwood	1	15-20	10-15	450	550	5.4	2.57	Good	Fair	Mature	10-15	5-10	Deadwood 10cm plus diam. Exposed roots	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Moderate	Occasional	Medium	337496.145	6253889.459	70.531
141	*Eucalyptus microcorys*	Tallowwood	1	10-15	5-10	150	300	2	2	Fair	Fair	Semi-mature	>50	<5	Deadwood <-5cm diam. No visual defects sited	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Minor	Occasional	Low	337499.457	6253891.235	69.837
142	*Eucalyptus microcorys*	Tallowwood	1	15-20	5-10	300	450	3.6	2.37	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam. No visual defects sited	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Minor	Occasional	Low	337497.416	6253884.643	69.962
143	*Angophora costata*	Smooth-barked Apple Myrtle	1	10-15	5-10	200	300	2.4	2	Fair	Poor	Semi-mature	<5	5-10	Deadwood <-5cm diam. Decay Wound(s)	Medium	Remove tree	Deadwood over exhibition. Wound at 4m has compromised retention of tree.	Failure Likely	Moderate	Occasional	Medium	337495.4	6253878.752	69.835
144	*Corymbia maculata*	Spotted Gum	1	15-20	5-10	300	400	3.6	2.25	Fair	Fair	Mature	15-25	<5	Deadwood <-5cm diam. Bleeding/sap flow Wound(s)	Medium	Remove deadwood Monitor	Deadwood over exhibition. Wound at base OK this inspection.	Failure Likely	Moderate	Occasional	Medium	337491.03	6253893.177	71.411
145	*Corymbia maculata*	Spotted Gum	1	10-15	5-10	300	400	3.6	2.25	Fair	Fair	Mature	25-50		Poor tree form	Low	Monitor	Unusual tree form.	Failure Possible	Minor	Occasional	Low	337490.745	6253891.314	71.523
146	*Eucalyptus saligna*	Sydney Blue Gum	1	15-20	5-10	250	300	3	2	Fair	Fair	Semi-mature	>50	<5	Deadwood 5 - 10cm diam. Weak unions	Medium	Remove deadwood Remove select branches	Deadwood over exhibition. Upper branches poorly attached.	Failure Likely	Minor	Occasional	Medium	337489.221	6253889.651	71.562
147	*Eucalyptus microcorys*	Tallowwood	1	5-10	5-10	250	350	3	2	Fair	Fair	Semi-mature	>50	5-10	Deadwood <-5cm diam.	Low	Remove deadwood	Deadwood over exhibition.	Failure Possible	Minor	Occasional	Low	337486.157	6253888.766	71.452
148	*Eucalyptus microcorys*	Tallowwood	1	20-30	15-20	600	750	7.2	2.93	Fair	Fair	Mature	25-50	<5	Deadwood <-5cm diam.	High	Remove deadwood	Deadwood over exhibition.	Failure Possible	Minor	Occasional	Low	337489.103	6253885.203	71.235
149	*Eucalyptus microcorys*	Tallowwood	1	15-20	10-15	500	650	6	2.76	Fair	Fair	Mature	25-50	<5	Deadwood 5 - 10cm diam. Wound(s)	Medium	Remove deadwood	Deadwood over exhibition.	Failure Possible	Moderate	Occasional	Medium	337484.904	6253881.944	70.551
150	*Ficus sp.*	Fig	1	5-10	<5	100	150	2	1.5	Good	Good	Semi-mature	>50		No visual defects sited	Medium		Growing on stump.	Failure Possible	Moderate	Occasional	Medium	337486.306	6253879.204	70.462
151	*Angophora costata*	Smooth-barked Apple Myrtle	1	5-10	5-10	200	250	2.4	1.85	Good	Fair	Semi-mature	>50	<5	Deadwood <-5cm diam. Bleeding/sap flow Wound(s)	Low	Remove deadwood Monitor	Deadwood over garden and exhibition. Sap flow base of tree.	Failure Possible	Minor	Occasional	Low	337490.478	6253874.742	70.797

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
152	*Eucalyptus botryoides*	Southern Mahogany	1	5-10	5-10	200	250	2.4	1.85	Fair	Fair	Semi-mature	15-25	<5	Deadwood <-5cm diam. Damaging infrastructure Wound(s)	Low	Remove deadwood Monitor	Deadwood over garden and exhibition. Tree is impacting fence.	Failure Possible	Minor	Occasional	Low	337486.126	6253872.373	70.407
153	*Corymbia maculata*	Spotted Gum	1	15-20	10-15	300	400	3.6	2.25	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over footpath and exhibition.	Failure Possible	Minor	Occasional	Low	337478.929	6253876.927	70.145
154	*Banksia integrifolia*	Coast Banksia	1	5-10	5-10	300	400	3.6	2.25	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	Low	Remove deadwood	Deadwood over footpath and exhibition.	Failure Possible	Minor	Occasional	Low	337482.19	6253864.906	69.884
155	*Buckinghamia celsissima*	Ivory Curl Tree	1	5-10	5-10	200	200	2.4	1.68	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337491.521	6253865.302	69.655
156	*Eucalyptus botryoides*	Southern Mahogany	1	20-30	15-20	650	750	7.8	2.93	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam. Wound(s)	High	Remove deadwood Monitor		Failure Unlikely	Minor	Frequent	Low	337492.673	6253866.037	69.85
157	*Eucalyptus botryoides*	Southern Mahogany	1	15-20	10-15	450	550	5.4	2.57	Good	Poor	Mature	10-15	5-10	Deadwood <-5cm diam. Wound(s) Decay	Medium	Remove deadwood Further reporting & testing	Wound base of tree needs (2) picus tests.	Failure Likely	Serious	Frequent	High	337492.638	6253864.568	69.773
158	*Lophostemon confertus*	Queensland Box	1	10-15	10-15	600	800	7.2	3.01	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over exhibition and pathway.	Failure Possible	Moderate	Frequent	Medium	337503.574	6253875.816	70.482
159	*Lophostemon confertus*	Queensland Box	1	15-20	10-15	700	800	8.4	3.01	Poor	Fair	Senescent	5-10	5-10	Deadwood 5 - 10cm diam. Dieback-general	High	Remove deadwood	Deadwood over exhibition and pathway.	Failure Possible	Moderate	Frequent	Medium	337514.014	6253863.889	68.524
160	*Eucalyptus punctata*	Grey Gum	1	15-20	15-20	700	850	8.4	3.09	Fair	Fair	Mature	25-50	5-10	Deadwood 10cm plus diam. Cavity(s)	Medium	Remove deadwood Further reporting & testing	Deadwood over exhibition and pathway. Cavity lower trunk needs picus test.	Failure Likely	Moderate	Frequent	Medium	337517.716	6253864.826	68.342
161	*Casuarina glauca*	Swamp she-oak	1	15-20	10-15	550	700	6.6	2.85	Fair	Fair	Mature	25-50	5-10	Deadwood 5 - 10cm diam. Hanger(s) Previous failures Included bark	Medium	Remove deadwood Remove hanging branch Monitor	Deadwood over exhibit and pathway. Medium hangers over exhibition.	Failure Possible	Moderate	Frequent	Medium	337516.329	6253882.836	75.018
162	*Casuarina cunninghamiana*	River She-oak	1	5-10	<5	150	250	2	1.85	Fair	Fair	Semi-mature	25-50		Abnormal lean	Low	Monitor	Tree on accute lean over exhibition.	Failure Possible	Moderate	Frequent	Medium	337511.123	6253887.85	69.462
163	*Casuarina glauca*	Swamp she-oak	1	15-20	15-20	550	700	6.6	2.85	Good	Fair	Mature	25-50	5-10	Deadwood 5 - 10cm diam.	Medium	Remove deadwood	Deadwood over pathway.	Failure Possible	Moderate	Frequent	Medium	337510.431	6253892.849	72.03
164	*Casuarina glauca*	Swamp she-oak	1	10-15	5-10	450	550	5.4	2.57	Good	Good	Mature	>50		Wound(s)	Medium	Monitor	Wound base of tree.	Failure Possible	Moderate	Frequent	Medium	337512.5	6253889.012	69.447
165	*Casuarina glauca*	Swamp she-oak	1	5-10	5-10	300	400	3.6	2.25	Fair	Fair	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337511.426	6253900.544	69.186
166	*Casuarina glauca*	Swamp she-oak	1	5-10	<5	150	200	2	1.68	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337509.112	6253902.691	69.142
167	*Casuarina glauca*	Swamp she-oak	1	5-10	<5	150	200	2	1.68	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337508.831	6253903.587	69.25
168	*Casuarina glauca*	Swamp she-oak	1	5-10	<5	100	100	2	1.5	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337508.211	6253904.565	69.256
169	*Casuarina glauca*	Swamp she-oak	1	10-15	5-10	300	350	3.6	2.13	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Occasional	Very Low	337506.867	6253906.959	69.647
170	*Lophostemon confertus*	Queensland Box	1	10-15	10-15	700	1000	8.4	3.31	Fair	Fair	Mature	15-25	10-20	Deadwood 5 - 10cm diam. Dieback-general	High	Remove deadwood	HERITAGE TREE 192L-Deadwood over exhibition and roadway.	Failure Likely	Moderate	Occasional	Medium	337495.28	6253915.397	71.598
171	*Glochidion ferdinandi*	Cheese Tree	1	10-15	10-15	500	800	6	3.01	Fair	Fair	Mature	25-50		No visual defects sited	Medium			Failure Possible	Minor	Occasional	Low	337500.206	6253920.795	71.033
172	*Lophostemon confertus*	Queensland Box	1	10-15	10-15	700	1000	8.4	3.31	Fair	Fair	Mature	25-50	<5	Deadwood <-5cm diam. Wound(s) Cross/rubbing branches	High	Remove deadwood Further reporting & testing	HERITAGE TREE 239L- Deadwood over exhibition and roadway. Wound base of tree needs picus test.	Failure Likely	Moderate	Occasional	Medium	337523.416	6253879.136	67.562
173	*Glochidion ferdinandi*	Cheese Tree	1	5-10	5-10	200	450	2.4	2.37	Good	Fair	Semi-mature	>50		No visual defects sited	Low			Failure Possible	Minor	Occasional	Low	337523.817	6253877.722	67.534
174	*Acacia melanoxylon*	Blackwood	1	10-15	5-10	400	550	5.4	2.57	Fair	Fair	Mature	10-15	5-10	Deadwood 5 - 10cm diam. Wound(s)	Low	Remove deadwood	Deadwood over roadway	Failure Possible	Minor	Occasional	Low	337526.093	6253869.699	67.425
175	*Lophostemon confertus*	Queensland Box	1	5-10	<5	250	300	3	2	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337508.862	6253853.63	67.52
176	*Banksia integrifolia*	Coast Banksia	1	5-10	<5	100	150	2	1.5	Good	Good	Semi-mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337513.366	6253854.083	67.22

Tree No.	Tree No.	Tree No.	Tree No.	Height	Canopy Spread	DBH	DAB	TPZ	SRZ	Health	Structure	Age	TLE	Dead wood %	Tree Defects	Tree Significance	Arborist Actions5	Comments	Probability of Risk	Risk Consequence	Occupancy Rate	Risk Priority	Easting	Northing	MSL
177	*Casuarina cunninghamiana*	River She-oak	1	15-20	10-15	700	900	8.4	3.17	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over garden and building.	Failure Possible	Minor	Frequent	Medium	337517.296	6253852.296	67.087
178	*Casuarina cunninghamiana*	River She-oak	1	15-20	10-15	450	600	5.4	2.67	Good	Fair	Mature	>50	<5	Deadwood <-5cm diam.	Medium	Remove deadwood	Deadwood over garden and building.	Failure Possible	Minor	Frequent	Medium	337518.231	6253851.905	66.961
179	*Lophostemon confertus*	Queensland Box	1	10-15	5-10	400	500	4.8	2.47	Fair	Fair	Mature	25-50	5-10	Deadwood 5 - 10cm diam.	Medium	Remove deadwood	Deadwood over garden and building.	Failure Possible	Minor	Frequent	Medium	337520.014	6253850.779	67.723
180	*Casuarina glauca*	Swamp she-oak	1	15-20	10-15	600	800	7.2	3.01	Fair	Fair	Mature	25-50	5-10	Deadwood 5 - 10cm diam. Included bark	Medium	Remove deadwood Aerial inspection	Deadwood over garden and building. Upper stem inclusion needs aerial inspection.	Failure Likely	Moderate	Frequent	Medium	337509.713	6253848.059	69.631
181	*Casuarina cunninghamiana*	River She-oak	1	5-10	5-10	200	250	2.4	1.85	Fair	Fair	Semi-mature	>50	<5	Deadwood <-5cm diam.	Low	Remove deadwood	Deadwood over walkway.	Failure Possible	Minor	Occasional	Low	337507.758	6253848.491	67.748
182	*Pittosporum rhombifolium*	Queensland Laurel	1	5-10	5-10	250	350	3	2	Good	Good	Mature	>50		No visual defects sited	Low			Failure Unlikely	Minor	Frequent	Low	337505.544	6253848.087	68.127
183	*Glochidion ferdinandi*	Cheese Tree	1	5-10	<5	300	350	3.6	2.13	Fair	Fair	Semi-mature	15-25	10-20	Deadwood <-5cm diam. Dieback-general	Low	Remove deadwood Monitor		Failure Unlikely	Minor	Frequent	Low	337504.7	6253849.5	68.316
184	*Glochidion ferdinandi*	Cheese Tree	1	10-15	5-10	350	450	4.2	2.37	Fair	Fair	Mature	25-50	<5	Deadwood <-5cm diam. No visual defects sited	Medium	Remove deadwood Monitor	Deadwood over garden	Failure Unlikely	Minor	Frequent	Low	337505.132	6253846.319	69.521

TREE PROTECTION ZONE

NO ACCESS
NO EXCAVATION
NO TRENCHING
NO STORAGE OF MATERIALS

Project manager: Warren Truong
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13. Appendix B – Environmental Policy

Lloyd Group believes the protection and management of our physical and social environment is an integral part of our organisation's daily operations.

Lloyd Group is committed to protecting and preserving the environment in all circumstances, to assist in the provision of a sustainable lifestyle for both present and future generations. We are committed to continual improvement with a goal of meeting or exceeding our client's expectations.

To achieve our commitment, we will:

- develop and implement a systematic approach to the management of environmental aspects and impacts.
- ensure this policy is documented, implemented, maintained and communicated to all employees, subcontractors, clients, and the public as required.
- continuously meet our statutory obligations regarding all relevant federal, state and local regulations and other requirements.
- Continually monitor and assess the needs of stakeholders and other interested parties.
- establishing measurable objectives and targets to improve our environmental performance.
- communicate our environmental management strategies to all staff, contractors and relevant third parties including the public.
- procure products and services based on minimising pollution and waste and promoting recycling principles wherever possible.
- conduct regular training and awareness programs for all management, staff and contractors.
- monitor and audit our environmental processes and management plan with a view to continually improving our environmental management system to enhance environmental performance,
- Comply with the requirements of AS/NZS ISO 14001:2004.

Lloyd Group, through the nature of its operational activities, accepts that it must share and promote the responsibility of Environmental Sustainability and will therefore act in a morally responsible manner at all times.

Dustin Lloyd
Managing Director
05-11-2020

Clinton Lloyd
Managing Director
05-11-2020