Level 3
101 Sussex Street
Sydney NSW 2000
t: (02) 9259 3800

30 November 2020

Our ref: 20SYD_16049

Catholic Cemeteries Board
Level 2, 11 Murray Rose Avenue
Sydney Olympic Park NSW 2127

Attention: David De Angelis

Dear David,

Re: Nepean Gardens DA 19/0875 RFI from Penrith Council (23 October 2020) Item 7 - Biodiversity

Eco Logical Australia Pty Ltd (ELA) was engaged by Catholic Cemeteries Board to assist in responding to the above RFI.

Table 1 and the Appendices respond to issues raised by Council.

Regards,

David Bonjer
Principal Consultant

Item 7 – Biodiversity

Table 1 RFI Response to Item 7

Council Comment	Applicant Response
7a) A consolidated map of impacts on native vegetation is required. Once a consolidated report and plan is provided, Council requests a site walkover with the applicant's representative to assist on site identification of vegetation for removal.	Botanica prepared plans showing impacts to trees (see Appendix A1) as a result of: • golf course earthworks • civil works including Park Road • buildings and bushfire Asset Protection Zones • landscaping • removal of trees for safety reasons (as per the Travers Tree Assessment) These figures were then used to prepare maps showing impacts to Plant Community Types. This consolidated map of impacts is provided in Appendix A2 in Figure 1 and 2. Travers determined the impact to native vegetation as 4.0 ha. ELA has considered all impacts to native vegetation and the impact totals 3.15 ha, a reduction of 0.85 ha due to a more accurate assessment of impacts. The updated assessment was run through the BAMC using the same plot data from the Travers BDAR. The results are provided in the Appendix of this report. Over-all there was a reduction in ecosystem credits from 88 to 68 credits required to be retired. The credit assessment report is attached. Council are welcome to attend site on request.
Council's Biodiversity Officer notes the following for your ongoing consideration: Ensure avoid and minimise efforts have been prioritised over offsetting including but not limited to retention of significant habitat trees, integrated landscaping that avoids the removal of existing native vegetation, retention of native vegetation/senescent vegetation and dead or decaying material in situ. Styled landscaping should not be prioritised over integrated	The proposed development has been designed and sited to minimise impacts to native vegetation (Appendix A1). See section 5 of the BDAR (Travers 2019)

Council Comment	Applicant Response
landscaping options, that retain as much native vegetation as possible.	
Where pruning could be an appropriate vegetation management strategy, this should be considered ahead of removal.	Noted. Whilst trees have been assumed to be removed in accordance with the Australian Standard, where-ever possible trees will be pruned rather than removed under the direction of a Project Arborist during the construction phase.
RFS GTAs that might alter the requirements for management of asset protection zones.	Minor changes to the landscaping aspects were made as a result of the RFS GTAs. These have been reflected in the impact footprint.
No works or infrastructure are in conflict with the NRAR GTAs (including any new requirements particularly in relation to waste water management and activities in the north east area of the property).	No significant changes have been made in relation to works on waterfront land. Final plans will be submitted to NRAR when seeking the Controlled Activity Approval.
The additional surveys, that can now be undertaken in warmer months are to be completed.	Based on the findings in the BDAR, removal of hollow bearing trees will not increase risk of SAII as those SAII entities known to occur or with potential to occur onsite are either: Species credit species / SAII for breeding habitat only, for which hollows are not part of the breeding habitat (Large-eared Pied Bat, large and little Bentwing Bats), or Species credit species / SAII for Mapped Important Habitat only, and which does not occur within the study area (Regent Honeyeater, Swift Parrot). The above species are also ecosystem credit species, with impacts offset through ecosystem credits as calculated in the BDAR. Fauna survey was undertaken in September / October and included ultrasonic survey at 4 locations for 1 night and 2 locations another night. Diurnal and nocturnal bird surveys and spotlighting for arboreal and terrestrial mammals was also conducted (BDAR table 2.1). Based on those species identified during survey or with the potential to occur, removal of HBT with small hollows only will not result in a SAII.

Council Comment	Applicant Response
	Orchid survey: No targeted survey for threatened orchids has been undertaken and documented in the BDAR. Section 4.3.1 includes one threatened orchid (*Caladenia tessellata*) within the BAM-C produced list) . Section 4.3.2 clarifies that the species was excluded as candidate species as it is known in Sydney from old records only (> 30 years old), none of those records are within 10 km of study area, and habitat was considered marginal. The BDAR was authored by a senior botanist and botanist (both BAM accredited). Given the above, it would seem appropriate to assume these species have low potential occur within the study area and to exclude as candidate species. The survey undertaken is adequate for the site. Stag watching is not necessary for the BDAR as the relevant species listed are ecosystem-credit species which do not require survey. The stag watching and fauna rescue will however be undertaken prior to construction as a method to minimise injury to animals during construction phase.
Either the letter previously requested from DPIE in relation to a suggested system error in the calculator for planted native vegetation, is supplied with the updated assessment OR that the matter is addressed through the revised credits/credit summary due to the reported update to the calculator being actioned.	ELA has applied the streamlined assessment criteria in BAM 2020 for planted native vegetation. Whilst it is likely that some of the vegetation is planted, the vegetation is part of a mosaic that includes remnant vegetation and therefore cannot be excluded from the assessment.
The revised assessment must have an accompanying map that consolidates all development and construction activities and therefore all affected vegetation.	See Appendix A1 of this letter report.
Given the extent of the operation / access hours, plans should reflect National Light Pollution Guidelines for Wildlife.	The Commonwealth Guidelines are designed to protect Important Habitat for Commonwealth threatened species, with particular reference to migratory seabirds, turtles and shorebirds. There is no Important Habitat within or adjoining the site. However, the following is noted: • The cemetery and golf course will not be lit.

Council Comment	Applicant Response
	• Lighting design of the clubhouse, pool and gym has not yet been prepared, however the proponent can use external down lighting.
Comprehensive consideration of indirect impacts please include any treatments that will be integrated into the plans to minimise the impacts during all phases of construction and operation.	A Construction Environment Management Plan will be prepared and implemented to avoid, minimise and manage indirect impacts.
Consideration of the Regent Honeyeater and any other species identified in updated field and desktop surveys is to be included.	Regent Honeyeater is a dual (ecosystem and species credit) species. It is included as an ecosystem credit candidate species in the BDAR but excluded as a species credit candidate species. The Regent Honeyeater is only a species credit species for Mapped Important Habitat which does not occur within the study area. As such, targeted survey for this species is not required.
The updated Credit Summary is to be finalised and included in the submission.	See Appendix A2, Table 2, Table 3 and 4. The revised impact calculations were re-run through the BAMC. ELA used the Travers plot data in Appendix 4 to generate Vegetation Integrity Scores (VIS). ELA notes that there are differences in the Travers and ELA VIS scores. The changes to the impact area and to the VIS for some PCTs has decreased the credit requirement from 88 credits (Travers 2019) to 68 credits (ELA 2020). The credit assessment report is attached.

A1 Landscape Plans

KEY PLAN

LEGEND

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED DUE TO DEVELOPMENT
- EXISTING TREES TO BE REMOVED DUE TO HEALTH
- ASSET PROTECTION ZONE (APZ)
- GROUNDWATER MONITORING WELLS

REVEGETATION AREAS:
(REFER TRAVERS DOCUMENTATION FOR FULL EXTENT OF REVEGETATION ACROSS SITE)

- RIVER FLAT EUCALYPT FULL REVEGETATION
- CUMBERLAND PLAIN WOODLAND FULL REVEGETATION
- CUMBERLAND PLAIN WOODLAND (NO MID STOREY)

GOLF COURSE AREAS:

- PROPOSED BUNKER
- PROPOSED GREEN
- PROPOSED TEE
- PROPOSED FAIRWAY
- PROPOSED SHORT ROUGH
- CREEK/WETLAND EXISITNG REVEGETATION WITH TRAVERS
- CREEK/WETLAND EXISITNG REVEGETATION WITH TRAVERS
- LANDSCAPE PLANTING - REFER LP.02 & LP.03
- BUSHLAND BUFFER PLANTING - REFER LP.01
- BUFFER PLANTING WITHIN APZ - REFER LP.01
- RIPARIAN REVEGETATION (HIGH) IN CONSULTATION WITH TRAVERS
- RIPARIAN REVEGETATION (LOW) IN CONSULTATION WITH TRAVERS
- MOWN LONG ROUGH (WITH TREES)
- MOWN LONG ROUGH INCLUDING EXISTING TREES)

NOTE: REFER TRAVERS 'FLORA & FAUNA SURVEY REPORT AND RESULTS' FOR DETAILS ON ALL REVEGETATION AND REGENERATION WORKS ON SITE

Issue:	Rev:	Description:	Date:
DA		FOR APPROVAL	05.12.19
DA	A	RFI	14.07.20
DA	B	OCTOBER 2020 RFI	27.11.20

Project title:
WALLACIA COUNTRY CLUB

Drawing title:
LANDSCAPE SITE PLAN 1 of 2

NARELLE SONTER
BOTANICA
LANDSCAPE AND HORTICULTURAL SPECIALISTS
PO Box 611 Avalon NSW 2107
Tel: (02) 9918 4016 Mobile: 0419 501 144

Job no: 191112
Drawn by: EH
Checked by: NS
Scale: 1:1000 @ A1
Drw no: LPS.01
CAD file name:
Plot date:
Sheet no: 1/6

MASTER PLANTING SCHEDULE

Key	Botanical Name	Common Name	Mat Ht	Pot Size
Large Trees				
AC	*Angophora costata*	Smooth-Barked Apple	25m	75 litre
ACS	*Acmena smithii*	Lilly Pilly	12m	75 litre
AF*	*Angophora floribunda*	Rough- Barked Apple	25m	75 litre
AS*	*Angophora subvelutina*	Broad Leaved Apple	12-20m	75 litre
AT	*Allocasuarina torulosa*	Forest Oak	12-20m	75 litre
AS	*Angophora subvelutina*	Broad - Leaved Apple	25m	75 litre
CCN	*Casuarina cunninghamiana*	River Sheoak	20m	75 litre
CSG	*Casuarina glauca*	Swamp Oak	20m	75 litre
CG	*Corymbia gummifera*	Red Bloodwood	15m	75 litre
CM*	*Corymbia maculata*	Spotted Gum	15-22m	75 litre
EA*	*Eucalyptus amplifolia*	Cabbage Gum	15-20m	75 litre
EE*	*Eucalyptus eugenioides*	Thin-Leaved Stringybark	25m	75 litre
EF*	*Eucalyptus fibrosa*	Red Ironbark	30m	75 litre
EG*	*Eucalyptus globoidea*	White Stringbark	20m	75 litre
EM*	*Eucalyptus moluccana*	Grey Box	20-25m	75 litre
EP*	*Eucalyptus paniculata*	Grey Ironbark	25-30m	75 litre
EPA*	*Eucalyptus punctata*	Grey Gum	25-35m	75 litre
ESA	*Eucalyptus saligna*	Sydney Blue Gum	20-30m	75 litre
ES	*Eucalyptus sideroxylon*	Mugga Ironbark	25m	75 litre
ET*	*Eucalyptus tereticornis*	Forest Red Gum	25m	75 litre
SG*	*Syncarpia glomulifera*	Turpentine	15-20m	75 litre
TL	*Tristaniopsis laurina*	Water Gum	15m	75 litre

Small Trees and Large Shrubs				
AB*	*Angophora bakeri*	Narrow-Leaved Apple	15m	75 litre
ACG	*Acacia cognata*	Bower Wattle	5m	25 litre
AD*	*Acacia decurrens*	Black Wattle	10-15m	75 litre
AI*	*Acacia implexa*	Hickory Wattle	4-10m	45 litre
AFL	*Acacia falcata*	Sickle Wattle	5m	25 litre
AFB	*Acacia floribunda*	Sally Wattle	4-6m	25 litre
AP	*Acacia parramattensis*	Sydney Green Wattle	8m	45 litre
ASM	*Acmena smithii 'Minor'*	Minor Lilly Pilly	5m	25 litre
ASS	*Acmena smithii 'Sublime'*	Sublime Lilly Pilly	3-5m	25 litre
BM	*Backhousia myrtifolia*	Grey Myrtle	3-4m	25 litre
BE	*Banksia ericifolia*	Heath Banksia	2-5m	25 litre
BS	*Banksia serrata*	Old Man Banksia	4-8m	45 litre
BSP	*Callistemon spinulosa*	Hairpin Banksia	2m	25 litre
BUS*	*Bursaria spinosa*	Blackthorn	2-3m	25 litre
CC	*Callistemon citrinus*	Crimson Bottlebrush	2m	25 litre
CDR	*Callistemon 'Dawson River Weeper'*	Dawson River Callistemon	5-6m	25 litre
CGM	*Ceratopetalum gummiferum*	Christmas Bush	2-4m	25 litre
CS	*Callistemon salignus*	Willow Bottlebrush	3-4m	25 litre
DV*	*Dodonaea viscosa*	Hop Bush	2m	25 litre
ER	*Elaeocarpus reticulatus*	Blueberry Ash	4-10m	45 litre
EXC*	*Exocarpus cupressiformis*	Cherry Ballarat	2-6m	45 litre
HN	*Hakea nesophylla*	Melaleuca Nesophyla	3m	25 litre
HS	*Hakea sericea*	Needle-Bush	3m	25 litre
HSA	*Hakea salicifolia*	Willow Leaf Hakea	5m	25 litre
JS	*Jacksonia scoparia*	Dogwood	3m	25 litre
MA	*Melaleuca armillaris*	Bracelet Honey Myrtle	7m	25 litre
MD	*Melaleuca decora*	White Feather Honey	3-7m	25 litre
ML	*Melaleuca linariifolia*	Snow In Summer	8m	45 litre
PLV	*Persoonia levis*	Broad-Leaf Geebung	4m	25 litre
SAE	*Syzygium australe 'Elite'*	Elite Lilly Pilly	3-4m	25 litre
SC	*Syzygium 'Cascade'*	Cascade Lilly Pilly	2.5m	25 litre
SR	*Syzygium 'Resilience'*	Resilience Lilly Pilly	5m	25 litre

Key	Botanical Name	Common Name	Mat Ht	Pot Size
Small and Medium Shrubs				
ASA	*Asplenium australasicum*	Bird's Nest Fern	1m	5 litre
ACC	*Acacia cognata*	Little Cog	0.9m	5 litre
AE	*Aspidistra elatior*	Cast Iron Plant	0.7m	5 litre
BHP	*Banksia spinulosa 'Honey Pots'*	Honey Pots	1m	5 litre
BVN	*Baeckea virgata 'Nana'*	Dwarf Baekea	1m	5 litre
CAW	*Callistemon 'Anzac White'*	Anzac White	1m	5 litre
CE	*Crowea exalata 'Little Dome'*	Little Dome	0.4m	5 litre
CM	*Clivea miniata*	Trumpet Lily	0.5m	5 litre
CS	*Callistemon subulatus*	Dwarf Bottlebrush	1-2m	5 litre
DU*	*Daviesia ulicifolia*	Gorse Bitter Pea	1m	5 litre
DS*	*Dillwynia sieberi*	Parrot Pea	1.5m	5 litre
DE	*Doryanthes excelsa*	Gymea Lily	1-2m	5 litre
EA	*Eriostemon australasius*	Pink Wax Flower	1-2m	5 litre
GF	*Gardenia 'Florida'*	Florida Gardenia	1.5m	5 litre
GFC	*Grevillea 'Fire Cracker'*	Fire Cracker	1m	5 litre
GJ	*Grevillea juniperina*	Prickly Spider Flower	2m	5 litre
GM	*Grevillea mucronulata*	Green Spider Flower	1-2m	5 litre
GO*	*Goodenia ovata*	Goodenia	1.5m	5 litre
GS	*Grevillea sericea*	Pink Spider Flower	1-2m	5 litre
HGN	*Hymenosporum 'Gold Nugget'*	Gold Nugget Frangipani	0.7m	5 litre
IA*	*Indigofera australis*	Native Indigo	1.5m	5 litre
KA	*Kunzea ambigua*	Tick Bush	2-3m	25 litre
LLB	*Leptospermum 'Lemon Lime Bitters'*	Lemon, Lime Bitters	0.7m	5 litre
LLS	*Leptospermum 'Little Lemon Scents'*	Little Lemon Scents	1m	5 litre
LP	*Leptospermum polygalifolium*	Yellow Tea Tree	2-3m	25 litre
MT	*Melaleuca thymifolia*	Thyme Honey Myrtle	1m	5 litre
MTC	*Melaleuca 'Cotton Candy'*	Cotton Candy Honey Myrtle	1m	5 litre
MTW	*Melaleuca 'White Lace'*	White Lace Honey Myrtle	1m	5 litre
OM	*Olearia microphylla*	Small-Leaved Daisy Bush	1m	5 litre
OD	*Ozothamnus diosmifolium*	Sago Flower	2m	5 litre
PFG	*Philotheca 'Flower Girl'*	Wax Flower	1.5m	5 litre
PL	*Persoonia linearis*	Narrow-Leaf Geebung	2-3m	25 litre
PML	*Pimelea linifolia*	Slender Rice Flower	0.4m	5 litre
PV*	*Pultenaea villosa*	Willdenow	0.5-2m	5 litre
STT	*Syzygium 'Tiny Trev'*	Tiny Trev	0.7m	5 litre
WF	*Westringia fruticosa*	Coastal Rosemary	1.5m	5 litre
XE	*Xanthorrea australis*	Austral Grass Tree	1-2m	25 litre
YF	*Yucca filamentosa*	Adam's Needle	1-2m	5 litre

Key	Botanical Name	Common Name	Mat Ht	Pot Size
Grasses				
ACP	*Austrodanthonia caespitosa*	Common Wallaby Grass	0.4m	150mm
AR*	*Aristida ramosa*	Three-Awn Speargrass	0.5m	150mm
CSP*	*Carex spp.*	Tall Sedge	1m	150mm
CG*	*Cyperus gracilis*	Slender Flat Sedge	1.2m	150mm
CT*	*Chloris truncata*	Windmill Grass	0.5m	150mm
DC	*Dianella caerulea*	Blue Flax Lily	0.5m	150mm
DL*	*Dianella longifolia*	Smooth Flax Lily	0.8m	150mm
DI	*Dietes indioides*	African Iris	0.8m	150mm
DRV*	*Dianella revoluta*	Paroo Lily	0.6m	150mm
DTB	*Dianella tasmanica 'Blaze'*	Blaze Lily	0.5m	150mm
EC*	*Echinopogon caespitosus*	Tufted Hedgehog Grass	0.6m	150mm
EM	*Entolasia marginata*	Bordered Panic	0.3m	150mm
FN	*Ficinia nodosa*	Knobby Club Rush	1m	150mm
GSP	*Gahnia spp.*	Rough Saw-sedge	1m	150mm
JU*	*Juncus usitatus*	Common Rush	1m	150mm
LGW	*Lomandra 'Great White'*	Great White Mat-Rush	0.5m	150mm
LAM	*Liriope 'Amethyst'*	Amethyst Liriope	0.4m	150mm
LIB	*Liriope 'Isabella'*	Isabella Liriope	0.4m	150mm
LLF*	*Lomandra filiformis*	Wattle Mat-Rush	0.4m	150mm
LL	*Lomandra longifolia*	Spiny-headed Mat-Rush	1m	150mm
LM*	*Lomandra multiflora*	Many Flowered Mat-Rush	0.7m	150mm
LLT	*Lomandra 'Tanika'*	Tanika Mat-Rush	0.6m	150mm
MS*	*Microlaena stipoides*	Weeping Grass	0.4m	150mm
PK	*Poa 'Kingsdale'*	Kingsdale	0.5m	150mm
POL	*Poa labillardieri*	Common Tussock Grass	0.8m	150mm
SG	*Stypandra glauca*	Nodding Blue Lily	1m	150mm
TA*	*Themeda australis*	Kangaroo grass	1m	150m

Key	Botanical Name	Common Name	Mat Ht	Pot Size
Groundcovers, Climbers				
AA	*Acinos arvensis*	Basil Thyme	0.2m	150mm
ADA	*Adiantum aethiopicum*	Common Maidenhair Fern	0.4m	150mm
AC	*Asperula conferta*	Common Woodruff	1m	150mm
AH	*Actinotus helianthi*	Flannel Flower	0.4m	150mm
AJ*	*Ajuga australis*	Australian Bugle	0.2m	150mm
AM*	*Arthropodium milleflorum*	Pale Vanilla Lily	0.5m	150mm
BA*	*Brunoniella australis*	Blue Yam	0.3m	150mm
CA	*Clematis aristata*	Old Man's Beard	0.1m	150mm
CD*	*Cheilanthes distans*	Bristly Cloak-Fern	0.2m	150mm
CS*	*Cheilanthes sieberi*	Rock Fern	0.3m	150mm
DR*	*Dichondra repens*	Kidney Weed	0.3m	150mm
ED*	*Eremophila debilis*	Winter Apple	1m	150mm
GBR	*Grevillea 'Bronze Rambler'*	Bronze Rambler	0.2m	150mm
GMT	*Grevillea 'Mt Tamboritha'*	Mount Tamboritha	0.2m	150mm
GT*	*Glycine tabacina*	Love Creeper	0.1m	150mm
GH*	*Goodenia hederacea*	Ivy Goodenia	0.3m	150mm
HA	*Hibbertia aspera*	Rough Guinea Flower	0.2m	150mm
HFW	*Hardenbergia 'Flat White'*	Flat White Twining-Pea	0.2m	150mm
HV*	*Hardenbergia violacea*	Purple Twining-Pea	0.2m	150mm
HD*	*Hibbertia diffusa*	Guinea Flower	0.3m	150mm
KR	*Kennedia rubicunda*	Dusky Coral Pea	0.3m	150mm
MNS	*Mentha satureioides*	Bush Mint	0.3m	150mm
PP	*Pandorea pandorana*	Wonga-Wonga Vine	0.3m	150mm
PSP	*Patersonia spp.*	Purple Flag	0.2m	150mm
TJ	*Trachelospermum jasminoides*	Star Jasmine	0.2m	150mm
VH	*Viola hederacea*	Native Violet	0.1m	150mm
WG	*Wahlenbergia gracilis*	Australian Bluebell	0.2m	150mm

'Cumberland Plain Woodland Species

Document Set ID: 9397365
Version: 1, Version Date: 01/12/2020

KEY PLAN

LEGEND

EXISTING TREES TO BE RETAINED

EXISTING TREES TO BE REMOVED DUE TO DEVELOPMENT

EXISTING TREES TO BE REMOVED DUE TO HEALTH

ASSET PROTECTION ZONE (APZ)

GROUNDWATER MONITORING WELLS

REVEGETATION AREAS:
(REFER TRAVERS DOCUMENTATION FOR FULL EXTENT OF REVEGETATION ACROSS SITE)

- RIVER FLAT EUCALYPT FULL REVEGETATION
- CUMBERLAND PLAIN WOODLAND FULL REVEGETATION
- CUMBERLAND PLAIN WOODLAND (NO MID STOREY)

GOLF COURSE AREAS:

- PROPOSED BUNKER
- PROPOSED GREEN
- PROPOSED TEE
- PROPOSED FAIRWAY
- PROPOSED SHORT ROUGH
- CREEK/WETLAND EXISITNG REVEGETATION WITH TRAVERS
- LANDSCAPE PLANTING - REFER LP.02 & LP.03
- BUSHLAND BUFFER PLANTING - REFER LP.01
- BUFFER PLANTING WITHIN APZ - REFER LP.01
- RIPARIAN REVEGETATION (HIGH) IN CONSULTATION WITH TRAVERS
- MOWN LONG ROUGH (WITH TREES)
- MOWN LONG ROUGH INCLUDING EXISTING TREES)

NOTE: REFER TRAVERS 'FLORA & FAUNA SURVEY REPORT AND RESULTS' FOR DETAILS ON ALL REVEGETATION AND REGENERATION WORKS ON SITE

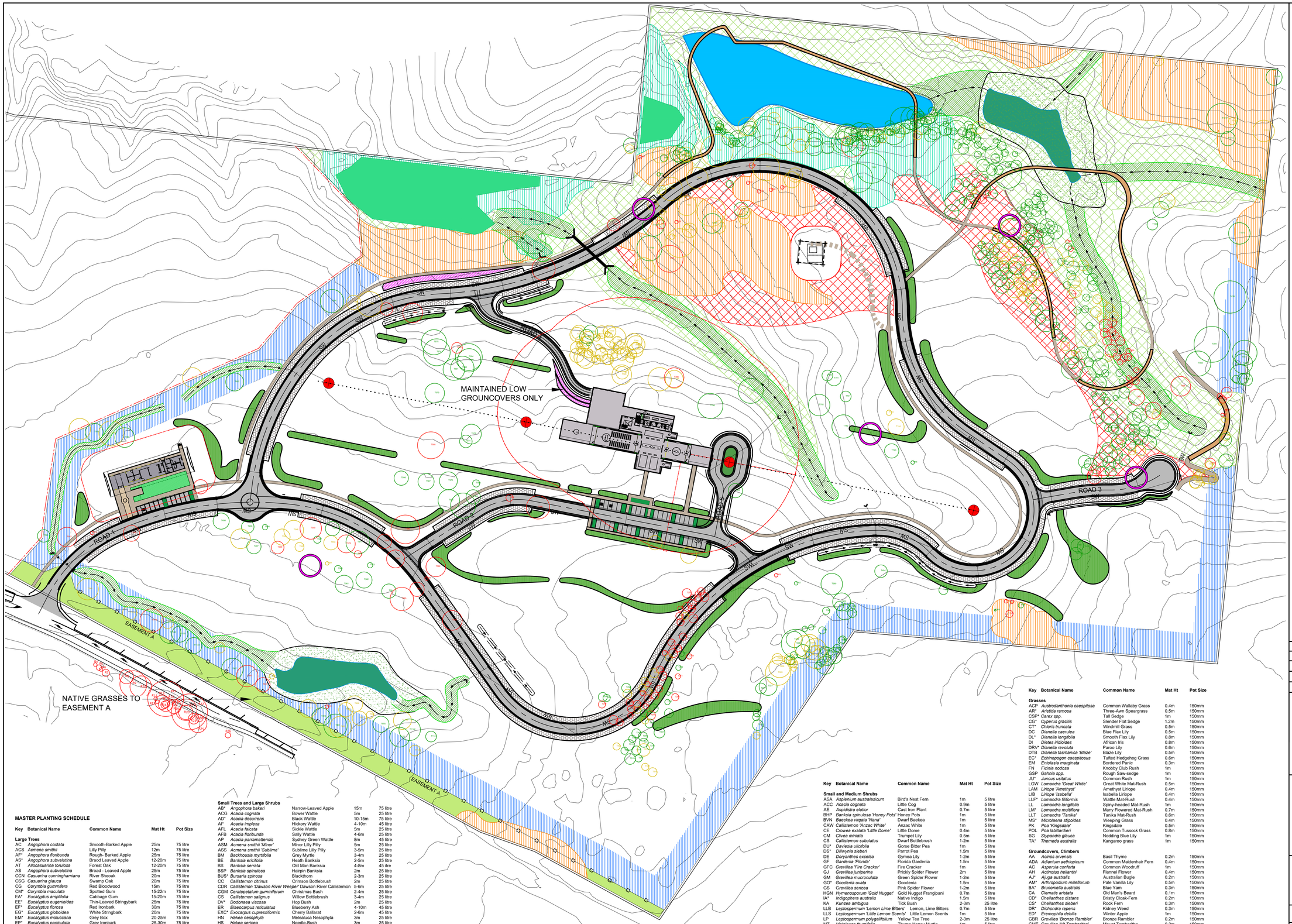
Issue:	Rev:	Description:	Date:
DA		FOR APPROVAL	05.12.19
DA	A	RFI	14.07.20
DA	B	OCTOBER 2020 RFI	27.11.20

Project title:
WALLACIA COUNTRY CLUB

Drawing title:
LANSCAPE SITE PLAN 2 of 2

NARELLE SONTER
BOTANICA
LANDSCAPE AND HORTICULTURAL SPECIALISTS
PO Box 611 Avalon NSW 2107
Tel: (02) 9918 4016 Mobile: 0419 501 144

Job no: 191112
Drawn by: EH
Checked by: NS
Scale: 1:1000 @ A1
Drw no: LPS.02
CAD file name:
Plot date:
Sheet no: 2/6



LEGEND

- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED DUE TO DEVELOPMENT
- EXISTING TREES TO BE REMOVED DUE TO HEALTH
- SCULPTURE. REFER FJLA DRAWINGS FOR FURTHER DETAILS
- GROUNDWATER MONITORING WELLS
- ASSET PROTECTION ZONE (APZ)
- GABION WALL ALONG PARK ROAD FRONTAGE

PROPOSED PLANTING:
(REFER BOTANICA DWGS L509 & L510 FOR DETAILS)

- SCREEN PLANTING
- RIPARIAN PLANTING - SWALE
- EXISTING EPHEMERAL MARSH WETLAND
- PROPOSED EPHEMERAL MARSH
- SCREEN PLANTING. REFER BOTANICA DWG No L503
- PLANTING BETWEEN TIERED RETAINING WALLS (REFER L506)
- NATIVE GRASSES TO EASEMENT A

EEC REGENERATION AREAS:

- CUMBERLAND PLAIN WOODLAND FOREST
- RIVER FLAT EUCALYPT FOREST ON COASTAL FLOODPLAINS
- CUMBERLAND PLAIN WOODLAND (NO MID-STORY VEGETATION)

REVEGETATION AREAS:

- RIVER FLAT EUCALYPT FULL REVEGETATION
- CUMBERLAND PLAIN WOODLAND FULL REVEGETATION

NOTE: REFER TRAVERS 'FLORA & FAUNA SURVEY REPORT AND RESULTS' FOR DETAILS ON ALL REVEGETATION AND REGENERATION WORKS ON SITE

Issue:	Rev:	Description:	Date:
DA		FOR APPROVAL	10.12.19
DA	A	RFI	14.07.20
DA	B		27.11.20

Project title:

NEPEAN MEMORIAL PARK

Drawing title:

SITE PLAN

Principal consultant:

Florence Jaquet
Landscape architect

A 8 Rowell Avenue, Camberwell 3124
E: flo@fjla.com.au
M 0419 983 641

Client:

NARELLE SONTER
BOTANICA
LANDSCAPE AND HORTICULTURAL SPECIALISTS
PO Box 611 Avalon NSW 2107
Tel: (02) 9918 4016 Mobile: 0419 501 144

Job no: 170925

Drawn by: EH

Checked by: NS

Scale: 1:1000 @ A1

CAD file name:

Plot date:

Drw no: L501

Sheet no: 1/8

MASTER PLANTING SCHEDULE

Key	Botanical Name	Common Name	Mat Ht	Pot Size
Large Trees				
AC	*Angophora costata*	Smooth-Barked Apple	25m	75 litre
ACS	*Acmena smithii*	Lilly Pilly	12m	75 litre
AF*	*Angophora floribunda*	Rough- Barked Apple	25m	75 litre
AS*	*Angophora subveluting*	Braod Leaved Apple	12-20m	75 litre
AT	*Allocasuarina torulosa*	Forest Oak	12-20m	75 litre
AS	*Angophora subveluting*	Broad - Leaved Apple	25m	75 litre
CCN	*Casuarina cunninghamiana*	River Sheoak	20m	75 litre
CSG	*Casuarina glauca*	Swamp Oak	20m	75 litre
CG	*Corymbia gummifera*	Red Bloodwood	15m	75 litre
CM*	*Corymbia maculata*	Spotted Gum	15-22m	75 litre
EA*	*Eucalyptus amplifolia*	Cabbage Gum	15-20m	75 litre
EE*	*Eucalyptus eugenioides*	Thin-Leaved Stringybark	25m	75 litre
EF*	*Eucalyptus fibrosa*	Red Ironbark	30m	75 litre
EG*	*Eucalyptus globoidea*	White Stringbark	20m	75 litre
EM*	*Eucalyptus moluccana*	Grey Box	20-25m	75 litre
EP*	*Eucalyptus paniculata*	Grey Ironbark	25-30m	75 litre
EPA*	*Eucalyptus punctata*	Grey Gum	25-35m	75 litre
ESA	*Eucalyptus saligna*	Sydney Blue Gum	20-30m	75 litre
ES	*Eucalyptus sideroxylon*	Mugga Ironbark	25m	75 litre
ET*	*Eucalyptus tereticornis*	Forest Red Gum	25m	75 litre
FR	*Fraxinus 'Raywoodii'*	Claret Ash	12m	75 litre
GB	*Ginkgo biloba*	Maidenhair Tree	10m	75 litre
JM	*Jacaranda mimosifolia*	Jacaranda	12m	75 litre
PCA	*Pyrus calleryana 'Aristocrat'*	Aristocrat Chanticleer	12m	75 litre
SG*	*Syncarpia glomulifera*	Turpentine	15-20m	75 litre
TL	*Tristaniopsis laurina*	Water Gum	15m	75 litre
UGL	*Ulmus glabra 'Lutescens'*	Golden Wych Elm	10m	75 litre
UPT	*Ulmus parvifolia 'Todd'*	Chinese Elm	10m	75 litre
Small Trees and Large Shrubs				
AB*	*Angophora bakeri*	Narrow-Leaved Apple	15m	75 litre
ACG	*Acacia cognata*	Bower Wattle	5m	25 litre
AD*	*Acacia decurrens*	Black Wattle	10-15m	75 litre
AI*	*Acacia implexa*	Hickory Wattle	4-10m	45 litre
AFL	*Acacia falcata*	Sickle Wattle	5m	25 litre
AFB	*Acacia floribunda*	Sally Wattle	4-6m	25 litre
AP	*Acacia parramattensis*	Sydney Green Wattle	8m	45 litre
ASM	*Acmena smithii 'Minor'*	Minor Lilly Pilly	5m	25 litre
ASS	*Acmena smithii 'Sublime'*	Subline Lilly Pilly	3-5m	25 litre
BM	*Backhousia myrtifolia*	Grey Myrtle	3-4m	25 litre
BE	*Banksia ericifolia*	Heath Banksia	2-5m	25 litre
BS	*Banksia serrata*	Old Man Banksia	4-8m	45 litre
BSP	*Banksia spinulosa*	Hairpin Banksia	2m	25 litre
BUS*	*Bursaria spinosa*	Blackthorn	2-3m	25 litre
CC	*Callistemon citrinus*	Crimson Bottlebrush	2m	25 litre
CDR	*Callistemon 'Dawson River Weeper'*	Dawson River Callistemon	5-6m	25 litre
CGM	*Ceratopetalum gummiferum*	Christmas Bush	2-4m	25 litre
CS	*Callistemon salignus*	Willow Bottlebrush	3-4m	25 litre
DV*	*Dodonaea viscosa*	Hop Bush	2m	25 litre
ER	*Elaeocarpus reticulatus*	Blueberry Ash	4-10m	45 litre
EXC*	*Exocarpus cupressiformis*	Cherry Ballarat	2-6m	45 litre
HN	*Hakea nesophyla*	Melealuca Nesophyla	3m	25 litre
HS	*Hakea sericea*	Needle-Bush	3m	25 litre
HSA	*Hakea salicifolia*	Willow Leaf Hakea	5m	25 litre
JS	*Jacksonia scoparia*	Dogwood	3m	25 litre
LB	*Lagerstroemia indica 'Biloxi'*	Biloxi Crepe Myrtle	7m	45 litre
LIA	*Lagerstroemia indica 'Acoma'*	Acoma Crepe Myrtle	3.5m	45 litre
LIN	*Lagerstoemia indica 'Natchez'*	Natchez Crepe Myrtle	8m	75 litre
LIT	*lagerstroemia indica 'Tuscarora'*	Tuscarora Crepe Myrtle	5-6m	45 litre
MA	*Melaleuca armillaris*	Bracelot Honey Myrtle	7m	25 litre
MD	*Melaleuca decora*	White Feather Honey	3-7m	25 litre
ML	*Melaleuca linariifolia*	Snow In Summer	8m	45 litre
PLV	*Persoonia levis*	Broad-Leaf Geebung	4m	25 litre
SAE	*Syzygium australe 'Elite'*	Elite Lilly Pilly	3-4m	25 litre
SR	*Syzygium 'Resilience'*	Resilience Lilly Pilly	5m	25 litre

Key	Botanical Name	Common Name	Mat Ht	Pot Size
Small and Medium Shrubs				
ASA	*Asplenium australasicum*	Bird's Nest Fern	1m	5 litre
ACC	*Acacia cognata*	Little Cog	0.9m	5 litre
AE	*Aspidistra elatior*	Cast Iron Plant	0.7m	5 litre
BHP	*Banksia spinulosa 'Honey Pots'*	Honey Pots	1m	5 litre
BVN	*Baeckea virgata 'Nana'*	Dwarf Baekea	1m	5 litre
CAW	*Callistemon 'Anzac White'*	Anzac White	1m	5 litre
CE	*Crowea exalata 'Little Dome'*	Little Dome	0.4m	5 litre
CM	*Clivea miniata*	Trumpet Lily	0.5m	5 litre
CS	*Callistemon subulatus*	Dwarf Bottlebrush	1-2m	5 litre
DU*	*Daviesia ulicifolia*	Gorse Bitter Pea	1m	5 litre
DS*	*Dillwynia sieberi*	Parrot Pea	1.5m	5 litre
DE	*Doryanthes excelsa*	Gymea Lily	1-2m	5 litre
GF	*Gardenia 'Florida'*	Florida Gardenia	1.5m	5 litre
GFC	*Grevillea 'Fire Cracker'*	Fire Cracker	1m	5 litre
GJ	*Grevillea juniperina*	Prickly Spider Flower	2m	5 litre
GM	*Grevillea mucronulata*	Green Spider Flower	1-2m	5 litre
GO*	*Goodenia ovata*	Goodenia	1.5m	5 litre
GS	*Grevillea sericea*	Pink Spider Flower	1-2m	5 litre
HGN	*Hymenosporum 'Gold Nugget'*	Gold Nugget Frangipani	0.7m	5 litre
IA*	*Indigophera australis*	Native Indigo	1.5m	5 litre
KA	*Kunzea ambigua*	Tick Bush	2-3m	25 litre
LLB	*Leptospermum 'Lemon Lime Bitters'*	Lemon, Lime Bitters	0.7m	5 litre
LLS	*Leptospermum 'Little Lemon Scents'*	Little Lemon Scents	1m	5 litre
LP	*Leptospermum polygalifolium*	Yellow Tea Tree	2-3m	25 litre
MT	*Melaleuca thymifolia*	Thyme Honey Myrtle	1m	5 litre
MTC	*Melaleuca 'Cotton Candy'*	Cotton Candy Honey Myrtle	1m	5 litre
MTW	*Melaleuca 'White Lace'*	White Lace Honey Myrtle	1m	5 litre
OM	*Olearia microphylla*	Small-Leaved Daisy Bush	1m	5 litre
OO	*Ozothamnus diosmifolium*	Sago Flower	2m	5 litre
PFG	*Philotheca 'Flower Girl'*	Wax Flower	1.5m	5 litre
PL	*Persoonia linearis*	Narrow-Leaf Geebung	2-3m	25 litre
PML	*Pimelea linifolia*	Slender Rice Flower	0.4m	5 litre
PV*	*Pultenaea villosa*	Willdenow	0.5-2m	5 litre
STT	*Syzygium 'Tiny Trev'*	Tiny Trev	0.7m	5 litre
WF	*Westringia fruticosa*	Coastal Rosemary	1.5m	5 litre
XE	*Xanthorrea australis*	Austral Grass Tree	1-2m	25 litre
YF	*Yucca filamentosa*	Adam's Needle	1-2m	5 litre

Key	Botanical Name	Common Name	Mat Ht	Pot Size
Grasses				
ACP	*Austrodanthonia caespitosa*	Common Wallaby Grass	0.4m	150mm
AR*	*Aristida ramosa*	Three-Awn Speargrass	0.5m	150mm
CSP*	*Carex spp.*	Tall Sedge	1m	150mm
CG*	*Cyperus gracilis*	Slender Flat Sedge	1.2m	150mm
CT*	*Chloris truncata*	Windmill Grass	0.5m	150mm
DC	*Dianella caerulea*	Blue Flax Lily	0.5m	150mm
DL*	*Dianella longifolia*	Smooth Flax Lily	0.8m	150mm
DI	*Dietes iridioides*	African Iris	0.8m	150mm
DRV*	*Dianella revoluta*	Paroo Lily	0.6m	150mm
DTB	*Dianella tasmanica 'Blaze'*	Blaze Lily	0.5m	150mm
EC*	*Echinopogon caespitosus*	Tufted Hedgehog Grass	0.6m	150mm
EM	*Entolasia marginata*	Bordered Panic	0.3m	150mm
FN	*Ficinia nodosa*	Knobby Club Rush	1m	150mm
GSP	*Gahnia spp.*	Rough Saw-sedge	1m	150mm
JU*	*Juncus usitatus*	Common Rush	1m	150mm
LGW	*Lomandra 'Great White'*	Great White Mat-Rush	0.5m	150mm
LAM	*Liriope 'Amethyst'*	Amethyst Liriope	0.4m	150mm
LIB	*Liriope 'Isabella'*	Isabella Liriope	0.4m	150mm
LLF*	*Lomandra filiformis*	Wattle Mat-Rush	0.4m	150mm
LL	*Lomandra longifolia*	Spiny-headed Mat-Rush	1m	150mm
LM*	*Lomandra multiflora*	Many Flowered Mat-Rush	0.7m	150mm
LLT	*Lomandra 'Tanika'*	Tanika Mat-Rush	0.6m	150mm
MS*	*Microlaena stipoides*	Weeping Grass	0.4m	150mm
PK	*Poa 'Kingsdale'*	Kingsdale	0.5m	150mm
POL	*Poa labillardieri*	Common Tussock Grass	0.8m	150mm
SG	*Stypandra glauca*	Nodding Blue Lily	1m	150mm
TA*	*Themeda australis*	Kangaroo grass	1m	150mm
Groundcovers, Climbers				
AA	*Acinos arvensis*	Basil Thyme	0.2m	150mm
ADA	*Adiantum aethiopicum*	Common Maidenhair Fern	0.4m	150mm
AC	*Asperula conferta*	Common Woodruff	1m	150mm
AH	*Actinotus helianthi*	Flannel Flower	0.4m	150mm
AJ*	*Ajuga australis*	Australian Bugle	0.2m	150mm
AM*	*Arthropodium milleiflorum*	Pale Vanilla Lily	0.5m	150mm
BA*	*Brunoniella australis*	Blue Yam	0.3m	150mm
CA	*Clematis aristata*	Old Man's Beard	0.1m	150mm
CD*	*Cheilanthes distans*	Bristly Cloak-Fern	0.2m	150mm
CS*	*Cheilanthes sieberi*	Rock Fern	0.3m	150mm
DR*	*Dichondra repens*	Kidney Weed	0.3m	150mm
ED*	*Eremophila debilis*	Winter Apple	1m	150mm
GBR	*Grevillea 'Bronze Rambler'*	Bronze Rambler	0.2m	150mm
GMT	*Grevillea 'Mt Tamboritha'*	Mount Tamboritha	0.2m	150mm
GT*	*Glycine tabacina*	Love Creeper	0.1m	150mm
GH*	*Goodenia hederacea*	Ivy Goodenia	0.3m	150mm
HA	*Hibbertia aspera*	Rough Guinea Flower	0.2m	150mm
HFW	*Hardenbergia 'Flat White'*	Flat White Twining-Pea	0.2m	150mm
HV*	*Hardenbergia violacea*	Purple Twining-Pea	0.2m	150mm
HD*	*Hibbertia diffusa*	Guinea Flower	0.3m	150mm
KR	*Kennedia rubicunda*	Dusky Coral Pea	0.3m	150mm
MNS	*Mentha satureioides*	Bush Mint	0.3m	150mm
PP	*Pandorea pandorana*	Wonga-Wonga Vine	0.3m	150mm
PSP	*Patersonia spp.*	Purple Flag	0.2m	150mm
TJ	*Trachelospermum jasminoides*	Star Jasmine	0.2m	150mm
VH	*Viola hederacea*	Native Violet	0.1m	150mm
WG	*Wahlenbergia gracilis*	Australian Bluebell	0.2m	150mm

**Cumberland Plain Woodland Species*

Document Set ID: 9397365
Version: 1, Version Date: 01/12/2020

A2 Development footprint, impacts and calculations

Figure 1: Assessment of all direct impacts (removed for development and removed for poor tree health) based on Travers vegetation mapping (2020) and the Landscape Plans from Botanica.

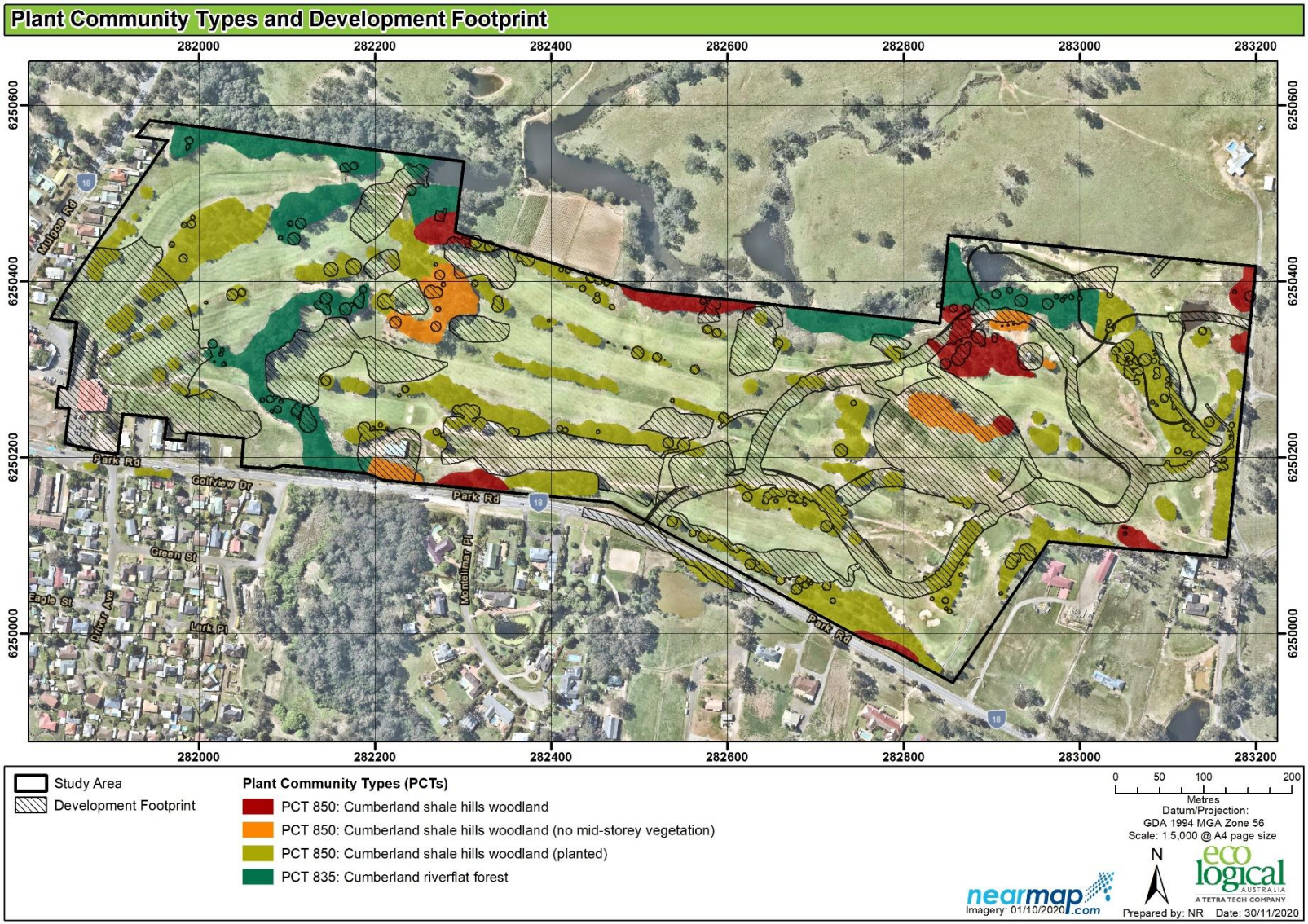


Figure 2: Development footprint (including trees to be removed for health reasons)

Table 2: Comparison of impact to PCTs associated with the development footprint

PCT and Veg Zone	Travers direct impact mapping (ha)	ELA direct impact mapping (ha)	Change in impact (ha)
PCT 835_moderate_poor	0.5	0.37	**-0.13**
PCT 850_poor_planted	2.3	2.01	**-0.29**
PCT 850_mod_poor	0.5	0.28	**-0.22**
PCT 850_poor_no understorey	0.7	0.49	**-0.21**
Total	**4.0**	**3.15**	**-0.75**

Table 3: Comparison of Travers Vegetation Integrity Scores versus output of Vegetation Integrity Scores used in ELA calculations

**Please note that the data used by ELA in the BAM Calculator to generate the new credit requirement, including the VIS scores shown below, was taken from the plot data sheets provided in Appendix A4 of Travers BDAR (December 2019).

PCT and Veg Zone	Travers VIS	ELA VIS	Change in VIS
PCT 835_moderate_poor	42.9	42.9	0
PCT 850_poor_planted	30.6	32	**+ 1.4**
PCT 850_mod_poor	53.8	42.6	**- 11.2**
PCT 850_poor_no understorey	43.8	43.8	0

Table 4: Comparison of ecosystem credit requirement detailed in Travers BDAR (Dec 2019) and revised credit requirement (ELA)

PCT and Veg Zone	Travers credit requirement	ELA credit requirement	Change in credit requirement
PCT 835_moderate_poor	11	8	**-3**
PCT 850_poor_planted	44	40	**-4**
PCT 850_mod_poor	15	7	**-8**
PCT 850_poor_no understorey	18	13	**-5**
Total	**88**	**68**	**-20**

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00023160/BAAS17001/20/00023161	Nepean Gardens	19/11/2020
Assessor Name	Report Created	BAM Data version *
Meredith Henderson	30/11/2020	32
Assessor Number	BAM Case Status	Date Finalised
BAAS17001	Open	To be finalised
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (General)	BOS Threshold: Biodiversity Values Map and area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	BC Act Listing status	EPBC Act listing status	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Cumberland riverflat forest											
1	835_Mod_poor	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	42.9	42.9	0.37	Endangered Ecological Community	Not Listed	High Sensitivity to Potential Gain	2.00		8
										Subtotal	**8**
Cumberland shale hills woodland											
2	850_No_mid	Cumberland Plain Woodland in the Sydney Basin Bioregion	43.8	43.8	0.49	Critically Endangered Ecological Community	Critically Endangered	High Sensitivity to Potential Gain	2.50	TRUE	13
3	850_Mod_poor	Cumberland Plain Woodland in the Sydney Basin Bioregion	42.6	42.6	0.28	Critically Endangered Ecological Community	Critically Endangered	High Sensitivity to Potential Gain	2.50	TRUE	7
4	850_Planted	Cumberland Plain Woodland in the Sydney Basin Bioregion	32	32.0	2	Critically Endangered Ecological Community	Critically Endangered	High Sensitivity to Potential Gain	2.50	TRUE	40
										Subtotal	**60**
										Total	**68**

Species credits for threatened species

BAM Credit Summary Report

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Species credits