

**ANGEL PLACE
LEVEL 8, 123 PITT STREET
SYDNEY NSW 2000**

URBIS.COM.AU
Urbis Pty Ltd
ABN 50 105 256 228

24 March 2021

Warwick Winn, General Manager
Penrith City Council
PO Box 60, Penrith, NSW 2751

council@penrith.city

Attention: Ms Kathryn Saunders, Senior Development Assessment Planner

Dear Mr Winn,

PPSSWC - 45 13, 17 AND 37 PARK ROAD, WALLACIA, 512 MULGOA ROAD, WALLACIA 2745 (DA019_0875)

1. INTRODUCTION

We are writing to you on behalf of our client and Applicant, the Catholic Cemeteries Board Ltd, in respect of the above matter which was considered by the Sydney Western City Planning Panel (**the Panel**) on 17th February 2021 and deferred.

To assist the Panel to determine the application, please find below a response to the matters that the Applicant was requested to address in the Notice of Deferral. This letter should be read in conjunction with a previous letter submitted on 19 February 2021 prior to the issue of the Notice of Deferral and supplements the advice provided at that time. This letter is supported by the following information:

- Attachment A – 19 February letter to Planning Panel
- Attachment B - Overall Site Plan -
- Attachment C – Legal Advice
- Attachment D – BDAR and EcoLogical Australia cover letter
- Attachment E - Contamination advice and Remediation Action Plan
- Attachment F – Sydney Water NOR
- Attachment G - Plans showing amended access to Wallacia Country Club
- Attachment H – Existing trees and disturbance plans
- Attachment I – Tree Assessment Evaluation Matrix

DA019_0875 Letter to Panel 24.3.21

2. BUFFER

The Applicant is willing to accept an appropriately worded condition which prohibits interments within Lot 1 in DP1254545 in perpetuity. We propose the following condition of consent to achieve this:

The area marked in dark shaded hatch as depicted in the Overall Site Plan prepared by Florence Jaquet is not to be used for interments without the prior development consent of the relevant consent authority.

The above condition is accompanied by the overall site plan submitted at **Attachment B**.

In addition we would be proposing the following staging of the development:

Phase 1 - upgrade of Wallacia Country Club and golf course refurbishment

Phase 2 – cemetery establishment

Figure 1 Overall Site Plan to accompany proposed Condition of Consent



Source: Urbis / Florence Jaquet

3. PERMISSIBILITY

In response to the Panel requiring further consideration of the permissibility of the proposed development Mills Oakley (MO) has provided additional legal advice. The legal advice does not consider the issue of whether the Site enjoys existing use rights, as it is evident from the Deferral Notice of the Panel that this is not in dispute. The additional legal advice addresses the characterisation of the proposed bowling green use.

The position of the applicant in relation to the permissibility of the proposed bowling green is:

- the characterisation of the existing use rights on the part of the subject site can be refined to a genus of 'Outdoor Sporting Club Green'. This level of generality is encouraged by the authorities to cover the individual activities carried out on the site, but is not so expansive as to allow uses that are too different to the existing golf club and golf course;
- The proposed bowling green is a sufficiently similar use to the golf course/putting green to be permissible under the existing use right genus of Outdoor Sporting Club Green;
- Alternatively, the bowling green could reasonably be considered to be an ancillary and incidental to the use of the golf course and club house.

Refer to legal advice submitted at **Attachment C**.

4. BIODIVERSITY AND SERIOUS AND IRREVERSIBLE IMPACTS

A revised Biodiversity Development Assessment Report (BDAR) has been prepared by EcoLogical Australia (ELA)- refer **Attachment D**. The BDAR includes an assessment as to whether the proposal will or will not have a Serious and Irreversible (SAIL) impact on each relevant candidate species, communities or populations. ELA has also prepared a covering letter addressing the matter of SAIL refer to **Attachment D**.

Whilst it is not the role of the accredited assessor to provide a recommendation as to whether the impact is serious and irreversible, the letter provides guidance to the Panel to inform this decision. There would be no compelling reason to conclude that the impact to 0.54 ha of moderate-poor CPW would be considered SAIL.

5. BIODIVERSITY IMPACT ASSESSMENT

The revised BDAR at **Attachment D** has been prepared based on the survey information completed as part of previous assessments across the study area (Travers 2017 Flora and Fauna report and 2019 BDAR) and vegetation mapping revisions undertaken by ELA in 2021.

The BDAR no longer assesses impacts to trees which may or may not require removal due to safety reasons. The proposal now also includes a Tree Protection and Management Plan that will be prepared by an AQF Level 5 Arboricultural Consultant and submitted for approval prior to issue of Construction Certificate by Penrith City Council. The cornerstone of the TPMP approach to provide for the retention of as many trees on site for as long as possible.

In summary the ELA 2021 BDAR has identified impacts to:

- 0.54 ha of moderate-poor condition Cumberland Plain Woodland
- 0.75 ha to planted native vegetation (which is no longer requires an offset due to release of guidelines from NSW DPIE)
- 0.14 ha to River Flat Eucalypt Forrest

Approximately 1.77 ha of CPW will remain on site and will be enhanced under a Vegetation Management Plan (VMP).

The design changes and the adoption of the Tree Protection and Management Plan approach have resulted in a reduction of:

- 0.66 ha of impact to CPW (a 55% reduction); and

- 0.34 ha to RFEF (a 66% reduction)

compared to the 2019 Travers BDAR.

6. CONTAMINATION

Written advice has been provided from Martens & Associates (see **Attachment E**). Several site contamination investigations and studies have been undertaken in respect of the development proposal at the site including:

- Preliminary Site Investigation prepared by Douglas Partners dated 6 June 2017;
- Detailed Site Investigation prepared by Martens & Associates dated 12 November 2020; and,
- Remediation Action Plan prepared by Martens & Associates dated 16 March 2021- refer **Attachment E**.

Martens & Associates have considered the various contamination investigations and studies against Clause 7 (1) of SEPP 55. Based on this assessment, it is concluded that all aspects of Clause 7 (1) are satisfied and therefore the Panel's threshold responsibility has been discharged.

Refer to **Attachment E** for details on the findings of the above contamination assessments and response to Clause 7(1) of SEPP 55.

7. ADEQUATE ARRANGEMENTS FOR INFRASTRUCTURE

Please find enclosed with this letter formal advice from Sydney Water dated 18th February 2021 which confirms availability of servicing subject to the terms of their Notice of Requirements (NOR). This NOR confirms that the proposal is capable of satisfying the requirements of Clause 7.7 of Penrith LEP (**Attachment F**).

8. SEPP INFRASTRUCTURE

The roadworks at the driveway to the Wallacia Country Club have been amended to left in / left out. The right hand turn into the Clubhouse has been removed from the design. The roadworks are minor (median island in the road and pedestrian refuge) therefore no road widening on the southern side of Park Road is required and the trees adjacent to the Park Road heritage conservation area are not impacted.

We note that Council has been provided with the amended access design to the Clubhouse and has given its "in principle" support. TfNSW has not raised any major objections to the proposed layout and the additional information requested by TfNSW would ordinarily be provided as part of post consent detailed design. It is the view of the Applicant that the concurrence and conferral requirements of SEPP Infrastructure have been met, and that concurrence will be issued shortly.

Amended plans for the access were provide to TfNSW via email on 20 March 2021- refer **Attachment G**. These were prepared in direct response to the following comments received from TfNSW 16 March 2021:

- *Swept paths should be a smooth, single radius and not have 'kinks' as currently demonstrated (in line with Austroads Standards).*

- *The swept path should show simultaneous entry/exit movements of the longest vehicle. In addition the swept paths should be undertaken from the correct side of the driveway access.*
- *A 12.5m vehicle should be included to be assessed as a checking vehicle for the swept path analysis.*
- *The driveway entrance has been widened closer to the pedestrian refuge. Adjustment to the central median opening for the right out movements is to be relocated as far east as possible to allow for adequate space for vehicles to hold within the westbound lane, should a pedestrian be crossing the road.*
- *The raised median is to be designed in accordance with Austroads. The current layout appears to be too narrow and does not provide enough physical deflection to restrict the right turn movement into the access driveway. The minimum median width that needs to be provided for is 1.2m wide.*
- *The sign stating "To enter country club house use roundabout" is not supported and is to be removed from the design. It is expected that patrons accessing the development should plan ahead their trip.*
- *The redundant laybacks should be reinstated in accordance with TfNSW standards (not council as mentioned).*

9. CONSISTENCY AND CLARITY ON TREE RETENTION

The original tree assessment was undertaken in 2017 during a period of prolonged drought. It has become evident in recent site visits that trees that were at this time identified as dead or dying have regenerated due to the cessation of drought conditions.

As identified in the original tree assessment and based on that initial assessment the total number of trees on site at present is approximately 1800 and approximately 250 trees identified for removal. However, based on a review of the landscape plan, and having regard to factors such as the regeneration of trees previously identified as dead or dying, we acknowledge that there has been uncertainty about the total number.

An updated Arboricultural impact assessment (AIA) undertaken by an appropriately qualified (AQF Level 5) arborist, ArborSafe, is nearing completion. Based on information that has been progressively fed through to the landscape team we have been able to verify the impact of the development footprint.

In this respect the number of trees now identified for removal is 269 (of which 32 are dead trees). The number of trees to be removed no longer includes trees to be removed for health or safety reasons. It is likely to be less than this, as the arborist has identified several trees that, subject to minor design changes, may be able to be retained.

Where there are instances of trees which were classified in the reports of Travers or ArborSafe as being in poor health or unsafe, these trees have not been included in the list of trees to be removed. These trees will be further assessed by ArborSafe to determine any remedial works that may be required to facilitate their retention.

The appended Existing Trees & Disturbance Plans Nos 1-3 (**Attachment H**) prepared by Botanica, detail existing trees and trees to be removed on the site.

ArborSafe is also in the process of classifying all trees surveyed into the following categories:

Category A - High quality, remaining life expectancy of at least 25 years

Category B - moderate quality, estimated remaining life expectancy of 15-25 years

Category C - low quality, estimated lift expectancy of 5-15 years

Category U - not viable for retention in the context of current land use for longer than 5 years.

This classification is based on a combination of arboricultural and landscape qualities, cultural and environmental values and Useful Life Expectancy (ULE). ULE refers to the expected period of time that a tree can be retained before it's amenity value declines to a point that it may detract from the appearance of the landscape or presents a hazard to people and or property. ULE values consider tree species, current age, health, structure and location. The classification matrix applied by ArborSafe is detailed at **Attachment I**.

Additional plans showing the retention value of each existing tree within the site are partially complete, and will be provided to Council and the Panel as soon as they are finalised.

The approach to tree removal and retention for the development will fundamentally be:

- Design evaluation and refinement to be applied to avoid impacts to all Category A and Category B trees.
- If a tree is classified as Category A or Category B, they are not to be removed without prior assessment by a AQF Level 5 arborist (except where the TPZ is impacted by the works for the development, as indicated on the appended plans.)
- If a tree identified as having to be removed for development purposes, the tree will be retained for as long as feasible prior to it being required to be removed for the cemetery.
- Trees in burial locations are proposed to be retained until the burial space is required and not removed until they are documented suitable for removal by a qualified arborist.

The preceding management and iterative assessment approach to tree removal could be captured in a suitable condition of consent to be implemented prior to the commencement of any construction activity on the site. This would require the preparation of:

- An Arboricultural Impact Assessment (AIA) to be undertaken prior to final decision on whether trees are to be removed.
- A Tree Protection Management Plan (TPMP) to mitigate impacts to trees that are to be retained on site.

Examples of such consent conditions are provided below for the Panel's consideration.

9.1. ARBORICULTURAL IMPACT ASSESSMENT (AIA)

The AIA should include, but not be limited to:

- *Provide a retention value rating for assessed trees based on their Useful Life Expectancy and Landscape Significance.*

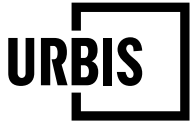
- *Include an assessment of all proposed works (cut, compacted fill, trenching, buildings, civil, stormwater & drainage, burial sites, retaining walls and other landscape works) reflected in the lodged DA drawings and determine the impact of those works on the trees.*
- *Determine the level of encroachment (i.e Minor or Major Encroachments), approximate percentage and encroachment type.*
- *Must assess Major Encroachments against Clause 3.3.4 of Australian Standard 4970-2009 Protection of trees on development sites and requires the Arborist to demonstrate how the tree/s will remain viable.*
- *Confirm that burial plots are not to impact TPZ by more than 10% unless agreed by a qualified arborist*
- *Include specific recommendations for measures to retain trees, particularly those of Medium to High Retention Value located in proximity to the proposed works.*
- *Retain identified habitat trees (as included in the Travers Tree Assessment) where possible, and safe to do so (must be supported with valid tree risk reasons if removal is proposed).*
- *Is not to include ecological or heritage assessments or comments unless the author is suitably qualified.*
- *any recommendation for the removal of trees that are not impacted by works will require an accompanying tree risk assessment (TRA) undertaken by an arboriculturist with current TRA qualifications (e.g TRAQ, QTRA), and demonstrate the nominated tree/s pose an unacceptable risk to persons or property.*
- *Include justification for an and an evaluation of the impacts of tree removal within a 30m setback from Park Road, to demonstrate that attempts have been made to preserve the landscape values of the site.*

9.2. TREE PROTECTION AND MANAGEMENT PLAN (TPMP)

A detailed site-specific TPMP is to be prepared by an AQF Level 5 Arboricultural Consultant and submitted for approval by Penrith City Council prior to issue of the Construction Certificate. The TPMP is to be prepared in accordance with the principles and specifications identified in AS4970 - 2009 Protection of trees on development sites and is to include, but not be limited to the following:

- *A site plan showing the correct Tree Protection Zone (TPZ) offsets for trees to be retained within 20 metres of any proposed works.*
- *A site plan showing the locations of proposed tree protection fencing, trunk and ground protection within the identified TPZ of trees to be retained within 20metres of the works;*
- *Unacceptable activities within fenced tree protection zones;*
- *Crown pruning specifications to AS4373-2007 Pruning of amenity trees, where applicable;*
- *Tree protection monitoring and compliance reporting schedule and key hold points;*
- *Tree root protection specifications for excavation or soil fill within the identified TPZs.*

The tree protection measures contained in the TPMP shall be shown clearly on the Construction Certificate drawings, including landscape, civil, stormwater and construction management plans.



The PCA must ensure the construction plans and specifications submitted fully satisfy the tree protection requirements identified in the TPMP.

A Project Arborist is to be appointed to monitor tree protection during the construction in accordance with the requirements identified in the TPMP.

All tree protection measures as detailed in the approved TPMP must be installed and certified in writing as fit for purpose by the Project Arborist, or by a consulting arborist with a minimum AQF Level 5 arboriculture qualification.

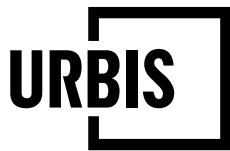
A Compliance Certificate is to be issued by the Project Arborist certifying that all tree protection measures as detailed in the approved TPMP have been complied with prior to issue of the Occupation Certificate.

The AIA and preparation of TPMP are proposed as pre-commencement conditions of consent for the Panel's consideration. We trust that this information assists the Panel in its decision making and that the application can be determined electronically upon receipt of this material.

Yours sincerely,

A handwritten signature in black ink, appearing to read "David Hoy".

David Hoy
Director
+61 2 8233 9925
dhoy@urbis.com.au



**ANGEL PLACE
LEVEL 8, 123 PITT STREET
SYDNEY NSW 2000**

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19 February 2021

Mr Justin Doyle
Chair
Sydney Western City Planning Panel

enquiry@planningpanels.nsw.gov.au

Dear Mr Doyle,

PPSSWC – 45 13, 17 AND 37 PARK ROAD WALLACIA 2745, 512 MULGOA ROAD WALLACIA 2745, (DA019_0875)

1. INTRODUCTION

We are writing to you on behalf of our client and Applicant, Catholic Cemeteries Board Ltd, in respect of the above matter which was considered by the Western City Planning Panel (**the Panel**) on 17th February 2021. To assist the Panel in addressing certain items that were raised by the Panel, please consider the following.

2. BIODIVERSITY

- The applicant has commenced work towards the provision an Addendum to the BDAR – we are advised that this will be completed within an estimated timeframe of **2 weeks** or sooner.
- Concurrently the applicant has also commenced work on the provision of a fresh BDAR – we are advised that this will be completed within an estimated timeframe of **3 – 4 weeks**
- We are advised that it is not expected that there will be any material difference in the outcomes of the Addendum to the existing BDAR and the fresh BDAR
- We are taking the step of preparing the fresh BDAR so that no issue will arise on whether or not a new BDAR is in fact required.

3. PERMISSIBILITY

To summarise the Applicant's position in respect of the permissibility of the recreational elements of the proposal:

- The introduction of the bowling green relies on existing use rights.
- The refurbishment of the Golf Club, including Club House and reconfiguration of the golf course relies on existing use rights.

Cover letter Nepean Gardens DA19_0875

- The pool and gym are introduced as Community Facilities (as defined), a permissible use on the site under the Penrith LEP.

4. SITE SERVICING

Please find enclosed with this letter formal advice from Sydney Water dated 18th February 2021 which confirms availability of servicing subject to the terms of their Notice of Requirements (NOR). This NOR confirms that the proposal is capable of satisfying the requirements of Clause 7.7 of Penrith LEP.

5. REMEDIATION

Please find enclosed with this letter an Addendum to the Remediation Action Plan prepared by Martens dated 19th February and in support of the RAP currently before Council/The Panel specifically addressing the issue of road works in Park Road.

6. PROJECT STAGING

Currently, the proposal does not contemplate any staging.

However, if the Panel was of a mind to grant consent, the Applicant would be willing to accept an appropriately worded condition which requires the upgrading of the Club house, golf course and construction of associated community facilities to be commenced prior to the first internment associated with the cemetery use.

We trust that this information assists the Panel in its decision making.

Yours sincerely,

A handwritten signature in black ink, appearing to read "David Hoy", with a stylized flourish at the end.

David Hoy
Director
+61 2 8233 9900
dhoy@urbis.com.au

cc. Penrith City Council

attach

Sydney Water Notice of Requirements dated 18.2.2021

Addendum to Remediation Action Plan, prepared by Martens dated 19.2.2021

Case Number: 188145

February 18, 2021

CATHOLIC METROPOLITAN CEMETERIES TRUST
c/- WARREN SMITH & PARTNERS PTY LTD

**NOTICE OF ANTICIPATED REQUIREMENTS
for
SECTION 73 SUBDIVIDER/DEVELOPER COMPLIANCE CERTIFICATE
(Sydney Water Act 1994, Part 6, Division 9)
PENDING DEVELOPMENT CONSENT**

Developer:	CATHOLIC METROPOLITAN CEMETERIES TRUST
Your reference:	5936000
Development:	13 Park Road, Wallacia
Development Description:	Change of Use of part of existing Golf Course to Cemetery including 27,000 Burial Plots, Chapel and Administration Building, internal roads, new parking and amended access from Park Road, reconfiguration of Golf Course to 9 holes, new Pool, Gym, Putting and Bowling Greens and alterations and additions to Wallacia Golf Club, tree removal, landscaping, fencing, civil and stormwater works and new intersection works along Park Road and Subdivision.
Council:	Penrith City Council
Your application date:	November 13, 2020

Dear Applicant

Sydney Water has assessed your application for the anticipated requirements of a Section 73 Compliance Certificate (the Certificate) pending development consent for the development shown above. Detailed information on your anticipated requirements is outlined below.

You have until February 18, 2022 to meet those requirements and receive the Certificate. If you have not received the Certificate by then you will have to reapply (and pay another application fee) and Sydney Water will issue you with a new notice. We may have extra requirements and charges may change in the new notice.

The Water Servicing Coordinator (Coordinator) will be your point of contact with Sydney Water. They can answer most questions you might have on our developer process and charges.

This is not a final notice and Sydney Water is not liable for any actions you take as a result of this Notice. You do not have the authority to start construction of works.

Once you receive final development consent you should submit a copy to Sydney Water. Provided that there have been no significant changes to the development, we will send you a Confirmation Letter.

If the development application has been subject to significant change then this anticipated requirements application will be terminated and you must submit a formal Section 73 application.

You can also find out about this process by visiting www.sydneywater.com.au > Plumbing, building & developing > Developing > Land development. If you want to find out the status of your application, simply select 'Developer Application Progress' and enter your case number (shown above) and email address. A response will be sent automatically to you.

What You Must Do To Get A Section 73 Certificate

Summary

This is a summary of Sydney Water's requirements. The detailed list begins on the next page.

You must do all of the following things:

1. Engage a Water Servicing Coordinator (Coordinator) before you sign the enclosed Agreement.
2. Sign both originals of the enclosed Agreement and give them to the Coordinator. You must do all the things that we ask you to do in that Agreement.
3. After you have signed the Agreement you then need to build the required sewer works at your own cost.
4. See Section 4 for any Ancillary Matters

Other things you need to do:

At the end of this Notice are some other things that you may need to do. They are NOT a requirement to be met before the Certificate can issue but may well be a requirement in the future because of the impact of your development on our assets. You must read them before you go any further.

DETAILED REQUIREMENTS

1. Water Servicing Coordinator

You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

For a list of authorised Coordinators, either visit www.sydneywater.com.au > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92**.

Coordinators will give you a quote or information about costs for services/works, including Sydney Water costs.

2. Developer Works Deed

After you engage a Coordinator, you must engage other Developer Infrastructure Providers (Providers) to carry out, where needed, the design and construction of the works. They must all have the appropriate capability. Your Coordinator can assist you.

You and your Providers will need to enter into an agreement with Sydney Water. To do this you need to sign and lodge **both originals** of the enclosed Developer Works Deed (Deed) with your nominated Coordinator. You will then need to work with your Coordinator to have the other Providers sign the Deed.

Before signing the Deed, each party must also read and understand the conditions of the agreement that are set out in the Developer Works Deed – Schedule 1: Standard Terms document. That document as well as information about it are available at sydneywater.com.au > Plumbing, building & developing > Developing > Developer deeds & standard terms

The Deed and the Standard Terms set out for this development all parties' roles and responsibilities as well as other information.

You must do all the things that we ask you to do in the Deed. This is because your development does not have sewer services and you must construct and pay for the following works under this Deed to provide these services.

3. Water and Sewer Works

3.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

Sydney Water has assessed your application and found that:

The existing 200mm CICL water main in Park Rd will serve your development.

A water main is available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application at Sydney Water Tap in™. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Once you have received your final Development Consent and the WSC has determined there are significant changes to the development that affect your design, your WSC will be required to submit a new application.

3.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

Sydney Water has assessed your application and found that:

- Your proposal to pump to the MH is to be limited to a maximum of 2 L/sec.

This private pumping arrangement must be assessed and approved by Sydney Water. You will need to lodge a Pressure Boosting and Pump Application in Sydney Water Tap in™.

You will have to pay an application fee.

- **You must construct a waste water main MH inlet to serve your development.** The terms of the Deed define this extension as 'Major Works'.

Once you have received your final Development Consent and the WSC has determined there are significant changes to the development that affect your design, your WSC will be required to submit a new application.

4. Ancillary Matters

4.1 Flow Management and Isolation of Sydney Water's Asset.

The above works will be constructed with a connection/cut-in to Sydney Water's (wastewater, water and/or stormwater) assets. To see that it complies with Occupational Health and Safety and Environmental legislation you must talk to your coordinator about the timely submission to Sydney Water of a request for flow management and asset isolation requirements.

4.2 Asset Adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your property be adjusted/deviated. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

4.3 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You

will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

4.4 Costs

Construction of these works will require you to pay project management, survey, design and construction costs **directly to your providers**. Additional costs payable to Sydney Water may include:

- design and construction audit fees;
- contract administration, Operations Area Charge & Customer Redress prior to project finalisation; and
- creation or alteration of easements etc.

Note: Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the issue of the Section 73 Certificate or release of the Bank Guarantee or Cash Bond.

Your Coordinator can tell you about these costs.

5. Special Requirements

The Final Development Consent

This application is based on the development and consent shown on Page 1. You must give us the **final** Development Consent before we issue the Certificate so we can make sure that the development is the same.

If the development is the same and all the requirements of this Notice have been met, we will issue the Certificate. If the development is NOT the same you must reapply (and pay another application fee) and we will issue another Notice. The requirements and charges may change in that Notice.

OTHER THINGS YOU NEED TO DO:

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Approval of your building plans

Please note that your building plans must be approved. This can be done at Sydney Water Tap in™. Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Sydney Water Tap in™ or call 13 20 92.

This is not a requirement of the Certificate but the approval is needed because construction/building works may impact on existing Sydney Water assets (e.g. water and sewer mains). In any case, these works MUST NOT commence until Sydney Water has granted approval.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Requirements for Business Customers for Commercial and Industrial Property Developments

If this property is to be developed for Industrial or Commercial operations, it may need to meet the following requirements:

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

A **Boundary Trap** is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Backflow Prevention Requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable **Backflow Prevention Containment Device** appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.
2. Conduct a site assessment to confirm the hazard rating of the property and its services. Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website:

<http://www.sydneywater.com.au/Plumbing/BackflowPrevention/>

Water Efficiency Recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- Install water efficiency fixtures to help increase your water efficiency, refer to WELS (Water Efficiency Labelling and Standards (WELS) Scheme, <http://www.waterrating.gov.au/>
- Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Refer to <http://www.sydneywater.com.au/Water4Life/InYourBusiness/RWTCalculator.cfm>
- Install water-monitoring devices on your meter to identify water usage patterns and leaks.
- Develop a water efficiency plan for your business.

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

Contingency Plan Recommendations

Under Sydney Water's [customer contract](#) Sydney Water aims to provide Business Customers with a continuous supply of clean water at a minimum pressure of 15meters head at the main tap. This is equivalent to 146.8kpa or 21.29psi to meet reasonable business usage needs.

Sometimes Sydney Water may need to interrupt, postpone or limit the supply of water services to your property for maintenance or other reasons. These interruptions can be planned or unplanned.

Water supply is critical to some businesses and Sydney Water will treat vulnerable customers, such as hospitals, as a high priority.

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at:

<http://www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/> or contact Business Customer Services on **1300 985 227** or businesscustomers@sydneywater.com.au

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through Sydney Water Tap in™ and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Large Water Service Connection

A water main are available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap in™. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Other fees and requirements

The requirements in this Notice relate to your Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements. These include:

- plumbing and drainage inspection costs;
the installation of backflow prevention devices;
- trade waste requirements;
- large water connections and
-
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

END OF NOTICE

After you have submitted the design to comply with the anticipated requirements Sydney Water will review the information and issue you with a partial design package.

19 February 2021

URBIS Consultants
Attn: Charlotte Ryan
By email

Dear Charlotte,

RE: ADDENDUM TO REMEDIATION ACTION PLAN – PROPOSED NEPEAN GARDENS CEMETERY, WALLACIA, NSW

Overview

In response to Penrith City Council indicating that the Remediation Action Plan (**RAP**) prepared in respect of the proposed Nepean Gardens Cemetery, Wallacia, was deficient in that it had not considered the road works on Park Road, we provide this addendum to the RAP. This advice should be read in conjunction with the RAP.

Proposed Road Works

The proposed road works are those described in the WSP plans at Appendix A of a letter prepared by TTPP Transport Planning dated 9 July 2020 and include the provision of a right turn [with accompanying slip lane] to the Wallacia Country Club and to the cemetery for west travelling traffic. The following is noted in respect of the works:

1. The road works are located within Council owned road reserve (see Figure 1 and Figure 2). Land use will therefore not change in this area as a result of the development.
2. The road works will include widening of existing Park Road pavement to the south by around 3.5 m to provide for the turning bay and slip lanes, as well as minor driveway entry works.
3. The public has access to land affected by the proposed road works.
4. Minimal earthworks will be required to undertake the road works, noting:
 - a. The land affected by the works already forms part of the road reserve and in part contains pavement materials.
 - b. Any vegetation removed as part of the works would be chipped and taken to an appropriate off-site facility.
 - c. Stripping of soil and any unsealed pavement within the works area will include, assuming a pavement depth of say 400 mm to suitable subgrade, around 250 m³ excavated material at the cemetery entrance and 200 m³ of excavated material at the Wallacia Country Club entrance.

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Figure 1: Approximate extent of road works at cemetery entrance.



Figure 2: Approximate extent of road works at Wallacia Country Club entrance.

Remediation Requirements

The works within Council's road reserve will adhere to the following remediation strategy:

1. All material excavated from the works area will be considered to be waste and will therefore be classified in accordance with the NSW Waste Classification Guidelines.
2. All material excavated from the works area will be taken from site and disposed of to an appropriately classified waste facility.
3. Any unexpected materials discovered during the works will be managed in accordance with the unexpected finds protocol provided in the RAP.

The remediation approach recommended above ensures that the land within Councils reserve will be fit for the intended purpose, that being unchanged from the current use.

Please call Mr Grant Harlow at our offices if you have any further queries regarding this matter.

For and on behalf of

MARTENS & ASSOCIATES PTY LTD



DR DANIEL MARTENS

Managing Director, Principal Engineer
LLB(Hons1) BSc(Hons1), MEngSc, PhD, MAWA, FIEAust, CPEng, NER

Nepean Gardens Masterplan

PARK ROAD, WALLACIA
21 Ha 9-HOLE GOLF COURSE



Issue:	Rev:	Description:	Date:
DA	A	For Client	28/11/2019
DA	B	For Client	05/12/2019
DA	C	RFI	22/07/2020

Project title:
WALLACIA MEMORIAL PARK

Drawing title:
Overall Site Plan

Principal consultant:

Florence Jaquet
Landscape architect

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E: flo@fja.com.au
M: 0419 983 641

Job no:
1703
Drawn by:
OK/SM
Checked by:

Scale:
1:2000 @A1
CAD file name:
1703_DES.dwg
Plot date:
28/11/2019

Drw no:
L1
Sheet no:
1

17 March 2021

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SYDNEY NSW 2000

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**Determination of DA19/0875 (PPSSWC-45-Penrith – DA19/0875)
Wallacia Golf Course
13, 17 and 37 Park Road Wallacia
Change of use of part of existing golf course**

1. We refer to the public meeting held by the Sydney Western City Planning Panel (the '**Panel**') on 17 February 2021 where the Panel determined unanimously to defer determination of the development application DA19/0875 (the '**DA**') for the reasons set out in the Record of Deferral (the '**Deferral Notice**').

Background

2. This letter provides further advice on the proposal in the DA to incorporate a bowling green into the existing golf course (and club house). This letter is to be read in conjunction with previous advice contained in our letter dated 25 September 2020 to the Catholic Cemeteries Board Ltd ('**CCB Ltd**') (our '**Earlier Advice**'), which we note has already been reviewed by the Panel.
3. This letter in particular responds to matters raised in paragraphs 24 to 35 of the Deferral Notice and the statement that the Panel would expect further consideration of the DA to address the comments contained in those paragraphs.
4. For the purposes of this letter we do not intend to address the issue of whether the Site enjoys existing use rights, as it is apparent from the Deferral Notice of the Panel that this is not in dispute. It is indicated at paragraphs 24 and 25 of the Deferral Notice "*the panel notes the advice in the Council assessment that the use of the golf course dates back to the 1930s ... and to the extent that any part of that use commenced prior to the commencement of any planning instrument which would prohibit it with or without development consent, it may well attract the existing use provisions of the Environmental Planning and Assessment Act.*"
5. The issue as we understand it is the characterisation of that existing use and whether such a characterisation would permit the proposed lawn bowling green.

Summary Advice

6. In summary:
 - a. the characterisation of the existing use rights on the part of the subject site can be refined to a genus of 'Outdoor Sporting Club Green'. Such a genus has been broadly and liberally construed from the current activities on the site and at a level of generality encouraged by the authorities to cover the individual activities carried on (but not in the terms of the detailed activities). That genus is not so expansive as to allow uses that are too different to the existing golf club and golf course on the subject site;
 - b. The proposed bowling green is sufficiently close to a golf course/putting green (which currently exist where the bowling green is proposed) to be permissible under an existing use right genus of Outdoor Sporting Club Green; and

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- c. Alternatively, the lawn bowling green could reasonably be considered to be ancillary and incidental to the use of the golf course and club house.
7. Accordingly, the bowling green proposed by the DA overcomes any permissibility issues by way of existing use rights or by being ancillary to the existing uses.

Detailed Advice

Principles for the Characterisation of Existing Use Rights

8. We note the applicable principles of categorisation of existing use rights set out in paragraphs 28 to 30 of the Deferral Notice, including those set out in the decision of Kirby P in *North Sydney Council v Boyts Radio & Electrical Pty Ltd* (1989) 16 NSWLR 50 ('*Boyts Radio*') and in particular the three key considerations set out by President Kirby (as his Honour was then) at page 59 of that decision:
 1. **Defining the "existing use" depends upon a detailed examination of the facts of each case.** Inevitably there will be borderline cases where the characterisation of the use which is protected will be controversial and upon which minds may differ.
 2. **Nevertheless, the general approach to be taken is one of construing the "use" broadly.** It is to be construed liberally such that confining the user to precise activity is not required. What is required is the determination of the appropriate genus which best describes the activities in question.
 3. **In determining that genus, attention should be focused on the purpose for which the determination is being made.** This is a town planning purpose. It therefore considers the use from the perspective of the impact of the use on the neighbourhood. This is because the regulation of the use within the neighbourhood is the general purpose for which planning law is provided.
9. We particularly note the findings of his Honour at page 64-65 of *Boyts Radio* that:

[Existing use rights] are not to be narrowly confined defined, restricting such use only to the precise activities shown by the evidence. They are to be broadly and liberally construed, keeping in mind the town planning context in which the classification is ventured. ... Equally erroneous is it to confine the use, adopting the definitions used in the NSPSO, years after the existing use rights had first been established.
10. That approach would be supported by the decision of the Chief Judge in *Seraglio v Shoalhaven City Council* [2017] NSWLEC 45 where at paragraph [47] it was held that:

[t]he appropriate characterisation of the purpose of the use of land should be done at a level of generality which is necessary and sufficient to cover the individual activities, transactions or processes carried on, not in terms of the detailed activities, transactions or processes
11. Applying those principles and as a starting point, we do not agree with Council's conclusion that '...the existing use rights are most appropriately characterised as a golf course and clubhouse (associated with the use of the golf course)' as that conclusion confines the genus too narrowly and only to the precise activities shown by the evidence.
12. We note however as stated at paragraph 31 of the Deferral Notice that the Panel does not agree with our characterisation of the relevant existing use rights in our Earlier Advice as 'recreation facility' on the basis that use of current LEP definitions is not called up in the authorities and that this characterisation is so expansive. While the precise term 'recreation facility' is not a defined term in the *Penrith Local Environmental Plan 2010* (NSW) (the '**PLEP**'), in view of the Panel's comments, we will refine our characterisation to be even closer to the level of generality that is encouraged by the authorities.

A More Refined Genus

13. As noted in paragraph 33 of the Deferral Notice, the permissibility issue arises from the proposal of a bowling green in a *PLEP* E3 Zoned part of the subject site which is currently used as a golf course and putting green. As detailed above, that use relies on existing use rights.

14. As called for by the authorities, defining the 'existing use' depends upon a detailed examination of the facts of each case and in determining the genus, the consideration of the use should be focused on the use from the perspective of the impact of the use on the neighbourhood. In our view, the following facts and circumstances are relevant:
- a. Golf is a club orientated relatively passive ball sport played outside on a turfed green.
 - b. Golfers pay for their games at the club house;
 - c. Staff members are employed by the golf club to service the golfers and maintain the golf course; and
 - d. Golfers often utilise the golf club house changing rooms and amenity facilities before and after their games.
15. On that basis, and at a level of generality encouraged by the authorities to cover the individual activities carried on but not in the terms of the detailed activities, the existing use rights on the relevant part of the subject site where the bowling green is proposed could be characterised in a more refined way as an 'Outdoor Sporting Club Green'. As will become clear below, in our view the use of the word 'green', as opposed to facility or field, confines the sporting activities permissible under the genus and would not be so expansive as to allow uses that are too different to a golf club and golf course.
16. This characterisation of use as an 'Outdoor Sporting Club Green' would appear to accord with the following characterisations of uses from the authorities which are illustrative for the present purposes. The use of premises for professional offices need not ordinarily be categorised with greater particularity (such as by reference to the particular profession): *Shire of Perth v O'Keefe (1964) 110 CLR 529* at 535; premises which warehoused electrical goods and other goods were categorised as a warehouse, notwithstanding that that would permit the storage of goods not previously stored: *Boys Radio* at 61.

Permissibility of the Bowling Green?

17. With a more refined characterisation of the relevant existing use rights as 'Outdoor Sporting Club Green', the question turns for the purposes of the DA, to whether the proposed bowling green is permissible under the existing use rights.
18. The Macquarie Dictionary defines 'green' in the relevant sporting context in just two ways:
- a. Golf:
 - i. the whole course of links on which golf is played;
 - ii. a putting green alone
 - b. a bowling green
19. When considering the perspective of the impact of the lawn bowling use on the neighbourhood:
- a. Similarly to golf, lawn bowls is a club orientated relatively passive ball sport played outside on a turfed green;
 - b. Similarly to golfers, lawn bowlers pay for their games at a club house;
 - c. Both golf and lawn bowls are low impact in terms of noise which they generate and their visual impact;
 - d. As with golf, staff members are employed by a club to service the lawn bowlers and maintain the bowling green; and
 - e. As with golfers, lawn bowlers often utilise the club house facilities before and after their games.
20. On the basis of the reasons and legal principles detailed above, **bowls and a bowling green are sufficiently close to golf and a golf course/putting green to be permissible under an existing use right genus of Outdoor Sporting Club Green**. As noted above, the use of 'green' does not

allow too wide a range of sporting or recreation activities due to the limited range of sporting activities understood to be played on a 'green', which does include lawn bowls as well as golf.

Ancillary Use - Alternative Consideration for Permissibility

21. If the Panel is not persuaded by our argument regarding the characterisation of the existing use we would submit, in the alternative, that the lawn bowling green is permissible as an ancillary use to the permitted golf course and club house existing use.
22. In the seminal decision of *Foodbarn Pty Ltd v Solicitor – General* (1975) 32 LGRA 157 (**Foodbarn**) the NSW Court of Appeal [at 61] held that it:

*“may be deduced that where part of a premises is used for a purpose which is subordinate to the purpose which inspires the use of another part, **it is legitimate to disregard the former and treat the dominant purposes as that for which the whole is being used.**”* (emphasis)
23. The Court of Appeal held that this principle applies irrespective of whether the dominant and ancillary (or servient) purposes relate to the whole of the premises or are found in separate parts of the premises.
24. Earlier in the decision of *Scott’s Provisions Stores Pty Ltd v Sydney City Council* (1958) 3 LGRA 191 the Court held that the test of whether a purpose of development is ancillary and incidental to another purpose is whether the two purposes are severable, namely, whether the operation of one does not inextricably require the other, although sometimes may be carried out in association with the other but other occasions may not.
25. Later in *Lizzio v Ryde Municipal Council* (1983) 155 CLR 211 (**Lizzio**) the High Court endorsed the decision in *Foodbarn* and held that the question of whether development is ancillary and incidental to another purpose is one of fact and degree. The process involves judgments not always susceptible to full rationalisation where minds may genuinely differ. In *Macquarie International Health Clinic Pty Ltd v University of Sydney* (1998) 98 LGRA 218 the Court of Appeal held that the test is purely objective.
26. The Court in *Lizzio* found that factors which may lead to a conclusion that a use is not ancillary and incidental to the dominant or principle purpose include factors such as the regularity of the activity, the extent of the activity and the fact that items for sale (in that case) were sourced from other premises.
27. In our submission **the use of the proposed lawn bowling green could reasonably be considered to be ancillary and incidental to the use of the golf course and club house for the following reasons:**
 - a. lawn bowls, similar to golf, is an outdoor ball oriented sporting activity played on a turfed green. The lawn bowling green would therefore be an 'extension' of the golf course and putting green.
 - b. the proposed lawn bowling green will be situated adjoining the club house and access to both the lawn bowling green and the golf course is to be through the club house, which will involve:
 - i. lawn bowling players (or members) paying for their game(s) at the golf club house;
 - ii. the use of the same staff members employed by the golf course club house to service the lawn bowling patrons,
 - iii. lawn bowling patrons utilising the same car parking facilities currently provided by the golf course, and
 - iv. lawn bowling patrons use the same club house facilities before and after their games.
28. Based on the above we consider that the use of the lawn bowling green would be inextricably linked to the golf course, particularly through the location and use of the club house. Following both *Foodbarn* and *Lizzio* the Panel could reasonably conclude that the use of the proposed lawn bowling green would be subservient to the predominant use of the golf course and not a separate and independent

use and therefore it should be disregarded for the purposes of characterising the use of the subject land.

Conclusion

29. In our view, the existing use rights on the relevant part of the site can be characterised as 'Outdoor Sporting Club Green'. This genus is at the level of generality required by the authorities but is not so expansive as to allow uses that are too different to the existing golf club and golf course on the subject site. For example, the limitation to a 'green' does not allow a soccer field to be included in this 'Outdoor Sporting Club Green' use. The proposed bowling green use falls within this 'Outdoor Sporting Club Green' genus and is therefore permissible under existing use rights.
30. In any case, even if this is not accepted, the lawn bowls green is a form of development which is ancillary and incidental to the golf course and club house use and is therefore permissible as a form of ancillary development.
31. Accordingly, the bowling green proposed by the DA overcomes any permissibility issues by way of existing use rights or by being ancillary to the existing uses.

If you have any questions or require further information, please do not hesitate to contact either Anthony Whealy on +61 0 8035 7848 or Ben Salon on +61 2 8035 7867.

Yours sincerely



Anthony Whealy
Partner
Accredited Specialist Local Government & Planning

A stylized topographic map with green contour lines is positioned on the left side of the page, extending from the top left towards the bottom left.

Nepean Gardens Biodiversity Development Assessment Report

Catholic Metropolitan Cemeteries Trust

DOCUMENT TRACKING

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Prepared by	Janene Devereux
Reviewed by	Meredith Henderson
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Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd (ELA) has been engaged by Catholic Metropolitan Cemeteries Trust to prepare a Biodiversity Development Assessment Report (BDAR) for the proposed re-design of the existing golf course and construction of a cemetery within 13 Park Road, Wallacia (the study area). This BDAR is required because the development site is located on the Biodiversity Values Map.

This BDAR would support the application DA 19/0875 to Penrith City Council under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This BDAR has been prepared to meet the requirements of the Biodiversity Assessment Method (BAM) established under Section 6.7 of the *Biodiversity Conservation Act 2016* (BC Act).

ELA understands that the development within the study area consists of the redesign of the existing golf course within the western portion of the study area and the construction of the Nepean Memorial Park within the eastern portion.

The proposed development will require the removal of approximately 0.14 ha of Cumberland riverflat forest (PCT 835) and 0.54 ha of Cumberland shale hills woodland (PCT 850). The removal of 0.75 ha of native planted vegetation was assessed using a streamlined assessment for Planted Native Vegetation. The removal of 0.27 ha of exotic and ornamental vegetation does not require assessment.

Impacts to the study area have been previously assessed by Travers Bushfire and Ecology in a 2017 Flora and Fauna report and in a 2019 BDAR.

This BDAR outlines the measures taken to avoid, minimise and mitigate impacts on the vegetation and species habitat present within the development footprint and measures to minimise impacts during construction and operation of the development. Following consideration of the below aspects, the residual unavoidable impacts of the project were calculated consistent with BAM by utilising the Biodiversity Assessment Method Credit Calculator (BAMC).

Vegetation described as PCT 835 and 850 corresponds to endangered ecological communities, listed under both the BC Act and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). PCT 835 corresponds to the NSW BC Act listed Endangered Ecological Community (EEC), *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (see Table 11). This community is also listed as Critically Endangered under the EPBC Act as *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria*. PCT 850 within the study area corresponds with the NSW BC Act listed Critically Endangered Ecological Community, *Cumberland Plain Woodland in the Sydney Basin Bioregion* (CPW) (see Table 11). This community is also listed as Critically Endangered under the EPBC Act as *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest*.

Targeted survey for species credit species has been completed as part of previous assessments across the study area (Travers 2017 and 2019a) and more recent vegetation mapping revisions were undertaken by ELA in 2021. Three species credit species have been assumed as present or recorded within the study area: *Chalinolobus dwyeri* (Large-eared Pied Bat), *Litoria aurea* (Green and Golden Bell Frog) and *Myotis macropus* (Southern Myotis). One endangered population was also assumed present:

Marsdenia viridiflora subsp. *viridiflora* - endangered population (*Marsdenia viridiflora* R. Br. subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas).

Table 1: Summary of ecosystem credits required to offset residual impacts of the proposed development

PCT ID	PCT Name	Vegetation Formation	Direct impact (ha)	Credits required
835	Cumberland riverflat forest	Forested Wetlands	0.14	6
850	Cumberland shale hills woodland	Grassy Woodlands	0.54	20

Table 2: Summary of species credits required to offset residual impacts of the proposed development

Species	Common Name	Direct impact / habitat (ha)	Credits required
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	0.25 ha	9
<i>Litoria aurea</i>	Green and Golden Bell Frog	0.25 ha	5
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	<i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i> population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	0.11 ha	2
<i>Myotis macropus</i>	Southern Myotis	0.25 ha	5

Three Matters of National Environmental Significance (MNES) listed under the EPBC Act were considered as likely or having potential to occur in the development site. The Significant Impact Criteria was applied to *Pteropus poliocephalus* (Grey-headed Flying-fox), *Chalinolobus dwyeri* (Large-eared Pied Bat) and *Litoria aurea* (Green and Golden Bell Frog). Assessments were also carried out for Critically Endangered Ecological Communities - *Cumberland Plain Woodland in the Sydney Basin Bioregion* and *River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria* and concluded that the proposed development is unlikely to constitute a significant impact on MNES.

Contents

1. Stage 1: Biodiversity assessment.....	1
1.1 Introduction.....	1
1.1.1 General description of the development site	1
1.1.2 Development site footprint	1
2. Legislative context.....	5
3. Methodology.....	7
3.1.1 Literature and Data Reviews.....	7
3.2 Landscape features.....	7
3.2.1 IBRA regions and subregions	7
3.2.2 Native vegetation extent	7
3.2.3 Rivers and streams.....	7
3.2.4 Wetlands	8
3.2.5 Connectivity features.....	8
3.2.6 Areas of geological significance and soil hazard features.....	8
3.2.7 Site context	8
3.3 Native vegetation	8
3.3.1 Survey effort	8
3.3.2 Plant Community Types present.....	10
3.3.3 Plant Community Type selection justification	14
3.3.4 Vegetation integrity assessment	15
3.3.5 Streamlined assessment module – Planted native vegetation.....	15
3.3.6 Use of local data	15
3.4 Threatened species.....	18
3.4.1 Ecosystem credit species	18
3.5 Species credit species	23
3.5.1 Targeted surveys.....	34
3.5.2 Species Credits Included in this Assessment.....	37
3.5.3 Use of local data	37
3.5.4 Expert reports	37
4. Stage 2: Impact assessment (biodiversity values).....	40
4.1 Avoiding impacts.....	40
4.1.1 Locating a project to avoid and minimise impacts on vegetation and habitat.....	40
4.1.2 Prescribed biodiversity impacts.....	41
4.2 Assessment of Impacts	43
4.2.1 Direct impacts	43
4.2.2 Change in vegetation integrity.....	44

4.2.3 Indirect impacts	44
4.2.4 Prescribed biodiversity impacts	45
4.2.5 Mitigating and managing impacts	46
4.2.6 Serious and Irreversible Impacts (SAII)	50
4.3 Risk assessment	53
4.4 Impact summary	57
4.4.1 Serious and Irreversible Impacts (SAII)	57
4.4.2 Impacts requiring offsets	57
4.4.3 Impacts not requiring offsets	57
4.4.4 Areas not requiring assessment	58
4.4.5 Credit summary	58
4.5 Consistency with legislation and policy	62
4.5.1 <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	62
4.5.2 Vulnerable Species	63
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)	63
<i>Chalinolobus dwyeri</i> (Large-eared Pied Bat)	63
<i>Litoria aurea</i> (Green and Golden Bell Frog)	63
4.5.3 <i>Critically Endangered Ecological Community</i>	66
<i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>	66
<i>River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria</i>	66
5. References	69
Appendix A: Definitions	71
Appendix B: Vegetation plot data	75
Appendix C: EPBC Act Likelihood of Occurrence	77
Appendix D: Biodiversity credit report	100

List of Figures

Figure 1: Site Map	3
Figure 2: Location Map	4
Figure 3: Plant Community Types and development footprint	16
Figure 4: Plot locations	17
Figure 5: Targeted surveys	38
Figure 6: Species polygons	39
Figure 7: Final project footprint	56
Figure 8: Impacts requiring offset	59
Figure 9: Impacts not requiring offset	60
Figure 10: Areas not requiring assessment	61

List of Tables

Table 1: Legislative context	5
Table 2: Native vegetation extent.....	7
Table 3: Rivers and streams	7
Table 4: Percent native vegetation cover in the landscape	8
Table 5: Full-floristic PCT identification plots.....	9
Table 6: Vegetation integrity plots.....	9
Table 7: Plant Community Types.....	10
Table 8: Threatened Ecological Communities	11
Table 9: PCT selection justification (Travers 2019a)	14
Table 10: Vegetation integrity.....	15
Table 11: Predicted ecosystem credit species	18
Table 12: Candidate species credit species.....	23
Table 13: Travers species credit species and threatened flora survey effort (Travers 2019a).	34
Table 14: Travers birds survey effort (Travers 2019a).	35
Table 15: Travers Bushfire and Ecology nocturnal birds, microbats and arboreal mammals survey effort (Travers 2019a).	36
Table 16: Travers Bushfire and Ecology reptiles and amphibians survey effort (Travers 2019a).....	36
Table 17: Travers Bushfire and Ecology invertebrate survey effort (Travers 2019a).	36
Table 18: Weather conditions	37
Table 19: Species credit species included in the assessment	37
Table 20: Locating and designing a project to avoid and minimise impacts on vegetation and habitat.	40
Table 21: Prescribed biodiversity impacts	42
Table 22: Locating and designing a project to avoid and minimise prescribed biodiversity impacts.....	42
Table 23: Direct impacts to native vegetation	43
Table 24: Direct impacts on threatened ecological communities	43
Table 25: Direct impacts on threatened species and threatened species habitat	43
Table 26: Change in vegetation integrity	44
Table 27: Indirect impacts.....	44
Table 28: Direct impacts on prescribed biodiversity impacts	45
Table 29: Measures proposed to mitigate and manage impacts.....	46
Table 30: Candidate Serious and Irreversible Impact entities	50
Table 31: Determining whether impacts are serious and irreversible.....	50
Table 32: Evaluation of an impact on a TEC – Cumberland Plain Woodland.....	51
Table 33: Likelihood criteria	53
Table 34: Consequence criteria.....	54
Table 35: Risk matrix	54
Table 36: Risk assessment.....	54
Table 37: Impacts to native vegetation that require offsets	57
Table 38: Impacts on threatened species and threatened species habitat that require offsets.....	57
Table 39: Ecosystem credits required	58
Table 40: Species credit summary.....	58
Table 41: EPBC Act Assessment for Vulnerable species.....	64

Table 42: EPBC Act Assessment for CEEC.....	67
Table 43: Likelihood of occurrence for threatened entities	78

Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
CEEC	Critically Endangered Ecological Community
DNG	Derived Native Grassland
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DPIE	NSW Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	NSW <i>Fisheries Management Act 1994</i>
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
LLS	Local Land Service
NSW	New South Wales
NRAR	NSW Natural Resources Access Regulator
EESG	NSW Environment, Energy and Science
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SSI	State Significant Infrastructure
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW <i>Water Management Act 2000</i>

1. Stage 1: Biodiversity assessment

1.1 Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Janene Devereux, who is an Accredited Person under the NSW *Biodiversity Conservation Act 2016* (BC Act) (Accreditation BAAS19045). This document is approved by Meredith Henderson (Accreditation BAAS17001).

A BDAR was prepared for the study area by Travers Bushfire and Ecology (hereafter referred to as Travers) in 2019. Field methodologies and results are provided in Travers 2019 and reproduced within this BDAR for context.

1.1.1 General description of the development site

The proposed development site is defined as the area of land subject to the proposed development application DA 19-0875. This study area is located at 13 Park Road, Wallacia (Lot 2 DP 1108408 and Lot 3 and 4 DP18701) in the City of Penrith local government area (LGA).

The study area contains an operational golf course and associated club house infrastructure, paths, and parking areas. The study area is zoned as E3 under the Penrith Local Environment Plan (LEP) 2010 and has a total area of 13.10 ha.

This report includes two base maps, the Site Map (Figure 1) and the Location Map (Figure 2).

1.1.2 Development site footprint

As outlined in Travers (2019a), the proposed redevelopment involves three parts:

- Redesign of the existing golf course and retention of the existing workshop / maintenance shed. This will involve rehabilitation of the creek line vegetation and threatened ecological communities (TEC) throughout the site (in accordance with the Vegetation Management Plan).
- Alterations and additions to the existing club including a new pool, gym, deck and terrace with internal refurbishments including a golf pro shop, function rooms, lounge and gaming area.
- The development of Nepean Memorial Park within the eastern portion of the site. This will include the construction of a multipurpose chapel and administration office, burial sites as well as the associated road network.

The western portion of the study area will be retained and existing fairways partial reconfigured.

The eastern portion will be used for a cemetery. The proposed development involves the construction of the following built facilities:

- A multipurpose chapel
- An administration office
- Alterations and additions to the existing clubhouse and
- Reuse of existing workshop building.

A road network has been designed to allow access to each of the cemetery facilities and access to the various proposed burial and memorial sites throughout. Please refer to Figure 3 for the proposed

development footprint. Any works confined to the areas within the development footprint are hereafter referred to as the 'development site'.

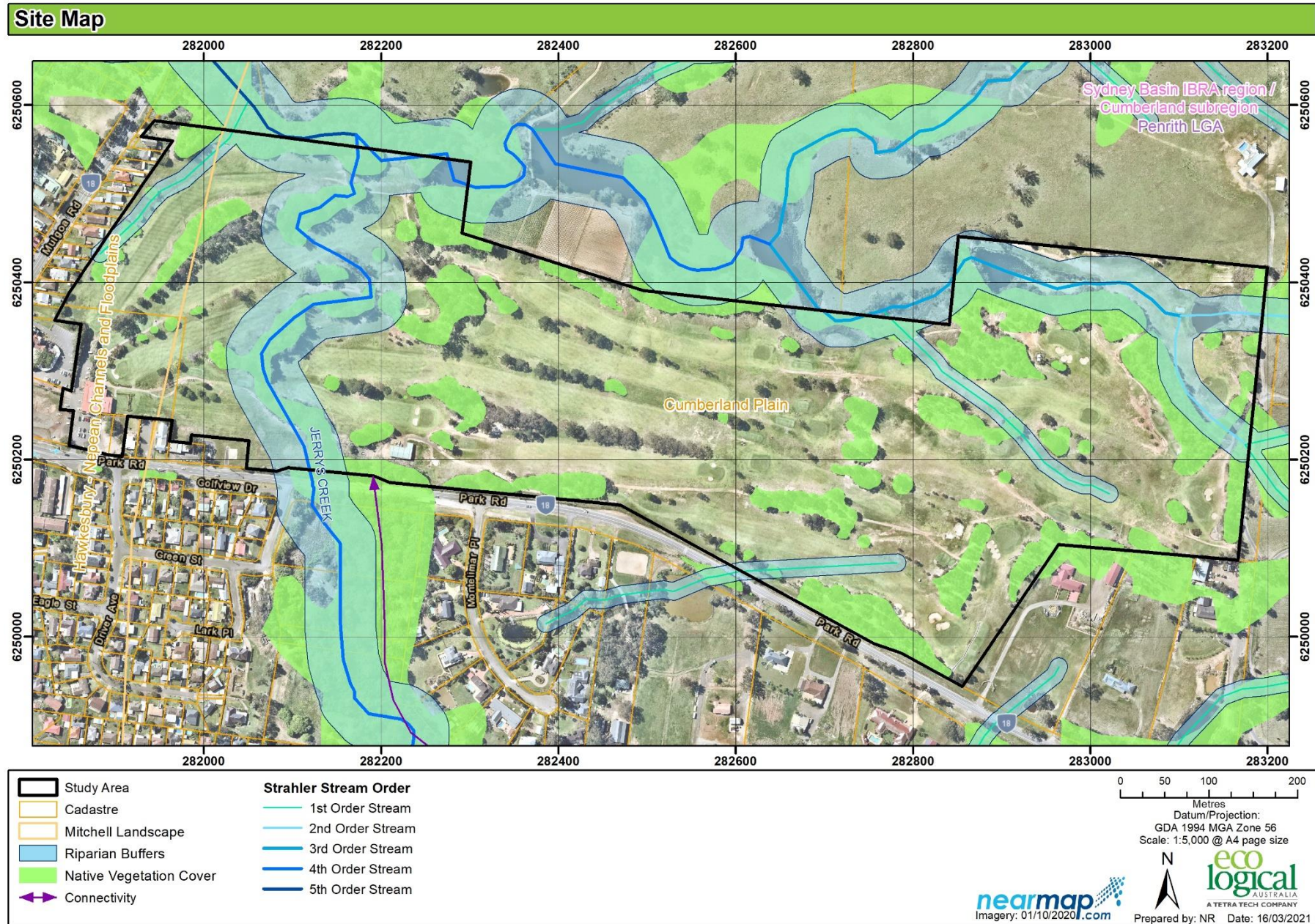


Figure 1: Site Map

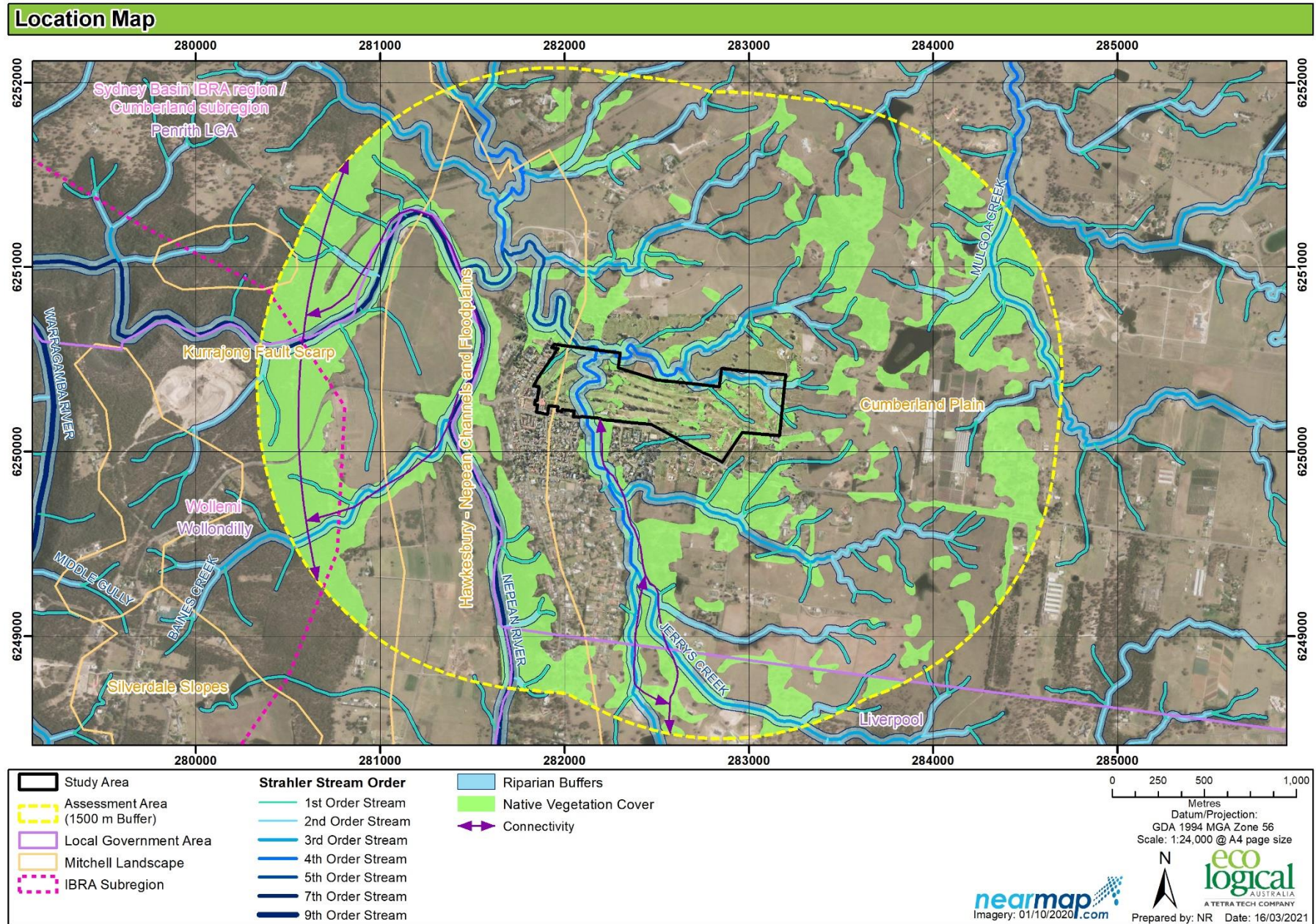


Figure 2: Location Map

2. Legislative context

Table 1: Legislative context

Name	Relevance to the project	Report Section
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999	Matters of national Environmental Significance have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is not likely to have a significant impact on MNES.	Section 4.5
State		
Environmental Planning and Assessment Act 1979	The proposed development requires consent under the (Penrith Local Environmental Plan 2010 (LEP) and is to be assessed under Part 4 of the EP&A Act.	Section 1
Biodiversity Conservation Act 2016	The proposed development exceeds the BAM threshold and requires submission of a Biodiversity Development Assessment Report.	Entire report
Fisheries Management Act 1994	The development does not involve impacts to Key Fish Habitat, does not involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage. A permit or consultation under the FM Act is not required.	N/A
Local Land Services Amendment Act 2016	The LLS Act does not apply to areas of the state to which the SEPP Vegetation applies. The Vegetation SEPP applies to the Penrith local government area.	N/A
Water Management Act 2000	The project involves works on waterfront land and therefore requires a Controlled Activity Approval under s91 of the WM Act	N/A
Planning Instruments		
Vegetation SEPP	The Vegetation SEPP applies to development that does not require consent. As this project requires consent under the Penrith City Council LEP, the Vegetation SEPP is not relevant.	N/A
Coastal Management SEPP	The proposed development is not located on land subject to the Coastal Management SEPP	N/A
State Environmental Planning Policy (Koala Habitat Protection) 2020	The proposed development is not located within a LGA to which the SEPP Koala Habitat Protection applies.	N/A
Penrith Local Environment Plan	The development site is zoned E3 under the Penrith LEP 2010.	N/A
Penrith City Council Development Control Plan (DCP)	<p>The Penrith City Council DCP contains provisions relating to native vegetation. Section C2-2.1 states that the objective of protecting trees and other vegetation where possible is to:</p> <ol style="list-style-type: none"> To protect and conserve the biodiversity values of trees and other vegetation in the City, To maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change, To support conservation and threat abatement action to minimise biodiversity loss and conserve threatened species and ecological communities in nature, To protect and enhance biodiversity corridors, landscape character and scenic values of the City, 	N/A

Name	Relevance to the project	Report Section
	<ul style="list-style-type: none"> e. Recognise the importance and function of trees and other vegetation for Cooling our City, f. To preserve the amenity of the City through the preservation of trees and other vegetation, g. To preserve existing trees and other vegetation where possible during the planning, design, development and construction process, h. To firstly avoid or minimise impacts of a proposed development and land use change on biodiversity and if impacts are unavoidable provide appropriate offsets, i. To achieve an appropriate balance between the protection of trees and other vegetation and mitigating risks from natural hazards. 	

3. Methodology

3.1.1 Literature and Data Reviews

A BDAR was prepared in 2019 for a previous development footprint within the development site by Travers (2019a). Survey data, including methodologies and results, collected from this previous assessment is utilised within this report to inform ecological constraints for the project.

The following data sources were reviewed by ELA as part of this report:

- Biodiversity Assessment Method Calculator
- BioNet Vegetation Classification 2021
- Additional GIS datasets including soil, topography, geology and drainage
- Flora and Fauna Assessment Report (Travers 2017)
- Biodiversity Development Assessment Report (Travers 2019a)
- Tree Assessment (Travers 2019b).
- Vegetation Management Plan (Travers 2019c)

3.2 Landscape features

3.2.1 IBRA regions and subregions

The development site falls within the Sydney Basin IBRA region and the Cumberland Plain IBRA subregions.

3.2.2 Native vegetation extent

The extent of native vegetation within the development site and buffer is outlined in Table 2. Thirty-one percent was entered in the BAMC tool for native vegetation extent.

Table 2: Native vegetation extent

Native vegetation cover within the development site (ha)	Native vegetation within the 1,500 m buffer area (ha)	Total area within the buffer (ha)	Percent native vegetation cover within the buffer area (%)
10.54	1267.7	392.9	31

There are no differences between the mapped vegetation extent and the aerial imagery.

3.2.3 Rivers and streams

The development site contains rivers and streams as outlined in Table 3. Watercourses and stream buffers are mapped on the Site Map (Figure 1) and the Location Map (Figure 2).

Table 3: Rivers and streams

River / stream	Strahler stream order	Riparian buffer
Jerrys Creek	2	20 m
Unnamed first order drainage	1	10 m

3.2.4 Wetlands

As outlined in Travers (2019a), the study area contains four waterbodies. These waterbodies have been constructed and therefore do not conform to a natural wetland community or threatened wetland ecological community.

3.2.5 Connectivity features

As per Travers (2019a), fragmented connectivity features exist along the main drainage line (Jerrys Creek) to the north and west towards the Nepean River. This river then connects to Burragorang State Conservation Area and the Blue Mountains National Park. Vegetation bordering this river is likely to provide habitat for highly mobile species such as birds and microchiropteran bats (microbats).

Connectivity features also exist from the east to the north of the study area (see Figure 1 and 2).

3.2.6 Areas of geological significance and soil hazard features

The study area does not contain karst, caves, crevices, cliffs or other areas of geological significance. The study area does not contain soil hazard features.

3.2.7 Site context

3.2.7.1 Method applied

The site-based method has been applied to this development.

3.2.7.2 Percent native vegetation cover in the landscape

The current percent native vegetation cover in the landscape was assessed in a Geographic Information System (GIS) using aerial imagery sourced from Six Maps using increments of 5%. The percent native vegetation cover within the assessment area (1267.7 ha) is 30.99% (392.9 ha) (Table 3).

The results of this analysis are shown in Table 4.

Table 4: Percent native vegetation cover in the landscape

Native vegetation within the study area (ha)	Native vegetation cover within the 1,500 m buffer area (%)
10.54	31

3.2.7.3 Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the study area. The patch size is greater than 100 ha which falls into the > 101 ha size class consistent with BAM.

3.3 Native vegetation

3.3.1 Survey effort

Vegetation surveys were originally undertaken by Travers in both 2017 and 2019. Initial flora surveys were undertaken on 5 October 2017 which included:

- Random meanders to gain a full species list of the plants within the study area
- Tree assessments

- Nine 20 x 20 m or 10 x 40 m floristic quadrats were undertaken within remnant bushland areas and plantation (Figure 4)
- Threatened species searches were conducted as near linear transects within areas of potential habitat.

Updated botanical surveys were undertaken on 3 December 2019 which included:

- Seven 20 x 50 m BAM vegetation integrity plots were undertaken within vegetation directly affected by the original impact footprint (Figure 4)
- Revision of 2017 vegetation mapping.

Additional surveys were conducted by ELA on 8 March 2021 which included the revision of 2019 vegetation mapping (Travers 2019a). This revised mapping was designed to be consistent with the requirements of BAM 2020.

Across 2017, 2019 and 2021, a total of 16 full-floristic vegetation plots were surveyed to identify PCTs and TECs on the study area (Table 5). A total of nine vegetation integrity plots were undertaken within the study area consistent with BAM minimum plots required per vegetation zone (Table 6).

All field data collected by Travers (2019a) at full-floristic and vegetation integrity plots is included in Appendix B:.

Table 5: Full-floristic PCT identification plots

PCT ID	PCT Name	Number of plots surveyed
835	Cumberland riverflat forest	5
850	Cumberland shale hills woodland	7
-	Native planted vegetation	4
-	Exotic/Ornamental planted vegetation	0

Table 6: Vegetation integrity plots

Veg Zone	PCT ID	PCT Name	Condition	Area of impact (ha)	Plots required	Plots surveyed (Travers 2019a)
1	835	Cumberland riverflat forest	Moderate - poor	0.14	1	1
2	850	Cumberland shale hills woodland	Moderate - poor	0.11	1	2
3	850	Cumberland shale hills woodland	Poor – no understorey	0.43	1	1
4	-	Native planted vegetation	Poor – planted	0.75	1	3
5	-	Exotic/Ornamental planted vegetation	Poor	0.27	0	0

3.3.2 Plant Community Types present

A total of two PCTs were identified within the study area (Table 7, Figure 3). Of these, both PCTs are listed TECs under the BC Act and *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Table 8). Justification for the selection of PCTs occurring on the study area is based on a quantitative analysis of full-floristic plot data (Travers 2019a) and is provided in Table 9. Example photos of the communities allocated are provided in Photo 1 to Photo 6 below. Field surveys conducted by ELA in March 2021 made adjustments to PCT allocation within the study area, including the mapping of all exotic/ornamental vegetation and the refinement of planted native vegetation across the study area.

It has been estimated that all 3.04 ha of PCT 835 within the study area corresponds with the NSW BC Act listed Endangered Ecological Community (EEC), *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (see Table 11). This community is also listed as Critically Endangered under the EPBC Act as *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria*.

It has also been estimated that 2.31 ha of PCT 850 within the study area corresponds with the NSW BC Act listed Critically Endangered Ecological Community (CEEC), *Cumberland Plain Woodland in the Sydney Basin Bioregion* (CPW) (see Table 11). This community is also listed as Critically Endangered under the EPBC Act as *Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest*.

Native planted vegetation is also present within study area. This community consists of locally-occurring species, such as *E. tereticornis*, *E. moluccana*, *E. crebra*, *E. punctata* and *E. fibrosa*, along with species that would not naturally occur within the site, such as *Lophostemon confertus*, *Grevillea robusta*, *Melaleuca quinquenervia* and *Callistemon viminalis*. The total area of native planted vegetation is 5.20 ha.

Exotic and/or ornamental species also occur within the study area. Species recorded include exotic species such as *Pinus radiata* and *Cinnamomum camphora*, and ornamental species such as *Corymbia citriodora*. The total area of exotic/ornamental within the study area is 2.16 ha.

Table 7: Plant Community Types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area (ha)	Percent cleared (%)
835	Cumberland riverflat forest	Coastal Floodplain Wetlands	Forested Wetlands	3.04	0.93
850	Cumberland shale hills woodland	Coastal Valley Grassy Woodlands	Grassy Woodlands	2.31	0.93
NA	Native planted vegetation	-	-	5.20	NA
NA	Exotic/Ornamental planted vegetation	-	-	2.16	NA

Table 8: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
835	Endangered Ecological Community	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion	3.04	Critically Endangered	River- flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria.	3.04
850	Critically Endangered Ecological Community	Cumberland Plain Woodland in the Sydney Basin Bioregion	2.31	Critically Endangered	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	2.31

**Photo 1** An example of vegetation mapped as PCT 835 - Cumberland riverflat forest within plot G1 (Photo from Travers 2019a)



Photo 2 An example of vegetation mapped as PCT 835 - Cumberland riverflat forest along Jerrys Creek (Photo from Travers 2019a)



Photo 3 An example of vegetation mapped as PCT 850 – Moderate Condition - Cumberland shale hills woodland (Photo from Travers 2019a)



Photo 4 An example of vegetation mapped as PCT 850 – Low-No Midstorey - Cumberland shale hills woodland (Photo from Travers 2019a)



Photo 5 An example of planted native vegetation within plot G5 (Photo from Travers 2019a)



Photo 6 An example of exotic/ornamental vegetation, including pine trees (*Pinus radiata*)

3.3.3 Plant Community Type selection justification

Justification for the PCTs within the study area is provided within Travers 2019a. Interim Biogeographic Regionalisation for Australia (IBRA) region and sub-region allowed for the narrowing of potential community types. The assessment of dominant canopy, mid-storey and ground cover species through the BioNet Vegetation Classification Tool, including the landscape position, allowed for the allocation of each PCT. The justification for this allocation is provided below in Table 9.

Table 9: PCT selection justification (Travers 2019a)

PCT ID	PCT Name	Selection criteria	Species relied upon for identification of vegetation type and relative abundance (Travers 2019a)
850	Cumberland shale hills woodland	<p>The IBRA region, subregion, soil landscape and landscape position of the study area correspond to those listed for the PCT under the BioNet Vegetation Classification.</p> <p>Results of floristic plot analysis including the presence of positive diagnostic canopy species</p>	<p>Presence of <i>E. moluccana</i> and <i>E. tereticornis</i> within the canopy and <i>Microlaena stipoides</i> and <i>Themeda triandra</i> in the ground strata.</p> <p>Canopy and mid-strata species presence, combined with the presence of <i>Acacia implexa</i>, which is diagnostic for this PCT. Correct landscape position (hills and rises).</p>
835	Cumberland riverflat forest	<p>The IBRA region, subregion, soil landscape and landscape position of the study area correspond to those listed for the PCT under the BioNet Vegetation Classification.</p> <p>Results of floristic plot analysis including the presence of positive diagnostic canopy species</p>	<p>Presence of <i>E. tereticornis</i> and <i>E. amplifolia</i> as upper strata within the Cumberland Plain subregion. This PCT was considered a match due to the presence of <i>E. amplifolia</i>, <i>Acacia parramattensis</i> and <i>Bursaria spinosa</i>. Landscape requirements were also met, with vegetation locations within alluvial flats along streams and creeks.</p>

Field surveys conducted by ELA in March 2021 confirmed allocated PCTs within the study area and concur with the justification provided by Travers (2019a).

3.3.4 Vegetation integrity assessment

A vegetation integrity assessment using the Credit Calculator (BAMC) was undertaken and the results are outlined in Table 10.

Table 10: Vegetation integrity

Veg Zone	PCT ID	Condition	Impact Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
1	835	Moderate-poor	0.14	44.8	17.6	100	42.9
2	850	Moderate-poor	0.11	35.3	27.0	81.3	42.6
3	850	Low – No Midstorey	0.43	28.0	68.5	73.5	52.1

3.3.5 Streamlined assessment module – Planted native vegetation

Section 2.2 of BAM 2020 contains a streamlined assessment module for planted native vegetation. The streamlined assessment can be used where native vegetation was planted for purposes such as street trees and other roadside plantings, windbreaks, landscaping in parks and gardens, and revegetation for environmental rehabilitation.

The streamlined assessment module for planted native vegetation has been applied to part of the development site where areas of planted native vegetation will be affected.

The planted native vegetation within the development site has been planted for the purpose of landscape plantings in the golf course grounds. Appendix D of BAM provides a decision-making key for the assessment of the planted native vegetation. This decision-making key was applied to the sections of planted native vegetation mapped within the development site. Following the decision key, the most appropriate result is D.1.5 since the planted vegetation is considered to be for functional and aesthetic purposes. Therefore, for those patches identified as planted native vegetation the use of Chapters 4 (native vegetation integrity plots) and 5 (threatened species assessment) are not required to be applied. The planted native vegetation must be assessed for threatened species habitat and suitable minimisation and mitigation measures must be applied (see Section 4 for details).

3.3.6 Use of local data

The use of local data is not proposed.

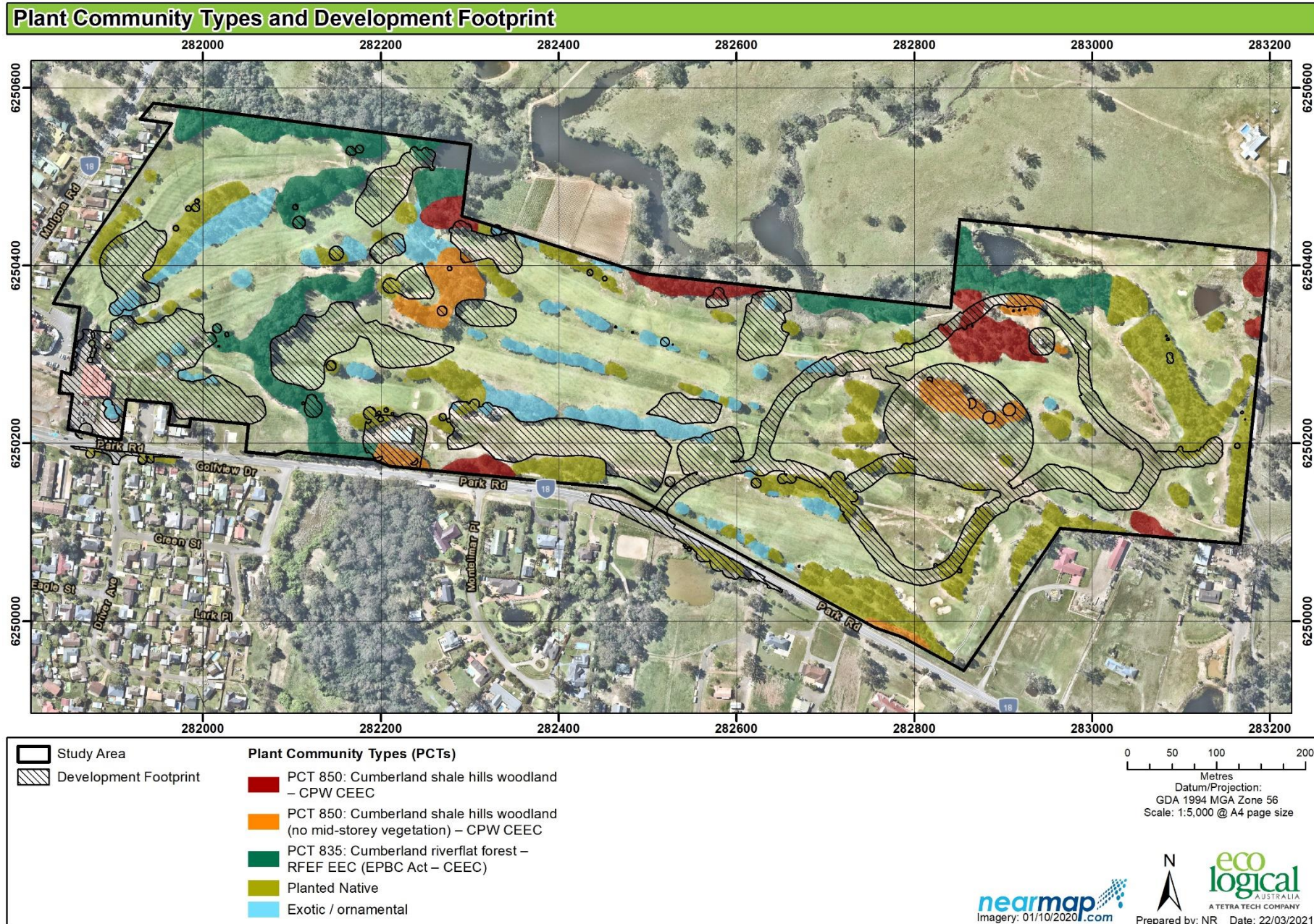


Figure 3: Plant Community Types and development footprint

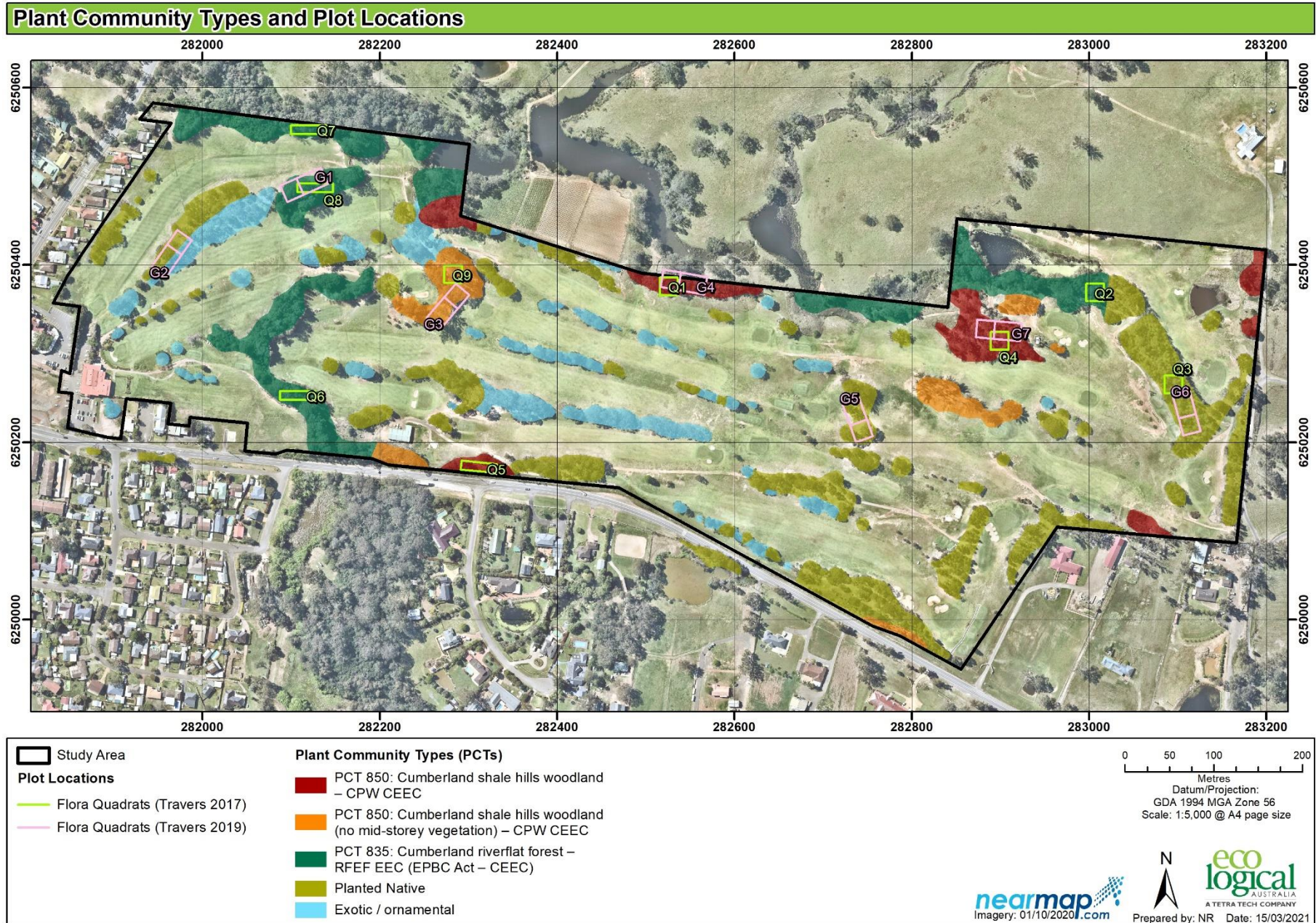


Figure 4: Plot locations

3.4 Threatened species

3.4.1 Ecosystem credit species

Ecosystem credit species predicted to occur at the study area, their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 11. Ecosystem credit species which have been excluded from the assessment and relevant justification are also included in Table 11.

Table 11: Predicted ecosystem credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species
<i>Anthochaera phrygia</i>	Regent Honeyeater (Foraging)	As per OEH mapped areas	-	High	Critically Endangered	Critically Endangered	<u>Included</u> Potential foraging habitat exists within the study area
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	-	-	Moderate	Vulnerable	Not listed	<u>Included</u> Potential habitat exists within the study area
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (Foraging)	-		Moderate	Vulnerable	Not listed	<u>Included</u> Potential foraging habitat exists within the study area
<i>Chthonicola sagittata</i>	Speckled Warbler	-	-	High	Vulnerable	Not listed	<u>Included</u> Potential habitat exists within the study area
<i>Circus assimilis</i>	Spotted Harrier	-	-	Moderate	Vulnerable	Not listed	<u>Included</u> Potential habitat exists within the study area
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	-	-	High	Vulnerable	Not listed	<u>Included</u> Potential habitat exists within the study area
<i>Daphoenositta chrysoptera</i>	Varied Sittella	-	-	Moderate	Vulnerable	Not listed	<u>Included</u>

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species
							Potential habitat exists within the study area
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	-	-	High	Vulnerable	Endangered	<u>Included</u> Potential habitat exists within the study area
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	-	-	High	Vulnerable	Not listed	<u>Included</u> Potential habitat exists within the study area
<i>Glossopsitta pusilla</i>	Little Lorikeet	-	-	High	Vulnerable	Not listed	<u>Included</u> Potential habitat exists within the study area
<i>Grantiella picta</i>	Painted Honeyeater	Mistletoes present at a density of >5 mistletoes per ha	-	Moderate	Vulnerable	Vulnerable	<u>Excluded</u> According to Travers (2019a), Mistletoe was not recorded within the study area. Painted Honeyeaters are unlikely to utilise the site for foraging. Additionally, this species was not detected during targeted surveys.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Waterbodies Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	-	High	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Hieraetus morphnoides</i>	Little Eagle	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Ixobrychus flavicollis</i>	Black Bittern	Waterbodies	-	Moderate	Vulnerable	Not Listed	Included

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species
		Land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation					Potential habitat exists within the study area
<i>Lathamus discolor</i>	Swift Parrot	As per OEH mapped areas	-	Moderate	Endangered	Critically Endangered	<u>Excluded</u> The study area is not within any OEH mapped areas for this species. It was not detected during field surveys.
<i>Lophoictinia isura</i>	Square-tailed Kite	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the development site
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	-	-	High	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the development site. Additionally, this species was recorded during targeted surveys
<i>Miniopterus australis</i>	Little Bent-winged Bat (Foraging)	-	-	High	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	-	-	High	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area. Additionally, this species was recorded during targeted surveys
<i>Neophema pulchella</i>	Turquoise Parrot	-	-	High	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Ninox connivens</i>	Barking Owl (Foraging)	-	-	High	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat exists within the study area
<i>Ninox strenua</i>	Powerful Owl (Foraging)	-	-	High	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat exists within the study area
<i>Pandion cristatus</i>	Eastern Osprey (Foraging)	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat exists within the study area
<i>Petaurus australis</i>	Yellow-bellied Glider	Hollow bearing trees Hollows > 25cm diameter	-	High	Vulnerable	Not Listed	<u>Included</u> Hollows exist within the study area, however, no large hollows suitable for large gliders or forest owls were recorded within the study area. Foraging habitat does occur, however.
<i>Petroica boodang</i>	Scarlet Robin	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Petroica phoenicea</i>	Flame Robin	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u>

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species
							Potential habitat exists within the study area
<i>Phascolarctos cinereus</i>	Koala (Foraging)	-	-	High	Vulnerable	Vulnerable	<u>Included</u> There is potential foraging habitat within the study area, however, no evidence of use of feed trees such as <i>E. tereticornis</i> or <i>E. punctata</i> during surveys
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox (Foraging)	-	-	High	Vulnerable	Vulnerable	<u>Included</u> Potential foraging habitat exists within the study area
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	-	-	High	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	-	-	High	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Stagonopleura guttata</i>	Diamond Firetail	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Potential habitat exists within the study area
<i>Tyto novaehollandiae</i>	Masked Owl (Foraging)	-	-	High	Vulnerable	Not Listed	<u>Included</u> Potential foraging habitat exists within the study area

3.5 Species credit species

Species credit species predicted to occur at the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class is included in Table 12. Justification for the inclusion or exclusion of species is also provided. The exclusion of species is conducted in accordance with Section 5.2.3.2a of the BAM.

Table 12: Candidate species credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
<i>Acacia pubescens</i>	Downy Wattle	-	-	High	Vulnerable	Vulnerable	<u>Excluded</u> This species was included in the targeted survey. No individuals were recorded. Additionally, the study area is highly degraded and subject to regular maintenance. This species is unlikely to occur.	Absent
<i>Anthochaera phrygia</i>	Regent Honeyeater	As per mapped areas	-	High	Critically Endangered	Critically Endangered	<u>Excluded</u> The study area does not contain mapped important areas for this species and development does not present risk of SAI. The mapped important areas for Regent Honeyeater was accessed on 10.03.2021.	Absent
<i>Burhinus grallarius</i>	Bush Stone-curlew	Fallen/standing dead timber including logs	-	High	Endangered	Not Listed	<u>Excluded</u> This species was included in the targeted survey. No individuals were recorded. Additionally, the study area is highly degraded, and the microhabitat required for this species is not considered to be present within the impact area.	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	-	-	Very High	Endangered	Vulnerable	<u>Excluded</u> This species was included in the targeted survey. No individuals were recorded. Additionally, the study area is highly degraded and subject to regular maintenance. This species is unlikely to occur.	Absent
<i>Callistemon linearifolius</i>	Netted Bottle Brush	-	-	Moderate	Vulnerable	Not Listed	<u>Excluded</u> This species was included in the targeted survey. No individuals were recorded. Additionally, the study area is highly degraded and subject to regular maintenance. This species is unlikely to occur.	Absent
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (breeding)	Hollow bearing trees; Eucalypt tree species with hollows greater than 9 cm diameter	-	Moderate	Vulnerable	Not Listed	<u>Included</u> Hollow bearing trees are present within the study area. This species, however, was included in the targeted survey. No individuals, or evidence of breeding was recorded. These surveys are considered adequate to assume absence.	Absent
<i>Callocephalon fimbriatum</i> - endangered population	Gang-gang Cockatoo	-	Hornsby and Ku-ring-gai LGAs	High	Endangered Population	Not Listed	<u>Excluded</u> This species was included in the targeted survey. No individuals were recorded.	Absent
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	-	-	Moderate	Vulnerable	Not listed	<u>Excluded</u>	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
							The study area is highly degraded such that this species is unlikely to occur. Additionally,	
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Cliffs Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels	-	Very High	Vulnerable	Vulnerable	<u>Included</u> Potential breeding habitat (i.e. cliffs, caves, rocky areas with outcrops, overhangs, escarpments or crevices) present within a two-kilometre radius of the site. However, SAI assessment for this species applies to 100m buffer around breeding habitat. No potential breeding habitat is present within 100 m of the study area, therefore the development does not pose a risk of SAI.	Present (recorded)
<i>Cynanchum elegans</i>	White-flowered Wax Plant	-	-	High	Endangered	Endangered	<u>Excluded</u> The study area is highly degraded such that this species is unlikely to occur. Regular maintenance of lawns and exotic species highly limiting the growth of understorey species.	Absent
<i>Eucalyptus benthamii</i>	Camden White Gum	-	-	High	Vulnerable	Vulnerable	<u>Excluded</u> No individuals were recorded in threatened species surveys or vegetation surveys.	Absent
<i>Grevillea juniperina</i>	Juniper-leaved Grevillea	-	-	Moderate	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded. Additionally, the	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
							study area is highly degraded and subject to regular maintenance. This species is unlikely to occur.	
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Other Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	-	High	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded. Waterbodies within the study area are unlikely to provide suitable foraging habitat for this species.	Absent
<i>Hibbertia</i> sp. Bankstown	Hibbertia sp. Bankstown	-	-	High	Critically Endangered	Critically Endangered	<u>Excluded</u> No individuals were recorded in threatened species surveys or vegetation surveys.	Absent
<i>Hieraaetus morphnoides</i>	Little Eagle	Nest trees - live (occasionally dead) large old trees within vegetation)	-	Moderate	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded.	Absent
<i>Lathamus discolor</i>	Swift Parrot	As per mapped areas	-	Moderate	Endangered	Critically Endangered	<u>Excluded</u> The study area does not contain mapped important areas for this species and development does not present risk of SAIL. The mapped important areas for Swift Parrot was accessed on 10 March 2021.	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
<i>Litoria aurea</i>	Green and Golden Bell Frog	Semi-permanent/ ephemeral wet areas Within 1km of wet areas/Swamps Within 1km of swamp/ Waterbodies Within 1km of waterbody	-	High	Endangered	Vulnerable	<u>Included</u> Habitat within the study area is considered degraded and waterbodies are man-made. Surveys, however, were deemed unable to confidently assume absence, therefore, presence is assumed.	Present (assumed)
<i>Lophoictinia isura</i>	Square-tailed Kite	Nest Trees	-	Moderate	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded.	Absent
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	Marsdenia viridiflora R. Br. subsp. Viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	-	Blacktown, Camden, Campbelltown, Canterbury-Bankstown, Cumberland, Fairfield, Liverpool and Penrith LGAs (as amended from the Determination))	Moderate	Endangered Population	Not Listed	<u>Included</u> Habitat within the study area is considered degraded however, surveys were deemed unable to confidently assume absence, therefore, presence is assumed.	Present (assumed)
<i>Meridolum corneovirens</i>	Cumberland Plain Land Snail	-	-	High	Endangered	Not Listed	<u>Included</u>	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
							This species was included in the targeted survey. No individuals were recorded. The study area is considered highly degraded and consistent management of understorey	
<i>Miniopterus australis</i>	Little Bent-winged Bat (Breeding)	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave' observation type code 'E nest-roost' with numbers of individuals >500 or from the scientific literature	-	Very High	Vulnerable	Not Listed	<u>Included</u> This species was included within targeted surveys. Microhabitat requirements are located within 2km of the study area. However, SAIL assessment for this species applies to 100m buffer around breeding habitat. No potential breeding habitat is present within 100 m of the study area, therefore the development does not pose a risk of SAIL.	Absent
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Caves Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding	-	Very High	Vulnerable	Not listed	<u>Included</u> This species was recorded within the study area. Additionally, microhabitat features such as caves are present within 2km of the study area.	Present (recorded)

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
		including species records with microhabitat code "IC - in cave "observation type code "E nest-roost "with numbers of individuals >500						
<i>Myotis macropus</i>	Southern Myotis	Hollow bearing trees Within 200 m of riparian zone/Other Bridges, caves or artificial structures within 200 m of riparian zone/ Waterbodies This include rivers, creeks, billabongs, lagoons, dams and other waterbodies on or within 200m of the site	-	High	Vulnerable	Not Listed	<u>Included</u> This species was recorded within the study area. Additionally, microhabitat features such as hollow bearing trees are present within the study area.	Present (recorded)
<i>Ninox connivens</i>	Barking Owl	Hollow bearing trees Living or dead trees with hollows greater than 20 cm diameter and	-	High	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded. Large hollows suitable for owl roosts were not recorded within the study area.	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
		greater than 4m above the ground						
<i>Ninox strenua</i>	Powerful Owl	Hollow bearing trees Living or dead trees with hollow greater than 20cm diameter	-	High	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded. Large hollows suitable for owl roosts were not recorded within the study area.	Absent
<i>Pandion cristatus</i>	Eastern Osprey (Breeding)	Presence of stick-nests in living and dead trees (>15m) or artificial structures within 100m of a floodplain for nesting)	-	Moderate	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded and no large stick nests were observed.	Absent
<i>Persicaria elatior</i>	Tall Knotweed	Semi-permanent/ ephemeral wet areas or within 50 m Swamps or within 50 m Waterbodies including Wetlands, or within 50 m	-	High	Vulnerable	Vulnerable	<u>Excluded</u> The habitat within the study area is considered degraded, and man-made waterbodies are unlikely to provide habitat for this species. This species was not recorded during targeted surveys.	Absent
<i>Persoonia hirsuta</i>	Hairy Geebung	-	-	High	Endangered	Endangered	<u>Excluded</u> No individuals were recorded in threatened species surveys or vegetation surveys.	Absent
<i>Petaurus norfolcensis</i>	Squirrel Glider	-	-	High	Vulnerable	Vulnerable	<u>Included</u>	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
							This species was included in the targeted survey. No individuals were recorded. Additionally, preferred habitat areas of Blackbutt-Bloodwood forest with heath understorey as not recorded within the study area.	
<i>Phascolarctos cinereus</i>	Koala	Other Areas identified via survey as important habitat (see comments)	-	High	Vulnerable	Vulnerable	<u>Included</u> This species was included in the targeted survey. No individuals were recorded.	Absent
<i>Pilularia novae-hollandiae</i>	Austral Pillwort	-	-	High	Endangered	Not Listed	<u>Excluded</u> No individuals were recorded in threatened species surveys or vegetation surveys.	Absent
<i>Pimelea spicata</i>	Spiked Rice-flower	-	-	High	Endangered	Endangered	<u>Included</u> This species was included in the targeted survey. No individuals were recorded. Additionally, the study area is highly degraded and subject to regular maintenance. This species is unlikely to occur.	Absent
<i>Pomaderris brunnea</i>	Brown Pomaderris	-	-	High	Endangered	Vulnerable	<u>Excluded</u> No individuals were recorded in threatened species surveys or vegetation surveys.	Absent
<i>Pommerhelix duralensis</i>	Dural Land Snail	Leaf litter and shed bark or within 50m of	-	High	Endangered	Endangered	<u>Included</u> This species was included in the targeted survey. No individuals	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
		litter or bark Rocky areas Rocks or within 50m of rocks Fallen/standing dead timber including logs Including logs and bark or within 50m of logs or bark					were recorded. The study area is considered highly degraded and consistent management of understorey	
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Breeding camps	-	High	Vulnerable	Vulnerable	<u>Included</u> This species was recorded during field surveys; however, no breeding camps were present or are known from the study area.	Present (recorded)
<i>Pultenaea pedunculata</i>	Matted Bush-pea	-	-	High	Endangered	Not Listed	<u>Excluded</u> No individuals were recorded in threatened species surveys or vegetation surveys.	Absent
<i>Thesium australe</i>	Austral Toadflax	-	-	High	Vulnerable	Vulnerable	<u>Excluded</u> No individuals were recorded in threatened species surveys or vegetation surveys.	Absent
<i>Tyto novaehollandiae</i>	Masked Owl	-	-	High	Vulnerable	Not Listed	<u>Included</u> This species was included in the targeted survey. No individuals were recorded. Large hollows suitable for owl roosts were not recorded within the study area.	Absent

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status	Justification for inclusion or exclusion of species	Presence/ absence in study area
<i>Wahlenbergia multicaulis</i>	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	-	-	High	Endangered Population	Not Listed	<u>Excluded</u> Not listed in the LGA.	Absent

3.5.1 Targeted surveys

Targeted surveys for species credit species were undertaken at the development site by Travers in 2019. The dates of these surveys are outlined in Table 13 to Table 17 below. The location of targeted surveys are shown on Figure 5, with the results of the surveys shown as individual species polygons on Figure 6. The survey effort included the following:

- Diurnal bird surveys
- Spot lighting and call playback for nocturnal mammals, forest owls and Green and Golden Bell Frog
- Ultrasonic recorders for microbats
- Opportunistic habitat searches for reptiles
- Spot lighting and call identification for amphibians
- Vegetation mapping
- Floristic plots and BAM plots
- Targeted searches.

3.5.1.1 Threatened flora

Surveys for threatened flora were completed by Travers in 2019. Threatened species searches (as relevant) were conducted as near linear transects within areas of potential habitat.

Opportunistic searches were also conducted by ELA ecologists on 8 March 2021.

Details of the targeted threatened flora survey effort is provided below in Table 13.

Table 13: Travers species credit species and threatened flora survey effort (Travers 2019a).

Species	BAM survey period (as per Travers 2019a)	Period surveyed (Travers 2019a)
<i>Grevillea juniperina</i> subsp. <i>Juniperina</i>	All months	5 October 2017 and 3 December 2019
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i>	Nov-Feb	3 December 2019
<i>Pimelea spicata</i>	All months	5 October 2017 and 3 December 2019

ELA confirmed that the vegetation within the development site is highly degraded, and the likelihood of threatened flora listed above in Table 12 and Table 13 is low. The justification provided within Travers 2019a, for the exclusion of species is detailed below.

Caladenia tessellata

This species is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW. There is marginal habitat within the study area but the lack of any nearby or recent records within 10 km suggests that there is no potential for this species to occur within the study area.

Callistemon linearifolius

Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW where it grows in dry sclerophyll forest. There is marginal habitat within the study area but the lack of any nearby or recent records within 10 km suggests that there is no potential for this species to occur within the study area. This plant is not cryptic and the level of survey effort would have

uncovered this species is it had been present in the study area. The vegetation present is also not a dry sclerophyll forest type.

***Wahlenbergia multicaulis* - endangered population**

This population is restricted to the Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield LGAs. It does not occur within the Penrith LGA, where the study area is located.

Persicaria elatior

This species grows in damp places especially beside streams and lakes, and occasionally in swamp forest. The study area provides low potential habitat, but the lack of any nearby or recent records within 10 km suggests that there is no potential for this species to occur within the study area. The streams and waterbodies in the study area are highly modified and managed.

Pilularia novae-hollandiae

Austral Pillwort grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. The watercourses and waterbodies within the study area provides very marginal habitat for this species. The lack of any nearby or recent records within 10 km suggests that there is no potential for this species to occur within the study area. The streams and waterbodies in the study area are highly modified and managed.

Pultenaea pedunculata

A disjunct population of this species occurs on the Cumberland Plain, in woodland on clay or sandy-clay, shale-derived soils. There is potential habitat within Cumberland Shale Hills Woodland within the study area but the lack of any nearby or recent records within 10 km suggests that there is no potential for this species to occur within the study area. Most of the Cumberland Shale Hills Woodland present is highly modified and managed.

***Hibbertia* sp. Bankstown**

This species is known only from Bankstown Airport in Sydney's southern suburbs, within the Bankstown LGA and has no potential to occur within the study area.

3.5.1.2 Diurnal birds

Surveys for threatened birds were completed by Travers in 2017 and 2019. Dates and times of these surveys are provided below in Table 14.

Table 14: Travers birds survey effort (Travers 2019a).

Date	Field survey Technique	Survey Effort (Travers 2019a)
27/9/17	Opportunistic observation	4hrs 1230 - 1630
28/9/17	Opportunistic observation	9hrs 0800 - 1700
29/9/17	Opportunistic observation	6hrs 30min 0830 - 1500
5/10/17	Opportunistic observation	7hrs 30min 1100 - 1830

Date	Field survey Technique	Survey Effort (Travers 2019a)
6/10/17	Opportunistic observation	8hrs 0800 - 1600
9/10/17	Opportunistic observation	2hrs 30min 1430 - 1700
10/10/17	Opportunistic observation	7hrs 30min 0700 - 1630
11/10/17	Opportunistic observation	7hrs 0730 - 1430
29/10/19	Opportunistic observation	5hrs 30min 1100 - 1630
30/10/19	Opportunistic observation	8hrs 0730 – 1530

3.5.1.3 Nocturnal Birds, Microbats and Arboreal Mammals

Targeted survey for nocturnal birds and arboreal mammals was conducted simultaneously by Travers on 5 October 2017. Spotlighting and ultrasonic recorders were utilised to detect bat species on 5 October 2017 and 29 October 2019. Dates and times of these surveys are provided below in Table 15.

Table 15: Travers Bushfire and Ecology nocturnal birds, microbats and arboreal mammals survey effort (Travers 2019a).

Date	Field survey Technique	Survey Effort (Travers 2019a)
05/10/17	Spotlighting and Call Playback	2hrs 30min 1900 - 2130
05/10/17	Ultrasonic recorders (passive monitors x 4)	Overnight – from 1800
29/10/19	Ultrasonic recorders (passive monitors x 2)	Overnight – from 1920

3.5.1.4 Reptiles and Amphibians

Targeted survey for reptiles and amphibians was conducted by Travers Bushfire and Ecology on 5-6 October 2017 and 9 October 2017. Dates and times of these surveys are provided below in Table 16.

Table 16: Travers Bushfire and Ecology reptiles and amphibians survey effort (Travers 2019a).

Date	Field survey Technique	Survey Effort (Travers 2019a)
05/10/17	Opportunistic habitat searches	7hrs 30min 1100 - 1830
05/10/17	Spotlighting and call identification Call playback (Green & Golden Bell Frog)	2hrs 30min 1900 - 2130
06/10/17	Opportunistic habitat searches	8hrs 0800 - 1600
09/10/17	Opportunistic habitat searches	2hrs 30min 1430 - 1700

3.5.1.5 Invertebrates

Targeted survey for invertebrates, such as the Cumberland Plain Land Snail and Dural Land Snail were conducted by Travers Bushfire and Ecology on 5-6 October 2017 and 9 October 2017. Dates and times of these surveys are provided below in Table 17.

Table 17: Travers Bushfire and Ecology invertebrate survey effort (Travers 2019a).

Date	Field survey Technique	Survey Effort (Travers 2019a)
05/10/17	Opportunistic habitat searches	7hrs 30min 1100 - 1830
06/10/17	Opportunistic habitat searches	8hrs 0800 - 1600
09/10/17	Opportunistic habitat searches	2hrs 30min 1430 - 1700

3.5.1.6 Weather Conditions

Weather conditions during the targeted surveys are outlined in Table 18.

Table 18: Weather conditions

Date	Weather details (travers 2019a)
27/9/17	2/8 cloud, gentle NNE wind, no rain, 26°C
28/9/17	3/8 cloud, gentle NW wind, no rain, 26°C
29/9/17	0/8 cloud, calm NNE wind, no rain, 18°C
5/10/17	4/8 cloud, gentle NNE wind, no rain, 23°C
6/10/17	8/8 cloud, light SW wind, no rain, 19°C
9/10/17	3/8 cloud, moderate WSW wind, no rain, 32°C
10/10/17	8/8 cloud, calm S wind, no rain, 15-22°C
11/10/17	8/8 cloud, calm NE wind, showers, 18°C
29/10/19	1/8 cloud, 3-15km/h NE wind, no rain, 13-31°C
30/10/19	1/8 cloud, 2-10km/h NE wind, no rain, 13-33°C
03/12/19*	no rain, 9-30°C

* data not provided within Travers (2019a). Weather data collected from bom.gov.au (BOM 2021).

3.5.2 Species Credits Included in this Assessment

Following completion of targeted surveys, the species credit species included in the assessment are outlined in Table 19.

Table 19: Species credit species included in the assessment

Species	Common Name	Species presence	Geographic limitations	Habitat (ha)	Biodiversity Risk Weighting
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Yes (surveyed)	-	0.25 ha	3
<i>Litoria aurea</i>	Green and Golden Bell Frog	Yes (assumed present)	-	0.25 ha	2
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	<i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i> population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	Yes (assumed present)	-	0.11 ha	2
<i>Myotis macropus</i>	Southern Myotis	Yes (surveyed)	-	0.25 ha	2

3.5.3 Use of local data

The use of local data is not proposed for this assessment.

3.5.4 Expert reports

Expert reports have not been prepared for this assessment

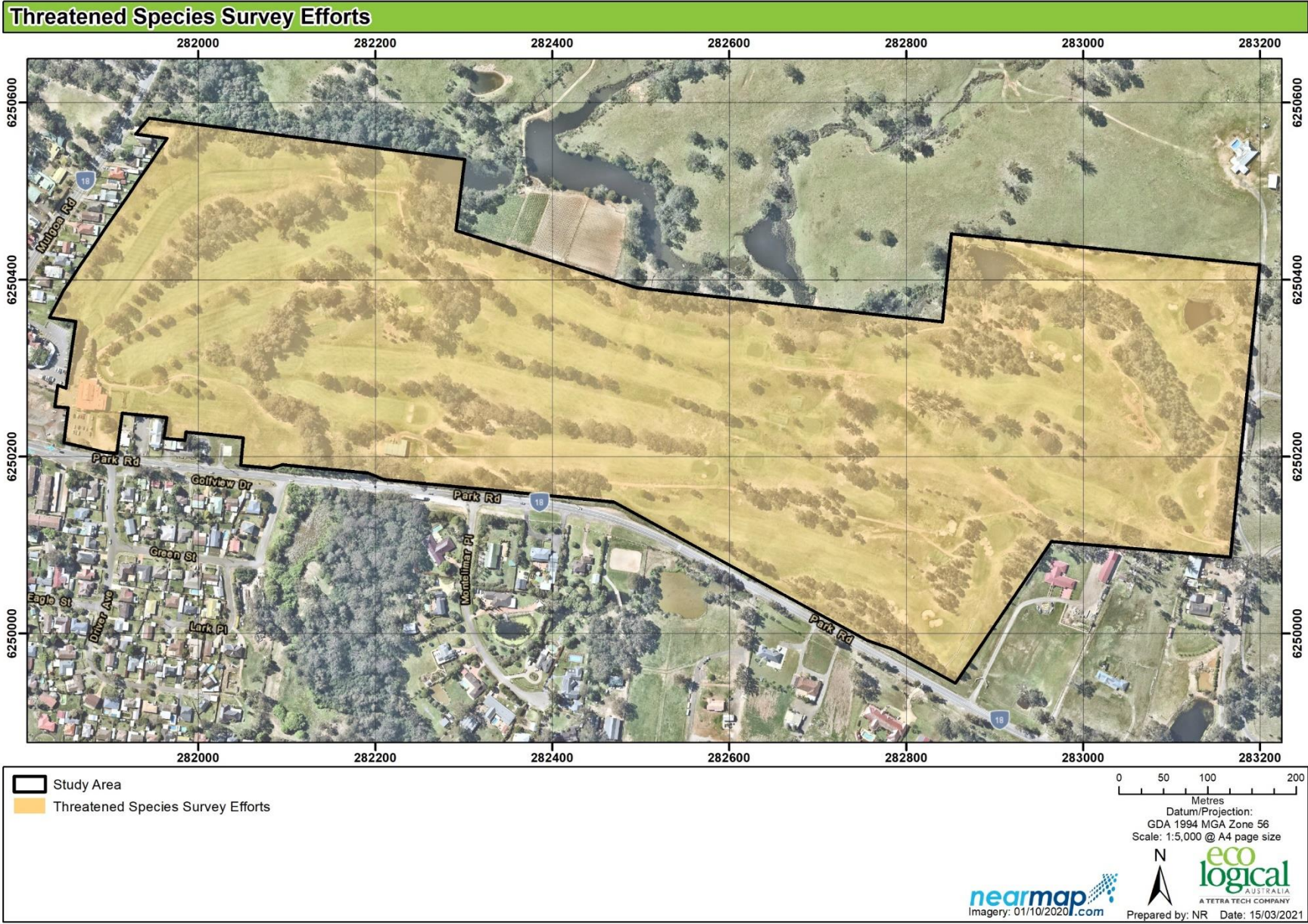


Figure 5: Targeted surveys



Figure 6: Species polygons

4. Stage 2: Impact assessment (biodiversity values)

4.1 Avoiding impacts

4.1.1 Locating a project to avoid and minimise impacts on vegetation and habitat

The development has been located and designed in a way which avoids and minimises impacts as outlined in Table 20.

Table 20: Locating and designing a project to avoid and minimise impacts on vegetation and habitat

Approach	How addressed (Travers 2019a)	Justification
locating the project in areas where there are no biodiversity values	The project has used areas where there are few biodiversity values including areas with existing fairways, access roads and existing cleared zones. The project has also used areas with very low biodiversity values such as exotic and degraded vegetation.	Where practical, the development site has been located within areas of existing fairways cleared of native vegetation and in exotic/planted vegetation.
locating the project in areas where the native vegetation or threatened species habitat is in the poorest condition	The project is predominantly located where native vegetation is in degraded or planted and threatened species habitat is considered marginal foraging habitat.	Part of the development site will affect 0.43 ha of native vegetation, which is highly disturbed and comprises mainly a canopy with a highly modified groundlayer and no shrub or midstorey. About 0.25 ha of disturbed native vegetation in a similar state, yet slightly better condition (comprising some occasional shrubs) will also require removal. Areas of good condition native vegetation, where vegetation integrity and habitat for threatened species is highest has been avoided within the development site where possible, leaving 4.67 ha remaining within the study area.
locating the project in areas that avoid habitat for species and vegetation in high threat categories (e.g. an EEC or CEEC), indicated by the biodiversity risk weighting for a species	The project has aimed to limit, as far as practical, the removal of vegetation/habitat in high threat categories by locating the majority of the development site within areas of lower quality vegetation (such as planted native vegetation or exotic/ornamental vegetation).	A small amount of Cumberland Plain Woodland (0.54 ha) and River Flat Eucalypt Forest (0.14 ha) will require removal. However, as far as practical, the CEEC (i.e. Cumberland Plain Woodland) has been retained in larger patches to preserve connectivity and limit edge effects (see Figure 3). Only marginal foraging habitat for threatened species in high threat categories will be affected.
locating the project such that connectivity enabling movement of species and genetic material between areas of adjacent or nearby habitat is maintained	The project has been located within an existing and highly modified golf course.	The proposed development has been located to avoid clearing within the good connectivity linkages on site. Connectivity between vegetation within the study area and vegetation extending beyond the study area will

Approach	How addressed (Travers 2019a)	Justification
		be maintained. Connectivity for highly mobile species will also be maintained.
reducing the clearing footprint of the project	The clearing footprint has been revised to reduce the impact to better quality vegetation on site.	The proposed development would remove 0.43 ha of native vegetation which is highly disturbed and comprises mainly of canopy with a highly modified groundlayer and no shrub or midstorey. About 0.25 ha of disturbed native vegetation in a similar state, yet slightly better condition (comprising some occasional shrubs) will also require removal. Areas of good condition native vegetation, where vegetation integrity and habitat for threatened species is highest has been avoided within the development site where possible, leaving 4.67 ha remaining within the study area. .
locating ancillary facilities in areas where there are no biodiversity values or threatened species habitat or habitat for species and vegetation in high threat status categories (e.g. an EEC or CEEC)	There are no ancillary services that require assessment as part of this BDAR. Ancillary services will be located offsite in already disturbed/man-made structures (existing sheds/roads etc)	N/A
providing structures to enable species and genetic material to move across barriers or hostile gaps	Structures to enable species and genetic material to move across barriers will not be constructed.	Connectivity between vegetation within the study area and vegetation extending beyond the study area will be maintained. Connectivity for highly mobile species will also be maintained. Regeneration and enhancement works will also be conducted following construction in accordance with the Vegetation Management Plan.
making provision for the demarcation, ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on the development site.	The development site is to be clearly demarcated to avoid impacts to retained vegetation.	The development site is to be clearly demarcated to avoid impacts to retained vegetation. Any trees planted as part of landscaping works should be consistent with the surrounding native vegetation communities within the study area. The development proposes to carryout enhancement and restoration within the River-flat Eucalypt Forest present.

4.1.2 Prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Table 21.

Table 21: Prescribed biodiversity impacts

Prescribed biodiversity impact	Description in relation to the development site	Threatened species or ecological communities effected
impacts of development on the habitat of threatened species or ecological communities associated with: <ul style="list-style-type: none"> non-native vegetation 	The development site contains non-native vegetation canopy which will be removed as part of the proposal. This non-native vegetation is considered to provide marginal foraging habitat for threatened species.	<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox). <i>Anthochaera phrygia</i> (Regent Honeyeater) <i>Lathamus discolor</i> (Swift Parrot)

4.1.2.1 Locating a project to avoid and minimise prescribed biodiversity impacts

The development has been located in a way which avoids and minimises prescribed biodiversity impacts as outlined in Table 22.

Table 22: Locating and designing a project to avoid and minimise prescribed biodiversity impacts

Approach	How addressed	Justification
Locating and designing the development to avoid severing or interfering with corridors connecting different areas of habitat, migratory flight paths to important habitat or preferred local movement pathways	The development will involve the removal of some native/planted and exotic vegetation which is likely to provide minimal foraging habitat.	In the context of the surrounding locality, it is considered that vegetation in the impact area is primarily in a disturbed condition and already highly fragmented. Thus, the footprint is considered to be located in an area where exchange of genetic material between adjacent or nearby habitat is already limited and will not affect the corridor connecting different areas of habitat, flight paths or preferred local movement paths. Better quality foraging habitat will be retained in the development footprint.
Optimising project layout to minimise interactions with threatened and protected species and ecological communities	The footprint has been generally placed to avoid impacts to areas of high biodiversity value.	The footprint has utilised the portion of the development site which includes primarily cleared lands and vegetation of lower biodiversity value due to the highly degraded vegetation resulting from past disturbances associated with the golf course.

4.2 Assessment of Impacts

4.2.1 Direct impacts

The direct impacts of the development on:

- native vegetation are outlined in Table 23
- threatened ecological communities are outlined in Table 24
- threatened species and threatened species habitat is outlined in Table 25
- prescribed biodiversity impacts is outlined in Section 4.2.2.

Direct impacts including the final project footprint (construction and operation) are shown on Figure 8.

Table 23: Direct impacts to native vegetation

PCT ID	PCT Name		Vegetation Class		Vegetation Formation	Direct impact (ha)
835	Cumberland riverflat forest		Coastal Wetlands	Floodplain	Forested Wetlands	0.14
850	Cumberland shale hills woodland		Coastal Valley Woodlands	Grassy	Grassy Woodlands	0.54
-	Native vegetation	planted	-	-	-	0.75

Table 24: Direct impacts on threatened ecological communities

PCT ID	BC Act				EPBC Act			
	Listing status	Name		Direct impact (ha)	Listing status	Name		Direct impact (ha)
835	Endangered Ecological Community	River-Flat Forest	Eucalypt on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion	0.14	Critically Endangered	River- flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria.	0.14	
850	Critically Endangered Ecological Community	Cumberland Woodland	Plain in the Sydney Basin Bioregion	0.54	Critically Endangered	Cumberland Shale Woodlands and Shale-Gravel Transition Forest	0.54	

Table 25: Direct impacts on threatened species and threatened species habitat

Species	Common Name	Direct impact number of individuals / habitat (ha)	NSW listing status	EPBC Listing status
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	0.25 ha	Vulnerable	Vulnerable
<i>Litoria aurea</i>	Green and Golden Bell Frog	0.25 ha	Endangered	Vulnerable

Species	Common Name	Direct impact number of individuals / habitat (ha)	NSW listing status	EPBC Listing status
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	<i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i> population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	0.11 ha	Endangered Population	Not Listed
<i>Myotis macropus</i>	Southern Myotis	0.25 ha	Vulnerable	Not Listed

4.2.2 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 26.

Table 26: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	835	Moderate_ poor	0.14	42.9	0	-42.9
2	850	Moderate_ poor	0.11	42.6	0	-42.6
3	850	Low – No Midstorey	0.43	52.1	0	-52.1

4.2.3 Indirect impacts

All impacts are considered to be confined to the boundaries of the development site. The indirect impacts of the development are outlined in Table 27.

Table 27: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
sedimentation and contaminated and/or nutrient rich run-off	Construction	Minimal due to the small area of disturbance	Downstream of the development site	During heavy rainfall or storm events	During rainfall events	Short term
transport of weeds and pathogens from the site to adjacent vegetation	Construction	Spread of weed seed or pathogens	Minimal. Impacts will be contained within already disturbed locations	During vegetation removal	Occasionally during vegetation removal	Short term
trampling of threatened flora species	Construction / operation	No threatened flora present	N/A	N/A	N/A	N/A

rubbish dumping	Construction / operation	Left by contractors during works	Potential to cause localised rubbish dumping	During construction	Occasionally during vegetation removal	Short term
increase in predatory species populations	Construction / operation	Negligible likelihood of impact occurring as only a small degraded area of native vegetation present	N/A	N/A	N/A	N/A
increase in pest animal populations	Construction / operation	Negligible likelihood of impact occurring as only a small degraded area of native vegetation present	N/A	N/A	N/A	N/A

4.2.4 Prescribed biodiversity impacts

The development site has the prescribed biodiversity impacts as outlined in Table 28.

Table 28: Direct impacts on prescribed biodiversity impacts

Prescribed impact	biodiversity	Nature	Extent	Frequency	Duration	Timing
impacts of development on the habitat of threatened species or ecological communities associated with:		Removal of exotic vegetation which provides minor connectivity for threatened species	Confined to the development site	During construction works	Throughout the life of the project	Long term impacts
<ul style="list-style-type: none"> non-native vegetation 						

4.2.5 Mitigating and managing impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 29.

Table 29: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
pre-clearance and avoidance to minimise the displacement of resident fauna	Minor	Minor	Pre-clearance survey of trees to be removed and identification / location of habitat trees by a suitably qualified ecologist. Supervision by a qualified ecologist(s) / licensed wildlife handler during tree removal in accordance with best practice methods.	Resident fauna relocated in a sensitive manner	Prior to and during clearing works	Project Manager / Ecologist
timing works to avoid critical life cycle events such as breeding or nursing	Moderate	Minor	If breeding threatened species are found during pre-clearance surveys, then avoid clearing works in later winter/spring during breeding/nesting period for birds. Where possible, avoid removing hollow bearing tree in bird and bat breeding periods.	Impacts to fauna during nesting/nursing avoided	During clearing works	Project Manager
instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or licensed wildlife handler during clearing events	Moderate	Minor	Supervision by a qualified ecologist/licensed wildlife handler during tree removal in accordance with best practice methods. Larger hollow bearing trees should be felled by an arborist in one to two metre sections, beginning at the top of the crown, roping, sectioning and lowered the hollow sections to the ground for inspection by the ecologist.	Any fauna utilising habitat within the development site will be identified and managed to ensure clearing works minimise the likelihood of injuring resident fauna	Prior to and during clearing	Project Manager / Ecologist

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
installing artificial habitats for fauna in adjacent retained vegetation and habitat or human made structures to replace the habitat resources lost and encourage animals to move from the impacted site, e.g. nest boxes	Moderate	Minor	Should any trees removed that have hollows/hollow trunks/ fissures, they should be retained as ground fauna habitat and/or used as replacement hollows and attached to trees within the within the development site. If it is impractical to use salvaged hollows as replacement tree hollows, compensatory nest boxes should be installed, as per the Vegetation Management Plan	Replacement of habitat features removed	Prior to and during clearing works	Project Manager / Ecologist
clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed	Moderate	Minor	During tree removal within the development site, any trees with the potential to fall or damage areas outside the development footprint should be removed using qualified arborists rather than heavy machinery.	Reduction of soil / vegetation disturbance outside of the development footprint	During clearing works	Project Manager
sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Moderate	Negligible	Appropriate controls are to be utilised to manage exposed soil surfaces and stockpiles to prevent sediment discharge. Soil and erosion measures such as sediment fencing, clean water diversion must be in place prior to the commencement of the construction works and must be regularly inspected and maintained throughout the development of the site.	Erosion and sedimentation will be controlled. Reduction of any runoff into streams within the development footprint.	Prior to and during clearing works	Project Manager

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
temporary fencing to protect significant environmental features such as riparian zones	Moderate	Negligible	Fencing around vegetation outside of the development footprint to prevent accidental impact/removal.	Reduce the likelihood of any accidental or indirect removal of vegetation, particularly vegetation listed as EEC/	Prior to and continuing through the duration of construction works	Project Manager
hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Moderate	Minor	Vehicles, machinery and building refuse associated with the development construction should remain only within construction footprint areas, avoiding weed or pathogen related impacts to vegetation outside of the development site	Prevent spread of weeds or pathogens	For the duration of construction works	Project Manager
staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Minor	Negligible	<p>All staff working on the development will undertake an environmental induction as part of their site familiarisation. This induction will include items such as:</p> <ul style="list-style-type: none"> • Site environmental procedures (vegetation management, sediment and erosion control, exclusion fencing and weeds) • What to do in case of environmental emergency (chemical spills, fire, injured fauna) • Key contacts in case of environmental emergency. 	All staff entering the study area are fully aware of the presence of native vegetation adjacent to the site and what to do in case of any environmental emergencies	To occur for all staff entering/working at the study area. Site briefings should be updated based on phase of the work and when environmental issues become apparent.	Project Manager
making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native	Major	Moderate	As per the Vegetation Management Plan, existing areas of Cumberland shale hills woodland and Cumberland riverflat	The regeneration and enrichment of EECs within the study area	Following construction works	Project Manager / Qualified bush regenerators.

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
vegetation habitat on or adjacent to the development site			forest will be regenerated using enrichment plantings and weed control.			

4.2.6 Serious and Irreversible Impacts (SAII)

The development has candidate Serious and Irreversible Impacts (SAII) values as outlined in Table 30. Detailed consideration of whether impacts on candidate species are serious and irreversible is included in Table 31 and on TECs is included in Table 32.

Table 30: Candidate Serious and Irreversible Impact entities

Species / Community	Common Name	Principle	Direct impact individuals / area (ha)	Threshold
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Principle 3 and Principle 4	0 ha	Breeding habitat as identified by survey.
Cumberland Plain Woodland	Cumberland Plain Woodland	Principle 1 and Principle 2	0.11 ha with mid and ground strata present 0.43 ha with heavily modified mid and ground strata	N/A - Under development

Table 31: Determining whether impacts are serious and irreversible

Determining whether impacts are serious and irreversible	Assessment
Principle 1	
Does the proposal impact on a species, population or ecological community that is a candidate entity because it is in a rapid rate of decline?	<p><i>Chalinolobus dwyeri</i> - No</p> <p>Cumberland Plain Woodland – Yes; the proposal will impact 0.54 ha of <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> which is listed as Critically Endangered under the BC Act.</p> <p>The proposal is not expected to impact on any other species or community considered to be in a rapid rate of decline.</p>
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible	The thresholds for Cumberland Plain Woodland in the Sydney Basin Bioregion have not been published yet according to the Threatened Biodiversity Data Collection provided in DPIE BioNet Atlas.
Principle 2	
Does the proposal impact on a species that is a candidate entity because it has been identified as having a very small population size?	<p><i>Chalinolobus dwyeri</i> - No</p> <p>Cumberland Plain Woodland – Yes; the proposal will impact 0.54 ha of <i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i> which is listed as Critically Endangered under the BC Act.</p> <p>The proposal is not expected to impact on any other species or community considered as having a very small population size.</p>
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible	The thresholds for Cumberland Plain Woodland in the Sydney Basin Bioregion have not been published yet according to the Threatened Biodiversity Data Collection provided in DPIE BioNet Atlas.
Principle 3	

Determining whether impacts are serious and irreversible	Assessment
Does the proposal impact on the habitat of a species or an area of an ecological community that is a candidate entity because it has a very limited geographic distribution?	<i>Chalinolobus dwyeri</i> – Yes; <i>C. dwyeri</i> are considered to have a limited geographic distribution, however proposal will impact upon potential or known breeding habitat, as the nearest rocky features are at least 600 metres to the south-southwest. Cumberland Plain Woodland - No
If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible.	N/A
Principle 4	
Does the proposal impact on a species, a component of species habitat or an ecological community that is a candidate entity because it is irreplaceable?	Cumberland Plain Woodland - No <i>Chalinolobus dwyeri</i> – Yes; <i>C. dwyeri</i> are considered to utilise habitats which are considered irreplaceable, however proposal will impact upon potential or known breeding habitat, as the nearest rocky features are at least 600 metres to the south-southwest.
b. If yes, is the impact in excess of any threshold identified and therefore likely to be serious and irreversible? Note: where candidate entities have no listed threshold, any impact is considered likely to be serious and irreversible.	N/A

Table 32: Evaluation of an impact on a TEC – Cumberland Plain Woodland

Impact Assessment Provisions	Assessment																
a) evidence of reduction in geographic distribution (Principle 1, clause 6.7(2)(a) BC Regulation) as the current total geographic extent of the TEC in NSW AND the estimated reduction in geographic extent of the TEC since 1970 (not including impacts of the proposal)	Only 9 percent of the original extent remains intact, with the remnants scattered widely across the Cumberland Plain																
b) extent of reduction in ecological function for the TEC using evidence that describes the degree of environmental degradation or disruption to biotic processes (Principle 2, clause 6.7(2)(b) BC Regulation) indicated by: i. change in community structure ii. change in species composition	<p>The benchmark for PCT 850 composition and structure, and the data collected from the study area is below.</p> <p>Vegetation within the study area is considered to be highly degraded and is considered lacking in composition values such as shrub and ground layer richness. Considering the already highly modified nature of Cumberland Plain Woodland within the development site, it is unlikely that the minimal clearing proposed will cause a substantial change in the species composition or structure of the CEEC.</p> <table><tr><th></th><th>PCT 850 - Benchmark</th><th>PCT 850 – moderate - poor</th><th>PCT 850 – no-midstorey –</th></tr><tr><td>Tree Richness</td><td>5</td><td>3</td><td>4</td></tr><tr><td>Shrub Richness</td><td>8</td><td>2</td><td>3</td></tr><tr><td>Grass and Grass Like Richness</td><td>12</td><td>6</td><td>4</td></tr></table>		PCT 850 - Benchmark	PCT 850 – moderate - poor	PCT 850 – no-midstorey –	Tree Richness	5	3	4	Shrub Richness	8	2	3	Grass and Grass Like Richness	12	6	4
	PCT 850 - Benchmark	PCT 850 – moderate - poor	PCT 850 – no-midstorey –														
Tree Richness	5	3	4														
Shrub Richness	8	2	3														
Grass and Grass Like Richness	12	6	4														

Impact Assessment Provisions	Assessment			
	Forb Richness	14	4	3.5
	Fern Richness	2	0	0
	Other	5	2	1
	Total length of fallen logs (m)	40	7	0
	Litter Cover (%)	40	72	66.5
	Number of Large Trees	3	3	3

iii. disruption of ecological processes**iv. invasion and establishment of exotic species****v. degradation of habitat, and****vi. fragmentation of habitat**

iii) the disruption of ecological processes is expected to be minimal, due to the impact avoidance measures and the small amount of clearing which will be occurring because of the development.

iv) Areas of Cumberland Plain Woodland within the study area have a significant amount of weed invasion and are significantly modified from their original condition state with often only a canopy layer remaining and a weedy groundlayer present.

v) as detailed above, areas of Cumberland Plain Woodland within the study area are considered to be degraded and modified. The proposed development will increase the degradation of habitat due to the clearing of this community. However, as the clearing is considered to be of small scale, and the remediation measures proposed within the Vegetation Management Plan intend to increase the quality of remaining habitat – the development is not expected to cause a significant degradation of habitat.

vi) Cumberland Plain Woodland only occurs as fragmented and isolated patches throughout the landscape. The patches that occur within the development site do not form any connections to larger contiguous patches. The proposed development is unlikely to contribute to further fragmentation and isolation of Cumberland Plain Woodland.

Considering the already modified nature of the River-Flat Eucalypt Forest and Cumberland Plain Woodland within the Development site, it is unlikely that the minimal clearing proposed will substantially reduce the quality or integrity of the EEC within the area.

a. the impact on the geographic extent of the TEC (Principles 1 and 3) by estimating the total area of the TEC to be impacted by the proposal:

i. in hectares, and

ii. as a percentage of the current geographic extent of the TEC in NSW.

The development will impact 0.54 hectares out of the total 2.31 hectares of Cumberland Plain Woodland within the study area. Approximately 1.77 hectares will remain within the study area, of which 1.17 hectares will have an intact mid and ground stratum.

The current extent of the community within NSW is approximately 11200 ha. Therefore the clearing for the proposed development represents 0.0048% of the current extent.

b. the extent that the proposed impacts are likely to contribute to further environmental degradation or the disruption of biotic processes (Principle 2) of the TEC by:

There is approximately 1,366 hectares within 1,500 metres and 9,856 hectares of Cumberland Plain Woodland within 5,000 metres of the study area. It almost exclusively occurs as small remnant and degraded sites.

Impact Assessment Provisions	Assessment
<p>i. estimating the size of any remaining, but now isolated, areas of the TEC; including areas of the TEC within 500 m of the development footprint or equivalent area for other types of proposals</p> <p>ii. describing the impacts on connectivity and fragmentation of the remaining areas of TEC measured by:</p> <ul style="list-style-type: none"> distance between isolated areas of the TEC, presented as the average distance if the remnant is retained AND the average distance if the remnant is removed as proposed, and estimated maximum dispersal distance for native flora species characteristic of the TEC, and other information relevant to describing the impact on connectivity and fragmentation, such as the area to perimeter ratio for remaining areas of the TEC as a result of the development <p>iii. describing the condition of the TEC according to the vegetation integrity score for the relevant vegetation zone(s) (Section 4.3). The assessor must also include the relevant composition, structure and function condition scores for each vegetation zone.</p>	<p>Retained vegetation within the study area is not significantly fragmented by the proposed development (see Figure 3). The proposal is not expected to introduce a barrier for the flow of genetic material between remaining patches retained in the study area.</p> <p>Within patch recruitment will continue in the retained patches, and the proposed regeneration works, as per the Vegetation Management Plan is expected to increase the value of the remaining patches within the development site.</p> <p>The relative condition of the TEC has been described above in detail. The vegetation integrity scores reflect the modified nature of the TEC present. The scores were 52 and 42 for the two PCT 850 vegetation zones. The only components that were close to benchmark were tree species richness and number of large trees. This is likely to reflect the management history of the site as an operational golf course, preferring large native trees over a more complex and structurally diverse vegetation.</p>

4.3 Risk assessment

A risk assessment has been undertaken for any residual impacts likely to remain after the mitigation measures (Section 4.1.1) have been applied. Likelihood criteria, consequence criteria and the risk matrix are provided in Table 33, Table 34 and Table 35 respectively, with the risk assessment provided in Table 36.

Table 33: Likelihood criteria

Likelihood criteria	Description
Almost certain (Common)	Will occur, or is of a continuous nature, or the likelihood is unknown. There is likely to be an event at least once a year or greater (up to ten times per year). It often occurs in similar environments. The event is expected to occur in most circumstances.
Likely (Has occurred in recent history)	There is likely to be an event on average every one to five years. Likely to have been a similar incident occurring in similar environments. The event will probably occur in most circumstances.
Possible (Could happen, has occurred in the past, but not common)	The event could occur. There is likely to be an event on average every five to twenty years.
Unlikely (Not likely or uncommon)	The event could occur but is not expected. A rare occurrence (once per one hundred years).
Remote	The event may occur only in exceptional circumstances. Very rare occurrence (once per one thousand years). Unlikely that it has occurred elsewhere; and, if it has occurred, it is regarded as unique.

Likelihood criteria	Description
(Rare or practically impossible)	

Table 34: Consequence criteria

Consequence category	Description
Critical (Severe, widespread long-term effect)	Destruction of sensitive environmental features. Severe impact on ecosystem. Impacts are irreversible and/or widespread. Regulatory and high-level government intervention/action. Community outrage expected. Prosecution likely.
Major (Wider spread, moderate to long term effect)	Long-term impact of regional significance on sensitive environmental features (e.g. wetlands). Likely to result in regulatory intervention/action. Environmental harm either temporary or permanent, requiring immediate attention. Community outrage possible. Prosecution possible.
Moderate (Localised, short-term to moderate effect)	Short term impact on sensitive environmental features. Triggers regulatory investigation. Significant changes that may be rehabilitated with difficulty. Repeated public concern.
Minor (Localised short-term effect)	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Easily rehabilitated. Requires immediate regulator notification.
Negligible (Minimal impact or no lasting effect)	Negligible impact on fauna/flora, habitat, aquatic ecosystem or water resources. Impacts are local, temporary and reversible. Incident reporting according to routine protocols.

Table 35: Risk matrix

Consequence	Likelihood				
	Almost certain	Likely	Possible	Unlikely	Remote
Critical	Very High	Very High	High	High	Medium
Major	Very High	High	High	Medium	Medium
Moderate	High	Medium	Medium	Medium	Low
Minor	Medium	Medium	Low	Low	Very Low
Negligible	Medium	Low	Low	Very Low	Very Low

Table 36: Risk assessment

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
vegetation clearing	Construction/ operation	Medium	Medium
sedimentation and contaminated and/or nutrient rich run-off	Construction	High	Medium
noise, dust or light spill	Construction	Medium	Low
inadvertent impacts on adjacent habitat or vegetation	Construction	Low	Low

Potential impact	Project phase	Risk (pre-mitigation)	Risk (post mitigation)
transport of weeds and pathogens from the site to adjacent vegetation	Construction	Low	Low
vehicle strike	Construction/ operation	Very Low	Very Low
trampling of threatened flora species	N/A	N/A	N/A
rubbish dumping	Operation	Low	Low
wood collection	Operation	Very Low	Very Low
bush rock removal and disturbance	Construction/ operation	Very Low	Very Low
increase in predatory species populations	Construction/ operation	Low	Low
increase in pest animal populations	Construction/ operation	Low	Low
increased risk of fire	Construction/ operation	Low	Low
disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds.	N/A	N/A	N/A
sedimentation and contaminated and/or nutrient rich run-off	Construction	Low	Low



Figure 7: Final project footprint

4.4 Impact summary

Following implementation of BAM and use of BAMC, the following impacts have been determined.

4.4.1 Serious and Irreversible Impacts (SII)

As discussed in Section 4.2.6, there are no thresholds for a SII on Cumberland Plain Woodland. The principles outlined in clause 6.7 of the BC Reg have been applied and further assessment consistent with ss 9.1.1 of BAM 2020 have been applied and are described above.

There are no impacts to potential breeding habitat for the Large-eared Pied Bat occurs within the development site. Therefore, a SII would not operate on the Large-eared Pied Bat.

4.4.2 Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 37 and shown on Figure 8. The impacts of the development requiring offset for threatened species and threatened species habitat are outlined in Table 38 and on Figure 8.

Table 37: Impacts to native vegetation that require offsets

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
850	Cumberland shale hills woodland	Coastal Valley Grassy Woodlands	Grassy Woodlands	0.54
835	Cumberland riverflat forest	Coastal Floodplain Wetlands	Forested Wetlands	0.14

Table 38: Impacts on threatened species and threatened species habitat that require offsets

Species	Common Name	Direct impact / habitat (ha)	NSW listing status	EPBC Listing status
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	0.25 ha	Vulnerable	Vulnerable
<i>Litoria aurea</i>	Green and Golden Bell Frog	0.25 ha	Endangered	Vulnerable
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	<i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i> population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	0.11 ha	Endangered Population	Not Listed
<i>Myotis macropus</i>	Southern Myotis	0.25 ha	Vulnerable	Not Listed

4.4.3 Impacts not requiring offsets

The impacts of the development not requiring offset for native vegetation are shown on Figure 9. Impacts not requiring offset includes the 0.75 ha of planted native vegetation which has been assessed under the planted native vegetation streamlined assessment module. Impacts not requiring offset are shown in Figure 8.

4.4.4 Areas not requiring assessment

Areas not requiring assessment within the development site include those identified as mown exotic grassland and other exotic flora. Areas not requiring assessment are shown in Figure 10.

4.4.5 Credit summary

The number of ecosystem credits required for the development are outlined in Table 39. The number of species credits required for the development are outlined in Table 40. A biodiversity credit report is included in Appendix D:.

Table 39: Ecosystem credits required

PCT ID	PCT Name	Vegetation Formation	Direct impact (ha)	Credits required
835	Cumberland riverflat forest	Forested Wetlands	0.14	3
850	Cumberland shale hills woodland	Grassy Woodlands	0.54	17

Table 40: Species credit summary

Species	Common Name	Direct impact / habitat (ha)	Credits required
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	0.25 ha	9
<i>Litoria aurea</i>	Green and Golden Bell Frog	0.25 ha	5
<i>Marsdenia viridiflora</i> subsp. <i>viridiflora</i> - endangered population	<i>Marsdenia viridiflora</i> R. Br. subsp. <i>viridiflora</i> population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	0.11 ha	2
<i>Myotis macropus</i>	Southern Myotis	0.25 ha	5



Figure 8: Impacts requiring offset



Figure 9: Impacts not requiring offset



Figure 10: Areas not requiring assessment

4.5 Consistency with legislation and policy

Additional matters relating to impacts on flora and fauna which are not covered by the BC Act must also be addressed for the proposed development. Potential MNES in accordance with the EPBC Act have been addressed below.

4.5.1 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The EPBC Act establishes a process for assessing the environmental impact of activities and developments where MNES may be affected. Under the Act, any action which “has, will have, or is likely to have a significant impact on a matter of MNES” is defined as a “controlled action”, and requires approval from the Commonwealth Department of Agriculture, Water and the Environment (DAWE), which is responsible for administering the EPBC Act.

The process includes conducting an Assessment of Significance for listed threatened species and ecological communities that represent a matter of MNES that will be impacted as a result of the proposed action. Significant impact guidelines (formerly Department of Environment and Energy (DotEE) 2014) that outline a number of criteria have been developed by the Commonwealth, to provide assistance in conducting the Assessment of Significance and help decide whether or not a referral to the Commonwealth is required.

A habitat assessment was undertaken and the following MNES were assessed consistent with the Significant Impact Guidelines 1.1:

Vulnerable Species

- *Pteropus poliocephalus* (Grey-headed Flying-fox)
- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Litoria aurea* (Green and Golden Bell Frog).

Critically Endangered Ecological Communities

- *Cumberland Plain Woodland in the Sydney Basin Bioregion*
- *River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria.*

4.5.2 Vulnerable Species

Pteropus poliocephalus (Grey-headed Flying-fox)

There are no known Grey-headed Flying Fox camps within the study area, with the nearest camp at Emu Plains (237), 16 km north of the study area (DAWE 2020b). In 2019 the camp recorded 500-2,499 individuals (DAWE 2020b).

Grey-headed Flying-fox present in camps within a 20 km radius of the site may use the foraging resources available within the development site. The potential foraging habitat within the development site is marginal would not be relied upon as a sole foraging resource for this species. The Grey-headed Flying-fox will use a range of resources within 20 km of their camps. Therefore, the resources available in the development site form part of a mosaic of resources within the locality.

Considering that Grey-headed Flying-fox is likely to forage within the development site on an occasional basis, a significance assessment has been undertaken in accordance with Significant impact guidelines 1.1 under the EPBC Act (Table 41) (DotEE, 2013).

Chalinolobus dwyeri (Large-eared Pied Bat)

There are no suitable breeding resources i.e. caves present within the development site. It is considered that this species may forage within the development site on an occasional basis, and therefore a significance assessment has been undertaken in accordance with Significant impact guidelines 1.1 under the EPBC Act (Table 41) (DotEE, 2013).

Litoria aurea (Green and Golden Bell Frog)

This species inhabits marshes, dams and stream-sides, particularly those containing *Typha* spp. (bullrushes) or *Eleocharis* spp. (spikerushes). The Green and Golden Bell Frog may utilise the dams and surrounding native vegetation on occasion as part of a larger home foraging range, and therefore a significance assessment has been undertaken in accordance with Significant impact guidelines 1.1 under the EPBC Act (Table 41) (DotEE, 2013).

Table 41: EPBC Act Assessment for Vulnerable species

Criterion	Assessment
Criterion a: lead to a long-term decrease in the size of an important population of a species	<p>The Matters of National Environmental Significance Impact Guidelines 1.1 (Commonwealth of Australia, 2013) defines an important population as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:</p> <ul style="list-style-type: none"> - Key source populations either for breeding or dispersal - Populations that are necessary for maintaining genetic diversity, and/or - Populations that are near the limit of the species range <p>The Grey-headed Flying-fox is considered one population due to the constant exchange of genetic material between individuals and its movement between camps throughout its entire geographic range. Maternity or other roosting habitat is considered important habitat for this species. No Grey-headed Flying-fox camps currently occur within the development site with the nearest active Grey-headed Flying-fox camp approximately 16 km to the north.</p> <p>Within NSW, based on available records, the largest concentration of populations appears to be in the sandstone escarpments of the Sydney basin and northwest slopes of NSW with these forming important population centres (DERM 2011). The Large-eared Pied Bat recorded on the development site is considered to form part of this important population due to the constant exchange of genetic material between individuals and movement throughout its entire geographic range. This species roosts mainly in caves (near their entrances) and crevices in cliffs. No roosting/breeding habitat occurs within the development site with the nearest potential caves/cliff habitat approximately 600m to the south and west.</p> <p>The Green and Golden Bell Frog Significant impact guidelines state that 'due to the restricted nature of all known populations in New South Wales and the uncertainty about the current status of the Victorian populations, all current populations of green and golden bell frog are regarded as an 'important population'. A current population is defined as a site where one or more green and golden bell frogs have been detected on at least one occasion since 1995, even if they have not recently been discovered at the site (DEWH& A 2009)'. One individual has been recorded in 2019 approximately 4 km to the east of the development site, therefore it is considered that the habitat on site, including dams and surrounding native vegetation may form part of a larger home foraging range for an important population of the Green and Golden Bell Frog.</p> <p>The proposed action will directly remove 0.14 ha of River Flat Eucalypt Forest, 0.11 ha of Cumberland Plain Woodland in moderate-low condition and 0.43 ha of low condition (no midstorey) which comprises suitable foraging habitat for the Grey-headed Flying-fox, Large-eared Pied Bat and Green and Golden Bell Frog. It is unlikely that this provides any suitable breeding habitat for these three species. Given the proximity of more suitable habitat outside the assessment area, the removal of this potential foraging habitat would not lead to the long-term decrease in the size of an important population of these species.</p>
Criterion b: reduce the area of occupancy of an important population	<p>The proposed development will reduce the extent of available potential foraging habitat for these three species. About 0.68 ha of potential foraging habitat will be removed from the development site. The vegetation within the development site may provide supplementary foraging habitat for the Grey-headed Flying-fox and Large-eared Pied Bat. The development site does not contain breeding or sheltering habitat (i.e. bat camps/roost sites). Both of these species are known to fly long distances and as such they are likely to utilise a large extent of habitat which may include some habitat within the development site and a large amount of habitat in adjacent lands. Due to the extent of habitat outside the development site, the removal of a small amount of native and non-native vegetation is unlikely to significantly reduce the extent of occupancy for these two</p>

Criterion	Assessment
	species. The Green and Golden Bell frog may utilise habitat in the form of dams and foraging habitat to be cleared, however, it is likely that this forms part of a larger home foraging range and will not significantly reduce the extent of occupancy for this species.
Criterion c: fragment an existing important population into two or more populations	The proposed action will remove 0.68 ha of vegetation, some of which is likely to provide marginal foraging habitat for the Grey-headed Flying-fox, Large-eared Pied Bat and Green and Golden Bell Frog. The removal of this vegetation will not significantly fragment vegetation corridors that may be used by these three species. The two bat species are highly mobile, and the Green and Golden Bell Frog is relatively mobile throughout large home ranges therefore the proposed action will not fragment an existing important population into two or more populations. While the potential foraging habitat may contribute as a 'stepping stone' for these highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the proposed works. Furthermore, the Grey-headed Flying-fox has been recorded in urban environments and are likely to continue to forage adjacent to the development site and across the broader locality.
Criterion d: adversely affect habitat critical to the survival of a species	<p>For the Grey-headed Flying-fox, foraging habitat within a 50-kilometre radius of a roost site with greater than 30,000 individuals is foraging habitat critical to the survival of this species. The study area is approximately 16 km south of the closest camp at Emu Plains which has 500-2,499 individuals as recorded in 2019. Therefore, foraging habitat at the study area is not consistent with habitat that would be critical to the survival of this species.</p> <p>For the large-eared pied bat Sandstone cliffs and fertile wooded valley habitat within close proximity of each other are considered habitat critical to the survival of this species (DERM 2011).</p> <p>There is no critical habitat listed for the Green and Golden Bell Frog. The site is considered unlikely to contain habitat critical to the survival of the species. A minimal amount of potential foraging habitat, in the form of dams and disturbed vegetation is present. No camps/roost sites will be affected by the proposed action. Given that these three species are relatively mobile, it is considered unlikely that the works would adversely affect habitat critical to the survival of this species.</p>
Criterion e: disrupt the breeding cycle of an important population	The proposed action will not disrupt the breeding cycle of the Grey-headed Flying-fox or Large-eared Pied Bat given that no camps or breeding caves will be affected by the proposed action and suitable foraging habitat is available adjacent to the development site. It is also not considered that the vegetation for removal provides breeding habitat for the Green and Golden Bell Frog in the locality.
Criterion f: Adversely affect habitat critical to the survival of a species; modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The potential foraging habitat to be removed is marginal and of low quality. Given the small amount of potential foraging habitat to be removed, that potential foraging habitat will persist adjacent to the development site and across the locality, and that these species are generally mobile throughout their home ranges, it is unlikely that the habitat to be removed would cause the species to decline.
Criterion g: Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the establishment of an invasive species that is harmful to these three species.
Criterion h: Introduce disease that may cause the species to decline	Grey-headed Flying-foxes are reservoirs for the Australian bat lyssavirus (ABL) and can cause clinical disease and mortality in Grey-headed Flying-foxes (DECCW 2009). The proposed action is unlikely to present a significant ecological stress on any camps or on

Criterion	Assessment
	<p>individuals that may utilise the development site and therefore the works are unlikely to introduce or exacerbate this virus or any other disease that may cause this species to decline.</p> <p>Frog Chytrid Fungus has been identified as a threatening process for the Green and Golden Bell Frog. The proposed action is unlikely to introduce or exacerbate this fungus or any other disease that may cause this species to decline.</p>
Criterion i: Interfere substantially with the recovery of the species	Considering the above factors, the proposed works will not interfere substantially with the recovery of these species.
Conclusion	In consideration of the above, the proposed works are considered unlikely to have a significant impact on the Grey-headed Flying-fox, Large-eared Pied Bat or Green and Golden Bell Frog

4.5.3 Critically Endangered Ecological Community

Cumberland Plain Woodland in the Sydney Basin Bioregion

This CEEC occurs on soils derived from Wianamatta Shale, and throughout the driest part of the Sydney Basin. Before European settlement, was extensive across the Cumberland Plain, western Sydney. Today, only 9 percent of the original extent remains intact, with the remnants scattered widely across the Cumberland Plain. The dominant canopy trees of Cumberland Plain Woodland are Grey Box (*Eucalyptus moluccana*) and Forest Red Gum (*E. tereticornis*), with Narrow-leaved Ironbark (*E. crebra*), Spotted Gum (*Corymbia maculata*) and Thin-leaved Stringybark (*E. eugenioides*) occurring less frequently. The shrub layer is dominated by Blackthorn (*Bursaria spinosa*), and it is common to find abundant grasses such as Kangaroo Grass (*Themeda australis*) and Weeping Meadow Grass (*Microlaena stipoides* var. *stipoides*).

River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria

This CEEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include *Eucalyptus tereticornis* (Forest Red Gum), *E. amplifolia* (Cabbage Gum), *Angophora floribunda* (Rough-barked Apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney, *E. ovata* (Swamp Gum) occurs on the far south coast, *E. saligna* (Sydney Blue Gum) and *E. grandis* (Flooded Gum) may occur north of Sydney, while *E. benthamii* is restricted to the Hawkesbury floodplain.

A layer of small trees may be present, including *Melaleuca decora*, *M. styphelioides* (Prickly-leaved Teatree), *Backhousia myrtifolia* (Grey Myrtle), *Melia azedarach* (White Cedar), *Casuarina cunninghamiana* (River Oak) and *C. glauca* (Swamp Oak).

Table 42: EPBC Act Assessment for CEEC

Criterion	Assessment
Criterion a: reduce the extent of an ecological community	A total of 0.14 ha of River-Flat Eucalypt Forest CEEC will be directly impacted. 0.11 ha of Cumberland Plains Woodland CEEC in moderate-low condition and 0.43ha of low condition (no midstorey) will be affected.
Criterion b: fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Both Riverflat Eucalypt Forest and Cumberland Plain Woodland within the project footprint exist as small, degraded patches. The areas proposed for removal will not result in fragmentation. Connectivity will be maintained outside the proposed action's footprint.
Criterion c: adversely affect habitat critical to the survival of an ecological community	The River-Flat Eucalypt Forest and Cumberland Plain Woodland within the project site has undergone significant past disturbance for construction of the gold course and generally occur as scattered trees with an exotic grassy understorey and little to no shrub cover. Given the vegetation proposed for removal is comprised of scattered trees with a predominantly exotic understorey, it is unlikely that the small area of River-Flat Eucalypt Forest or Cumberland Plain Woodland to be removed would represent an area of habitat that is critical to the survival of these communities within the locality.
Criterion d: modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	Considering the limited amount of soil and water disturbance likely to occur as part of the clearing proposed for both the River-Flat Eucalypt Forest and Cumberland Plain Woodland, it is not considered that modification to abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival will be affected.
Criterion e: cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	<p>The River-Flat Eucalypt Forest is heavily impacted by weed invasion, particularly by privet and Camphor laurel, which often form dense stands. The Cumberland Plain Woodland within the development site forms small remnants with some areas comprising canopy only, and a highly modified groundlayer and no shrub layer. Some areas comprise a canopy layer with a sparse shrub layer and modified weedy groundlayer.</p> <p>Considering the already highly modified nature of the River-Flat Eucalypt Forest and Cumberland Plain Woodland within the development site, it is unlikely that the minimal clearing proposed will cause a substantial change in the species composition for these two communities.</p>
Criterion f: cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: <ul style="list-style-type: none"> – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community 	<p>As discussed above in Criterion e, both the River-Flat Eucalypt Forest and Cumberland Plain Woodland have a significant amount of weed invasion and are significantly modified from their original condition state with often only a canopy layer remaining and a weedy groundlayer present.</p> <p>Considering the already modified nature of the River-Flat Eucalypt Forest and Cumberland Plain Woodland within the Development site, it is unlikely that the minimal clearing proposed will substantially reduce the quality or integrity of the occurrence of these two communities to a level beyond their current state.</p>
Criterion g: interfere with the recovery of an ecological community.	The proposed action is unlikely to interfere with the recovery of these two ecological communities due to the already highly modified nature of vegetation present and the minimal amount of clearing proposed.

Criterion	Assessment
Conclusion	In consideration of the above, the proposed works are considered unlikely to have a significant impact on either Riverflat Eucalypt Forest or Cumberland Plain Woodland.

5. References

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Travers Biodiversity and Ecology (2019c) Vegetation Management Plan. Proposed Wallacia Country Club Golf Course & Proposed Cemetery Lot 2 DP 1108408 13 Park Road, Wallacia

Appendix A: Definitions

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) and some fish
Broad condition state:	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length
Local population	The population that occurs in the development site. In cases where multiple populations occur in the development site or a population occupies part of the development site, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines

Terminology	Definition
Operational Manual	The Operational Manual published from time to time by OEH, which is a guide to assist assessors when using the BAM
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤ 30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site.
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height < 5 cm within a vegetation zone.
Remaining impact	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM
Sensitive biodiversity values land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.
Site-based development	a development other than a linear shaped development, or a multiple fragmentation impact development
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by OEH and accessible from the BioNet website.
Threatened species	Critically Endangered, Endangered or Vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as Critically Endangered, Endangered or Vulnerable.
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.

Terminology	Definition
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs

Appendix B: Vegetation plot data

Composition (number of species)																													
Structure (total cover)															Function														
Plot	Pct	Condition Class	Zone	Easting	Northing	Bearing	Tree	Shrub	Grass	Forbs	Ferns	Other	Tree	Shrub	Grass	Forbs	Ferns	Other	Large trees	Hollow trees	Litter Cover	Length Fallen Logs	Tree Stem 5 – 9 cm	Tree Stem 10 – 19 cm	Tree Stem 20 – 29 cm	Tree Stem 30 – 49 cm	Tree Stem 50 - 79 cm	Tree Regen	High Threat Exotic
G1	835		56	282093.9	6250478	68	4	0	5	3	0	1	43	0	0.8	0.3	0	0.1	4	2	78	42	1	1	1	1	1	1	41.2
G2		PLANTED	56	281976.6	6250431	219	5	0	3	2	0	1	22.0	0.0	51.1	0.2	0.0	0.1	1	0	19	0	0	0	1	1	1	0	11.7
G3	850	NO MIDSTOR EY	56	282289.4	6250373	220	4	3	4	2	0	0	37	15	20.3	0.2	0	0	5	3	65	0	0	1	1	1	1	0	4.5
G4	850	NO MIDSTOR EY	56	282525.3	6250385	101	4	3	4	5	0	2	48.0	46.1	37.1	1.8	0.0	0.2	1	0	68	0	1	1	1	1	1	1	54.1
G5		PLANTED	56	282745.5	6250173	334	3	0	3	3	0	1	35.0	0.0	7.2	0.3	0.0	0.1	2	0	7.8	0	0	0	1	1	1	0	10.1
G6		PLANTED	56	283121.4	6250213	340	2	0	4	6	0	2	30.0	0.0	3.4	10.7	0.0	0.2	0	0	85	0	1	1	1	1	0	1	2.4
G7	850	MOD_PO OR	56	282870.2	6250331	95	3	2	6	4	0	2	26.0	7.0	8.5	0.4	0.0	0.2	3	0	72	7	1	1	1	1	1	1	71.6

Appendix C: EPBC Act Likelihood of Occurrence

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the Protected Matters Search Tool. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- ‘known’ = the species was or has been observed on the site
- ‘likely’ = a medium to high probability that a species uses the site
- ‘potential’ = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- ‘unlikely’ = a very low to low probability that a species uses the site
- ‘no’ = habitat within the study area and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species or ecological communities that were recorded within the study area or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to Commonwealth legislation was not considered necessary.

Information provided in the habitat associations’ column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database and the NSW Threatened Species Data Collection.

Table 43: Likelihood of occurrence for threatened entities

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
ECOLOGICAL COMMUNITIES						
<i>Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion</i>	-	E	Occurs almost exclusively on soils derived from Tertiary alluvium, or on sites located on adjoining shale or Holocene alluvium. Often adjacent to and on slightly higher ground than Castlereagh Ironbark Forest or Shale Gravel Transition Forest in the Sydney Basin Bioregion. Dominated by <i>Eucalyptus parramattensis</i> subsp. <i>parramattensis</i> , <i>Angophora bakeri</i> and <i>Eucalyptus sclerophylla</i> . A small tree stratum of <i>Melaleuca decora</i> is sometimes present, generally in areas with poorer drainage. It has a well-developed shrub stratum consisting of sclerophyllous species such as <i>Banksia spinulosa</i> var. <i>spinulosa</i> , <i>Melaleuca nodosa</i> , <i>Hakea sericea</i> and <i>Hakea dactyloides</i> (multi-stemmed form). The ground stratum consists of a diverse range of forbs including <i>Themeda australis</i> , <i>Entolasia stricta</i> , <i>Cyathochaeta diandra</i> , <i>Dianella revoluta</i> subsp. <i>revoluta</i> , <i>Stylidium graminifolium</i> , <i>Platysace ericoides</i> , <i>Laxmannia gracilis</i> and <i>Aristida warburgii</i> .	No – this ecological community was not identified within the development site.	N/A	No
<i>Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community</i>	-	E	The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees. It has a dense to sparse tree layer in which <i>Casuarina glauca</i> (swamp oak) is the dominant species northwards from Bermagui. Other trees including <i>Acmena smithii</i> (Lilly Pilly), <i>Glochidion</i> spp. (Cheese Trees) and <i>Melaleuca</i> spp. (Paperbarks) may be present as subordinate species and are found most frequently in stands of the community northwards from Gosford. <i>Melaleuca ericifolia</i> is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, <i>Parsonsia straminea</i> , <i>Geitonoplesium cymosum</i> and <i>Stephania japonica</i> var. <i>discolor</i> , a sparse cover of shrubs, and a continuous groundcover of forbs,	No – this ecological community was not identified within the development site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater.			
<i>Cooks River / - Castlereagh Ironbark Forest</i>		CE	Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. The structure of the community may vary from tall open forests (>40m) to woodlands. The most widespread and abundant dominant trees include <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>Eucalyptus amplifolia</i> (Cabbage Gum), <i>Angophora floribunda</i> (Rough-barked Apple) and <i>Angophora subvelutina</i> (Broad-leaved Apple). <i>Eucalyptus baueriana</i> (Blue box), <i>Eucalyptus botryoides</i> (Bangalay) and <i>Eucalyptus elata</i> (River Peppermint) may be common south from Sydney. <i>Eucalyptus ovata</i> (Swamp Gum) occurs on the far south coast, <i>Eucalyptus saligna</i> (Sydney Blue Gum) and <i>Eucalyptus grandis</i> (Flooded Gum) may occur north of Sydney, while <i>Eucalyptus benthamii</i> is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including <i>Melaleuca decora</i> , <i>M. styphelioides</i> (prickly-leaved teatree), <i>Backhousia myrtifolia</i> (grey myrtle), <i>Melia azadarach</i> (white cedar), <i>Casuarina cunninghamiana</i> (river oak) and <i>Casuarina glauca</i> (swamp oak). Scattered shrubs include <i>Bursaria spinosa</i> , <i>Solanum prinophyllum</i> , <i>Rubus parvifolius</i> , <i>Breynia oblongifolia</i> , <i>Ozothamnus diosmifolius</i> , <i>Hymenanthera dentata</i> , <i>Acacia floribunda</i> and <i>Phyllanthus gunnii</i> . The groundcover is composed of abundant forbs, scramblers and grasses.	No – this ecological community was not identified within the development site.	N/A	No
<i>Cumberland Plain Woodland in the Sydney Basin Bioregion</i>		CE	This CEEC occurs on soils derived from Wianamatta Shale, and throughout the driest part of the Sydney Basin. Before European settlement, was extensive across the Cumberland Plain, western Sydney. Today, only 9 percent of the original extent remains intact, with the remnants scattered widely across the Cumberland Plain. The dominant canopy trees of Cumberland Plain Woodland are Grey Box (<i>Eucalyptus moluccana</i>) and Forest Red Gum (<i>E. tereticornis</i>), with Narrow-leaved Ironbark (<i>E. crebra</i>), Spotted Gum	Yes – this ecological community was identified within the development site.	Yes	Yes

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			(<i>Corymbia maculata</i>) and Thin-leaved Stringybark (<i>E. eugenioides</i>) occurring less frequently. The shrub layer is dominated by Blackthorn (<i>Bursaria spinosa</i>), and it is common to find abundant grasses such as Kangaroo Grass (<i>Themeda australis</i>) and Weeping Meadow Grass (<i>Microlaena stipoides</i> var. <i>stipoides</i>).			
<i>Elderslie Banksia Scrub Forest in the Sydney Basin Bioregion</i>		CE	This EEC is restricted to the Cumberland subregion of the Sydney Basin IBRA bioregion. It is only known from the Camden local government area (LGA) in proximity to the Nepean River. The ecological community occurs at low elevations, of around 60 to 100 m above sea level. It is normally above the 100 year flood level, though it is possible that some regrowth on mined sand deposits is now artificially within the present floodplain. It is found in an area that receives around 750 mm rainfall annually. The ecological community occurs on deep sandy substrates on high-level Tertiary alluvium. Key elements of the canopy include <i>Banksia integrifolia</i> subsp. <i>integrifolia</i> (Coast Banksia), <i>Angophora subvelutina</i> (Broad-leaved Apple), <i>Eucalyptus botryoides</i> x <i>E. saligna</i> (a natural hybrid of Bangalay and Sydney Blue Gum) and various other species of Eucalyptus over a mostly shrubby understorey	No – this ecological community was not identified within the development site.	No	No
<i>River-flat eucalypt forest on coastal floodplains of southern NSW and eastern Victoria</i>	-	CE	This CEEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>E. amplifolia</i> (Cabbage Gum), <i>Angophora floribunda</i> (Rough-barked Apple) and <i>A. subvelutina</i> (broad-leaved apple). <i>Eucalyptus baueriana</i> (blue box), <i>E. botryoides</i> (bangalay) and <i>E. elata</i> (river peppermint) may be common south from Sydney, <i>E. ovata</i> (Swamp Gum) occurs on the far south coast, <i>E. saligna</i> (Sydney Blue Gum)	Yes – this ecological community was identified within the development site.	Yes	Yes

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			<p>and <i>E. grandis</i> (Flooded Gum) may occur north of Sydney, while <i>E. benthamii</i> is restricted to the Hawkesbury floodplain.</p> <p>A layer of small trees may be present, including <i>Melaleuca decora</i>, <i>M. styphelioides</i> (Prickly-leaved Teatree), <i>Backhousia myrtifolia</i> (Grey Myrtle), <i>Melia azaderach</i> (White Cedar), <i>Casuarina cunninghamiana</i> (River Oak) and <i>C. glauca</i> (Swamp Oak).</p>			
<i>Shale Sandstone Transition Forest of the Sydney Basin Bioregion</i>			Occurs at the edges of the Cumberland Plain in western Sydney, most now occurs in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local government areas. The main tree species include <i>Eucalyptus tereticornis</i> (Forest Red Gum), <i>E. punctata</i> (Grey Gum), stringybarks (<i>E. globoidea</i> , <i>E. eugenioides</i>) and ironbarks (<i>E. fibrosa</i> and <i>E. crebra</i>). Areas of low sandstone influence (more clay-loam soil texture) have an understorey that is closer to Cumberland Plain Woodland.	No – this ecological community was not identified within the development site.	N/A	No
<i>Turpentine-Ironbark Forest of the Sydney Basin Bioregion</i>	-	CE	<p>Restricted to areas with clay soil derived from Wianamatta Shale in an area that generally has an annual rainfall of more than 950 mm. A medium-height open forest with a lower tree layer, an open low shrub layer and a prominent ground layer. Western outliers of the community in wetter habitats may have a tall open forest structure. On the lowlands, the canopy is dominated by <i>Syncarpia glomulifera</i> (Turpentine), with <i>Eucalyptus paniculata</i> (Grey Ironbark) and <i>E. eugenioides</i> (Thin-leaved Stringybark) occurring less frequently. On the margin of the Cumberland Plain, the vegetation is dominated by <i>Eucalyptus punctata</i> (Grey Gum) and <i>Syncarpia glomulifera</i>, with species such as <i>Corymbia gummifera</i> (Red Bloodwood) and <i>Eucalyptus globoidea</i> (White Stringybark) occurring sporadically. The westernmost occurrences of the community are dominated by species such as <i>Syncarpia glomulifera</i>, <i>Eucalyptus globoidea</i>, <i>Eucalyptus cypellocarpa</i> (Monkey Gum), <i>E. notabilis</i> (Mountain Mahogany) and <i>E. paniculata</i> (Grey Ironbark) in southern areas.</p>	No – this ecological community was not identified within the development site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			<i>Eucalyptus punctata</i> (Grey Gum) and/or <i>E. piperita</i> (Sydney Peppermint) are common in areas with sandstone influence.			
<i>Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion</i>		E	This EEC is generally a tall open eucalypt forests found on igneous rock (predominately Tertiary basalt and microsyenite) in, or adjacent to, the Sydney Basin Bioregion. The ecological community occurs in areas of high rainfall, generally ranging from 950 to 1600 mm/year. Dominant canopy species are most often <i>Eucalyptus fastigata</i> (brown barrel), <i>E. viminalis</i> (ribbon gum) and <i>E. radiata</i> subsp. <i>radiata</i> (narrow-leaved peppermint). <i>Eucalyptus obliqua</i> (messmate stringybark), <i>E. elata</i> (river peppermint), <i>E. quadrangulata</i> (white-topped box) and <i>E. smithii</i> (ironbark peppermint) are also common components. <i>Eucalyptus oreades</i> (Blue Mountains ash) and <i>E. blaxlandii</i> (Blaxland"s stringybark) are prevalent in the Blue Mountains forms, particularly on the rocky edges of basalt. <i>Eucalyptus cypellocarpa</i> (mountain grey gum) is widespread in drier sites throughout the range of the ecological community, while <i>E. piperita</i> (Sydney peppermint) may also occur. <i>Eucalyptus ovata</i> (swamp gum) may be present in areas of impeded drainage or high groundwater.	No – this ecological community was not identified within the development site.	N/A	No
<i>Western Sydney - Dry Rainforest and Moist Woodland on Shale</i>		CE	Occurs almost exclusively on soils derived from Tertiary alluvium, or on sites located on adjoining shale or Holocene alluvium. Often adjacent to and on slightly higher ground than Castlereagh Ironbark Forest or Shale Gravel Transition Forest in the Sydney Basin Bioregion. Dominated by <i>Eucalyptus parramattensis</i> subsp. <i>parramattensis</i> , <i>Angophora bakeri</i> and <i>Eucalyptus sclerophylla</i> . A small tree stratum of <i>Melaleuca decora</i> is sometimes present, generally in areas with poorer drainage. It has a well-developed shrub stratum consisting of sclerophyllous species such as <i>Banksia spinulosa</i> var. <i>spinulosa</i> , <i>Melaleuca nodosa</i> , <i>Hakea sericea</i> and <i>Hakea dactyloides</i> (multi-stemmed form). The ground stratum consists of a diverse range of grasses and forbs including <i>Themeda australis</i> , <i>Entolasia stricta</i> , <i>Cyathochaeta diandra</i> , <i>Dianella revoluta</i> subsp.	No – this ecological community was not identified within the development site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
<i>revoluta</i> , <i>Stylidium graminifolium</i> , <i>Platysace ericoides</i> , <i>Laxmannia gracilis</i> and <i>Aristida warburgii</i> .						
FAUNA						
<i>Actitis hypoleucos</i>	Common Sandpiper	M	Coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of <i>Casuarina cunninghamiana</i> (River Oak).	Potential - occasional seasonal foraging habitat features associated with this species were identified within the development site. The development site is not within an important breeding area for the species.	Yes (minor foraging only)	No – the species is highly mobile and preferable foraging habitat is available within the broader locality.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	Found over most of NSW except for the far north-west. Permanent freshwater wetlands with tall, dense vegetation, particularly <i>Typha</i> spp. (Bullrushes) and <i>Eleocharis</i> spp. (Spikerushes).	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Shallow fresh or brackish wetlands, with	Unlikely - suitable habitat not identified within	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			inundated or emergent sedges, grass, saltmarsh or other low vegetation.	the development site.		
<i>Calidris ferruginea</i>	Curlew Sandpiper	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. Littoral and estuarine habitats, including intertidal mudflats, non-tidal swamps, lakes and lagoons on the coast and sometimes inland.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Calidris melanotos</i>	Pectoral Sandpiper	M	Shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	Suitable foraging habitat for this species is present. No breeding habitat occurs.	Yes (minor foraging only)	Yes
<i>Cuculus optatus</i>	Oriental Cuckoo	M	Nonbreeding habitat: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodland.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Dasyurus maculatus maculatus</i>	Spotted-tailed Quoll	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Unlikely – suitable habitat, in the form of maternal den site, were not identified within the development site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site or indirectly impacted	Impact Assessment Required
<i>Falco hypoleucos</i>	Grey Falcon	V	The Grey Falcon is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Gallinago hardwickii</i>	Latham's Snipe	M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Grantiella picta</i>	Painted Honeyeater	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Hirundapus caudacutus</i>	White-throated Needletail	V, M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occur most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	V	Largely confined to Triassic and Permian sandstones within the coast and ranges in an area within approximately 250 km of Sydney. Dry and wet sclerophyll forests, riverine forests, coastal heath swamps, rocky outcrops, heaths, grassy woodlands.	Unlikely - suitable habitat not identified within	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				the development site.		
<i>Lathamus discolor</i>	Swift Parrot	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands.	Potential – foraging habitat features associated with this species were identified within the development site.	Yes (minor foraging only)	No – the species is highly mobile and more foraging habitat is available within the broader locality.
<i>Limosa lapponica</i>	Bar-tailed Godwit	M	Summer migrant to Australia. Widespread along the coast of NSW, including the offshore islands. Also numerous scattered inland records. Intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, bays, seagrass beds, saltmarsh, sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. Rarely inland wetlands, paddocks and airstrips.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Litoria aurea</i>	Green and Golden Bell Frog	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. Marshes, dams and stream-sides, particularly those containing <i>Typha</i> spp. (bullrushes) or <i>Eleocharis</i> spp. (spikerushes). Some populations occur in highly disturbed areas.	Potential – foraging and minimal breeding habitat features associated with this species were identified within the development site.	Yes (minor foraging only)	Yes
<i>Mixophyes balbus</i>	Stuttering Frog	V	Along the east coast of Australia from southern Qld to north-eastern Victoria. Rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Unlikely - suitable habitat not identified within the development site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
<i>Monarcha melanopsis</i>	Black-faced Monarch	M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland. Rainforest, open eucalypt forests, dry sclerophyll forests and woodlands, gullies in mountain areas or coastal foothills, Brigalow scrub, coastal scrub, mangroves, parks and gardens.	Unlikely - habitat present is substantially degraded such that this species is unlikely to utilise the development site for foraging or breeding.	N/A	No
<i>Monarcha trivirgatus</i>	Spectacled Monarch	M	Usually considered a denizen of the dense rainforests and moist eucalypt forests of eastern and north-eastern Australia, the Spectacled Monarch sometimes also inhabits mangroves and other densely vegetated habitats	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Motacilla flava</i>	Yellow Wagtail	M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA. Swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Numenius madagascariensis</i>	Eastern Curlew	CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms.	Unlikely - suitable habitat not identified within the development site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site or indirectly impacted	Impact Assessment Required
<i>Pandion cristatus</i>	Eastern Osprey	M	Common around the northern NSW coast, and uncommon to rare from coast further south. Some records from inland areas. Rocky shorelines, islands, reefs, mouths of large rivers, lagoons and lakes.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Petauroides volans</i>	Greater Glider	V	This population on the south coast of NSW is bounded by the Moruya River to the north, Coila Lake to the south and the Princes Highway and cleared land exceeding 700 m in width to the west. Eucalypt forests and woodlands.	Unlikely - habitat present is substantially degraded such that this species is unlikely to utilise the development site for foraging or breeding.	N/A	No
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Phascolarctos cinereus</i>	Koala	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. Eucalypt woodlands and forests.	Unlikely - Habitat present is substantially degraded such that this species is unlikely to utilise the development site for foraging or breeding.	N/A	No
<i>Pommerhelix duralensis</i>	Dural Land Snail	E	The species is a shale-influenced-habitat specialist, which occurs in low densities along the western and northwest fringes of the	Unlikely - Habitat present is	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			Cumberland IBRA subregion on shale-sandstone transitional landscapes. The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris.	substantially degraded such that this species is unlikely to utilise the development site.		
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	V	Fragmented distribution across eastern NSW. Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Likely – seasonal foraging habitat available within the study area. No camps identified within study area.	Yes (foraging only)	Yes
<i>Rhipidura rufifrons</i>	Rufous Fantail	M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW. Wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Rostratula australis</i>	Australian Painted Snipe	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Swamps, dams and nearby marshy areas.	Unlikely - suitable habitat not identified within the development site.	N/A	No
<i>Tringa nebularia</i>	Common Greenshank	M	Summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range. Terrestrial wetlands and sheltered coastal habitats.	Unlikely - suitable habitat not identified within	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				the development site.		
FLORA						
<i>Acacia bynoeana</i>	Bynoe's Wattle	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Heath or dry sclerophyll forest on sandy soils.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Acacia pubescens</i>	Downy Wattle	V	Restricted to the Sydney region around the Bankstown-Fairfield-Rookwood and Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Open woodland and forest, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Allocasuarina glareicola</i>	-	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Castlereagh woodland on lateritic soil. Found in open woodland with <i>Eucalyptus parramattensis</i> , <i>Eucalyptus fibrosa</i> , <i>Angophora bakeri</i> , <i>Eucalyptus sclerophylla</i> and <i>Melaleuca decora</i> .	Unlikely - the presence of this species was not identified, and suitable habitat was not identified	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				within the development site. Site is too degraded for presence of this species.		
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley. Dry rainforest; littoral rainforest; Leptospermum laevigatum-Banksia integrifolia subsp. integrifolia (Coastal Tea-tree– Coastal Banksia) coastal scrub; Eucalyptus tereticornis (Forest Red Gum) or Corymbia maculata (Spotted Gum) open forest and woodland; and Melaleuca armillaris (Bracelet Honeymyrtle) scrub.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Darwinia biflora</i>	-	V	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas, in an area bounded by Maroota, North Ryde, Cowan and Kellyville. Woodland, open forest or scrub-heath on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Eucalyptus aggregate</i>	Black Gum	V	In NSW, found in the Central and Southern Tablelands, in the South Eastern Highlands Bioregion and on the western fringe of the Sydney Basin Bioregion. Alluvial soils, on cold, poorly-drained flats and	Unlikely - the presence of this species was not identified, and the	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			hollows adjacent to creeks and small rivers. Usually occurs in open woodland with a grassy groundlayer.	development site is not within the species' distribution.		
<i>Eucalyptus benthamii</i>	Camden White Gum	V	<p>Alluvial flats of the Nepean River and its tributaries. Mainly Kedumba Valley of the Blue Mountains National Park and Bents Basin State Recreation Area. Also along the Nepean River around Camden and Cobbitty, at Werriberri (Monkey) Creek in The Oaks, and on the Nattai River in Nattai National Park.</p> <p>Occurs in open forest. Requires a combination of deep alluvial sands and a flooding regime.</p>	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site.	N/A	No
<i>Genoplesium baueri</i>	Bauer's Orchid	Midge E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Dry sclerophyll forest and moss gardens over sandstone.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flowered Grevillea	V	<p>Sporadically distributed throughout the Sydney Basin and in the Hunter in the Cessnock - Kurri Kurri area. Also known from Putty to Wyong and Lake Macquarie on the Central Coast.</p> <p>Heath and shrubby woodland to open forest on sandy or light clay soils usually over thin shales.</p>	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				Site is too degraded for presence of this species.		
<i>Haloragis exaltata</i> subsp. <i>exaltata</i>		V	Disjunct distribution in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Protected and shaded damp situations in riparian habitats.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Melaleuca deanei</i>	Deane's Paperbark	V	Ku-ring-gai/Berowra area, Holsworthy/Wedderburn area, Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Heath on sandstone.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Micromyrtus minutiflora</i>	-	V	Restricted to the general area between Richmond and Penrith, western Sydney. Castlereagh Scribbly Gum Woodland, Ironbark Forest, Shale/Gravel Transition Forest, open forest on tertiary alluvium and consolidated river sediments.	Unlikely - the presence of this species was not identified, and the development site is not within the	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				species' distribution.		
<i>Persicaria elatior</i>	Tall Knotweed	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). Beside streams and lakes, swamp forest or disturbed areas.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Persoonia acerosa</i>	Needle Geebung	V	Recorded only on the central coast and in the Blue Mountains, from Mt Tomah in the north to as far south as Hill Top where it is now believed to be extinct. Dry sclerophyll forest, scrubby low-woodland and heath on low fertility soils.	Unlikely - the presence of this species was not identified, and the development site is not within the species' distribution.	N/A	No
<i>Persoonia hirsuta</i>	Hairy Geebung	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				for presence of this species.		
<i>Persoonia nutans</i>	Nodding Geebung	E	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Northern populations: sclerophyll forest and woodland (Agnes Banks Woodland, Castlereagh Scribbly Gum Woodland and Cooks River / Castlereagh Ironbark Forest) on aeolian and alluvial sediments. Southern populations: tertiary alluvium, shale sandstone transition communities and Cooks River / Castlereagh Ironbark Forest.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Pimelea curviflora</i> var. <i>curviflora</i>	-	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Pimelea spicata</i>	Spiked flower	Rice- E	Two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). Well-structured clay soils. <i>Eucalyptus moluccana</i> (Grey Box) communities and in areas of ironbark on the Cumberland Plain. Coast Banksia open woodland or coastal grassland in the Illawarra.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				development site. Site is too degraded for presence of this species.		
<i>Pomaderris brunnea</i>	Rufous Pomaderris	V	In NSW, found around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands. Moist woodland or forest on clay and alluvial soils of flood plains and creek lines.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Pterostylis saxicola</i>	Sydney Plains Greenhood	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. There are very few known populations and they are all very small and isolated. Two populations occur within a conservation reserve (Georges River National Park; Scheyville National Park). Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where <i>Pterostylis saxicola</i> occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. All species of <i>Pterostylis</i> are deciduous and die back to fleshy, rounded underground tuberoids. The time of emergence and withering has not been recorded for this species, however flowering occurs from October to December and may vary due to climatic conditions.	Unlikely - The presence of this species was not identified (conspicuous species). The development site is not within the currently known locations and it was determined that the habitat is substantially degraded such that this species is unlikely to utilise	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
				the development site.		
<i>Pultenaea glabra</i>	Smooth Bush-pea	V	Restricted to the higher Blue Mountains and has been recorded from the Katoomba-Hazelbrook and Mount Victoria areas, with unconfirmed sightings in the Mount Wilson and Mount Irvine areas. Swamp margins, hillslopes, gullies and creekbanks, within dry sclerophyll forest and tall damp heath on sandstone.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Furthermore, the site is on the fringe of the predicted distribution. Site is too degraded for presence of this species.	N/A	No
<i>Pultenaea parviflora</i>	-	V	Endemic to the Cumberland Plain. Mainly from Windsor to Penrith and east to Dean Park, with outlier populations at Kemps Creek and Wilberforce. Dry sclerophyll forest, especially Castlereagh Ironbark Forest, Shale Gravel Transition Forest and transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland.	Unlikely - the presence of this species was not identified, and suitable habitat was not identified within the development site. Site is too degraded for presence of this species.	N/A	No
<i>Rhizanthella slateri</i>	Eastern Underground Orchid	E	Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's	Unlikely - The presence of this species was not	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
			Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	identified (conspicuous species). The development site is not within the currently known locations and it was determined that the habitat is substantially degraded such that this species is unlikely to utilise the development site.		
<i>Rhodamnia rubescens</i>	Scrub Turpentine	CE	Occurs in coastal districts north from Batemans Bay in New South Wales, approximately 280 km south of Sydney, to areas inland of Bundaberg in Queensland. Populations of <i>R. rubescens</i> typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m above sea level in areas with rainfall of 1,000-1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Unlikely – not identified during targeted survey for this species.	N/A	No
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Subtropical and littoral rainforest on gravels, sands, silts and clays.	Unlikely - the presence of this species was not identified, and the development site is not within the species' distribution.	N/A	No

Scientific Name	Common Name	EPBC Act Status	Distribution and Habitat	Likelihood of occurrence on site	Habitat on site directly or indirectly impacted	Impact Assessment Required
<i>Thelymitra kangaloonica</i>	Kangaloon Orchid	Sun CE	Only known to occur on the southern tablelands of NSW in the Moss Vale / Kangaloon / Fitzroy Falls area at 550-700 m above sea level. Swamps in sedgelands over grey silty grey loam soils.	Unlikely - the presence of this species was not identified, and the development site is not within the species' distribution.	N/A	No
<i>Thesium australe</i>	Austral Toadflax	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Grassland on coastal headlands or grassland and grassy woodland away from the coast.	Unlikely - suitable habitat not identified within the development site.	N/A	No

Appendix D: Biodiversity credit report



22 March 2021

Our ref: 20SYD-16049

General Manager
Penrith City Council
PO Box 60, Penrith, NSW 2751

Attention: Warwick Wynn

Dear Mr Winn,

Nepean Gardens DA 19/0875

Further to the Sydney Western City Planning Panel's (the Panel) decision to defer the determination of DA19_0875 and to assist the Panel to determine the application, Eco Logical Australia (ELA) provides the following response to the two biodiversity related matters raised in the record of deferral issued by the Panel.

Issue raised by Panel	Response
c) Biodiversity and SAI – Any submission as to whether the proposal will or will not have a Serious and Irreversible Impact (SAI) on each relevant candidate species, community or population.	<p>The Biodiversity Assessment Method (BAM) and requires accredited assessors to provide additional analysis in relation to candidate 'Serious and Irreversible Impact' (SAI) candidates.</p> <p>The new Biodiversity Development Assessment Report (BDAR) attached identifies two candidate SAI entities:</p> <ul style="list-style-type: none">• Cumberland Plain Woodland• <i>Chalinolobous dwyeri</i> (Large eared pied bat) <p>Section 4.2.6 of the BDAR assesses the impacts against the principles identified in section 6.7.2 of the BC Regulation 2017. No thresholds have been set by the government regarding the level of impact considered SAI for these entities.</p> <p>The proposed development will impact on 0.54 ha of Cumberland Plain Woodland. The CPW is generally in moderate-poor condition on site, as evidenced by the Vegetation Integrity scores which are less than benchmark in all measures (tree, shrub grass, forbs and fern richness; length of fallen logs) except the number of large trees. This impact represents 0.0048% of the extent of CPW. Approximately 1.77 ha of CPW will remain on site and will be enhanced under a Vegetation Management Plan (VMP).</p> <p>To put the extent of proposed impact in context, the recently exhibited draft Cumberland Plain Conservation Plan (draft CPCP) and associated biodiversity</p>

Issue raised by Panel	Response
	<p>certification for the aerotropolis and growth areas, proposes an impact to 1,015 hectares of CPW, which represents 4.4% of the extent of this community within a 10,000 m radius of the development areas assessed in the draft CPCP. The Nepean Gardens impact of 0.54 ha constitutes 0.053 % of the impact associated with the draft CPCP.</p> <p>The BAM Stage 2 Operations manual states: <i>The assessor is not required to provide a recommendation on whether the impact is serious and irreversible. It is for the consent authority to determine whether an impact will be serious and irreversible.</i></p> <p>Whilst the accredited assessor is not required to recommend whether an impact is SAll, our opinion is that the impact is minor, it can be offset and there would be no compelling reason to conclude that the impact to 0.54 ha of moderate-poor CPW would be considered serious and irreversible for Cumberland Plain Woodland.</p>
<p>d) Biodiversity Impact Assessment –</p> <p>An updated BDAR report is to be supplied (or the statutory basis upon which it submitted one is not required) and any submission relied upon as to why the panel should conclude that the requirements of the Biodiversity Conservation Act 2016 have been complied with (particularly in regards to any impacts associated with infrastructure including sewer and external road network extents). Any requisite guidelines relevant to the objective of avoiding and minimising ecological impacts should be addressed. The submission may include any proposed practical revisions to the internal pathways if appropriate to reduce tree loss.</p>	<p>A new BDAR has been prepared by Eco Logical Australia (attached). ELA undertook site validation of vegetation communities and updated the vegetation community mapping from the previous Travers BDAR (2019). The BAM plot data that was collected by Travers was less than 5 years old and was collected in accordance with the BAM. The Travers plot data was utilised in the new BDAR.</p> <p>The impacts assessed in the BDAR include:</p> <ul style="list-style-type: none"> • Earthworks associated with golf course design • Building footprints • Tree removal along Park Road to allow for road widening • Buildings and bushfire Asset Protection Zones (APZs) <p>Sewer lines will not result in any additional impact. The sewer lines are proposed to be constructed using a combination of directional drilling and open trenching. In locations of directional drilling, no surface disturbance (and therefore no impact to vegetation) will occur. In areas of open trenching, the sewer is either on cleared land or is within the proposed road network which is already counted as part of the development footprint.</p> <p>The BDAR no longer assesses impacts to trees which may or may not require removal due to safety reasons. The proposal now includes a Tree Protection and Management Plan that will be prepared by an AQF Level 5 Arboricultural Consultant and submitted for approval prior to issue of Construction Certificate by Penrith City Council.</p> <p>The previous BDAR (Travers, 2019) identified an impact to:</p> <ul style="list-style-type: none"> • 1.2 ha of Cumberland Plain Woodland in moderate or poor condition • 2.3 ha of planted vegetation that was categorised as CPW. • 0.5 ha of River-flat Eucalypt Forrest (RFEF) <p>The new BDAR (ELA 2021) has assessed impacts to:</p> <ul style="list-style-type: none"> • 0.54 ha of Cumberland Plain Woodland • 0.75 ha to planted native vegetation (which is no longer requires an offset due to release of guidelines from NSW DPIE) • 0.14 ha to RFEF <p>The reductions are due to design changes to avoid vegetation and the use of the Tree Protection and Management Plan approach. This has resulted in:</p> <ul style="list-style-type: none"> • A reduction of 0.66 ha of impact to CPW (a 55% reduction) and

Issue raised by Panel	Response
	<ul style="list-style-type: none"> <li data-bbox="659 264 1189 291">• A reduction of 0.34 ha to RFEF (a 66% reduction). <p data-bbox="659 331 1433 456">The development has been designed to avoid and minimise impacts to native vegetation to the extent possible whilst delivering the project. Residual impacts will be offset through the retirement of biodiversity credits in accordance with the BAM</p>

If further advice or clarification is required I can be contacted on 0405 910 839.

Regards,



David Bonjer
Principle Planner, NSW

16 March 2021

URBIS Consultants
Attn: Charlotte Ryan
By email

Dear Charlotte,

RE: SYDNEY WESTERN CITY PLANNING PANEL RESOLUTION NOTICE OF DEFERRAL DATED 17 FEBRUARY 2021, PROPOSED NEPEANS GARDENS CEMETERY, WALLACIA, NSW

Overview

As requested, we provide this advice in response to [42e] of the Panel's notice of deferral in respect of the proposed Nepean Gardens Cemetery development (the **Site**) which requested:

***"Contamination** – Written advice is required from an appropriate contamination expert that the Panel can rely upon to discharge the threshold responsibilities arising from SEPP 55".*

Investigations and Studies Completed

Several site contamination investigations and studies have been undertaken in respect of the development proposal at the Site. These are briefly summarised in Table 1.

Table 1: Summary of contamination studies undertaken in respect of the development proposal.

Investigation	Comment(s)
Preliminary Site Investigation (PSI) prepared by Douglas Partners, dated 6 June 2017	<ul style="list-style-type: none"> The PSI included a desktop review of relevant environmental and site information supported by a detailed site walk over. The PSI identified 15 areas of environmental concern (AECs), and recommended that a DSI be prepared which further tested those areas.
Detailed Site Investigation (DSI) prepared by Martens & Associates, dated 12 November 2020	<ul style="list-style-type: none"> The initial DSI was prepared 14 August 202, but was updated to include additional sampling of stockpiles within the Site. The DSI found that the Site maintains a low risk of contamination, with all soil samples containing chemical concentrations below the adopted site assessment criteria (SAC). However, on the basis of bonded asbestos fragments being found in fill material between the 3rd and 7th green (AEC16) and stockpiled material to the west of the maintenance shed (AEC17), the DSI recommended that a RAP be prepared. Two minor data gaps were identified below existing structures, but

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	<p>these were considered minor and capable of being managed during construction.</p> <ul style="list-style-type: none"> The DSI concluded that the Site was suitable for the proposed cemetery development. Burial plots in areas AEC16 and AEC17 would require remediation prior to use for cemetery purposes.
Remediation Action Plan (RAP) prepared by Martens & Associates, dated 16 March 2021	<ul style="list-style-type: none"> The RAP was initially prepared 27 November 2020, but Council considered that some minor additions would be necessary. As part of joint conferencing process in NSW Land and Environment Court proceedings 2019/00364850, several minor amendments were made to the RAP, resulting in Council being satisfied that: the RAP sufficiently addressed the issue of site contamination; the requirements of clause 7(1) of SEPP 55 were satisfied; and that site contamination was not a reason for withholding development consent. The amendments made to the RAP are summarised as: <ul style="list-style-type: none"> Inclusion of an additional data gap, that being proposed roadworks within Park Road at each of the two Site entrances. Inclusion of a data gap remediation and validation strategy, including validation against general (non-asbestos) soil contamination criteria. Management of temporary stockpiles during the remediation works. The final RAP as agreed with Council, including amendments to the applicant and application names, is provided at Attachment A.

Consideration of Clause 7(1) of SEPP 55

We have considered the various contamination investigations and studies against clause 7(1) of SEPP 55, with that consideration summarised at Table 2. Based on this assessment we conclude that all aspects of cl 7(1) are satisfied and that therefore in our view, that the Panel's threshold responsibility has been discharged.

Table 2: Consideration of clause 7(1) of SEPP 55.

SEPP 55 cl 7(1)	Consideration(s)
(a) <i>A consent authority must not consent to the carrying out of any development on land unless it has considered whether the land is contaminated.</i>	<p>This element is satisfied because:</p> <ul style="list-style-type: none"> Multiple studies and investigation reports have been prepared in respect of the land which have enabled the consent authority to consider whether the land is contaminated. Those reports include the initial PSI prepared in 2017, the DSI prepared in 2020 and the RAP, most recently updated in 2021.

<p>(b) <i>If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be, after remediation) for the purpose for which the development is proposed to be carried out.</i></p>	<p>This element is satisfied because:</p> <ul style="list-style-type: none"> • Only a small portion of the land, that being AEC16 and AEC17, was identified as being contaminated. The RAP provides a methodology for remediating these areas through off-site disposal of the material followed by a site validation regime. Following remediation, the land will be suitable for the cemetery use. • Data gaps identified in the RAP are very minor and consist of areas under existing structures and the proposed site entrance works within the Park Road corridor. The RAP provided a detailed strategy for data gap remediation and validation. Following remediation, the land will be suitable for cemetery use and Park Road will remain suitable for use as a road.
<p>(c) <i>If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.</i></p>	<p>This element is satisfied because:</p> <ul style="list-style-type: none"> • The remediation works outlined in the RAP will be undertaken prior to the land being used for cemetery purposes. • The remediation works outlined in the RAP can be readily incorporated into a properly worded condition of consent that provides certainty in respect of the timing of any remediation works.

Please call the undersigned if you have any further queries regarding this matter.

For and on behalf of

MARTENS & ASSOCIATES PTY LTD



DR DANIEL MARTENS

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Attachment A – Updated Remediation Action Plan

Remediation Action Plan for the Proposed Nepean Gardens Cemetery, Wallacia, NSW



Prepared for Catholic Cemeteries Board

Report No: P1706171JR08V02

16 March 2021

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Project Details

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All enquiries regarding this project are to be directed to the Project Manager.

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Contents

1	Introduction	7
1.1	Overview.....	7
1.2	Proposed development	7
1.3	Objectives and Scope of the RAP	7
1.4	Reference Guidelines and Planning Instruments.....	8
1.5	Abbreviations	9
2	Site Background Information.....	10
2.1	Site Details.....	10
3	Previous Site Investigations.....	12
3.1	Preliminary Site Investigation.....	12
3.2	Detailed Site Investigation	13
4	Data Gap Closure.....	15
4.1	Data Gap Extents	15
4.2	Data Gap Closure Methodology	15
4.3	Data Gap SAC	16
4.4	Data Gap Remediation and Validation	16
5	Remediation Areas	17
5.1	Extent of Remediation Required	17
6	Remediation Goals and Options	18
6.1	Remediation Goal	18
6.2	Assessment of Remediation Options	18
6.3	Preferred Soil Remediation Options	19
7	Remediation Plan	20
7.1	Introduction.....	20
7.2	Stage 1 –Regulatory Approvals / Notifications	20
7.3	Stage 2 – Appointment of Contractor / Consultant	20
7.4	Stage 3 – Site Establishment.....	21
7.5	Stage 4 – Remediation Work	21
7.6	Stage 5 – Waste Classification.....	22
7.7	Site Validation	22
8	Site Management Plan for Remediation	26
8.1	Overview.....	26
8.2	Construction Environmental Management Plan	26
8.3	Worker Health and Safety Plan (WHSP)	28
9	Environmental Regulatory Requirements	32
9.1	State Environmental Planning Policies	32
9.2	Waste Disposal Requirements	32
9.3	Asbestos Licences.....	32
10	Remediation Contacts	33
11	Contingency Plan for Remediation and Redevelopment	34
11.1	Overview.....	34
11.2	Unexpected Finds	34

11.3	Unacceptable Level of Dust.....	35
11.4	Unacceptable Level of Noise.....	35
11.5	Excessive Rainfall	35
12	Conclusion.....	36
13	Limitations	37
14	References.....	38
15	Attachment A: Maps	39

Tables

Table 1: Site Information.	10
Table 2: PSI (DP, 2017) summary.	12
Table 3 : DSI summary (MA, 2020).	13
Table 4: Conceptual site model.	16
Table 5: Review of soil remediation options.	19
Table 6: Data quality objectives for the assessment of soil.	23
Table 7: Personal protective equipment.....	30

Maps

Map 1: Site Location Map.....	40
Map 2: Remediation Areas.....	41
Map 3: Data Gap Locations	42

1 Introduction

1.1 Overview

This report documents a Remediation Action Plan (**RAP**) on behalf of the Catholic Cemeteries Board. The report supports a development application (**DA**) for a proposed cemetery in the eastern portion of Wallacia Golf Course, 13 Park Road and 512 Mulgoa Road, Wallacia, NSW (the **site**).

A Detailed Site Investigation (**DSI**) was previously prepared for the site (MA, 2020), which identified bonded fragments of asbestos containing material (**ACM**) within fill mounds identified between the 3rd and 7th holes, and within stockpiled fill material to the west of the existing maintenance shed.

This report has been prepared in general accordance with ASC NEPC (1999, amended 2013), NSW EPA (2017) and NSW EPA (2020).

1.2 Proposed development

The proposed development will involve converting the golf course (or part thereof) into a cemetery development known as 'Nepean Gardens' (the **Development**).

1.3 Objectives and Scope of the RAP

The RAP objectives are:

- Set remediation goals and criteria.
- Define the extent of areas requiring remediation.
- Review possible remedial options.
- Provide rationale for the preferred remedial option.
- Provide a remediation plan to implement and validate the preferred remediation option.
- Provide a site management plan for the remediation.
- Outline contingency plans.
- Outline regulatory compliance requirements.

1.4 Reference Guidelines and Planning Instruments

This assessment was prepared in general accordance with the following guidelines:

1. State Environmental Planning Policy No. 55 – Remediation of Land (**SEPP 55**).
2. ASC NEPC (1999, amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure* (referred to as ASC NEPM (2013)).
3. NSW EPA (2017) 3rd Ed. *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme*.
4. NSW EPA (1995) *Sampling Design Guidelines*.
5. NSW EPA (2020) *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines*.
6. SafeWork NSW (2019) *How to Safely Remove Asbestos Code of Practice*.

1.5 Abbreviations

AASS	Actual acid sulfate soil	MBT	Monobutyltin
ABC	Ambient background concentrations	MNA	Monitored natural attenuation
ACM	Asbestos containing material	MPE	Multi phase extraction
AEC	Area of environmental concern	NAPL	Non aqueous phase liquid
AF	Asbestos fines	NATA	National Association of Testing Authorities
AMP	Asbestos Management Plan	ND	No data
ANZECC	Australia and New Zealand Environment Conservation Council	NEPC	National Environment Protection Council
ANZG	Australian and New Zealand Governments	NEPM	National Environment Protection Measure
ASC NEPM	National Environmental Protection (Assessment of Site Contamination) Measure (2013)	OCF	Organochloride pesticides
ASS	Acid sulfate soil	OEH	NSW Office of Environment and Heritage
ASSMAC	Acid Sulfate Soils Management Advisory Committee	OPP	Organophosphorus pesticides
AST	Above ground storage tank	PACM	Potential asbestos containing material
BGL	Below ground level	PAH	Polycyclic aromatic hydrocarbons
BH	Borehole	PASS	Potential acid sulfate soil
BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene	PCB	Polychlorinated biphenyl
CEMP	Construction Environmental Management Plan	PCEMP	Post Construction Environmental Management Plan
COC	Chain of custody	PESA	Preliminary Environmental Site Assessment
COPC	Contaminants of potential concern	PFAS	Per- and polyfluoroalkyl substances
DA	Development application	PID	Photoionisation detector
DBT	Dibutyltin	ppb	Parts per billion
DEC	Department of Environment and Conservation	ppm	Parts per million
DECC	Department of Environment and Climate Change	PQL	Practical quantitative limit (interchangeable with EQL and LOR)
DNAPL	Dense non aqueous phase liquid	PSI	Preliminary Site Investigation
DP	Deposited Plan	QA/QC	Quality assurance / quality control
DPI	NSW Department of Primary Industry	RAC	Remediation acceptance criteria
DPIW	NSW Department of Primary Industry – Water	RAP	Remediation Action Plan
DQI	Data quality indicators	HHRA	Human Health Risk Assessment
DQO	Data quality objectives	RPD	Relative percentage difference
DSI	Detailed Site Investigation	SAC	Site assessment criteria
EAC	Ecological assessment criteria	SAQP	Sampling and Analysis Quality Plan
EIL	Ecological investigation level	SEPP	State Environmental Planning Policy
EMP	Environmental Management Plan	SIL	Soil investigation level
EPA	NSW Environmental Protection Authority	SOP	Standard operating procedure
EQL	Estimated quantitation limit (interchangeable with PQL and LOR)	SWL	Standing water level
ESA	Environmental Site Assessment	SWMS	Safe Work Method Statement
ESL	Ecological screening level	TB	Trip blank
FA	Fibrous asbestos	TBT	Tributyl tin
GIL	Groundwater investigation level	TCLP	Toxicity characteristics leaching procedure
HIL	Health investigation level	TEQ	Toxic equivalency factor
HM	Heavy metals	TP	Test pit
HSL	Health screening level	TPH	Total petroleum hydrocarbons
IA	Investigation area	TRH	Total recoverable hydrocarbons
ISQG	Interim Sediment Quality Guideline	TS	Trip spike
ITP	Inspection Testing Plan	UCL	Upper confidence limit
LGA	Local government area	UPSS	Underground petroleum storage system
LNAPL	Light non aqueous phase liquid	UST	Underground storage tank
LOR	Limit of reporting (interchangeable with EQL and PQL)	VHC	Volatile halogenated compounds
MA	Martens & Associates Pty Ltd	VOC	Volatile organic compounds
mAHD	Metres, Australian Height Datum	WHS	Work health and safety
mbgl	Metres below ground level	WHSP	Work Health and Safety Plan

2 Site Background Information

2.1 Site Details

Site information is summarised in Table 1. Site area and general surrounds plans are provided in Map 1.

Table 1: Site Information.

Item	Description / Detail
Property address	13 Park Road and 512 Mulgoa Road, Wallacia, NSW
Lot / DP	Lot 4 in DP 18701 Lot 3 in DP 18701 Lot 2 in DP 1254545 Lot 1 in DP 1254545
Site area	Approximately 44.4 ha (Six Maps, 2020)
LGA	Penrith City Council (PCC)
Current zoning	The majority of the site is zoned E3 – Environmental Management. A small portion of the site in the south is zoned RU5 – Rural Village.
Current land use and site infrastructure	Currently the site is an operating golf course. Observed infrastructure relevant to this investigation included: <ol style="list-style-type: none"> 1. A carparking area, members clubhouse and administration building in the southwest corner of the site. 2. Multiple maintenance sheds, primarily used by the greens keeping staff in the central southern portion of the site with above-ground storage tanks in the maintenance shed area. 3. Two dilapidated sheds in the central northern portion of the site. 4. A telecommunications tower in the north eastern portion of the site.
Surrounding land uses	The site is bordered by rural allotments to the north and east, Park Road to the south and residential properties to the south and west. A BP service station is located to the west of the site and an operating market garden is located adjacent to the northern boundary. Jerrys Creek is located in the western portion of the golf course.
Topography	The site is located within undulating terrain, with general grades of 5-10% and slightly steeper grade of up to 20 % near to drainage depressions. The site has a generally northerly aspect and varies from approximately 65 mAHd near the eastern site boundary, falling to 45 mAHd within the drainage depression near the central northern portion of the site.
Geology	The Penrith 1:100,000 Geological Sheet 9030 (1991) indicates the site is underlain by Wianamatta Group Bringelly Shale comprising shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.
Soil landscape	The NSW Environment and Heritage eSPADE website identifies that the site is associated with Luddenham soil landscapes consisting of shallow dark podzolic soils or massive earthy clays on crests, moderately deep red podzolic soils on upper slopes, and moderately deep yellow podzolic soils and prairie soils on lower slopes and drainage lines.

Item	Description / Detail
Drainage	The site generally drains via overland flow into drainage depressions within the site, ultimately leading north to a series of creeks north of the site.

3 Previous Site Investigations

Site contamination risk has been previously assessed in the following documents:

1. Douglas Partners (2017) Preliminary Site Investigation – Contamination: Proposed Cemetery, Wallacia Golf Course, Wallacia, NSW. Ref. 76652.02.
2. Martens and Associates (2020) *Detailed Site Investigation for the Proposed Nepean Gardens, Wallacia, NSW*. Ref. P1706171JR07V02 (November 2020).

A summary of the above investigations is provided in the following sections.

3.1 Preliminary Site Investigation

A PSI (DP, 2017) was previously completed for the site which identified potential sources of contamination. Key findings are summarised in Table 2.

Table 2: PSI (DP, 2017) summary.

Investigation Details	Investigation Task and Finding
Scope of works	<ul style="list-style-type: none"> Desktop review of previous reports, aerial photographs, online databases and land title information. Review of local geology, hydrogeology and topography maps. Site walkover to review existing site conditions. Identification of AECs.
Key findings of historic site review and walkover	<p>Aerial photographs from 1947, 1961, 1975, 1986, 1998, 2002, 2005 and 2014 were reviewed. The following observations were made:</p> <ul style="list-style-type: none"> A structure in the place of the existing clubhouse / administration building was observed in the 1947 aerial photograph. The golf course was first observed in the 1961 aerial photograph. Three former structures which are no longer present were observed in the 1947, 1961 and 1986 aerial respectively. Evidence of soil disturbance and likely filling was observed in a number of aerial photographs. <p>DP also undertook a site walkover inspection, which identified that:</p> <ul style="list-style-type: none"> The site was, at the time of inspection, being used as a golf course. A brick and timber clubhouse were present in the southwest corner of the site. A galvanised steel maintenance shed was present in the central southern portion of the site. Two above ground storage tanks (AST) were observed at the maintenance shed.
Identified AEC and COPC	<p>DP identified 15 AECs, including existing and former sheds and structures, areas of identified fill across the golf course, potential use of fuels or oils around the existing maintenance shed, and the entire golf course for potential pesticide use since its establishment over 50 years ago.</p> <p>AECs identified by DP have been included in the conceptual site model (CSM) for the DSI (Section. 4)</p>
Recommendations	<p>The PSI recommended a DSI be undertaken to assess AEC and associated COPC.</p>

3.2 Detailed Site Investigation

A DSI was completed for the site by MA, initially reported in Report No. 1706171JR07V01 (14 August 2020). The DSI was updated on 12 November 2020 (Report No. 1706171JR07V02) following supplementary fieldworks to close some previously identified data gaps. Key findings are outlined in Table 3.

Table 3 :DSI summary (MA, 2020).

Investigation Details	Investigation Task and Finding
Scope of works	<ul style="list-style-type: none"> ○ Review of PSI (MA, 2020). ○ Intrusive subsurface investigation and sampling of AECs as identified in the PSI (DP, 2017). ○ Laboratory analyses of selected samples for identified COPC and assessment against site acceptance criteria (SAC). ○ Preparation of a report in general accordance with the relevant sections of ASC NEPM (1999, amended 2013), NSW EPA (2017) and NSW EPA (2020).
Site Walkover	<p>Prior to DSI intrusive investigations, MA undertook a detailed site walkover on 9 June 2020. In addition to previous findings from DP (2017) investigations, MA observed the following:</p> <ul style="list-style-type: none"> ○ Additional areas of fill, not identified by DP (2017) were observed across the site, particularly around golf course tees and greens, as well as fill mounds in the central northern portion of the site. ○ A number of soil stockpiles and mounds were observed in the central southern portion of the site between the 3rd and 7th hole and to the west of the maintenance shed. ○ Two dilapidated galvanised iron and timber sheds were observed in the northern portion of the site. ○ An exposed fibrous cement pipe was observed at the ground surface in the central northern portion of the site. Given the age of the site and golf course usage, this was considered likely to be a potential asbestos pipe. ○ A fragment of fibrous cement material (potential asbestos containing material, PACM) was observed at the soil surface in the central northern portion of the site. ○ Based on the findings of the site walkover, additional AECs were included as part of the subsurface investigation program.

Investigation Details	Investigation Task and Finding
DSI Field Work	<p>Initial surface and subsurface soil investigations were completed between 16 and 24 June 2020 and involved:</p> <ul style="list-style-type: none"> Excavation of 70 boreholes (BH301 – BH370) using a hand operated hydraulic pushtube to a maximum investigation depth of 1.0 mbgl. Excavation of 32 test pits (TP401 – TP432) using a hand spade to a maximum investigation depth of 0.4 mbgl. Collection of an asphalt sample for coal tar analysis. Collection of representative soil samples from boreholes and test pits to be sent for laboratory analysis and for future reference. Laboratory analysis of representative soil samples. Collection of QA / QC samples for laboratory analysis. <p>Supplementary subsurface soil investigations were completed between 4 and 9 November 2020, in AECs 10,12, 13, 16 and 17, and involved:</p> <ul style="list-style-type: none"> Excavation of 32 test pits (TP501 – TP532) using a 1.8 tonne excavator to a maximum investigation depth of 1.8 mbgl. Collection of PACM material samples to be sent for laboratory analysis. Collection of representative soil samples to be sent for laboratory analysis. Laboratory analysis of PACM and soil samples. <p>Soil sampling locations are shown in Map 3 and borehole and test pit logs are provided in Attachment B.</p>
Key findings	<p><u>Chemical contamination:</u></p> <p>Site testing within all accessible AEC indicated found chemical contaminant concentrations in collected soil samples to be below the adopted SAC.</p> <p><u>Asbestos in soil:</u></p> <p>Fill mounds between the 3rd and 7th holes (AEC 16) were observed to contain a large amount of builders rubble which included fibre cement sheeting fragments.</p> <p>Stockpiled fill material to the west of the existing maintenance shed (AEC 17) was observed to contain similar material to that encountered at AEC 16 including cement fibre sheeting fragments.</p> <p>Laboratory testing of collected soil and material samples confirmed the presence of asbestos within material samples. All analysed soil samples were found to free of asbestos fibres at the reporting limit of 0.1 mg/kg in accordance with AS4964. We note that the asbestos found in soil sample TP501 /1.0-1.0 (collected at TP501) was a bonded ACM fragment and not fibrous (refer to Australian Saffert Environment & Technology Pty Ltd report ASET89461/92641/1-10).</p>
Recommendations	<p>The DSI recommended that a RAP be prepared outlining remediation and management requirements to address identified ACM contamination associated with AEC 16 and AEC 17.</p>

4 Data Gap Closure

4.1 Data Gap Extents

The following data gaps identified in the DSI (MA, 2020) as requiring additional assessment that still remain as data gaps are:

1. AEC 1: Footprint of existing clubhouse.
2. AEC 9: Footprint of existing maintenance shed.

The footprints beneath these structures could not be accessed during the DSI field investigations and will require assessment post demolition, if such structures are to be removed. If the structures are to remain, then no further assessment is necessary.

A further minor data gap has been identified as part of the RAP, that being material contained within Council's road corridor which will be subject to road works on Park Road as part road widening work and an upgrade to the current site driveway and entry.

4.2 Data Gap Closure Methodology

If demolition of site structures is proposed, the following works are recommended following demolition to address the data gaps noted above:

1. Walkover and inspection of data gap areas and adjacent curtilage.
2. Document any areas or locations of building waste. Undertake shallow raking of topsoil via excavator with toothed bucket attachment to assess for presence of any suspected ACM below surface.
3. Collection of soil samples in footprint of former structures at one per 25 m².
4. Soil samples to be laboratory analysed for heavy metals, TRH, BTEXN, PAH, OC and OP pesticides and phenols.
5. Laboratory results are to be compared to site assessment criteria (SAC) adopted from the DSI, and NSW EPA (2014) waste classification guidelines to confirm contamination status and classification of the material.

In respect of the Site entry and road widening works, the following works are recommended to address the data gap.

1. All works associated with the road widening and site access upgrades are to be supervised by a suitably qualified environmental consultant. Any material exposed during these works showing potential signs of contamination (e.g. observed PACM, petroleum and / or oil spills, chemical odours or staining) is to be managed in accordance with the unexpected finds protocol provided in Section 11.2.

2. All material excavated from the works area will be considered to be waste and will therefore be classified in accordance with the NSW Waste Classification Guidelines.
3. All material excavated from the works area will be taken from the site and disposed at a suitably licenced waste facility.

Data gap locations are shown in the site plan in Attachment A.

4.3 Data Gap SAC

The SAC for data gap investigation (Table 4) are adopted from the DSI (MA, 2020).

Table 4: Conceptual site model.

Media	Adopted Guidelines	Applicability
Soil	ASC NEPM (2013)	<p><u>Health investigation levels (HIL)</u></p> <p>HIL C – Open space was adopted based on the proposed land use.</p> <p><u>Health screening levels (HSL)</u></p> <p>HSL C – Open space land use for sand was adopted based on granular natural and fill material.</p> <p><u>Ecological Investigation Levels (EIL)</u></p> <p>EILs were derived from methodology from ASC NEPM (2013) for the protection of terrestrial ecosystems for urban residential areas and public spaces.</p> <p>A pH of 5.87 has been adopted from results of a salinity assessment prepared by MA (2020). A conservative CEC of 5 cmol/kg has been adopted. Individual EIL values are provided in Attachment C.</p> <p><u>Ecological Screening Levels (ESL)</u></p> <p>Residential / public open space use, coarse soil.</p> <p><u>Management Limits</u></p> <p>Residential / public open space use, coarse soil.</p> <p><u>Asbestos</u></p> <p>Assessed on a detect / non-detect basis.</p>

4.4 Data Gap Remediation and Validation

If any of the data gap sampling is found to exceed the SAC, the adopted remediation strategy will be to remove the affected material to a suitable facility for off-site disposal. Site validation measures will be undertaken generally in accordance with those outlined under Section 7.7 of this report.

5 Remediation Areas

5.1 Extent of Remediation Required

Based on the DSI (MA, 2020) findings, site contamination is limited to fill material containing bonded asbestos fragments within AEC 16 and AEC 17 as follows:

- Remediation Area A (AEC 16) – Fill material was observed in several test pit locations in AEC 16, with depths ranging between 0.0 mbgl and > 1.8 mbgl. The area of AEC has been estimated as approximately 3,200 m². The MA (2020) DSI indicated that fill material within AEC 16 contains bonded ACM fragments. Based on an approximate average depth of fill (1.0 m), the volume of ACM impacted fill requiring remediation is approximately 3,200 m³.
- Remediation Area B (AEC 17) – A stockpile of approximately 100 m³ of soil fill material was located in AEC 17. The MA (2020) DSI indicated that fill material within this stockpile contains bonded ACM fragments.

The location of remediation areas (AEC 16 and AEC 17) is provided in Attachment A.

6 Remediation Goals and Options

6.1 Remediation Goal

The remediation goal is to remediate areas where future site receptors may come in contact with soils currently contaminated by asbestos. The remediation plan will provide context for further site investigation work to assess identified data gaps and to waste classify material being removed from site as part of remediation and construction works.

6.2 Assessment of Remediation Options

Soil remediation options were considered, with reference to NSW EPA (2017) and ASC NEPM (2013), for the preferred hierarchy of options for site clean-up and / or management, as follows:

- On-site treatment of the contamination so that it is destroyed and the associated risk is reduced to an acceptable level.
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which the soil is returned to the site.
- Removal of contaminated material to an approved facility, followed, where necessary, by replacement with appropriate material, if required.
- Cap and contain material onsite with an appropriately designed barrier.

Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy would be required.

Review of available soil remediation strategies and technologies is considered on the basis of:

- Effectiveness at achieving remediation objectives.
- Suitability in light of the proposed development.
- Anticipated costs.
- Ongoing environmental and public health adequacy.

A review of remediation options considered possible for the site is presented in Table 5.

Table 5: Review of soil remediation options.

Remediation Options	Advantages	Disadvantages	Comments
Capping and containment	<ul style="list-style-type: none"> Excavation and removal of contaminated soils not required, reducing tipping costs. 	<ul style="list-style-type: none"> Human health risk is mitigated by burying, but contamination remains onsite. A long term Environmental Management Plan (EMP) required to manage remaining contamination. Note on title indicating presence of contamination. Likely to require additional earthworks and over excavation to facilitate capping layer beneath design levels. 	<p>In consideration of the proposed development, construction of a containment cell and capping layer is generally not considered a feasible option given that proposed future use as a cemetery involves ongoing excavation across the site. There would be an ongoing risk that buried contamination would be disturbed during operational use of the site.</p> <p>In light of the proposed use, onsite containment of asbestos contamination is not considered an appropriate remediation method.</p>
Offsite disposal	<ul style="list-style-type: none"> Provides the shortest timeframe for remediation. Removes human and ecological risks and long term management requirements. Meets redevelopment objectives. Suitable to remove heavy metal and PAH contamination. 	<ul style="list-style-type: none"> Cost for material transport and disposal charges. Cost associated with classifying wastes prior to offsite disposal. 	<p>This proven and reliable technique for managing contamination is suitable as it removes identified contamination and associated risk to humans and environment.</p> <p>This remediation option is considered the most appropriate remediation technique to remove risk and prevent long term management requirements.</p>

6.3 Preferred Soil Remediation Options

In consideration of soil remediation technologies presented in Table 6 and the proposed development, the excavation and offsite disposal of impacted soil are considered the most suitable remediation option.

Details of remediation and validation methodology are provided in Section 7.

7 Remediation Plan

7.1 Introduction

The following sections outline works required to remediate identified contamination such that the site is fit for the proposed development.

All remediation works within the Penrith local government area are considered to be Category 1 works under State Environmental Planning Policy No.55 – Remediation of Land and accordingly require consent.

Unless otherwise identified, activities discussed below will be the responsibility of the contractor or its representative.

7.2 Stage 1 –Regulatory Approvals / Notifications

The following notifications are required (unless approved by consent conditions):

- Notification to Penrith City Council is required in accordance with SEPP – 55 where other development consents do not cover the work. At the conclusion of remediation works, Council shall again be notified of the remediation outcome.
- Notification of asbestos removal work must be lodged with SafeWork NSW prior to the commencement of remediation works.

7.3 Stage 2 – Appointment of Contractor / Consultant

For remediation works to be successfully completed the appointment of a suitability qualified environmental consultant and an earthworks contractor is required. The environmental consultant should be engaged to:

- Supervise all remediation and validation works.
- Monitor the excavation and stockpiling of impacted material.
- Provide waste classification of material to be disposed of offsite.
- Document all stages of the excavation and stockpiling of contaminated soil.
- Monitor and document the offsite disposal of material to an appropriately licenced landfill.
- Perform validation inspections and testing of remediation areas.
- Prepare a validation report documenting remediation and validation reports, and confirming final site status.

7.4 Stage 3 – Site Establishment

Prior to any remediation / construction works, the site shall be prepared for the works. This will include:

- Establishment of site offices, work sheds and amenities for site workers.
- Appropriate physical barriers and site signage is to be erected surrounding site areas requiring remediation and site signage.
- Installation of appropriate dust control measures (i.e. dust screens and / or water sprays).
- Establishment of site holding areas for contaminated material. Site areas nominated to store material are to have appropriate environmental controls in place including storm water diversion, erosion and sedimentation controls and dust suppression.

7.5 Stage 4 – Remediation Work

The adopted remediation is outlined in the following sections.

7.5.1 Remediation Area A (AEC16)

The proposed works sequence in Remediation Area A shall be:

- Excavate fill in the remediation area until underlying natural residual silty clays are exposed. Residual silty clays are expected at depths ranging from 0.0 mbgl to > 1.8 mbgl. It is anticipated that the fill material in this area will need to be excavated to an average depth of 1.0 mbgl and over an area of approximately 3,200 m².
- The estimated lateral extent of the remediation area is shown on the site plan in Attachment A.

Excavated material is to be placed either:

- Directly into trucks for offsite disposal if *in-situ* waste classified; or
- In the designated contaminated material holding prior to offsite disposal.

The soil removed from AEC16 will be waste classified as a minimum classification of "special waste – asbestos waste" and will require formal waste classification in accordance with NSW EPA (2014) waste classification guidelines.

The appointed environmental consultant shall validate remediation excavations, as outlined in Section 7.7.

7.5.2 Remediation Area B (AEC 17)

Excavate fill in the remediation area stockpile until underlying natural residual clays are exposed. The lateral extent of the remediation area stockpile is shown on the site plan in Attachment A.

Excavated material is to be placed either:

- Directly into trucks for offsite disposal if *in-situ* waste classified; or
- In the designated contaminated material holding prior to offsite disposal. Holding areas or any temporary stockpiles are to be located wholly within AEC 17.

The soil removed from AEC17 will be waste classified as a minimum classification of “special waste – asbestos waste” and will require formal waste classification in accordance with NSW EPA (2014) waste classification guidelines.

The appointed environmental consultant shall visually validate the base of the excavated stockpile, as outlined in Section 7.7.

7.6 Stage 5 – Waste Classification

7.6.1 Waste Classification

Prior to any soil being removed from site, a formal waste classification is to be prepared for the material in accordance with the NSW EPA (2014) Waste Classification Guidelines.

7.6.2 Waste Disposal, Materials Tracking and Management

Any relocation or movement of contaminated spoil onsite shall be recorded on daily site logs by the remediation contractor. These documents shall be updated daily and kept in the site office.

Offsite disposal will require materials tracking for site validation. This shall entail recording of vehicle registration numbers, number of truck movements and approximate volumes of material transported. Materials tracking documentation is to be supplied to the environmental consultant upon disposal, along with tipping documents supplied by the receiving landfill.

Transportation of waste shall be, where applicable, undertaken by appropriately qualified and licensed contractor.

7.7 Site Validation

Prior to the AEC 16 and AEC 17 being declared fit for the proposed land use, a validation report documenting the completed remediation works and results of validation testing must be prepared by the appointed site environmental consultant. The following sections outline the site validation requirements.

7.7.1 Data Quality Objectives

The data quality objective (DQO) process is required to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of the site. Table 6 outlines the process used to develop the DQO for the site post remediation and were developed with reference to NSW EPA (2017) and ASC NEPM (2013).

Table 6: Data quality objectives for the assessment of soil.

Step 1 Stating the Problem	<p>Previous site investigations have identified the presence of asbestos contamination in fill material at the site, which requires appropriate remediation before the site can be deemed suitable for the intended use as a cemetery.</p> <p>Testing to date has also identified minor data gaps that may also need to be remediated.</p>
Step 2 Identifying the Decision(s)	<p>To assess the suitability of the site for future land use, decisions are to be made based on the remediation removing the identified risk to future site users.</p> <ul style="list-style-type: none"> Has the completed remediation works removed the identified risk to future site users? Is the soil quality suitable for the intended land use? Are future management of site soils required?
Step 3 Identification of Inputs to the Decision	<p>The inputs to the validation of the site will include:</p> <ul style="list-style-type: none"> Existing assessment data. Observations during remedial activities.
Step 4 Study Boundary Definitions	<p>Study boundaries are as follows:</p> <ul style="list-style-type: none"> Lateral – Lateral boundary of the assessment is defined by the remediation area extents, site boundaries and proposed redevelopment areas. Vertical – Vertical boundary will be governed by the maximum depth of impacted fill. Temporal – The dates of site inspections, remediation and validation works.
Step 5 Development of Decision Rules	<p>The decision rules for this remediation area are as follows:</p> <ul style="list-style-type: none"> If no bonded asbestos is visible at the completion of excavating the fill material or the base of the soil stockpile, then the area can be confirmed as validated. If bonded asbestos is visible following excavation of the fill material, then additional remediation or management strategies will be required for that remediation area. If bonded asbestos is visible following excavation of the fill material, and the site boundary has been reached, further management is required in the area. All material nominated for offsite disposal shall be classified in accordance with NSW EPA (2014) Waste Classification Guidelines. Material tracking is to be appropriately documented and waste disposal dockets validated.
Step 6 Specification of Limits on Decision Errors	<p>Specific limits for the acceptability of data obtained during the remediation and validation works would be in general accordance with NSW EPA endorsed guidelines.</p>
Step 7 Optimisation of Sampling Design	<p>Validation based on the remediation option, to ensure that all the necessary data is collected to confirm site suitability the proposed land use.</p>

7.7.2 Asbestos Validation Process

Validation of bonded asbestos (ACM) impacted AEC will be undertaken by visually assessing the bases and walls of excavations (AEC 16) and footprint of former stockpiles (AEC 17).

Following removal of ACM impacted soils, a walkover of the entire AEC area shall be undertaken and raking of the surface completed to assess the upper 100 mm of soils. Raking of both the base and walls of any excavation is to be completed. Raking can be completed via machine (excavator tooth bucket or soil tyne) or by hand with a suitable rack.

If any additional ACM (or suspected ACM) is identified during the visual assessment process, additional excavation is to occur under the supervision of the appointed environmental consultant. Any additional material excavated is to be disposed offsite with other remediation spoil and waste classified as per Section 7.6. The process is to be repeated until validation is successful.

At the completion of visual validation, an asbestos clearance certificate is to be obtained confirm that no asbestos is present within the AEC areas.

It is recommended that land surrounding the delineated AEC 16 and 17 is assessed for ACM contamination via a series of shallow test pits to confirm the extent of ACM impact have been fully remediated.

7.7.3 General Contaminant Validation Process

If non-asbestos soil contamination is identified during data gap investigation works, the following process will be used to validate the area:

1. Material deemed to be contaminated (i.e. exceeding the adopted SAC) will be excavated and removed offsite to a suitable waste facility.
2. Validation testing of the resulting excavation shall be undertaken at 1 sample per 25 m². Collected samples shall undergo laboratory analysis for the relevant contaminant(s) of concern.
3. Steps 1 and 2 shall be repeated until laboratory results confirm that the sampled material meets the SAC outlined in Table 4.

7.7.4 Imported Fill Protocol

Where any fill is imported to the site during remediation or for further earthworks, the fill is to be documented and verified as ENM or VENM. Waste classification documentation is to be provided and reviewed by the appointed environmental consultant prior to material importation.

All imported material is to be tracked and inspected by the environmental consultant at initial importation.

7.7.5 Validation Reporting

A site validation report is to be prepared by the environmental consultant at the completion of remediation works. This report shall document remediation and validation sequence, detail all results of the assessment, provide material tracking data for material taken from the site and document any imported material (and testing or supporting documentation for it).

The document shall include details regarding any remaining site contamination, and identify residual risks posed by remaining contaminants, and provide comment on whether remediation has been successful and suitability of areas AEC 16 and AEC 17 or any other remediated area for the proposed land use.

8 Site Management Plan for Remediation

8.1 Overview

A site-specific Construction Environmental Management Plan (**CEMP**) and worker health and safety plan (WHSP) are to be prepared by the appointed Contractor prior to the commencement of site works. CEMP and WHSP must meet the requirements of relevant occupational and environmental legislation. The following sections are intended as a guide to the information that should be included in these plans.

8.2 Construction Environmental Management Plan

A site specific CEMP shall be prepared to ensure the works do not negatively impact on potential receptors (humans and environment) and comply with applicable environmental legislation. Based on the site condition and proposed remediation method, primary environmental hazards requiring management during remedial works may include:

- Asbestos management.
- Soil management.
- Air quality / dust control.
- Erosion and sediment control measures.
- Noise and odour controls.

Additional on-site management issues that may be included in the CEMP include:

- Site access and security.
- Signage and contact Information.
- Traffic control.
- Hours of operation.
- Imported material.

Suggested requirements for these management points are discussed in the following subsections.

8.2.1 Asbestos Management

An asbestos removal control plan (**ARCP**) must be prepared and included in the CEMP. The ARCP will set out the responsibilities, procedures and safeguards that will be followed by contractor during the handling of asbestos impacted soil.

The ARCP is to be submitted to SafeWork NSW as part of the asbestos removal notification.

8.2.2 Air Quality / Dust Control

Due to the proposed remediation involving soil excavation and offsite disposal, the potential for dust generation is elevated. Management of dust will be required throughout remediation works. Dust suppression measures are to include:

- Use of water sprays across the remediation areas. Water spraying the area before the commencement of remediation work (i.e. the day before) should be undertaken to dampen the soil prior to excavation.
- If during excavation works measurable volumes of dust are being produced, dust control measures will need to increase and continued use of water to spray material will be required.
- All soil loads are to be covered once placed in trucks for the duration of transport to the licensed waste facility.
- Vehicle access will be limited to those vehicles required within the area of remediation.

8.2.3 Noise Control

To mitigate noise impacts which may arise as a result of remedial works, the contractor will undertake works in accordance with state and local noise regulations. The contractor's machinery, including machinery hired by the contractor, should be in good working order so that abnormal machine noise is avoided.

All works are to be undertaken with the designated working hours in Section 8.2.9.

8.2.4 Odour Control

Based on the identified site contaminants and site location relative to surrounding receptors, odour is not considered to be a major environmental concern. Should odours be encountered, contingency measures including the covering of temporary stockpiles should be implemented.

8.2.5 Site Access and Security

Prior to works commencing, barricades shall be erected to control access to the designated work area, along the proposed remediation area boundary. Site security and access controls must remain in place during all onsite remediation works.

8.2.6 Signage and Contact Information

Security fencing and asbestos removal signage around all defined remediation areas must be installed and maintained by the contractor.

A sign displaying the contact details of the contractor (including the onsite foreman or manager) shall be displayed for the duration of remediation works.

8.2.7 Traffic Control

Prior to exiting the site, vehicles shall have wheels washed at a designated exit point to remove potentially contaminated soil that may have accumulated while onsite. Prior to leaving the site, during the decontamination phase, earthworks machinery is required to decontaminate upon plastic sheeting laid beneath vehicles, with all accumulated potentially contaminated soil removed. Plastic sheeting and contaminated soils collected should be disposed of with classified waste for subsequent offsite disposal.

8.2.8 Hours of Operation

Onsite works are only permitted during the following hours as outlined in NSW EPA Interim Construction Noise Guideline:

- Monday – Friday: 7:30 am – 5:30 pm.
- Saturday: 7:30 am – 3:30 pm.
- Sunday and public holidays: No work permitted.

In certain instances, these hours may be modified when the contractor has the approval of Council.

8.3 Worker Health and Safety Plan (WHSP)

Worker health and safety of all onsite workers or visitors is the responsibility of the contractor. The purpose of a WHSP is to provide relevant health and safety information for all personnel working on or visiting the site.

The WHSP should include (but not necessarily be limited to):

- WHS legislative requirements.
- Hazardous materials identification (including fuel and chemical management).
- Induction requirements. All onsite personnel and visitors must be suitably inducted prior to entering the site.
- Location of worker facilities.
- Designation, delineation and control of access to various work zones.
- Community notification.
- Roles and responsibilities.

- Training and competency.
- Hazard identification and risk assessment.
- Control measures including personal protective equipment (PPE).
- Incident and emergency response.
- Safe work method statement(s).
- Toolbox meetings.
- Audits and inspections.

8.3.1 WHS Legislation and Standards

All onsite works should comply with the WHS act, regulations, codes of practice, and with relevant Australian Standards. As a minimum all work must comply with:

- Workplace Health and Safety Act (2011).
- Workplace Health and Safety Regulation (2017).
- AS 1940 (2017) – The Storage and Handling of Flammable and Combustible Liquids.
- AS 2436 (2010 R2016) – Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites.
- Managing the Work Environment and Facilities Code of Practice (December 2018).
- Managing Noise and Preventing Hearing Loss at Work Code of Practice (October 2018).
- Hazardous Manual Tasks Code of Practice (October 2018).
- Work Health and Safety Consultation, Co-operation and Co-ordination Code of Practice (May 2018).
- SafeWork NSW (2019) How to Safely Remove Asbestos Code of Practice.

8.3.2 Hazard Assessment

A WHS hazards assessment is to be completed by the contractor and incorporated into the WHSP. Key hazards may include:

- Onsite chemical hazards (storage of fuels, contaminated soils).
- Heat exposure for workers.
- Buried services.
- Noise.
- Dust.
- Operation of heavy equipment.
- Operation of electrical equipment.

8.3.3 Site Inductions

Prior to starting works, site workers and subcontractors involved in the project shall attend a site specific safety induction.

Documented evidence of the safety induction must be available onsite. The contractor must supply site workers and subcontractors with appropriate PPE as outlined in Section 8.3.4.

8.3.4 Personal Protective Equipment

Table 7 below lists the personal protective equipment (**PPE**) required to prevent exposure to contaminants, in designated remediation areas.

Table 7: Personal protective equipment.

Type	Description	When Required
Head protection	Hard hat	All site activities
Eye protection	Safety glasses	All site activities
Hand protection	Disposable nitrile gloves	Soil sampling activities
	Cut resistant gloves	Manual handling activities
Body protection	High visibly clothing	All site activities
	Sunhat, sunscreen	All site activities
	Disposable coveralls	During asbestos remediation works
Foot protection	Steel toed boots	All site activities
Hearing protection	Ear plugs or ear muffs	Site activities likely to generate potentially harmful noise levels
Respiration protection	Minimum P2 dust mask	Dust generating activities

Site personnel should be aware that personal protective equipment required to be worn may limit manual dexterity, hearing, visibility and may increase the difficulty of performing tasks. PPE places an additional strain on the user when performing work that requires physical activity.

Eating, drinking, chewing gum or tobacco, smoking or any practice that involves hand to mouth transfer increases the probability of ingestion of foreign matter into the body. Hands must be thoroughly washed before eating, drinking or smoking. Clothing which becomes dirty from onsite work should be washed separately from other clothing.

9 Environmental Regulatory Requirements

9.1 State Environmental Planning Policies

All remediation works within the Penrith local government area are considered to be Category 1 works under State Environmental Planning Policy No.55 – Remediation of Land and accordingly require consent.

9.2 Waste Disposal Requirements

All waste soil must be classified in accordance with EPA (2014) waste classification guidelines prior to offsite disposal to a suitably licenced waste receiving facility.

Waste classification documentation and waste dockets from the receiving waste facility must be kept for validation of the remediation works.

9.3 Asbestos Licences

All asbestos removal shall be undertaken in accordance with relevant work health and safety regulation including but not limited to:

- Safework NSW – Applicant Guide for Asbestos Licences and Notifications (2019).
- Safe Work Australia – How to Safely Remove Asbestos: Code of Practice (2019).

10 Remediation Contacts

Names and phone numbers of appropriate personnel for contact during the remediation will be provided prior to commencement of remediation work.

11 Contingency Plan for Remediation and Redevelopment

11.1 Overview

It is considered possible that unexpected situations may occur during remediation and site redevelopment works including the possibility to uncover unidentified contamination. A site contingency plan for managing unexpected situations should be prepared by the Contractor. Unexpected situations that may arise include:

1. Uncovering types of contamination that are not presently identified.
2. Generation of unacceptable levels of dust.
3. Generation of unacceptable asbestos fibres.
4. Generation of an unacceptable level of noise.
5. Excessive rainfall, and collection of excessive water in excavations.

The following sections outline contingency procedures for the events listed above.

11.2 Unexpected Finds

All site personnel are to be aware of their responsibilities under the unexpected finds protocol and are to report any potential signs of contamination (e.g. observed PACM, petroleum and / or oil spills, chemical odours or staining) to the site manager immediately. In the event of uncovering unexpected finds during remedial works, the following steps are to be undertaken by the contractor:

1. Cease all work in the area and notify site foreman / manager and environmental consultant.
2. Notify any relevant authorities (e.g. fire brigade) if an emergency response is required.
3. Construct temporary barricading to prevent worker / public access to any unexpected and / or unknown substances.
4. Install appropriate stormwater diversion and sediment controls as required.
5. Notify relevant authorities that the contractor is legally required to notify (e.g. NSW EPA and / or Council).
6. Site foreman / manager is to arrange site inspection by the environmental consultant to assess the unexpected find and determine if any further investigation, management or remedial action is required in the area.

The environmental consultant is to prepare an assessment and, if required, validation of each unexpected find to the contractor prior to the recommencing of works ceased as a result of the unexpected find.

All unexpected finds are to be documented in the site Validation Report prepared by the environmental consultant at the end of remediation works.

11.3 Unacceptable Level of Dust

Contingency measures must be prepared to control unacceptable dust levels. Excessive dust may be identified by workers, dust monitoring equipment or community complaints. Actions to control excessive dust can include:

- Increased use of water sprays.
- Covering soil stockpiles.
- Changing work protocols (e.g. avoiding work on windy days).

11.4 Unacceptable Level of Noise

Contingency measures must be prepared to control unacceptable noise levels. Excessive noise may be identified by workers, noise monitoring equipment or community complaints. Actions to control excessive noise can include:

- Identification and isolation of the source of noise.
- Modification of the action of the source to reduce the noise.
- Erection of temporary noise barriers.

11.5 Excessive Rainfall

Contingency measures must be prepared to control the effects of excessive rainfall. Actions to control the effects of excessive rainfall can include:

- Construction of sediment and surface water controls.
- Diversion of surface water away from excavations, soil stockpiles and active work areas.
- Appropriate stockpile covers.

12 Conclusion

This RAP has found that:

1. Based on previous site investigations, only areas AEC 16 and AEC 17 require remediation in order that these areas can be made suitable for burial plots as part of proposed cemetery development.
2. Identified residual data gaps are considered to be minor. Data gaps can be closed during the site entry road works and following demolition, should structures be demolished.
3. A suitable and practical remediation strategy for areas AEC 16 and AEC 17, including remediation goals and options, a remediation plan, remediation works, site validation measures have been developed and can be implemented as part of the site development works. The recommended remediation methodology is to excavate and dispose waste material off-site to an appropriately licensed facility.
4. Suitable site management and contingency measures to be employed during the remediation of areas AEC 16 and AEC 17 have been documented.
5. Suitable site management and contingency measures to be employed during data gap investigation (and remediation works if required) have been documented.

13 Limitations

This RAP was undertaken in accordance with current industry standards.

It is important to note that no land contamination study can be considered to be a complete and exhaustive characterisation of a site nor can it be guaranteed that any assessment shall identify and characterise all areas of potential contamination or all past potentially contaminating land uses. This is particularly the case where onsite filling has occurred and site access was limited. Therefore, this report should not be read as a guarantee that only contamination identified shall be found on the site. Should material be exposed in future which appears to be contaminated, additional testing may be required to determine the implications for the site.

Martens & Associates Pty Ltd has undertaken this assessment for the purposes of assessing potential site contamination. No reliance on this report should be made for any other investigation or proposal. Martens & Associates Pty Ltd accepts no responsibility, and provides no guarantee regarding the characteristics of areas of the site not specifically studied in this investigation.

14 References

- Douglas Partners (2017) *Preliminary Site Investigation – Contamination: Proposed Cemetery, Wallacia Golf Course, Wallacia, NSW*. Ref. 76652.02.
- Martens and Associates Pty Ltd (2017) *Preliminary Geotechnical, Groundwater and Salinity Assessment: Proposed Wallacia Cemetery, Wallacia, NSW*. Ref. P1706171JR01V01.
- Martens and Associates Pty Ltd (2020) *Salinity Assessment: Proposed Wallacia Memorial Park, Wallacia, NSW*. Ref. P1706171JR03V01.
- Martens and Associates (2020) *Detailed Site Investigation for the Proposed Nepean Gardens, Wallacia, NSW*. Ref. P1706171JR07V02 (November 2020)
- NEPC (1999, amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure*. Referred to as ASC NEPM (2013).
- NSW DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*.
- NSW EPA (2017) 3rd Ed. *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme*.
- NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*.
- NSW EPA (2020) *Consultants Reporting on Contaminated Land: Contaminated Land Guidelines*.
- SafeWork NSW (2019) *How to Safely Remove Asbestos Code of Practice*
- State Environmental Planning Policy No 55 – Remediation of Land 1998 (NSW).

15 Attachment A: Maps



Map 01	Map
Wallacia, NSW	Site
Amendment to Nepean Gardens Cemetery	Project
Remedial Action Plan	Sub-Project
CMCT	Client
16/03/2021	Date



Remediation Areas

Map 02	Map
Wallacia, NSW	Site
Amendment to Nepean Gardens Cemetery	Project
Remedial Action Plan	Sub-Project
CMCT	Client
16/03/2021	Date



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Map Title / Figure:

Data Gap Locations

Map 03	Map
Wallacia, NSW	Site
Amendment to Nepean Gardens Cemetery	Project
Remedial Action Plan	Sub-Project
CMCT	Client
16/03/2021	Date

Case Number: 188145

February 18, 2021

CATHOLIC METROPOLITAN CEMETERIES TRUST
c/- WARREN SMITH & PARTNERS PTY LTD

**NOTICE OF ANTICIPATED REQUIREMENTS
for
SECTION 73 SUBDIVIDER/DEVELOPER COMPLIANCE CERTIFICATE
(Sydney Water Act 1994, Part 6, Division 9)
PENDING DEVELOPMENT CONSENT**

Developer:	CATHOLIC METROPOLITAN CEMETERIES TRUST
Your reference:	5936000
Development:	13 Park Road, Wallacia
Development Description:	Change of Use of part of existing Golf Course to Cemetery including 27,000 Burial Plots, Chapel and Administration Building, internal roads, new parking and amended access from Park Road, reconfiguration of Golf Course to 9 holes, new Pool, Gym, Putting and Bowling Greens and alterations and additions to Wallacia Golf Club, tree removal, landscaping, fencing, civil and stormwater works and new intersection works along Park Road and Subdivision.
Council:	Penrith City Council
Your application date:	November 13, 2020

Dear Applicant

Sydney Water has assessed your application for the anticipated requirements of a Section 73 Compliance Certificate (the Certificate) pending development consent for the development shown above. Detailed information on your anticipated requirements is outlined below.

You have until February 18, 2022 to meet those requirements and receive the Certificate. If you have not received the Certificate by then you will have to reapply (and pay another application fee) and Sydney Water will issue you with a new notice. We may have extra requirements and charges may change in the new notice.

The Water Servicing Coordinator (Coordinator) will be your point of contact with Sydney Water. They can answer most questions you might have on our developer process and charges.

This is not a final notice and Sydney Water is not liable for any actions you take as a result of this Notice. You do not have the authority to start construction of works.

Once you receive final development consent you should submit a copy to Sydney Water. Provided that there have been no significant changes to the development, we will send you a Confirmation Letter.

If the development application has been subject to significant change then this anticipated requirements application will be terminated and you must submit a formal Section 73 application.

You can also find out about this process by visiting www.sydneywater.com.au > Plumbing, building & developing > Developing > Land development. If you want to find out the status of your application, simply select 'Developer Application Progress' and enter your case number (shown above) and email address. A response will be sent automatically to you.

What You Must Do To Get A Section 73 Certificate

Summary

This is a summary of Sydney Water's requirements. The detailed list begins on the next page.

You must do all of the following things:

1. Engage a Water Servicing Coordinator (Coordinator) before you sign the enclosed Agreement.
2. Sign both originals of the enclosed Agreement and give them to the Coordinator. You must do all the things that we ask you to do in that Agreement.
3. After you have signed the Agreement you then need to build the required sewer works at your own cost.
4. See Section 4 for any Ancillary Matters

Other things you need to do:

At the end of this Notice are some other things that you may need to do. They are NOT a requirement to be met before the Certificate can issue but may well be a requirement in the future because of the impact of your development on our assets. You must read them before you go any further.

DETAILED REQUIREMENTS

1. Water Servicing Coordinator

You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

For a list of authorised Coordinators, either visit www.sydneywater.com.au > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92**.

Coordinators will give you a quote or information about costs for services/works, including Sydney Water costs.

2. Developer Works Deed

After you engage a Coordinator, you must engage other Developer Infrastructure Providers (Providers) to carry out, where needed, the design and construction of the works. They must all have the appropriate capability. Your Coordinator can assist you.

You and your Providers will need to enter into an agreement with Sydney Water. To do this you need to sign and lodge **both originals** of the enclosed Developer Works Deed (Deed) with your nominated Coordinator. You will then need to work with your Coordinator to have the other Providers sign the Deed.

Before signing the Deed, each party must also read and understand the conditions of the agreement that are set out in the Developer Works Deed – Schedule 1: Standard Terms document. That document as well as information about it are available at sydneywater.com.au > Plumbing, building & developing > Developing > Developer deeds & standard terms

The Deed and the Standard Terms set out for this development all parties' roles and responsibilities as well as other information.

You must do all the things that we ask you to do in the Deed. This is because your development does not have sewer services and you must construct and pay for the following works under this Deed to provide these services.

3. Water and Sewer Works

3.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

Sydney Water has assessed your application and found that:

The existing 200mm CICL water main in Park Rd will serve your development.

A water main is available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application at Sydney Water Tap in™. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Once you have received your final Development Consent and the WSC has determined there are significant changes to the development that affect your design, your WSC will be required to submit a new application.

3.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

Sydney Water has assessed your application and found that:

- Your proposal to pump to the MH is to be limited to a maximum of 2 L/sec.

This private pumping arrangement must be assessed and approved by Sydney Water. You will need to lodge a Pressure Boosting and Pump Application in Sydney Water Tap in™.

You will have to pay an application fee.

- **You must construct a waste water main MH inlet to serve your development.** The terms of the Deed define this extension as 'Major Works'.

Once you have received your final Development Consent and the WSC has determined there are significant changes to the development that affect your design, your WSC will be required to submit a new application.

4. Ancillary Matters

4.1 Flow Management and Isolation of Sydney Water's Asset.

The above works will be constructed with a connection/cut-in to Sydney Water's (wastewater, water and/or stormwater) assets. To see that it complies with Occupational Health and Safety and Environmental legislation you must talk to your coordinator about the timely submission to Sydney Water of a request for flow management and asset isolation requirements.

4.2 Asset Adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your property be adjusted/deviated. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

4.3 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You

will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

4.4 Costs

Construction of these works will require you to pay project management, survey, design and construction costs **directly to your providers**. Additional costs payable to Sydney Water may include:

- design and construction audit fees;
- contract administration, Operations Area Charge & Customer Redress prior to project finalisation; and
- creation or alteration of easements etc.

Note: Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the issue of the Section 73 Certificate or release of the Bank Guarantee or Cash Bond.

Your Coordinator can tell you about these costs.

5. Special Requirements

The Final Development Consent

This application is based on the development and consent shown on Page 1. You must give us the **final** Development Consent before we issue the Certificate so we can make sure that the development is the same.

If the development is the same and all the requirements of this Notice have been met, we will issue the Certificate. If the development is NOT the same you must reapply (and pay another application fee) and we will issue another Notice. The requirements and charges may change in that Notice.

OTHER THINGS YOU NEED TO DO:

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Approval of your building plans

Please note that your building plans must be approved. This can be done at Sydney Water Tap in™. Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Sydney Water Tap in™ or call 13 20 92.

This is not a requirement of the Certificate but the approval is needed because construction/building works may impact on existing Sydney Water assets (e.g. water and sewer mains). In any case, these works MUST NOT commence until Sydney Water has granted approval.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Requirements for Business Customers for Commercial and Industrial Property Developments

If this property is to be developed for Industrial or Commercial operations, it may need to meet the following requirements:

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

A **Boundary Trap** is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Backflow Prevention Requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable **Backflow Prevention Containment Device** appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.
2. Conduct a site assessment to confirm the hazard rating of the property and its services. Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website:

<http://www.sydneywater.com.au/Plumbing/BackflowPrevention/>

Water Efficiency Recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- Install water efficiency fixtures to help increase your water efficiency, refer to WELS (Water Efficiency Labelling and Standards (WELS) Scheme, <http://www.waterrating.gov.au/>
- Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Refer to <http://www.sydneywater.com.au/Water4Life/InYourBusiness/RWTCalculator.cfm>
- Install water-monitoring devices on your meter to identify water usage patterns and leaks.
- Develop a water efficiency plan for your business.

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

Contingency Plan Recommendations

Under Sydney Water's [customer contract](#) Sydney Water aims to provide Business Customers with a continuous supply of clean water at a minimum pressure of 15meters head at the main tap. This is equivalent to 146.8kpa or 21.29psi to meet reasonable business usage needs.

Sometimes Sydney Water may need to interrupt, postpone or limit the supply of water services to your property for maintenance or other reasons. These interruptions can be planned or unplanned.

Water supply is critical to some businesses and Sydney Water will treat vulnerable customers, such as hospitals, as a high priority.

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at:

<http://www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/> or contact Business Customer Services on **1300 985 227** or businesscustomers@sydneywater.com.au

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through Sydney Water Tap in™ and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Large Water Service Connection

A water main are available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap in™. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

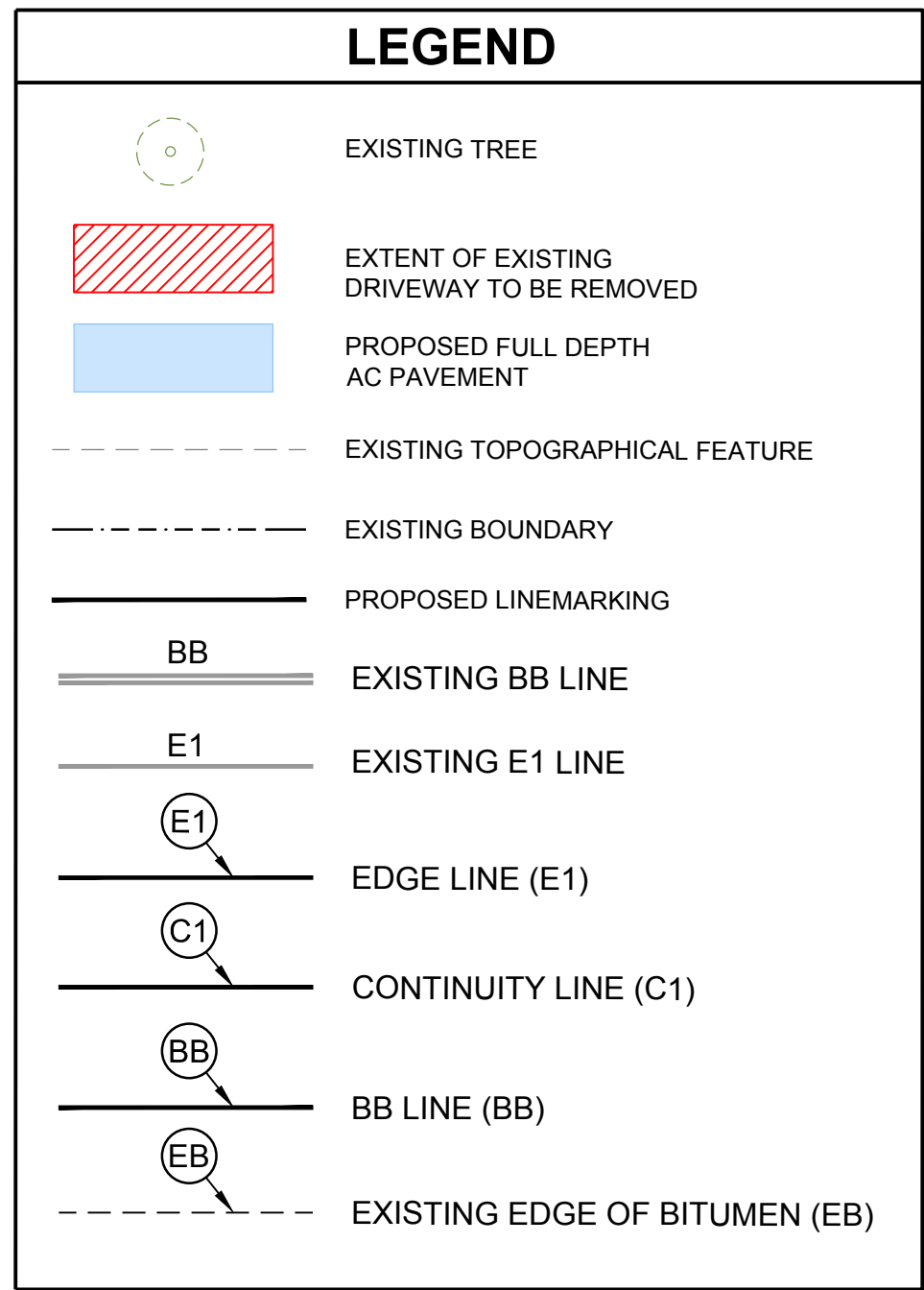
Other fees and requirements

The requirements in this Notice relate to your Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements. These include:

- plumbing and drainage inspection costs;
the installation of backflow prevention devices;
- trade waste requirements;
- large water connections and
-
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

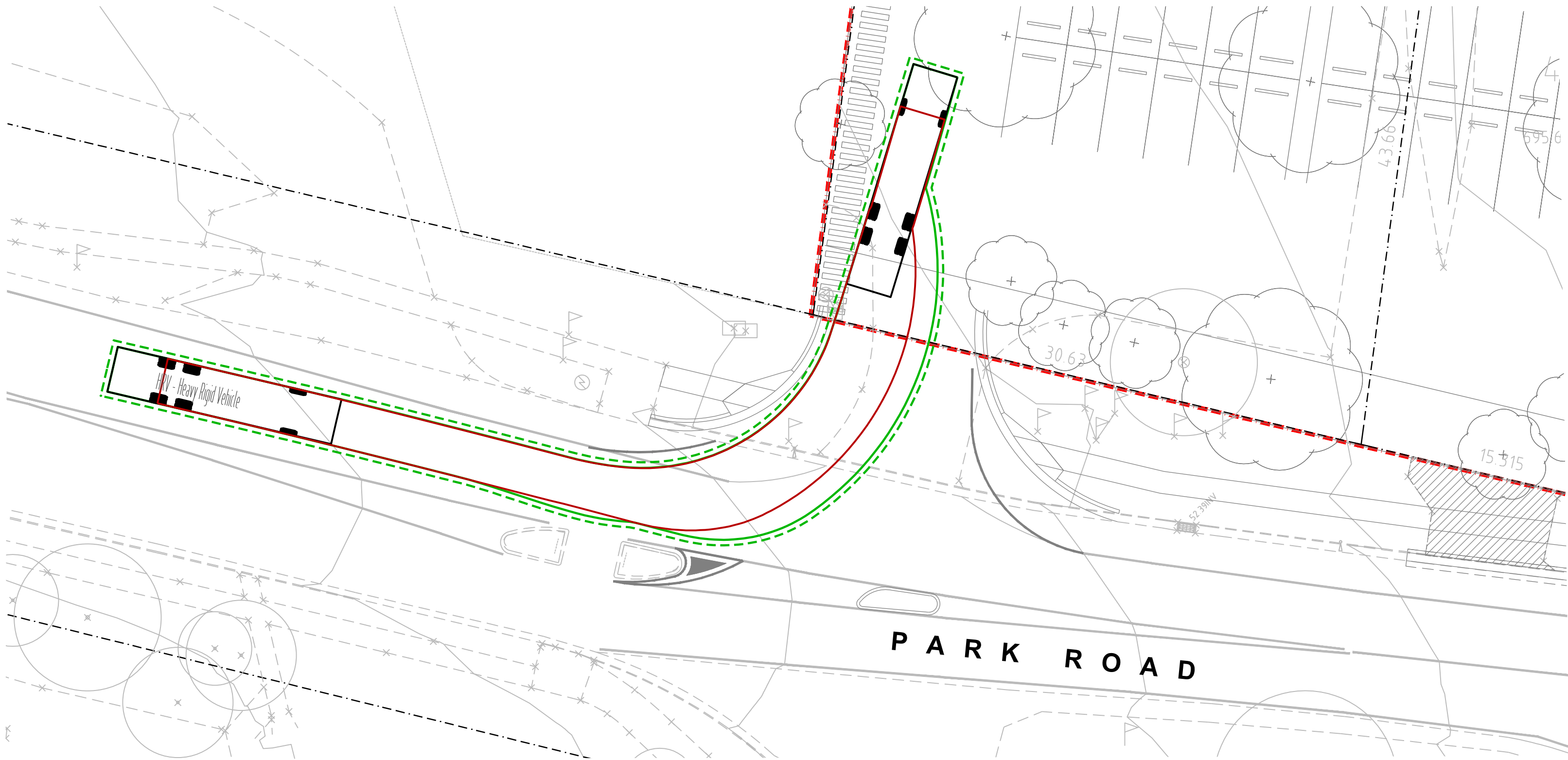
END OF NOTICE

After you have submitted the design to comply with the anticipated requirements Sydney Water will review the information and issue you with a partial design package.

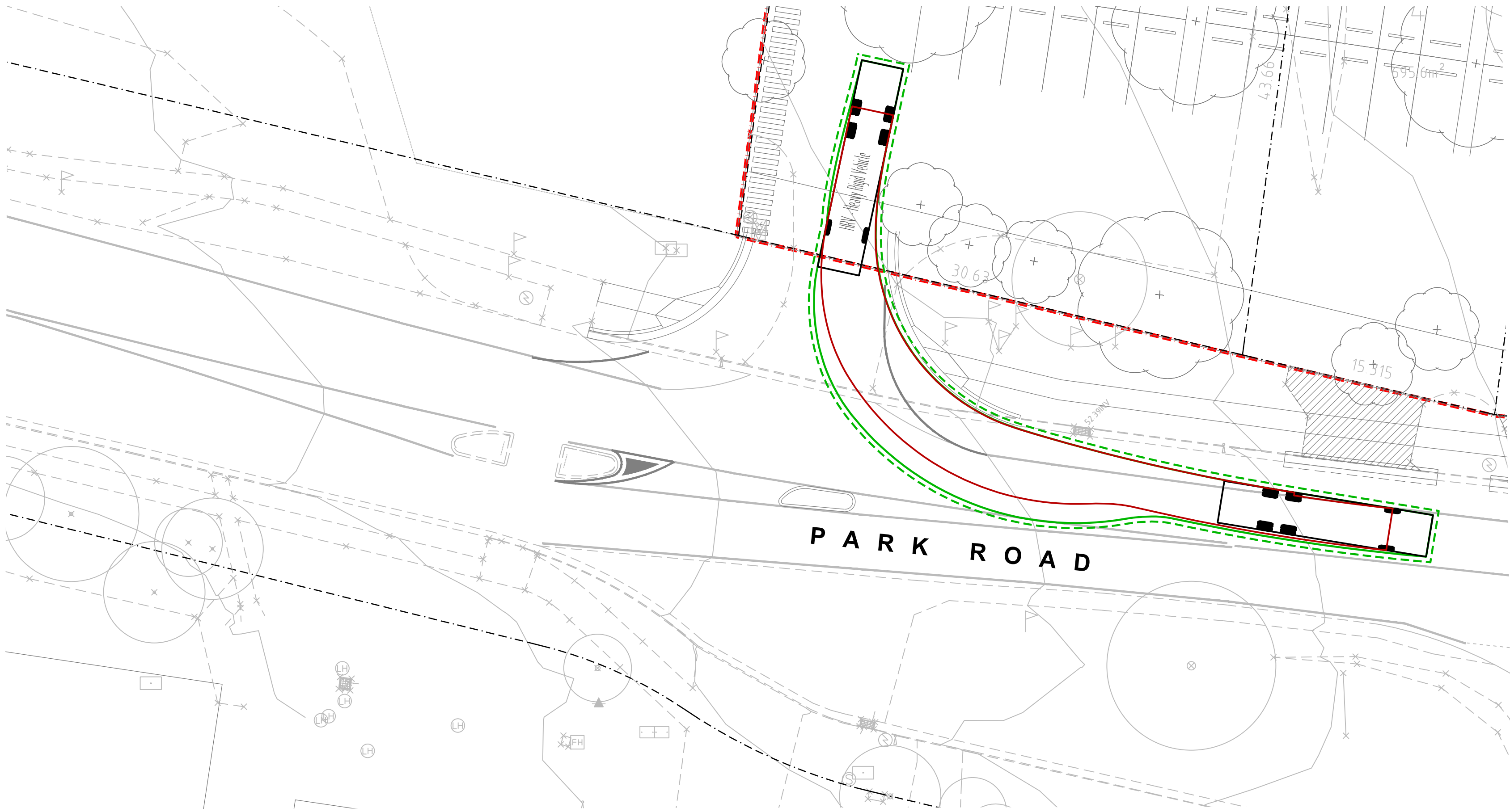


CLIENT	CMCT
PROJECT	NEPEAN GARDENS

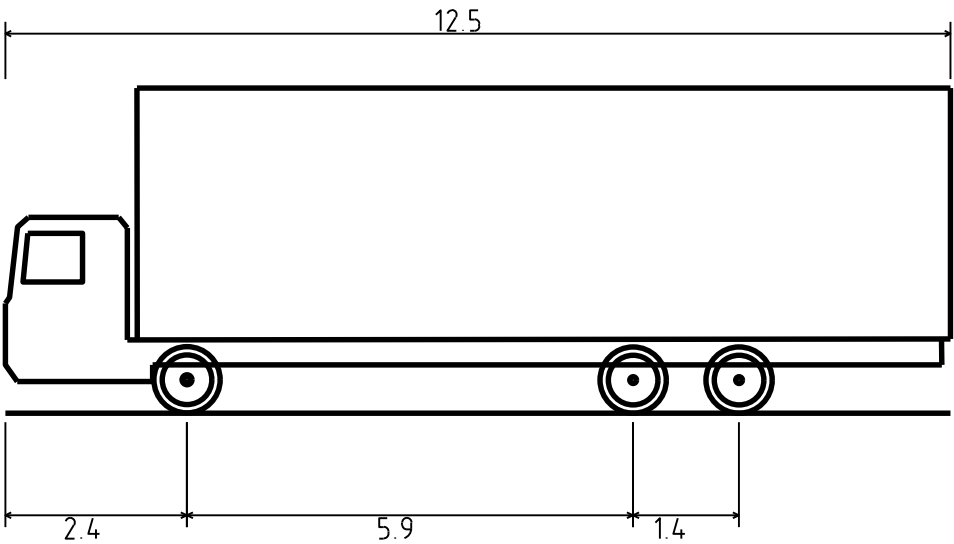
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SCALE	DRAWN	DESIGNED	CHECKED	APPROVED
AS SHOWN	J.W.	J.W.	M.C.	M.C.
JOB No.	DRAWING No.		ISSUE	
5936001		C7.01		6
DATE	STATUS			
JUNE 2020	DEVELOPMENT APPLICATION			



SWEPT PATH - HRV 12.5m LEFT ENTRY



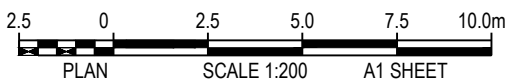
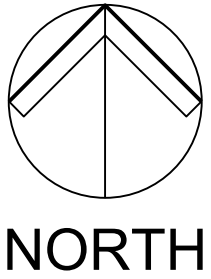
SWEPT PATH - HRV 12.5m LEFT EXIT



HRV - Heavy Rigid Vehicle
Overall Length 12.500m
Overall Width 2.500m
Overall Body Height 4.300m
Min Body Ground Clearance 0.417m
Track Width 2.500m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 12.500m

PRELIMINARY - NOT FOR CONSTRUCTION

DO NOT SCALE FROM DRAWINGS, CHECK & VERIFY ALL DIMENSIONS & LEVELS BEFORE COMMENCEMENT OF ANY WORK.
THIS DRAWING IS NOT TO BE COPIED IN PART OR WHOLE WITHOUT WRITTEN PERMISSION FROM WARREN SMITH AND PARTNERS.



REVISION	AMENDMENT	DATE	REVISION	AMENDMENT	DATE
1	ISSUE FOR INFORMATION	19/03/21			

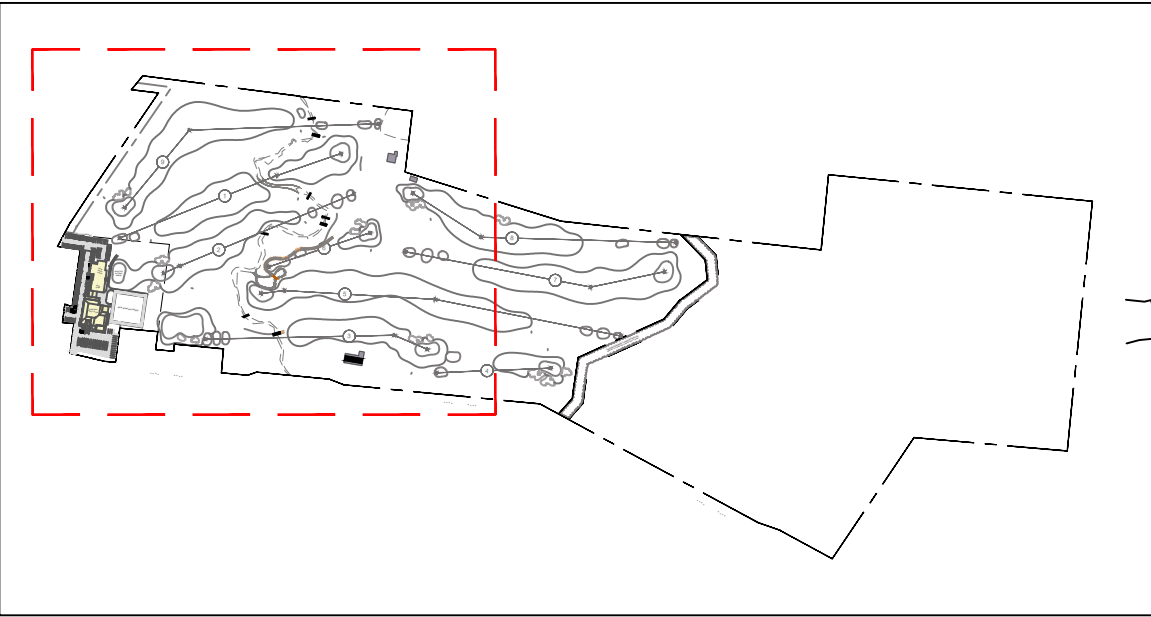
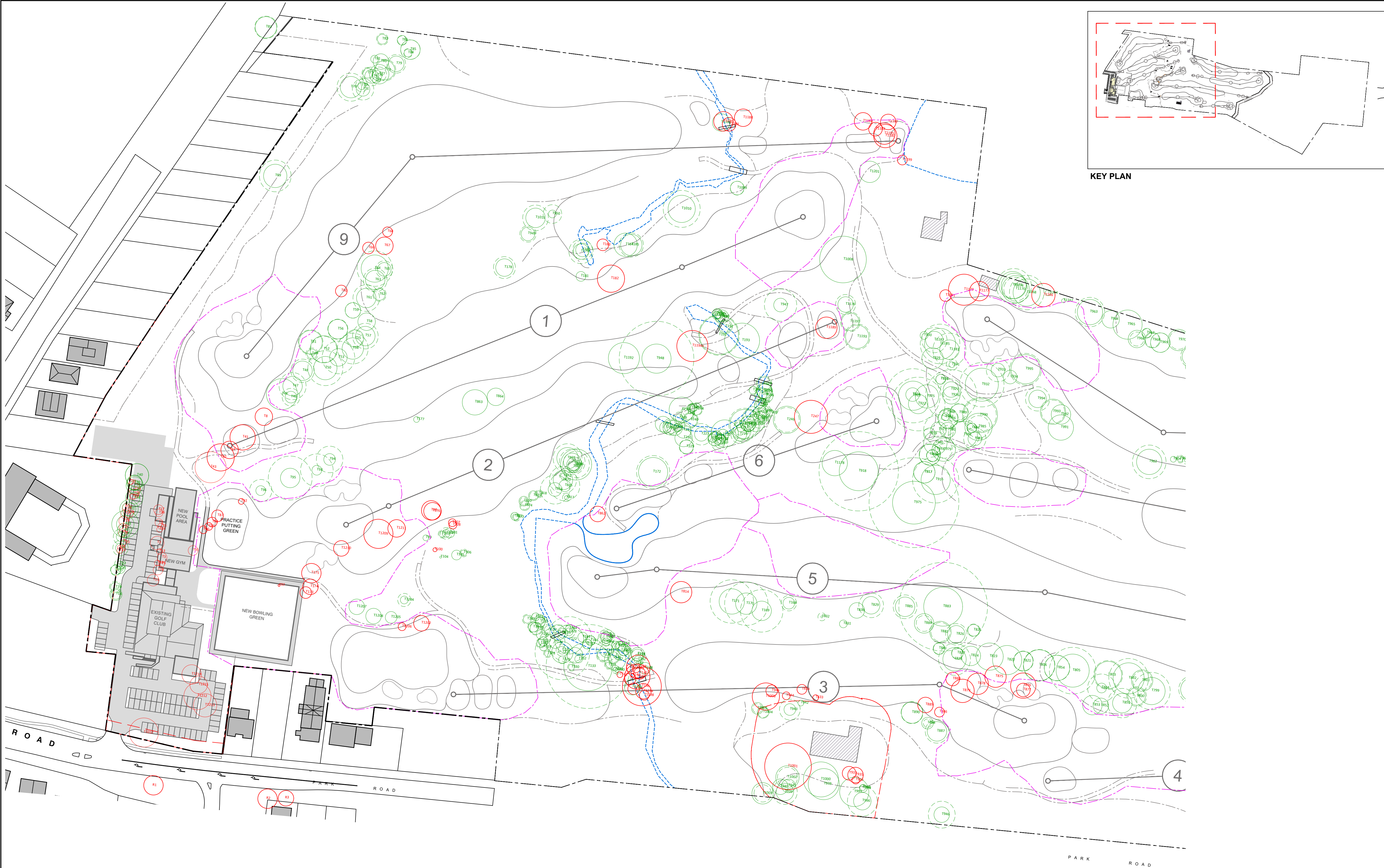
CLIENT	CMCT
PROJECT	NEPEAN GARDENS

PREPARED BY

Warren Smith & Partners Pty Ltd
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CONSULTING ENGINEERS
■ Hydraulic Services ■ Fire Services
■ Civil Services ■ Sydney Water Accredited Water
Servicing Co-ordinator and Designer
SERVING THE CONSTRUCTION INDUSTRY
SINCE 1981.

TITLE				
SWEPT PATHS - SHEET 2				
SCALE	DRAWN	DESIGNED	CHECKED	APPROVED
AS SHOWN	J.W.	J.W.	M.C.	M.C.
JOB No.	DRAWING No.		ISSUE	
5936001	C9.02		1	
DATE	STATUS			
JUNE 2020	DEVELOPMENT APPLICATION			



KEY PLAN

LEGEND

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED AS A RESULT OF THE DEVELOPMENT
SITE TOTAL: 269
(INCLUDING 32 DEAD TREES)
- EXTENT OF GOLF COURSE EARTHWORKS
- ASSET PROTECTION ZONE (APZ)

Issue:	Rev:	Description:	Date:
A		UPDATED TO INCLUDE ARBORSAFE AIA DATA	24.03.21

Project title:
NEPEAN MEMORIAL PARK

Drawing title:
EXISTING TREES &
DISTURBANCE PLAN 1

N A R E L L E S O N T E R
BOTANICA
LANDSCAPE AND HORTICULTURAL SPECIALISTS
PO Box 811 Avalon NSW 2107
Tel: (02) 9918 4016 Mobile: 0419 501 144

Job no: 191112	
Drawn by: EH	
Checked by: NS	
Scale: 1:1000 @ A1	
CAD file name:	Drw no: LDP.01
Plot date:	Sheet no: 1/3



LEGEND

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED AS A RESULT OF THE DEVELOPMENT
SITE TOTAL: 269
(INCLUDING 32 DEAD TREES)
- ASSET PROTECTION ZONE (APZ)
- EXTENT OF DISTURBANCE ASSOCIATED WITH ROADWORKS
- DRAINAGE SWALE
- FOOTPATHS
- RETAINING WALLS

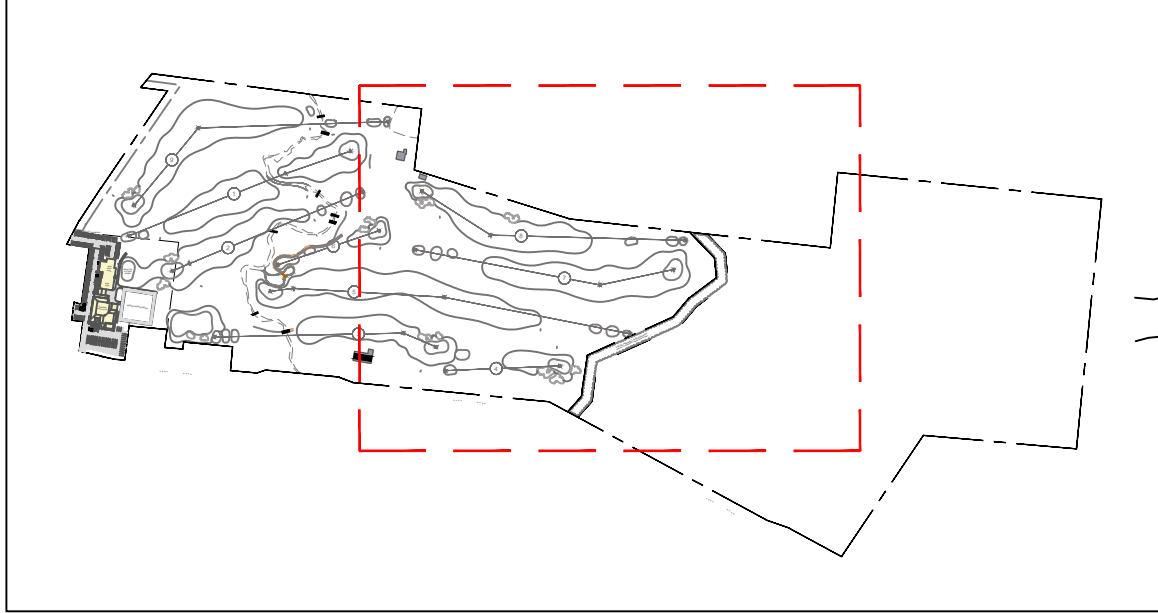
Issue:	Rev:	Description:	Date:
A		UPDATED TO INCLUDE ARBORSAFE AIA DATA	24.03.21

Project title:
NEPEAN MEMORIAL PARK

Drawing title:
EXISTING TREES &
DISTURBANCE PLAN 3

Principal consultant:	Client:
<i>Florence Jaquet</i> <i>Landscape architect</i>	
A: 9 Royell Avenue, Canberr y ell 3124 E: flo@fjla.com.au M: 0419 983 641	

NARELLE SONTERR BOTANICA LANDSCAPE AND HORTICULTURAL SPECIALISTS <small>P.O. Box 611 Avalon NSW 2107 Tel: (02) 9918 4016 Mobile: 0419 501 144</small>	
Job no: 170925	
Drawn by: EH	
Checked by: NS	
Scale: 1:1000 @ A1	
CAD file name:	Drw no: LDP.03
Plot date:	Sheet no: 3/3



KEY PLAN

LEGEND

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED AS A RESULT OF THE DEVELOPMENT
SITE TOTAL: 269
(INCLUDING 32 DEAD TREES)
- EXTENT OF GOLF COURSE EARTHWORKS
- ASSET PROTECTION ZONE (APZ)

Issue:	Rev:	Description:	Date:
A		UPDATED TO INCLUDE ARBORSAFE AIA DATA	24.03.21

Project title:
NEPEAN MEMORIAL PARK

Drawing title:
EXISTING TREES &
DISTURBANCE PLAN 2

N A R E L L E S O N T E R

BOTANICA

LANDSCAPE AND HORTICULTURAL SPECIALISTS

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Job no: 191112

Drawn by: EH

Checked by: NS

Scale: 1:1000 @ A1

CAD file name:

Plot date:

Drw no:
LDP.02

Sheet no:
2/3

Appendix A. Explanation of Tree Assessment Terms

Tree number: Refers to the individual identification number assigned within the ArborSafe software to each assessed tree on the site and the number which appears on the tree's tag.

Tree location: Refers to the easting and northing coordinates assigned to the location of the tree as obtained from the geo-referenced aerial image within the ArborSafe software.

Tree species: Provides the botanic name (genus, species, sub-species, variety and cultivar where applicable) in accordance with the International Code of Botanical Nomenclature (ICBN), and the accepted common name.

Trees in group: The number of trees encompassing a collective assessment of more than one tree. Typically grouped trees have similar attributes that can be encompassed within one data record.

Height: The estimated range in metres attributed to the tree from its base to the highest point of the canopy. Where required height will be estimated to the nearest metre.

Diameter at Breast Height (DBH): Refers to the tree's estimated trunk diameter measured 1.4m from ground level for a single trunked tree. These estimates increase in 50mm increments. Where required DBH will be measured to give an accurate measurement for single trunked trees, trees with multiple trunks, significant root buttressing, bifurcating close to ground level or trunk defects and will be measured as per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

Canopy spread: The estimated range in metres attributed to the spread of the tree's canopy on its widest axis. Where required crown spread will be estimated to the nearest metre.

Health: Refers to the health and vigour of the tree.

Category	Description
Excellent	Canopy full with even foliage density throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth. Exceptional specimen.
Good	Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators, none or minimal deadwood.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood, may contain epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

Age: Refers to the life cycle of the tree.

Category	Description
Young	Newly planted small tree not fully established may be capable of being transplanted or easily replaced.
Juvenile	Tree is small in terms of its potential physical size and has not reached its full reproductive ability.
Semi-mature	Tree in active growth phase of life cycle and has not yet attained an expected maximum physical size for its species and/or its location.
Mature	Tree has reached an expected maximum physical size for the species and/or location and is showing a reduction in the rate of seasonal extension growth.
Senescent	Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by natural deterioration in health and structure.

Structure: Refers to the structure of the tree from roots to crown.

Category	Description
Good	Sound branch attachments with no visible structural defects, e.g. included bark or acute angled unions. No visible wounds to the trunk and/or root plate. No fungal pathogens present.
Fair	Minor structural defects present, e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present.
Poor	Moderate structural defects present, including bifurcations with included bark with union failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots.
Hazardous	Significant structural defects with failure imminent (3–6 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.

Useful Life Expectancy (ULE): Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or presents a greater risk and/or more hazards to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes within the tree's location and environment which may influence the ULE value.

Category
0 Years
<5 Years
5–10 Years
10–15 Years
15–25 Years
25–50 Years
>50 Years

Defects: Visual observations made of the presenting defects of the tree and its growing environment that are, or have the capacity to impact upon, the health, structural condition and/or the useful life expectancy of the tree. Defects may include adverse physical traits or conditions, signs of structural weaknesses, plant disease and/or pest damage, tree impacts to assets or soil related issues.

Tree Significance: Includes environmental, social or historical reasons why the tree is significant to the site. The tree may also be rare under cultivation or have a rare or localised natural distribution.

Arborist Actions: A list of arboricultural and/or plant health care works that are aimed at maintaining or improving the tree's health, structural condition or form. Actions may also directly or indirectly reduce the risk potential of the tree such as via the removal of a particular branch or the moving of infrastructure from under its canopy.

Appendix B. Tree Retention Values

Based upon BS 5837–2012: *Trees in relation to design, demolition and construction* – recommendations.

Category and definition	Criteria (including sub-categories where appropriate)		
Category U			
Trees in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than 5 years.	<ul style="list-style-type: none">Trees that have a severe structural defect that are not remediable such that their failure is expected within 12 months.Trees that will become unviable after removal of other Category U trees (e.g. where for whatever reason the loss of companion shelter cannot be mitigated by pruning).Trees that are dead or are showing signs of significant, immediate and irreversible overall decline.Trees infected with pathogens of significance to the health and or safety of other trees nearbyLow quality trees suppressing adjacent trees of better quality.Noxious weeds or species categorised as weeds within the local area. <p>Note: Category U trees can have existing or potential conservation value* which might make it desirable to preserve.</p>		
	1. Arboricultural Qualities	2. Landscape qualities	3. Cultural and environmental values
Category A			
Trees of High Quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years.	Trees that are particularly good examples of their species, especially if rare or unusual (in the wild or under cultivation); or those that are important components of groups or avenues.	Trees or groups of significant visual importance as arboricultural and/or landscape features. (e.g. feature and landmark trees).	Trees, groups or plant communities of significant conservation, historical, commemorative or other value (e.g. remnant trees, aboriginal scar trees, critically endangered plant communities, trees listed specifically within a Heritage statement of significance).
Category B			
Trees of Moderate Quality with an estimated remaining life expectancy of 15–25 years and of dimensions and prominence that cannot be readily replaced within 10 years.	Trees that might be included within Category A but are downgraded because of diminished condition such that they are unlikely to be suitable for retention beyond 25 years.	Trees that are visible from surrounding properties and/or the street but make little visual contribution to the wider locality.	Trees with conservation or other cultural value (trees within conservation areas or landscapes described within a statement of significance, locally indigenous species).
Category C			
Trees of Low Quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable.	Trees of very limited value or such impaired condition that they do not qualify in higher categories.	Trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.

*Where trees would otherwise be categorised as U, B or C but have significant identifiable conservation, heritage or landscape value even though only for the short term, they may be upgraded, although they might be suitable for retention only.

Tree Quality

		Health**			
		Excellent/ Good	Fair	Poor	Dead
Structure	Good	A	B	C	U
	Fair	B	B	C	U
	Poor	C	C	U	U
	Hazard*	U	U	U	U

*Structural hazard that cannot be remediated through mitigation works to enable safe retention.

** Trees of short term reduced health that can be remediated via basic, low cost plant health care works (e.g. mulching, irrigation etc.) may be designated in a higher health rating to ensure correct retention value nomination.

Category A	Typically trees in this category are of high quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. The tree may make significant amenity contributions to the landscape and may make high environmental contributions. In some cases, trees within this category may not meet the above criteria, however possess significant heritage or ecological value. Trees of this retention value warrant design consideration and amendment to ensure their viable retention.
Category B	Typically trees in this category are of moderate quality with an estimated remaining life expectancy of 15–25 years and prominence of size dimensions that cannot be readily replaced within 10 years. They may make moderate amenity contributions to the landscape and make low/moderate environmental contributions. Trees with this retention value warrant lesser design consideration in an attempt to allow for their retention.
Category C	Trees in this category are of low quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable, may have poor health and/or structure, are easily replaceable, or are of undesirable species and do not warrant design consideration.
Category U	Trees in this category are found to be in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than five years. These trees may be dead and/or of a species recognised as a weed that resulted in them being unretainable. These trees should be removed irrespective of any future development.

Appendix C. ArborSafe Tree Risk Assessment Matrix

Tree Risk Assessment Matrix

		PROBABILITY				
		A). No Detectable Threat	B). Failure Unlikely	C). Failure Possible	D). Failure Likely	E). Failure Certain
CONSEQUENCE	1). Minor	A1 NEGLIGIBLE	B1 VERY LOW	C1 LOW	D1 MEDIUM	E1 MEDIUM
	2). Moderate	A2 VERY LOW	B2 LOW	C2 MEDIUM	D2 MEDIUM	E2 HIGH
	3). Serious	A3 LOW	B3 MEDIUM	C3 MEDIUM	D3 HIGH	E3 URGENT
	4). Extreme	A4 MEDIUM	B4 MEDIUM	C4 HIGH	D4 URGENT	E4 CRITICAL

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The Tree Risk Assessment is based on a ground based Visual Tree Assessment (VTA) as detailed in the Limitations of Assessment, Weather & Terms document.

WEATHER

An understanding of the destructive capability of wind and adverse weather is necessary and will assist site owners and managers to comprehend the limitations of arboricultural inspections. For further details refer to Weather section of the Limitations of Assessment, Weather & Terms document.

Due to the known destructive capability of strong winds on defect-free trees, the ArborSafe assessment (including the risk assessment) is based on normal weather, wind speeds and directions for the site and the trees, up to a maximum average wind speed of 33 knots and/or a maximum gust of 43 knots, unless otherwise specifically advised in writing.

PROBABILITY

For both Current Risk and the Residual Risk After Remedial Works, the inspecting Arborist considers the following points when determining the Probability of a future tree failure:

- The probability of tree failure is considered to be within a 12 month reinspection interval, unless more frequent assessment is requested by the site manager.
- The tree risk assessment is based on normal weather, wind speeds and directions for the site and the trees, up to a maximum average wind speed of 33 knots and/or a maximum gust of 43 knots, unless otherwise specifically advised in writing.
- Where a tree has multiple defects, the probability of failure for the Current and Residual Risk is based on the part(s) of concern that present the highest risk.
- Where possible, cavities or hollows within 1.5m of ground are sounded and/or probed to investigate their extent and potential effect on structural integrity.
- Evidence of previous failures, types of defects and species traits are considered when assessing the probability of failure.
- Multiple compounding and/or progressive defects may increase the probability of failure.
- If the structural integrity of the tree or part(s) of concern cannot be adequately determined from ground based VTA, if reasonable, the inspecting arborist will nominate further detailed inspection or testing of the defect/s and will nominate the location, type of test or report and detail required to make a future informed decision on the structural integrity of the tree or part(s) thereof.
- The inspecting arborist may consider the potential impact of works within the root zone on the probability of failure, only where information on works within root zones has been accurately provided or is clearly visible at the time of the assessment.
- The inspecting arborist may consider the effects of changes in wind loading on assessed trees when the site manager has informed the inspecting arborist of all activities that have taken place in proximity to assessed trees.

PROBABILITY	DESCRIPTION	EXAMPLE
No Detectable Threat (Failure Unforeseeable)	The tree has no sighted risk related defects and/or structure where failure of the tree or part is considered not foreseeable during the reinspection period.	The tree may present with good structure which is well suited to the location with no risk related defects sighted.
Failure Unlikely	The tree has a visible defect(s) and/or structure where failure of the tree or part is considered unlikely during the reinspection period.	The tree may present with fair to good structure, which is well suited to the location. The tree may exhibit good response growth, with defects that are well tolerated by the species and are unlikely to fail during the reinspection period.
Failure Possible	The tree has a visible defect(s) and/or structure where failure of the tree or part is considered possible during the reinspection period.	Previous branch failures may be evident in the subject tree. Excessive branch end weight. Included bark not well tolerated by the species. Epicormic branch growth. Bird browsing damage on branch unions. Cavities and/or decay of unknown extent. Small quantity of dead wood. Increased canopy exposure to wind.
Failure Likely	The tree has a visible defect(s) and/or structure where failure of the tree or part is considered likely during the reinspection period.	The tree may present a trend of branch failures or with poor structure and known not to be well tolerated by the species. Advanced decay with poor response growth or significant basal or trunk decay or with a pathogen known to result in root plate or tree part failure. Significant cavities likely to impact tree structure. Significant earth works within the tree's Structural Root Zone (SRZ). Tree displays evidence of included bark and/or with significant swelling, cracks, splits, bleeding sap flow or aerial roots within a branch union. Tree exhibits large branch growth at previous lopping points. Significant quantity of deadwood. The tree has multiple defects each deemed a lower probability but combined present as compounding defects.
Failure Certain	The tree has a visible defect(s) and/or structure and failure of the tree or part is considered certain during the reinspection period.	The tree may have severe defects that have a potential of failure at any time and/or compromised tree or branch structure is evident. Unstable hanging limbs. Active root plate movement is evident via soil lifting/cracking. Active trunk or branch union splits/cracks.

CONSEQUENCE

For both Current Risk and the Residual Risk After Remedial Works, the inspecting Arborist considers the following points when determining the Consequence of a potential future tree failure:

- The size of the tree part(s) of concern considering its fall distance and/or whether the tree/branch may have undergone changes in load due to loss of subordinate branches or decay.
- Asset value or importance within the fall zone.
- If multiple targets within fall zone increase the consequence.
- The potential severity of injury or asset damage from the size of part(s) of concern.
- Information provided by the client regarding occupancy and usage within the fall zone.
- The potential for impacting a target considering the intensity of use for extended duration of occupancy within the fall zone.
- Observations at the time of assessment of human activity, visitation, assets and usage within the fall zone.
- The presence or lack of target protection from other trees, branches, hardware or structures that may reduce the severity of impact.
- Where a tree has multiple defects, the consequence of failure for the Current Risk and Residual Risk After Works is based on the part(s) of concern that present the highest risk.

CONSEQUENCE	DESCRIPTION	EXPLANATION
Minor	A chance of insignificant to minor human injury (i.e. Minor injury resulting in no treatment or basic first aid treatment only, with no time off work). A very low chance of severe injury or death.	Tree or tree part to fail of a small size (Typically <30mm diameter) and/or tree within an area of rare occupancy and/or asset damage limited to lower value assets (Typically <\$500).
Moderate	A chance of moderate human injury (i.e. Injury resulting in multiple medical treatments, non-permanent injury, with less than 10 days off work). Low chance of severe injury or death.	Tree or tree part to fail of a moderate size (Typically 30mm-100mm diameter) and/or tree within an area of occasional occupancy and/or asset damage limited to moderate value assets (Typically \$500-\$5000).
Serious	A chance of major human injury (i.e. Extensive injuries requiring significant medical treatment or surgery, resulting in serious or permanent injury/illness with greater than 10 days off work). Some chance of severe injury or death.	Tree or tree part to fail of a large size (Typically 100mm-450mm diameter) and/or tree within an area of frequent occupancy and/or asset damage limited to high value assets (Typically \$5000-\$500,000).
Extreme	A chance of severe human injury or death (i.e. Severe injury/illness requiring life support, actual or potential fatality with greater than 250 days off work).	Tree or tree part to fail of a very large size (Typically >450mm diameter) and/or tree within an area of constant occupancy and/or asset damage limited to very high value assets (Typically >\$500,000).

All risk based remedial actions should be prioritised by levels of risk, from Critical to Negligible in a descending manner. Critical risk works should be performed as soon as possible and fall zones of the tree or part(s) of concern should have effective exclusion zones established and maintained until remedial actions are performed. Urgent to High risk remedial work actions should be performed as soon as is practicable, with other risk level remedial works to be prioritised at the client's discretion based on their comfort with risks posed and resources available.

Risk Matrix V7 (Nov 2020)