



TERRESTRIAL BIODIVERSITY REPORT
&
THREATENED SPECIES ASSESSMENT FOR THE
NORTH HEAD LONG-NOSED BANDICOOT
AT
83 - 85 BOWER STREET, MANLY

Prepared for:

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CONTENTS

Page No.

FLORA AND FAUNA BIODIVERSITY

1	Introduction	1
1.1	Background	1
1.2	Literature review	1
1.3	Existing development	2
1.4	Proposed development	14
2	Part A- Flora and fauna biodiversity	23
2.1	Biodiversity survey	23
2.2	Vegetation description and ecological status	23
2.3	Vegetation status	23
2.3.1	Ecological Community Status	23
2.3.2	Plant Species Status	24
2.4	Description of fauna habitat	24
2.5	Fauna status	24
2.6	Fauna recorded utilising resources within the property	25
2.7	Long-nosed bandicoot activity and access to the subject land	25
3	Addressing Clause 6.5 Terrestrial Biodiversity	27
3.1	Clause (3)	27
3.2	Clause (4)	28
4.	Part B- Assessment of Significance (5-part test) Long-nosed Bandicoot	29
5	General Conclusions	32
6	Recommendations	33
7	References and literature reviewed	34

FIGURES	Page No.
Figure 1 Section of mapping by MLEP 2013 indicating elements of 'terrestrial biodiversity' (shaded in green) occurring contiguously over the southern section of the Manly LGA south of Addison Road	1
Figure 2 Aerial view of location of 83 - 85 Bower Street, Manly, (bounded in red outline) amongst surrounding residential development	2
Figure 3 View of section of western facade of current dwelling and section of the rear grassed yard. Existing vegetation to be removed indicated above includes ornamental plantings including Banana Palm, <i>Clivia</i> (Bush Lily), Kentia Palm and other plantings	3
Figure 4 View of northern section of Area 1 indicating mature individual of Broad-leaved Paperbark. Well established garden beds include Canary Island Palm, Bangalow Palm, Kentia Palm, Raphis Palm and Fruit Salad Plant	4
Figure 5A Well established garden beds at the southern section of Area 2 leading to a pond surrounded by Banana Palms and a small area of Buffalo Grass include Cabbage Palm (<i>Cordyline australis</i>), Dragon Tree (<i>Dracaena draco</i>) Small-leaved Camellia, <i>Clivia</i> , Variegated Shell Ginger, <i>Dietes</i> , Kentia Palm and Chinese Hibiscus	5
Figure 5B Clumps of Banana Palm are located at the northern section of Area 2 adjacent to a pond	6
Figure 6 A small area of exotic Buffalo Grass occurs within Area 3 containing the fenced off, disused, swimming pool	7
Figure 7 View of section of Area 3 indicating location of mature individual of Broad-leaved Paperbark, Dragon Tree (proposed to be relocated) and fenced off, disused swimming pool	8
Figure 8 Small area of upper terraced garden on northern side of house with Buffalo lawn grass. Landscaped species include Buxus, West Australian Peppermint (<i>Agonis flexuosa</i>) (to RHS of image), Small-leaved Camellia (<i>Camellia sasanqua</i>), <i>Clivia</i> , Xanadu (<i>Philodendron xanadu</i>), <i>Dietes</i> , Spiny-headed Mat-rush and Chinese Hibiscus	9

FIGURES	Page No.
Figure 9 Area of lower terraced garden on northern side of dwelling with Buffalo lawn grass in poor condition. Landscaped species include Camellia, Duranta, Golden Cane Palm, Clivia, Xanadu (<i>Philodendron xanadu</i>), Dietes, Bhuddhist Pine (<i>Podocarpus macrophyllus</i>), Licorice Plant (<i>Helichrysum petiolare</i>), Kentia Palm, Moso Bamboo, Frangipani and Chinese Hibiscus	10
Figure 10 Two distinct Bandicoot diggings observed in bare ground at lower terraced area of subject site	11
Figure 11 Well established garden beds within hard surfaced area including a pond that contains Common Water Hyacinth and Water Lettuce as well as Mosquito Fern (Figure 12) surrounded by relatively tall Banana Palms, Rough Tree Fern and Cabbage-tree Palm among others	12
Figure 12 Small pond in Area 6 containing noxious water weeds, Water Hyacinth and Water Lettuce	13
Figure 13A Site plan of proposed amended dwelling house, dashed blue outline indicates current dwelling (see final architectural plans from Evans & Green 2021)	17
Figure 13B Ground floor plan of proposed amended dwelling house (for detail see final revised architectural plans from Evans & Green 2021)	18
Figure 13C First floor plan of proposed amended dwelling house (for detail see final revised architectural plans from Evans & Green 2021)	19
Figure 13D Section taken through eastern side of proposed amended dwelling house (see final revised architectural plans from Evans & Green 2021)	20
Figure 14 Proposed revised landscape plan associated with proposed amended dwelling house (see final revised Landscape Concept Plan by Landart 2021)	21
Figure 15 Location of numbered trees listed in Table 2 that are proposed for removal (final revised Landscape Concept Plan by Landart 2021)	22
Figure 16 Gaps of approximately 5cm occur beneath the front gate, the side gate at the western end of Area 1 and the side gate between Area 4 & Area 6, sufficient to allow entry to Bandicoots which may forage continuously between grassed council verges and grassland patches within properties on Bower Street	26

TABLES

Table 1 A total of 6 separate grassed and vegetated areas can be distinguished at the subject properties.	3
Table 2 Lists of plant species proposed for removal as a result of construction	16

APPENDICES

1 Threatened species listed by DPIE Bionet Atlas of NSW Wildlife for Manly locality	35
2 North-head population of Long-nosed Bandicoot	36

FLORA AND FAUNA BIODIVERSITY

1 Introduction

1.1 Background

Elements of Terrestrial Diversity (Clause 6.5 Sections [3] & [4] of MLEP - 2013) are required to be addressed and qualified before a development application can be sought on land that has been mapped as having 'terrestrial biodiversity significance' (MLEP – 2013). Manly Council has requested this information in regard to a development application for 83 - 85 Bower Street, Manly.

Figure 1 indicates that the entire southern section of the Manly locality, south of Addison Road, that is contiguous with Sydney Harbour National Park, including the area containing Bower Street, is mapped by Manly Council LEP 2013 as having Terrestrial Biodiversity provisions. The site has been identified as containing habitat for the endangered population of Long-nosed Bandicoot (*Perameles nasuta*).



Figure 1 - Section of mapping by MLEP 2013 indicating elements of 'terrestrial biodiversity' (shaded in green) occurring contiguously over the southern section of the Manly LGA south of Addison Road.

1.2 Literature review

Existing information on 'Threatened Flora and Fauna of the Locality' was accessed from the Department of Planning, Industry and Environment (DPIE) Bionet Atlas - (January 2020), Commonwealth Protected Matters Environmental Reporting Tool (January 2020), and RoTAP (Briggs and Leigh, 1996) databases. Other literature detailing regionally and locally

threatened and significant flora and fauna, as well as endangered populations and plant communities of the study area, included NSW Scientific Committee Final Determinations (1996 - 2020), The Native Vegetation of the Sydney Metropolitan Catchment Management Authority Area (2016), Benson and Howell (1994), and the Manly Council Website (2020).

1.3 Existing development

The subject land at 83 - 85 Bower Street, Manly, comprises two properties and has a total site area of 1,390m². It is located on the southern side of Bower Street, with a view overlooking Manly Beach. The land has a northerly aspect. The existing dwelling is a composite single-level rendered detached building with separate double garage. Figure 2 indicates the location of the property amongst established residences on Bower Street. Figure 3 is an image of a section of the western facade of the dwelling with area of lawn grass and perimeter plantings of mostly ornamental small trees and shrubs.



Figure 2 - Aerial view of location of 83 - 85 Bower Street, Manly, (bounded in red outline) amongst surrounding residential development



Figure 3 View of section of western facade of current dwelling and section of the rear grassed yard. Existing vegetation to be removed indicated above includes ornamental plantings including Banana Palm, *Clivia* (Bush Lily), Kentia Palm and other plantings

The rear (western) and front (northern) yards consist of a series of interconnected terraced lawn areas with perimeter plantings of mostly ornamental small tree, shrub and ground cover species. The lawn grass consists mostly of Buffalo Grass (Figure 3), with patches of bare earth and leaf litter. The owners keep 2 large dogs on the premises and these animals use these patches of lawn grass as defaecating areas.

A total of 6 separate grassed and vegetated areas can be distinguished at the subject properties. These are located, qualified and characterised in the following Table 1:

AREA	RELATIVE LOCATION	RELATIVE AREA (m ²)
1	Large grassed area on western side of dwelling (Figures 3 & 4)	375
2	Area to western side of disused swimming pool fenced off to accommodate populations of Eastern Water Dragons (Figure 5)	95
3	Area containing swimming pool and associated gardens (Figure 6), including individual of Broad-leaved Paperbark (Figure 7)	118
4	Small upper terraced area on northern side of house (Figure 8)	31
5	Lower linear terraced section on northern side of house (Figure 9) including Bandicoot diggings (Figure 10)	169
6	Narrow garden area alongside path on south-eastern side (Figure 11)	42

These 6 separate areas delineated at the subject properties are further described as follows:

AREA 1

Figure 3 indicates the typical landscape occurring in Area 1.

The grassed area contains mostly Buffalo Grass estimated at about 200m² in area, with 95% grass and 4% bare ground and leaf litter.

Canopy trees include an individual of Broad-leaved Paperbark to 10m tall with canopy spread to 13m in width and an individual of Sydney Blue Gum to 12m tall. The individual of Broad-leaved Paperbark in this area appears to be greater than 80 years maturity, appearing in images of the area taken in 1943 (Figure 4).



Figure 4 View of northern section of Area 1 indicating mature individual of Broad-leaved Paperbark. Well established garden beds include Canary Island Palm, Bangalow Palm, Kentia Palm, Raphis Palm and Fruit Salad Plant

There is scattered dog excrement on the lawn left to decompose.

A typical digging characteristic of Bandicoot activity was observed in a patch of bare earth in this area. This digging may have been relatively old as the soil appeared very dry and crumbly.

Common indigenous and ornamental species planted around the perimeter of this area include the following:

Indigenous

Birds Nest Fern (*Asplenium australasicum*); Broad-leaved Paperbark (*Melaleuca quinquenervia*), Sydney Blue Gum (*Eucalyptus saligna*), Bangalow Palm (*Archontophoenix cunninghamiana*) and Spiny-headed Mat-rush (*Lomandra longifolia*).

Ornamental

Paw Paw, Sasanqua Camellia, Bush Lily (*Clivia miniata*), Pigs Ear (*Cotyledon orbiculata*), Cordyline species (*Cordyline australis*; *Cordyline fruticosa*), Golden Dewdrops (*Duranta erecta*), Golden Cane Palm, Glossy-leaved Paper Plant (*Fatsia japonica*), Grevillea (*Grevillea 'sylvia'*), Kentia Palm, Canary Island Palm, Raphis Palm, Cocos Palm, Banana Palm, Oleander, Fruit Salad Plant (*Monstera fruticosa*) and Bird of Paradise Flower (*Strelitzia parviflora*).

AREA 2

Figure 5 indicates the typical landscape occurring in Area 2.



Figure 5A Well established garden beds at the southern section of Area 2 leading to a pond surrounded by Banana Palms and a small area of Buffalo Grass include Cabbage Palm (*Cordyline australis*), Dragon Tree (*Dracaena draco*) Small-leaved Camellia, Clivia, Variegated Shell Ginger, Dietes, Kentia Palm and Chinese Hibiscus

The northern section of this area is fenced off to prevent dogs from entering the area which is occupied by various cohorts of populations of Eastern Water Dragon (indicated in distance in Figure 5).

The small grassed area at the northern section of the area contains mostly Buffalo Grass estimated at about 20m² in area, with 75% grass and 4% bare ground and leaf litter.

A stone wall alongside the path at the northern section of the area is good sheltering habitat for reptiles such as the Eastern Water Dragon which is common to this area.

Several individuals of Eastern Water Dragon of varying age and Brush Turkey chicks were observed in this area. No Bandicoot diggings observed in this area.

Common indigenous and ornamental species established or mostly planted around the perimeter of this area include the following:

Indigenous

Scurvy Weed (*Commelina cyanea*), Bangalow Palm and Sweet Pittosporum (*Pittosporum undulatum*).

Ornamental

Bouganvillea, Sasanqua Camellia, Bush Lily (*Clivia miniata*), Variegated Shell Ginger (*Alpinia zerumbet*), Cabbage Palm (*Cordyline australis*), Golden Dewdrops (*Duranta erecta*), Golden Cane Palm, Chinese Hibiscus (*Hibiscus rosa-sinensis*), Dietes, Dragon Tree (*Dracaena draco*), Kentia Palm, Canary Island Palm, Raphis Palm, Banana Palm (7m tall, >5 clumps) (Figure 5B), Frangipani, Purple Amaranth (*Amaranthus cruentus*), Roldana and Bird of Paradise Flower (*Strelitzia parviflora*).



Figure 5B - Clumps of Banana Palm are located at the northern section of Area 2 adjacent to a pond

AREA 3

Figure 6 indicates the typical landscape occurring in Area 3.



Figure 6 A small area of exotic Buffalo Grass occurs within Area 3 containing the fenced off, disused, swimming pool

This area contains a disused swimming pool (Figure 2) indicated in Figure 6.

A small grassed area leading to the pool contains mostly Buffalo Grass estimated at about 20m² in area, with 90% grass and 10% bare ground and leaf litter.

An individual of Broad-leaved Paperbark to 11m tall occurring in this area has a canopy spread of about 8m in width (Figure 7). The individual of Broad-leaved Paperbark appears to be greater than 80 years maturity, appearing in images of the area taken in 1943 (Figure 7).

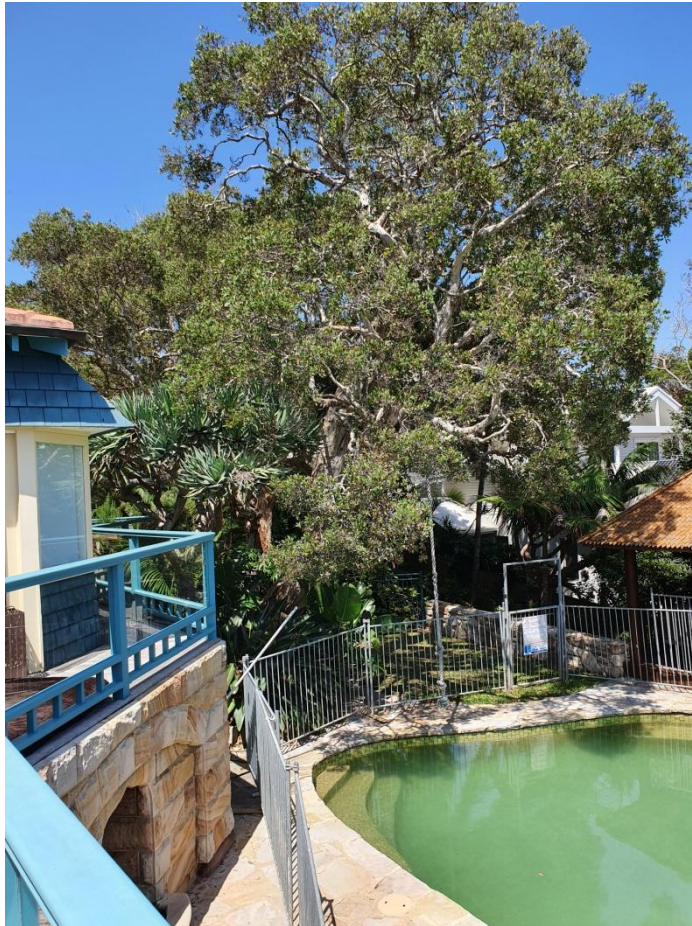


Figure 7 View of section of Area 3 indicating location of mature individual of Broad-leaved Paperbark, Dragon Tree (proposed to be relocated) and fenced off, disused swimming pool

A mature individual of Dragon Tree (*Dracaena draco*) is proposed to be relocated elsewhere in a suitable location on the property.

Water Dragons were observed inhabiting this area.

No Bandicoot diggings were observed in this area. The area is fenced off and dogs cannot enter.

Common indigenous and ornamental species planted around the perimeter of this area include the following:

Indigenous

Broad-leaved Paperbark (*Melaleuca quinquenervia*)

Ornamental

Bush Lily (*Clivia miniata*), Dragon Tree to 5m tall, spread 4m (*Dracaena draco*), Kentia Palm, Tricolor Jasmine (*Trachelospermum jasminoides*), Glossy-leaved Paper Plant and Giant White Bird of Paradise (*Strelizia nicolai*).

AREA 4

Figure 8 indicates the typical landscape occurring in the upper terraced section of Area 4.



Figure 8 Small area of upper terraced garden on northern side of house with Buffalo lawn grass. Landscaped species include Buxus, West Australian Peppermint (*Agonis flexuosa*) (to RHS of image), Small-leaved Camellia (*Camellia sasanqua*), Clivia, Xanadu (*Philodendron xanadu*), Dietes, Spiny-headed Mat-rush and Chinese Hibiscus

The small grassed area contains mostly Buffalo Grass estimated at about 16m² in area, with 90% grass and 10% bare ground and leaf litter (Figure 8).

There is scattered fresh dog excrement on the lawn left to decompose.

No Bandicoot diggings observed in this area.

Common indigenous and ornamental species planted around the perimeter of this area include the following:

Indigenous

Spiny-headed Mat-rush, sapling of Port Jackson Fig (to 1.3m tall)

Ornamental (including non-local indigenous tree species)

Willow Myrtle (*Agonis flexuosa*), Xanadu (*Philodendron xanadu*), Bush Lily (*Clivia miniata*), Chinese Hibiscus (*Hibiscus rosa-sinensis*), Dietes and Buxus (*Buxus microphylla* var. *japonica*)

AREA 5

Figure 9 indicates the typical landscape occurring in the lower linear terraced section of Area 5.



Figure 9 Area of lower terraced garden on northern side of dwelling with Buffalo lawn grass in poor condition. Landscaped species include Camellia, Duranta, Golden Cane Palm, Clivia, Xanadu (*Philodendron xanadu*), Dietes, Bhuddhist Pine (*Podocarpus macrophyllus*), Licorice Plant (*Helichrysum petiolare*), Kentia Palm, Moso Bamboo, Frangipani and Chinese Hibiscus

The linear shaped grassed area contains mostly Buffalo Grass estimated at about 50m² in area, with 60% grass and 40% bare ground and dead above-ground canopy grass (Figure 9).

There is scattered fresh dog excrement on the lawn left to decompose.

Two Bandicoot diggings were observed in bare earth within this area (Figure 10).



Figure 10 Two distinct Bandicoot diggings observed in bare ground at lower terraced area of subject site

A small pond of about 1m diameter with free standing water also occurs in the far north-eastern corner of this area.

A stone wall forming a boundary at the lower section of this area is good sheltering habitat for reptiles such as the Eastern Water Dragon which occurs in this area.

Common indigenous and ornamental species mostly planted around the perimeter of this area include the following:

Indigenous

Sweet Pittosporum, Rough Tree Fern, Scurvy weed (*Commelina cyanea*), Burrawang (*Macrozamia communis*)

Ornamental

Camellia (*Camellia japonica*), Xanadu (*Philodendron xanadu*), Bush Lily (*Clivia miniata*), Chinese Hibiscus (*Hibiscus rosa-sinensis*), Dietes, Golden Dewdrops (*Duranta erecta*), Golden Cane Palm, Clivia, Xanadu (*Philodendron xanadu*), Pineapple Guava (*Feijoa sellowiana*), Bhuddhist Pine (*Podocarpus macrophyllus*), Licorice Plant (*Helichrysum petiolare*), Kentia Palm, Moso Bamboo, Frangipani, Evergreen Giant (*Liriope 'muscaris'*), Port Wine Magnolia (*Michelia figo*), Orange Jessamine (*Murraya paniculata*) and Red Amaranthus (*Amaranthus caudatus*).

AREA 6

Figure 11 indicates the typical landscape occurring in Area 6 that occurs at the south-eastern section of the property.



Figure 11 Well established garden beds within hard surfaced area including a pond that contains Common Water Hyacinth and Water Lettuce as well as Mosquito Fern (Figure 12) surrounded by relatively tall Banana Palms, Rough Tree Fern and Cabbage-tree Palm among others.

Common indigenous and ornamental species established or mostly planted around the perimeter of this area include the following:

Indigenous

Rough Tree Fern (*Cyathea australis*), Cabbage-tree Palm (*Livistona australis*), Port Jackson Fig (*Ficus rubiginosa*) and Mosquito Fern (*Azolla filiculoides*), .

Ornamental

Sasanqua Camellia, Banana Palm (to 8m tall, 3 clumps), Sago Palm (*Cycas revoluta*), Foxtail Agave (*Agave attenuata*), Paper Reed (*Cyperus papyrus*), Creeping Fig (*Ficus pumila*), Evergreen Giant (*Liriope 'muscari'*), Sacred Bamboo (*Nandina domestica*) and Bird of Paradise Flower (*Strelitzia parviflora*).

Priority Weeds for Greater Sydney

[Water](#)

[hyacinth](#)

Eichhornia crassipes

Regional Recommended Measure

Land managers should mitigate spread from their land. Plant should not be bought, sold, grown, carried or released into the environment.

[Water lettuce](#)

Pistia stratiotes

Regional Recommended Measure

Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment. Notify local control authority if found.

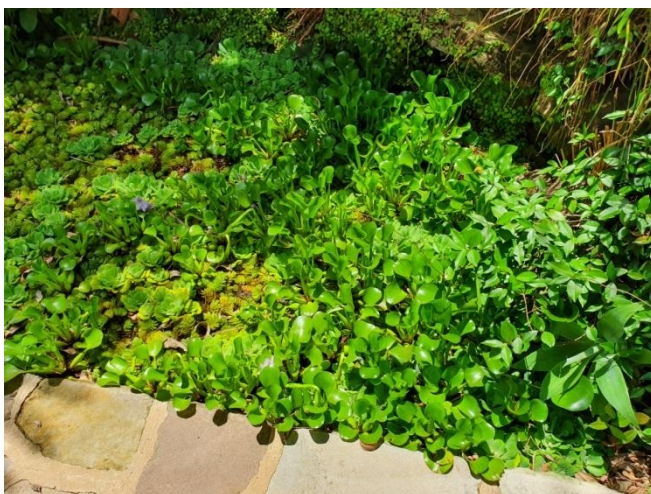


Figure 12 - Small pond in Area 6 containing noxious water weeds, Water Hyacinth and Water Lettuce

1.4 Proposed development

The Amended Development Application proposes:

The initial proposed development (March 2020) was to demolish the existing house and locate a new two-storey dwelling on roughly the same location as the existing house.

In summary, the current amended development (March 2021) proposes the following:

1. Maintain parts of the existing house - that is to maintain the existing garage, with 2 bedrooms plus the bathroom on the ground floor. The footprint of the house would alter slightly to accommodate these changes.
2. Maintain the existing pool as a water tank/detention tank, and a such, deleting the detention tank that occurs along the front boundary.
3. Move the current pool up closer to the house.

No change is proposed to the existing trees to be removed/retained, however the layout around the pool will change from the approval.

This scheme is being lodged as a s4.55 modification to the original consent, DA2020/0855.

In detail, the new development proposal includes alterations and additions that vary from the original consent scheme as follows:

1. Alterations & additions to the existing house, with retention of some of the original fabric of the ground floor - the previous approved scheme was for demolition of all of the existing house & construction of a new dwelling. Maintained fabric includes the existing attached garage on Montpelier Place, the two ground floor bedrooms and bathrooms on the east of the site, as well as the existing in-ground pool.
2. The existing pool is to be reused as an in-ground detention tank and water re-use tank, with the pool covered by a new concrete lid which would then be covered in soil and landscaped. A new pool is proposed to the east of the existing pool, closer to the proposed house. A water feature pond extends all along the west facade of the modified scheme.
3. The approved in-ground detention tank along the northern front boundary is proposed to be deleted.
4. A new terraced lawn and garden, built around and above the existing in-ground pool, is proposed to replace the approved position of the in-ground pool from the previous approved DA scheme.

5. A new carport is proposed - accessed from Montpelier place.
6. The proposed house is essentially in the same position as the approved DA scheme. The northern setback of the front ground floor terrace and the front living room match that of the approved scheme. The western facade of the living room and dining room is essentially that of the approved scheme, with a minor increase in footprint in the south-west corner of the proposal. The setback on the south-east is greatly increased, whilst the existing setback is maintained on the east of the ground floor bedrooms.
7. The western half of the site is maintained as a landscaped lawn and garden, as per the approved scheme. Landscaping also runs all along the northern site boundary, as per the approved scheme.
8. The ridge height of the proposal matches the upper ridge height of the approved scheme.
9. No change is proposed to the trees previously approved to be removed or transplanted.
10. Overall there is a decrease in both demolition on the site and excavation on the site.

Figures 13A, 13B, 13C & 13D indicate the amended site plan location, floor plans and cross-section of the proposed amended dwelling, respectively.

Figure 14 is a revised landscape plan for the proposed construction.

Figure 15 indicates existing plants which are proposed for removal and Table 2 below lists the plant species and their significance to the local area.

No. (Figure 15)	Plant Species	Significance to local area & Comments
1 & 1A	Clump consists of 5 x Banana Palms (to 6m), Kentia Palm and one Cocos Palm (to 5m tall)	Planted ornamentals, no significance
2	Over-mature individual of Broad-leaved Paperbark (<i>Melaleuca quinquinervia</i>).	May be up to 80 years old, a swamp-occurring species not in natural habitat, over-mature
3	Dragon Tree (<i>Dracaena draco</i>)	Canary Islands native. Mature tree to 5m tall. To be replanted elsewhere in property in suitable location
4	Bangalow Palm	Planted local native, unsuitable habitat
5	Banana Palms to 7m tall	Planted ornamentals, no significance
6	Kentia Palm	Planted ornamental, no significance
7	Clump of Banana Palms	Planted ornamentals, no significance
8	Oleander	Planted ornamentals, no significance

No. (Figure 15)	Plant Species	Significance to local area & Comments
9	Bangalow Palm	Planted local native, unsuitable habitat
10	Bush of Orange Jessamine	Planted ornamentals, no significance
11	Frangipani	Planted ornamentals, no significance, but will be transplanted elsewhere on property in suitable location (Glenice Buck Designs 2020)
12	<i>Camellia japonica</i>	Planted ornamentals, no significance
13	Willow Myrtle (<i>Agonis flexuosa</i>)	Non-local native (West Aust. species) no significance
14	Willow Myrtle (<i>Agonis flexuosa</i>)	Non-local native (West Aust. species) no significance
15	Banana Palms to 7m	Planted ornamentals, no significance
16	Banana Palms to 7m tall	Planted ornamentals, no significance
17	Cabbage-tree Palm, Kentia Palm & Banana Palm to 7m tall	Planted ornamentals, no significance
18	Sago Palm to 5m tall	Planted ornamentals, no significance
19	Banana Palms to 8m tall	Planted ornamentals, no significance

Table 2 - Lists of plant species proposed for removal as a result of construction

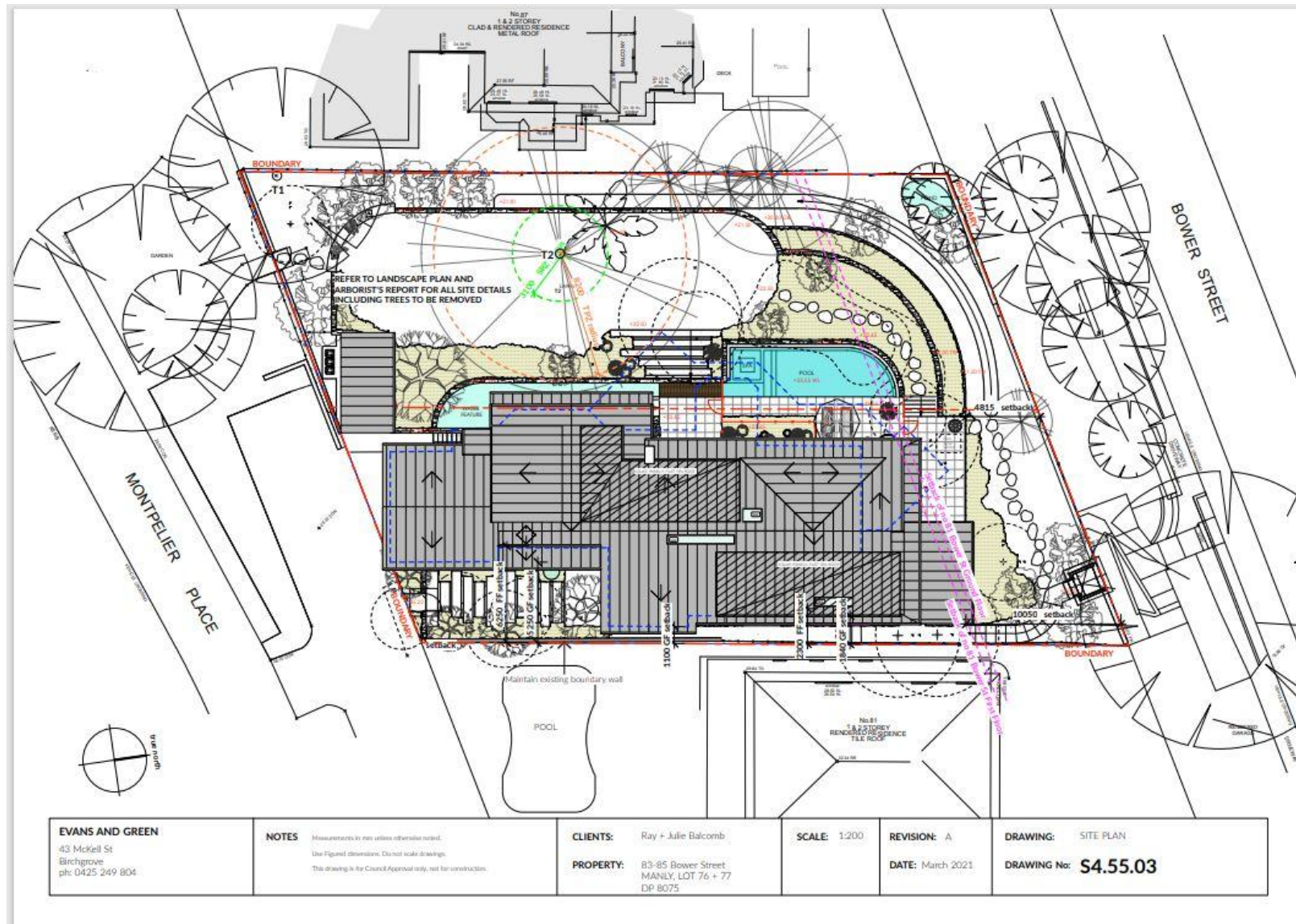


Figure 13A - Site plan of proposed amended dwelling house, dashed blue outline indicates current dwelling (see final architectural plans from Evans & Green 2021)

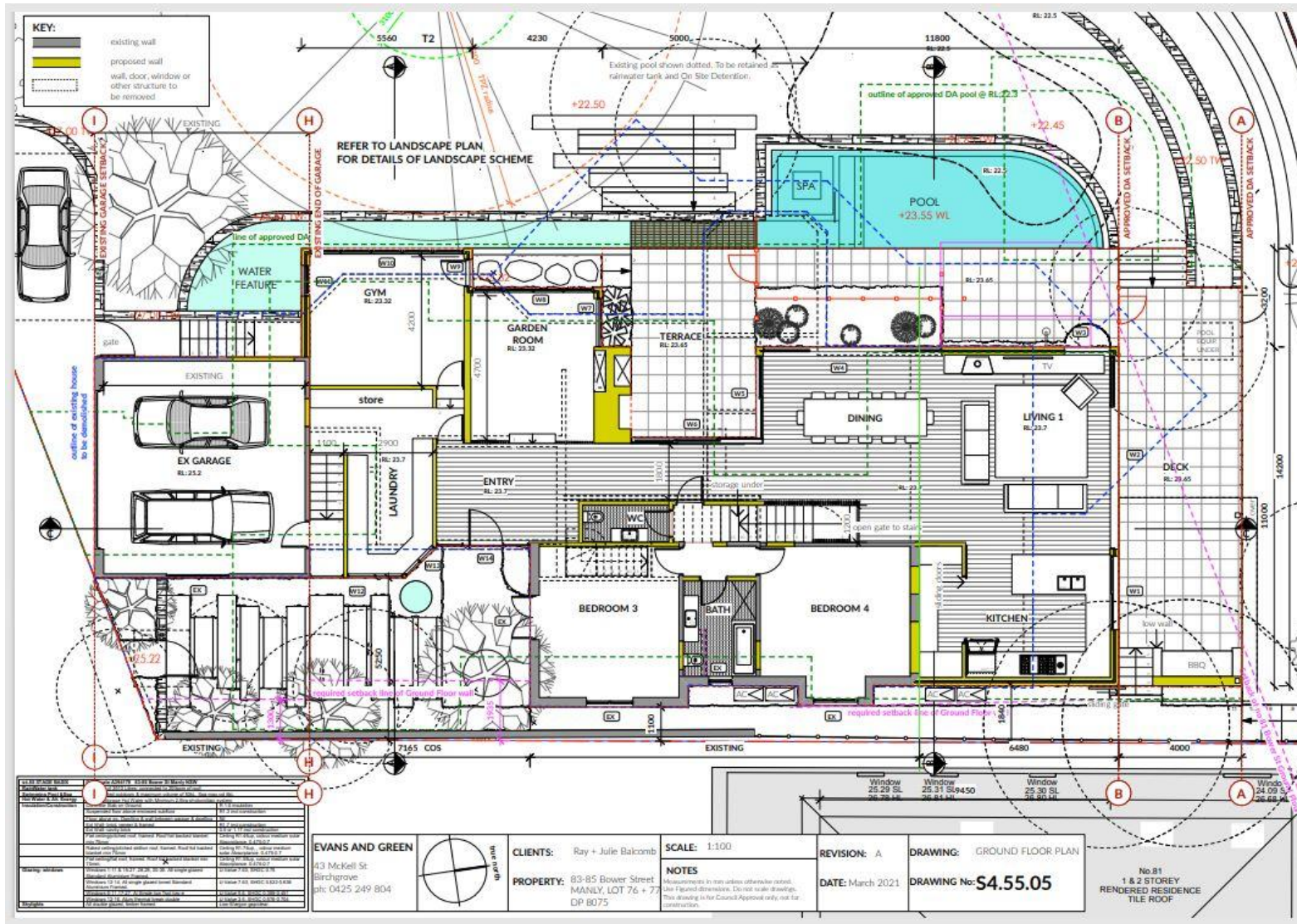


Figure 13B - Ground floor plan of proposed amended dwelling house (for detail see final revised architectural plans from Evans & Green 2021)

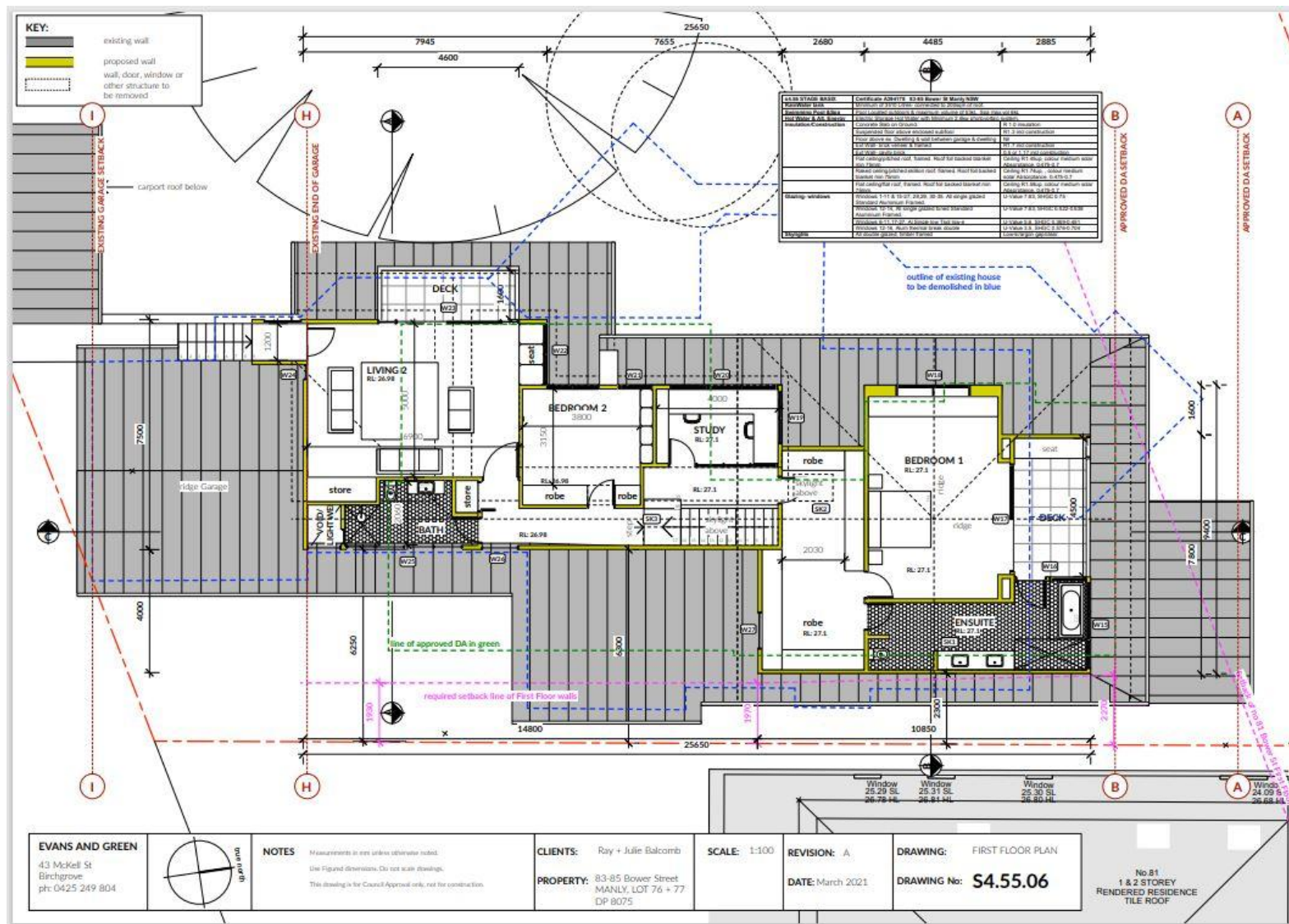


Figure 13C - First floor plan of proposed amended dwelling house (for detail see final revised architectural plans from Evans & Green 2021)

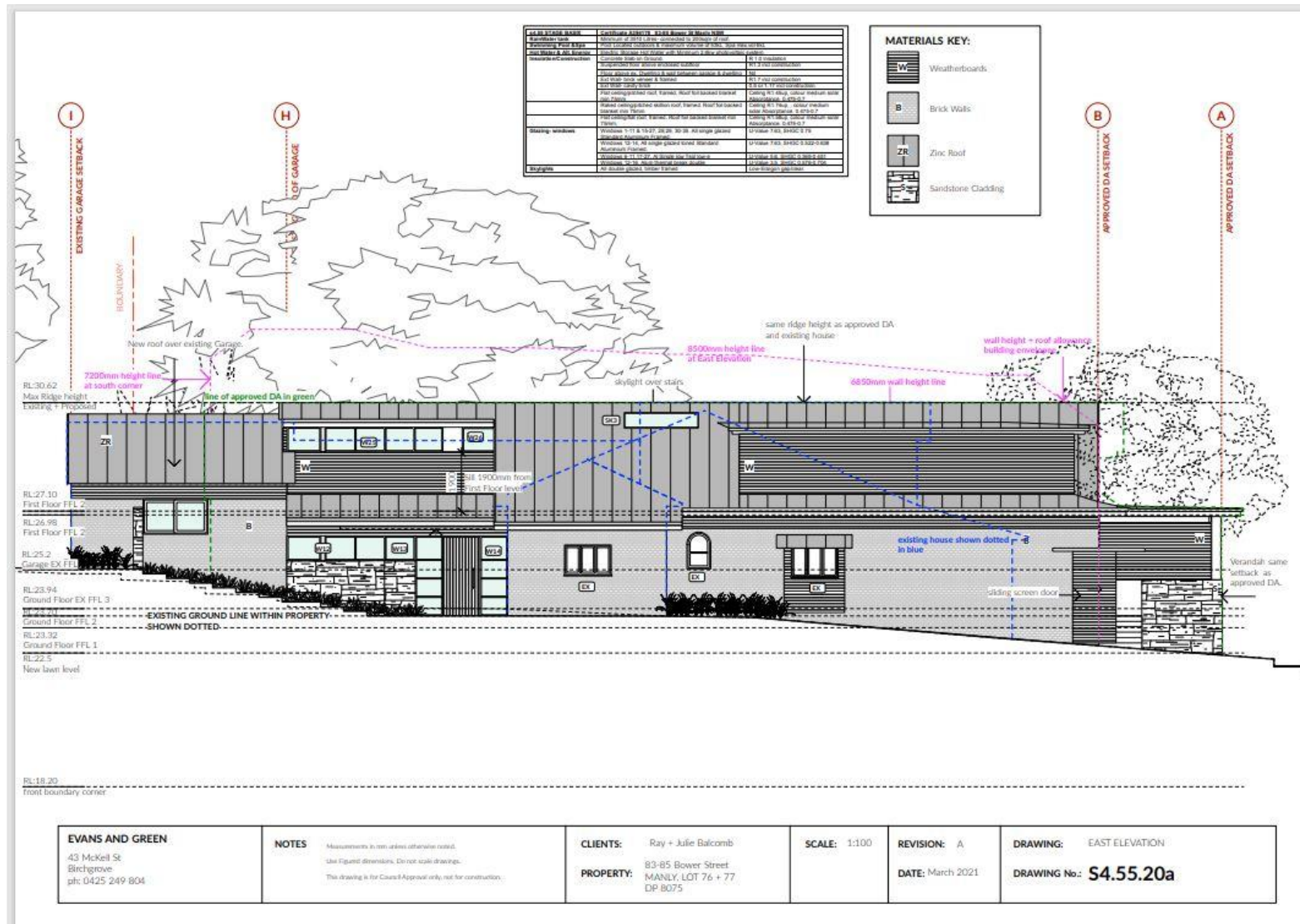


Figure 13D - Section taken through eastern side of proposed amended dwelling house (see final revised architectural plans from Evans & Green 2021)

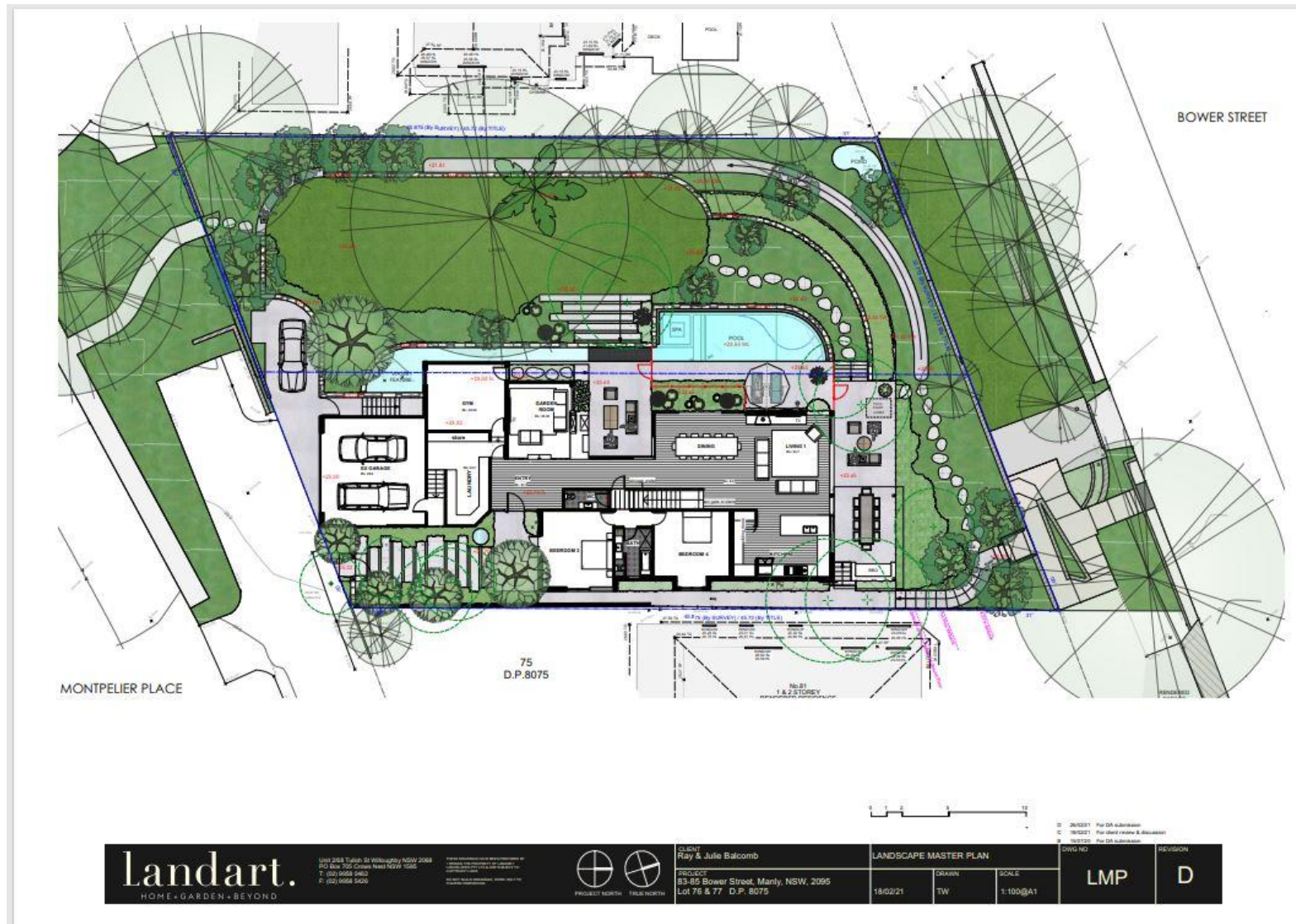


Figure 14 - Proposed revised landscape plan associated with proposed amended dwelling house (see final revised Landscape Concept Plan by Landart 2021)

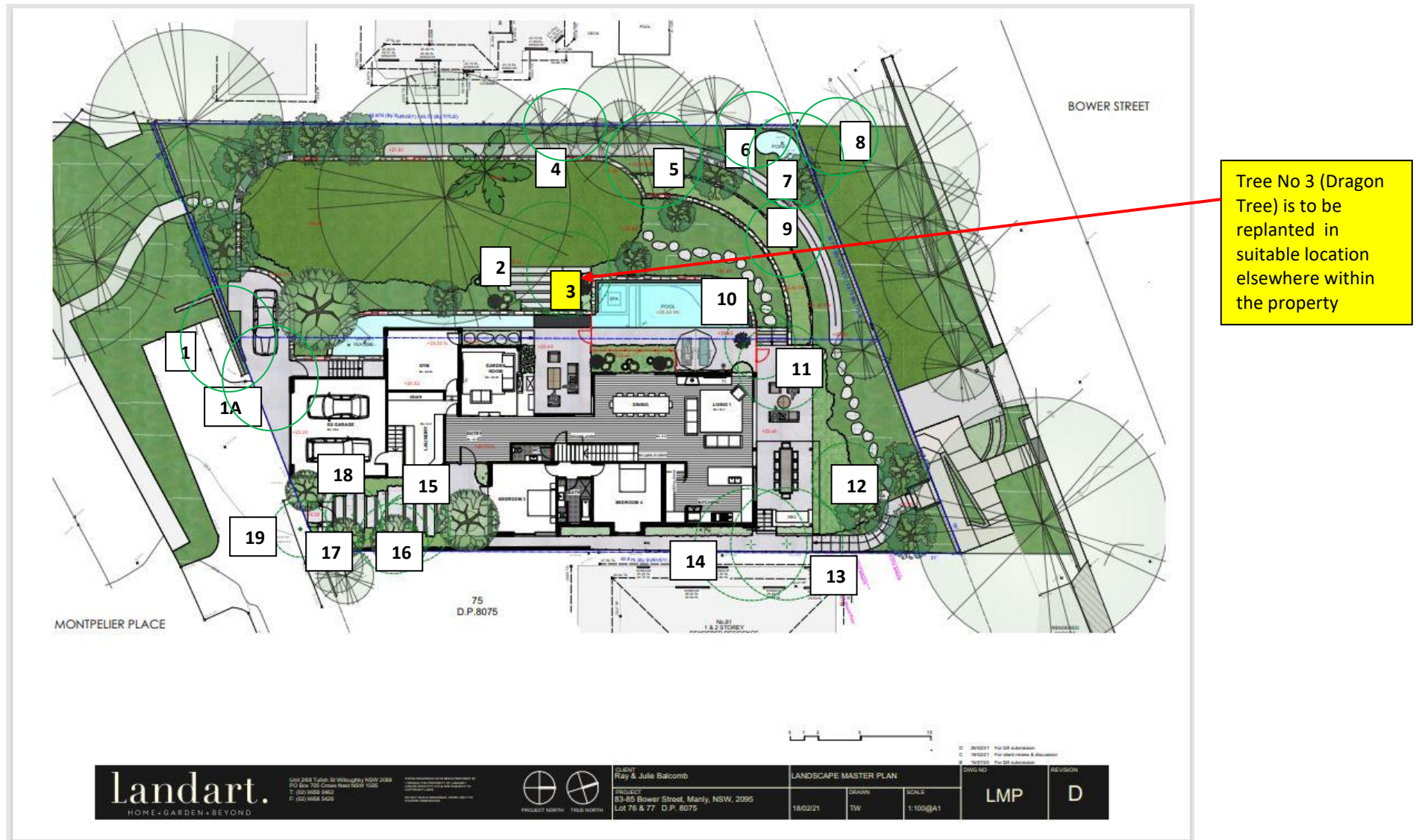


Figure 15 - Location of numbered trees listed in Table 2 that are proposed for removal (final revised Landscape Concept Plan by Landart 2021)

2 PART A - FLORA AND FAUNA BIODIVERSITY

2.1 Biodiversity survey

The subject site was inspected by ACS Environmental on the 22nd of January 2020.

For flora, a comprehensive survey of the area was undertaken for indigenous and exotic species in the front and side and garden sections.

For fauna, an opportunistic survey of all species utilising resources on the subject land was undertaken. Scats or other signs of fauna activity were noted. Potential habitat for threatened fauna species known to occur within the immediate area was assessed.

2.2 Vegetation description and ecological status

All of the outside areas of this property have been landscaped utilising mostly exotic species (see Section 1.3).

There are four (4) distinct areas of mostly discontinuous exotic lawngrass, dominated by Buffalo Grass (Figures 3, 4, 6, 8 & 9). The lower section of lawn in Area 5 is contiguous with the small patch of grassland in Area 2 though separated by a makeshift fence to prevent dogs from entering Area 2 to provide protection to a cohort of Eastern Water Dragons that find shelter there.

Species occurring in the perimeter landscaped areas and along paths include Ornamental Ginger (*Alpinia zerumbet*), Sago Palm, Kentia Palm, Clivea, Raphis Palm, Rough Tree-fern, Banana Palm, Frangipani, Sago Palm, Golden Cane Palm, Xanadu Philodendron, Bird-of-Paradise, Cordyline, Dragon Tree, Camellia (*Camellia japonica*), Chinese Hibiscus (*Hibiscus rosa-sinensis*), Dietes, Golden Dewdrops (*Duranta erecta*), Pineapple Guava (*Feijoa sellowiana*), Bhuddhist Pine (*Podocarpus macrophyllus*), Licorice Plant (*Helichrysum petiolare*), Moso Bamboo, Evergreen Giant (*Liriope 'muscari'*), Port Wine Magnolia (*Michelia figo*), Orange Jessamine (*Murraya paniculata*) and Red Amaranthus (*Amaranthus caudatus*) among others (see Section 1.3).

2.3 Vegetation status

2.3.1 Ecological community status

The structure and composition of the vegetation at 83 - 85 Bower Street, Manly, is a managed and maintained ornamental vegetation community with only a few native species planted among the ornamental suite of species. The community is not listed as of conservation value

either by the NSW Biodiversity Conservation Act (BC Act) (2016) or by the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act) (1999).

2.3.2 Plant species status

None of the individual native species recorded on site are listed as threatened under the NSW BC Act or the Commonwealth EPBC Act.

2.4 Description of fauna habitat

Fauna habitat present on the subject land was rated fair for some native species, particularly birds and reptiles, as several water sources are present, there are dense patches of vegetation and crevices present in a rock wall that extends below the swimming pool. The fauna habitat however lacks a layered vegetation structure, includes mostly introduced flora species and lacks habitat features such as tree hollows, hollow logs and significant depth of leaf litter.

Habitat that was present was considered suitable for native species that have adapted to urban environments, such as the native brush-tail possum (*Trichosurus vulpecula*) (observed by owner) and the Common Ringtail Possum (*Pseudocheirus peregrinus*), as well as observed Eastern Water Dragon, Brush Turkey and several species of parrots such as Rainbow Lorikeet, Crimson Rosella and Sulphur-crested Cockatoo. With very few exceptions, threatened fauna species rarely benefit from urban development.

The North-Head population of Long-nosed Bandicoot do however actively forage within urban environments and in Manly are known to use council grassed roadside verges at night as movement corridors in search of food. Characteristic Bandicoot diggings were observed within some areas of grassland in Area 1 and Area 5 (Section 1.3) within the property at No. 83 - 85 Bower Street, though according to the owner, much less frequently since the property was inhabited in early 2019 (Figure 10).

2.5 Fauna status

Undisturbed bush-land on North-Head is home to 14 mammal species, 87 bird species, 21 reptile species and 5 frog species (Manly Council 2013).

Further, a total of 25 threatened fauna species recorded by the Bionet Atlas of the Office of Environment and Heritage (OEH 2018) as occurring within the Manly locality are listed in *Appendix 1*. Some of these species are also covered by the Commonwealth Department of Environment and Energy (DoEE) threatened species *Environment Protection and Biodiversity Conservation Act (EPBC Act)*.

The subject land was assessed for potential for the listed species to occur. One population, the North-Head population of Long-nosed bandicoot was assessed as having potential to utilise resources on the subject land due to its close proximity to North-Head reserves and the presence of contiguous council managed roadside verges (*Appendix 2*). There is no natural or other potential habitat present for any of the other listed threatened species.

There is no habitat on the site for any migratory bird species such as the White-bellied Sea-eagle or the White-throated Needle-tail but some may fly overhead as part of a wider foraging range.

2.6 Fauna recorded utilising resources within the property

Bird species including the Rainbow Lorikeet (*Trichoglossus haematodus*), Sulphur-crested Cockatoo (*Cacatua galerita*) and Noisy Miner (*Manorina melanocephala*), were noted foraging for nectar and other food resources in shrubs within the property. A family of Australian Brush Turkey (*Alectra lathamii*) were foraging within the undergrowth. These bird species are common in the Manly locality.

The Dark-flecked Skink (*Lampropholis delicata*) was recorded in crevices in the rock wall and several juvenile and adult individuals of Eastern Water Dragon (*Physignathus lesueurii lesueurii*) were recorded basking mainly in Areas 2 & 3 (Section 1.3). Another reptilian species which has potential to be present in the shaded areas of the garden is the Eastern Water Skink (*Eulamprus quoyii*).

The Common Brushtail Possum (*Trichosurus vulpecular*) had been recently observed by the owner. Evidence of diggings of Long-nosed Bandicoot activity were observed in bare earth patches in grassland within Areas 1 and 5 of the property (Figure 10).

The presence of large dogs wandering throughout the property and defaecating on rear lawns may potentially dissuade Bandicoots from actively foraging within the property, though the owner has confirmed that any dogs taken outside the house after dusk was attended and on a leash.

2.7 Long-nosed Bandicoot activity and access to the property

No. 83 - 85 Bower Street occurs in proximity to undisturbed bush-land on North-Head where good quality habitat exists for the population of Long-nosed Bandicoot to breed and forage.

At night Long-nosed Bandicoots are known to forage from North-Head into the Eastern Hill area via grassed roadside verges and contiguous garden scapes.

Bandicoot foraging was noted in the grassed areas of Area 1 and Area 5 within the subject property (Figure 10) indicating they may be currently actively foraging in the area.

Bandicoots are able to access the front and side gardens, accessed beneath the respective gates (Figure 16), allowing access to foraging resources within the grassed areas of the property.



Figure 16 - Gaps of approximately 5cm occur beneath the front gate, the side gate at the western end of Area 1 and the side gate between Area 4 & Area 6, sufficient to allow entry to Bandicoots which may forage continuously between grassed council verges and grassland patches within properties on Bower Street.

The areas of grassed lawns comprised of Buffalo Grass may potentially make ideal foraging habitat for the Bandicoot, though the active presence of two large domestic dogs that roam freely throughout the property may deter Bandicoot activity when these dogs are roaming outside the house. The owner has stated that the dogs are kept inside the house after dusk except when they are allowed out for ablutions but the dogs are supervised with the owners in attendance and on leashes at these times. The presence of continuous fresh and decaying dog faeces may deter some Bandicoot activity in this area though characteristic diggings indicate at least the occasional presence of Bandicoots within the property boundaries (Figure 10).

3 Addressing Clause 6.5 'Terrestrial Biodiversity' sections (3) & (4) of MLEP 2013

3.1 Clause (3) *'Before determining a development application for development on land to which this clause applies, the consent authority must consider the following':*

(a) *Whether the proposed development is likely to have:*

(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land,

Comment – It is considered that the proposal will not significantly alter the potential foraging habitat for the Bandicoot, though the current status of the many varied gardens may be modified as some small trees and shrubs will require removal to allow for demolition of the current dwelling and construction of the new residence (Figure 15).

(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna,

Comment – Fauna habitat present on the subject land is rated as fair for some native species, particularly birds and reptiles, as several water sources are present, there are dense patches of vegetation and crevices present in a rock wall that extends below the swimming pool. The fauna habitat however lacks a layered vegetation structure, includes mostly introduced flora species and lacks habitat features such as tree hollows, hollow logs and significant depth of leaf litter. The proposed 'plunge pool' water feature indicated in the landscape plan in Figure 14 will be fenced to prevent dogs from entering and will provide ideal habitat for the resident Eastern Water Dragon populations.

(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land,

Comment – As the vegetation on site is mostly exotic and provides no specific habitat features for local fauna, there is no potential to fragment, disturb or diminish any biodiversity structure of the land.

(iv) any adverse impact on the habitat elements providing connectivity on the land,

Comment – The exotic vegetation at the front and sides of the subject site is contiguous with other such managed landscapes and has no connectivity with areas of natural vegetation.

(b) Any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development:

Comment – The proposed development is for the demolition of the current dwelling and replacement of a new residence in approximately the same location as the present (Figures 13A, 13B & 13C). The current assemblage of mainly exotic ornamental plants appears tolerant of the seaside conditions and appears to attract nectar feeding avifauna thus maintaining the sites biodiversity. New landscaping (Figure 14) may enhance the potential for nectivorous feeding.

3.2 Clause (4) ‘Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that’:

(a) The development is sited and will be managed to avoid any significant adverse environmental impact:

Comment – The development design is in accordance with Manly Council's LEP and will not contribute to any adverse environmental impact.

(b) If the impact cannot reasonably be avoided by adopting feasible alternatives – the development is designed, sited and will be managed to minimise the impact:

Comment – Not applicable, as the development will not contribute to any adverse environmental impact.

(c) If the impact cannot be minimised – the development will be managed to minimise the impact:

Comment – Not applicable, as the development will not contribute to any adverse environmental impact.

4 PART B ASSESSMENT OF SIGNIFICANCE (5-part Test)

Assessment of the impact on the North Head Long-nosed Bandicoot population under Schedule 1 Part 1 of the BC Act by modifications to an existing dwelling at No. 38 Bower Street, Manly.

In 1997 the NSW Scientific Committee made a final determination that the North Head population of Long-nosed Bandicoots should be listed as an endangered population on Part 2 of Schedule 1 of the *Biodiversity Conservation Act 2016*.

No. 83 - 85 Bower Street falls within the mapped area in MLEP 2013 as requiring an assessment of significance (5-part Test) for any works that may potentially affect Long-nosed bandicoot habitat.

Under the NSW [Biodiversity Conservation Act 2016](#) populations will now be defined as 'part of a species'.

- A population of a species will only be eligible to be listed as 'threatened' if the species is not already listed.
- Endangered populations currently listed under the *Threatened Species Conservation Act 1995* will be carried over to the NSW *Biodiversity Conservation Act 2016*. The NSW Threatened Species Scientific Committee will review listings and determine when changes to listings are necessary.

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species, populations or ecological communities or their habitats:

The factors of assessment:

(a) in the case of a threatened species, whether the proposed development or activity proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Comment: The Long-nosed Bandicoot population of North-head is now presumed to be listed as a 'threatened' species under the BC Act.

The Development Application proposes:

Demolition of existing house and construction of new two-storey dwelling in approximately the same location as existing. Some excavation is required on the southern section of the property to accommodate new car parking areas (Figure 13C).

There will be only small changes to any of the main garden areas at either the front or at the side gardens. There is a small alteration to the building footprint.

The proposed works are highly unlikely to have a significant impact on the life cycle of the Long-nosed Bandicoot or place the local population at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,***

Comment: Not applicable. No threatened ecological community will be affected by the proposal.

(c) in relation to the habitat of a threatened species, population or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed***

Comment: Some Bandicoot foraging activity was recorded on some areas of exotic grassland at the subject land at No. 83 - 85 Bower Street. The proposal will largely maintain the garden and extent of lawn areas (Figure 14) and not significantly remove or modify the habitat. It is recommended that at present before construction, a small floatation structure is attached to the disused pool to enable Bandicoots to swim out from the pool if they inadvertently fall into the pool because the pool fencing is open to Bandicoot entry.

- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and***

Comment: Potential Bandicoot foraging or nesting habitat is present on the subject land. The extent of lawn area will be maintained or possibly even increased as a result of the proposal (See Figure 14).

- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality, long-term survival of the species,***

Comment: Some areas of foraging habitat were recorded on the subject land, but the proposal will not decrease the extent of or fragment or isolate any area of recorded foraging habitat for the Long-nosed Bandicoot. It is strongly recommended that the owners maintain the practice of attending to and accompanying dogs that may enter the yard after dusk, to have the dogs on a leash and in company with the owner(s).

(d) whether the action proposed is likely to have an adverse effect on any declared area of outstanding biodiversity (either directly or indirectly)

Comment: No area of **outstanding biodiversity** has been declared for the North-Head population of Long-nosed Bandicoot, and the development proposal will not decrease the overall foraging habitat in the rear yard. The proposed removal of current dwelling and replacement with new residence is considered unlikely to have any adverse effect, either directly or indirectly on the local population of Long-nosed Bandicoot.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Comment: There are three main Key Threatening Processes listed under the BC Act (2016) directed solely towards the North-Head population of Long-nosed Bandicoot.

1. Predation by the domestic cat and dog (OEH 2020 - Species profiles).
2. Predation by the European Red Fox (*Vulpes vulpes*).
3. Clearing of native bush-land and fragmentation of habitat, as it leads to a loss of biodiversity.

The development proposal does not involve removal of native vegetation or fragmentation of habitat and is unlikely to contribute to the operation of, or increase the impact of any of the key threatening processes listed. As the owners of the subject land own two large active dogs, it is recommended that the dogs are kept inside after dusk and if entering the yard after dusk, to be accompanied by owners and to be restrained by a leash.

Assessment of Significance Conclusion

The subject land at 83 - 85 Bower Street contains a single storey rendered building situated on the southern side of Bower Street. The Development Application proposes demolition of the existing residence and construction of a new two-storey residence at approximately the same footprint as the existing (Figures 13 - 14).

At present the planted garden areas do not provide specific habitat features for the bandicoot though the maintained discontinuous grassy areas of Buffalo Grass provide suitable foraging areas. The Long-nosed Bandicoot forages mainly at or after dusk, digging for invertebrates, fungi and tubers (DPIE 2020). During this survey evidence of bandicoot

activity was noted in Area 1 and Area 5 (Figure 10) of the property. As the owners of the subject land own two large active dogs, it is recommended that the dogs be restricted from entering the front and side yard areas at, and after dusk, unless closely supervised, accompanied by owners, and restrained on a leash.

Given recommendations to manage the proposal to demolish the existing residence and construct a new dwelling house, there should be no impact on the life cycle of the North Head Population of Long-nosed Bandicoot.

The five factors requiring consideration, in determining '*whether there is likely to be a significant effect on threatened species or their habitats*', concluded that there should be no significant effect on the North-Head Long-nosed Bandicoot population by the proposed alterations and additions. As a consequence further assessment in the form of a 'Species Impact Statement' is considered not warranted.

5 GENERAL CONCLUSIONS

No. 83 - 85 Bower Street, Manly is situated within mapped Long-nosed Bandicoot habitat and therefore required that an Assessment of Significance be undertaken to determine if any part of the proposed development application would impact on the life-cycle or integrity of threatened fauna species that occur in the immediate area.

Manly Council has also requested additional information in regard to the proposed development, in particular, elements of Terrestrial Biodiversity (Clause 6.5 Sections [3] & [4] of Manly Local Environment Plan (MLEP) - 2013) which is required to be addressed before a development application can be considered.

All garden areas of this property have mostly been landscaped utilising exotic species (see Section 1.3). Well defined exotic lawn areas have been maintained at the front and sides of the property (Figures 3, 4, 6, 8 & 9).

The planted gardens with a variety of flowering plant species, including trees and shrubs, provide foraging resources for avian fauna and suitable foraging and sheltering habitat occurs for common reptile species observed at the subject site.

The North-Head population of Long-nosed Bandicoot was assessed as having potential to enter the property from the Council verge at the front boundary and beneath a gate at the rear of the property on its western side. There is no suitable habitat present for any of the other listed threatened fauna species (Appendix 1). There is also no habitat on the site for any migratory bird species but some may fly overhead as part of a wider foraging range (Appendix 1).

The proposal to demolish part of the existing building and construct additions and alterations to the existing residence will result in the retention of many of the garden beds containing exotic shrubs and small trees and potentially enhance the area of lawns, and as such this proposal is considered to have no adverse impact on the ecological value and significance of the site, notwithstanding that the majority of flora is not natural to the region.

During this survey, some bandicoot activity was recorded in Areas 1 and 5 area of the subject land (see Section 1.3).

As the current owners own two large active dogs, it is recommended the dogs be accompanied by the owner or other handlers and restrained by leash when entering the yard after dusk, such that Bandicoots, if present would not be at risk if foraging at the property.

As recent bandicoot foraging activity was recorded at the subject site, a suitable flotation structure placed at the side of the swimming pool is recommended to be secured there in the unlikely event that an individual Bandicoot may inadvertently fall into the pool.

6 RECOMMENDATIONS

- 6.1 Work hours 7.00am to 6.00pm. No noisy construction work outside the hours of 7.30am and 4.30pm.
- 6.2 Builders and contractors should be made aware of the potential presence, activity and conservation significance of the North-Head population of Long-nosed Bandicoot.
- 6.3 The site manager should provide areas for the storage of hazardous materials; with an impermeable ground cover and an immediate supply of absorbent material for containment of spillage. No spillages are to enter any ponds occurring at the property or into the road drainage system in Bower Street. This prevents contamination of foraging habitat further afield.
- 6.4 All open footing trenches, pits and holes have a secure cover at night. This prevents accidental drowning of bandicoots if the trenches or pool excavation areas were to fill following heavy rain.
- 6.5 Long-nose Bandicoots are nocturnal foragers. Outside lighting in the rear garden area should be the lowest level required for safety. Movement sensor lights should not be installed.

- 6.6 Care should be taken at night in the driveway when moving cars as bandicoots may seek shelter beneath stationary vehicles.

7 REFERENCES AND LITERATURE REVIEWED

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- Commonwealth DoEE Protected Matters Environmental Search Tool (2020)
- Evans & Green, A (2021) 83_85 Bower Street Proposal-200114
- Landart (2021) Landscape Concept Plan for 83 - 85 Bower Street, Manly
- NSW Scientific Committee. Final Determinations (1996 – 2020) Determinations relating to listings of threatened species, populations, ecological communities and key threatening processes in the Schedules of the *Threatened Species Conservation Act 1995*.
- NSW Scientific Committee. (1997) Final determination to list the North Head population of the Long-nosed Bandicoot (*Peremeles nasuta*) Geoffroy 1804, as an endangered population on Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995*
- DPIE Bionet Atlas (2020). NPWS Geographic Information Systems Division, Hurstville NSW, 2220.
- Scott L.K. (1995) Nutritional ecology and population biology of the Long-nosed Bandicoot *Peremeles nasuta*: Implications for conservation. M.Sc. Thesis, Univ. of Syd. Sydney.
- Stoddart E (1995) Long-nosed Bandicoot pp184-185 in Fauna of Australia Ed. R Strahan Reed Books Chatswood.
- Walton D.W. and Richardson B.J. (eds.) (1989). *Fauna of Australia*. Mammalia. Canberra: Australian Government Publishing Service Vol 1B pp. 401-1227.

Appendix 1 Threatened fauna species listed by the DPIE Bionet Atlas of NSW Wildlife (2020) for the Manly locality.

Family	Common name	Scientific name	NSW status	Comm. status	No. of records
Amphibia Myobatrachidae	Red-crowned Toadlet	<i>Pseudophryne australis</i>	V,P		55
Reptilia Varanidae	Rosenberg's Goanna	<i>Varanus rosenbergi</i>	V,P		4
Aves Columbidae	Rose-crowned Fruit-Dove	<i>Ptilinopus regina</i>	V,P		2
	Superb Fruit-Dove	<i>Ptilinopus superbus</i>	V,P		1
Ardeidae	Australasian Bittern	<i>Botaurus poiciloptilus</i>	E1,P	E	1
	Black Bittern	<i>Ixobrychus flavicollis</i>	V,P		3
Accipitridae	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V,P	C	6
	Square-tailed Kite	<i>Lophoictinia isura</i>	V,P,3		2
Burhinidae	Bush Stone-curlew	<i>Burhinus grallarius</i>	E1,P		4
Cacatuidae	Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V,P,2		1
Psittacidae	Little Lorikeet	<i>Glossopsitta pusilla</i>	V,P		1
	Swift Parrot	<i>Lathamus discolor</i>	E1,P,3	CE	5
Strigidae	Powerful Owl	<i>Ninox strenua</i>	V,P,3		86
Petroicidae	Scarlet Robin	<i>Petroica boodang</i>	V,P		1
Mammalia Peramelidae	Southern Brown Bandicoot (eastern)	<i>Isodon obesulus obesulus</i>	E1,P	E	2
	Long-nosed Bandicoot, North Head	<i>Perameles nasuta</i>	E2,P		2,266
Phascolarctidae	Koala	<i>Phascolarctos cinereus</i>	V,P	V	1
Burramyidae	Eastern Pygmy-possum	<i>Cercartetus nanus</i>	V,P		355
Pteropodidae	Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V,P	V	205
Emballonuridae	Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V,P		1
Vespertilionidae	Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V,P	V	3
	Southern Myotis	<i>Myotis macropus</i>	V,P		13
	Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V,P		1
Miniopteridae	Little Bent-winged Bat	<i>Miniopterus australis</i>	V,P		5
	Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V,P		36

Legend

EPBC Act (1999) (Commonwealth Status)

C, J, K = China, Japan Korea Bi-lateral Bird Agreements

V=vulnerable

E=endangered

C E = Critically Endangered

BC Act (2016) (NSW Status)

V= Vulnerable

E1= endangered species, E2= endangered population

Appendix 2

The Population of threatened Long-nosed Bandicoot at North Head, Manly

Bandicoots in general are a vital part of our natural ecosystem and form an interdependent relationship that benefits both plant and animal. Bandicoots carry beneficial bacteria and fungi on their bodies that are able to act as antibiotics for plants, promoting plant growth and seed germination (Walton & Richardson 1989, Stoddart 1995).

Generally, the Long-nosed Bandicoot (*Perameles nasuta*) is classed as common along the eastern seaboard of Australia and is not listed as a threatened species under current Commonwealth or State legislation.

However, in Manly, the North Head population of Long-nosed Bandicoot has been isolated and separated from other populations, with the closest known surviving population occurring in the Pittwater Local Government Area. As such, it is important to halt actions or activities which may further jeopardize the survival of the population. The small size of the population at North Head, and its isolation from other Long-nosed Bandicoot populations, means that it may be prone to inbreeding depression and possible reduced genetic variability. Therefore the population of Long-nosed bandicoot at North Head may be genetically distinct from other populations, and as a result may be affected detrimentally by environmental change and is vulnerable to random or unplanned disturbances.

The Long-nosed Bandicoot is essentially a solitary animal that occupies a variety of habitats on North Head. Studies by the former Department of Environment, Climate Change and Water (DECCW) in 2002 recorded between 130-160 individuals. An increase in population size is considered to be a result of protection measures introduced by State government and Manly Council.

Scott (1995) found that the diet of Long-nosed Bandicoot at North Head consists primarily of beetles, larvae, ants, and to a lesser extent monocotyledonous leaf and stem and fungi. This diet is maintained throughout the year. The conical holes bandicoots leave in the soil are often seen at the interface of naturally vegetated and areas of open grass.

Bandicoots live up to three years. The home range for a female bandicoot is approximately 1.7 ha and 4.4 ha for males. Once mature, males will disperse to find their own territory. A female matures at 5 months and may have more than one litter per season of 2-3 young. A newborn weighs only 0.25g and is 13mm long.

Bandicoots will return to a nest site during the daylight hours. The nest is usually built in bushland but individuals may nest in urban areas if the conditions are suitable. The nest consists of a shallow depression covered with grass or leaves.