



Integrated Landscape Solutions
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Yurrah Pty Ltd
abn 26 067 601 683
14 Cox Rd Windsor
PO Box 2039 Windsor Q 4030
Tel 3857 8477 Fax 3857 8276
Email: mail@yurrah.com.au
Web: www.yurrah.com.au

Mr Rob Moore
Project Director
Delfin Lend Lease
Level 2, 349 Coronation Drive
Milton QLD 4064

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 28/11/10

18th November 2010

Dear Rob, email: rob.moore@lendlease.com.au

RE: Ecological Report for Yarrabilba Precinct One (Early Release Area) Development Application

Yurrah has been commissioned by Delfin Lend Lease to provide an ecological report accompanying the development application for Precinct 1 of the Yarrabilba Urban Development Area (UDA). Plans reviewed include:

Yarrabilba Preferred Structure Plan #YB-OLL-SP101118 dated 18th November 2010;
Yarrabilba Urban Footprint Area Issues #YB-UF-CO101118 dated 18th November 2010;
Precinct One Reconfiguration of a Lot #YB-PO1_ROL101118 dated 18th November 2010; and
Landscape Concept Plan #YB-PO1_LCP101118 sheet 1 of 2 and sheet 2 of 2 dated 18th November 2010.

Yurrah is familiar with the ecological values of Yarrabilba and has previously undertaken site investigations and assessment reports for the Structure Planning process with Logan City Council. Yurrah has specifically been requested to review the following:

1. *Comment on the proposed subdivision layout in relation to the Mapped 'Of Concern' Regional Ecosystem boundaries within the Precinct 1 planning area;*

Response to 1: The design of the urban development for Precinct 1 is completely outside of the mapped remnant vegetation area, as shown in the subdivision plan referred to above. It is proposed to protect and rehabilitate the remnant vegetation within the waterway corridor network that will be dedicated to Council as public open space.

It is noted that the Precinct 1 area does not contain any koala habitat constraints as mapped by GHD in their recent report to Logan City Council (see also the Constraints and Opportunities Urban Footprint Area plan), and the conserved waterways do not form part of the major future wildlife movement corridors across the Yarrabilba site.

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 12/10/2012

2. Comment on the development setbacks from 'Of Concern' remnant vegetation, including the acceptability of streets as a part of integrated buffers;

Response to 2: The development set-backs from remnant vegetation have been set by an average distance of 30 metres, which is consistent with the DERM *Regional Vegetation Management Code for South East Queensland Bioregion – version 2* (November 2009) and the *Concurrence Agency Policy for Reconfiguring a Lot (RaL) – version 2* (October 2009). This development set-back enables the design and construction of an integrated buffer between remnant vegetation and development, and may include pathways and roadways (including local streets or collector roads) to facilitate access. A Design Code has been developed for this buffer system as follows:

The Waterways and Environmental Corridor Interface (Buffer) Design Code

This Code applies to the design and management of all Waterway and Environmental Corridor Interface (ie buffer) design at Yarrabilba, during both the construction and operational phases of the project. The Performance Measures are derived from a consideration of the functional requirements of the buffers, based on possible impacts. These are primarily as follows:

- the long term protection of habitat and integrity of the natural waterway resource, including enhancement of fauna movement corridors;
- the provision of a physical separation distance as a barrier between adjacent development and the natural waterway resource, and clarification of real property boundaries;
- the accommodation within the buffer of natural physical processes including land stability, erosion and accretion, flood mitigation, climate change and the greenhouse effect;
- the filtration of pollutants and competition from potentially invasive species and
- the provision of appropriate, controlled human access.

Performance Measure	Acceptable Solution(s)	Comments
P1 Protection of biodiversity and the distribution of species is achieved through: • restoration of continuity of riparian vegetation • connectivity with other remnants • provision of suitable habitat to facilitate fauna	AS1.1 No reduction in extent of existing indigenous vegetation and species richness; and	The restoration and rehabilitation of core waterway vegetation is a major element in the long-term management of the Yarrabilba conservation estate.
	AS 1.2 Rehabilitation of cleared areas to restore abundance and species richness to pre-clearing levels; and	Riparian and wetland species add species richness and diversity to the waterway corridor.
	AS1.3 Continuity is restored for riparian vegetation along the whole length of the waterways.	Continuity is necessary to maximise movement opportunities across all groups of indigenous fauna including the koala.

movement and gene exchange along the waterway corridors		
P2 Protection of Buffers through appropriate vegetation structure and floristics that is separate from that of the riparian habitat.	AS2.1 Protection and retention of existing indigenous vegetation within the buffer zone; and AS 2.2 Rehabilitation of cleared areas to restore abundance and species richness to pre-clearing levels with special reference to koala habitat trees; and AS 2.3 Edge-planting designed to seal the buffer vegetation, transition to the cultural landscape and minimise niche opportunities for weed establishment.	The buffers will be rehabilitated as open forest with pre-clearing species richness and diversity. The lower layers of vegetation – particularly the indigenous perennial grasses and macrophytes – are to be targeted for restoration. Edge species comprise dense-canopied shrubs and clumping species to minimise spread of weeds through exploitation of gaps. Species to include wattles and she-oaks that may need periodic replacement if natural recruitment has not occurred. Species will transition to cultural landscape that will also include locally indigenous species but also some species introduced to the site.
P3 Provision of physical separation through construction of combinations of roadways, pathways, bikeways, firebreaks and water quality treatment devices.	AS 3.1 All grassed areas in the cultural landscape are separated from the buffer vegetation by a pathway, bikeway, roadway, firebreak or water quality treatment device.	A separation element of one or more of these types will provide a clear indication of the boundary at the interface of urban use and bushland.
P4 Filtration of pollutants is ensured to maintain approved standards of water quality within the streams, and prior to discharge into the buffer areas.	AS 4.1 Water-sensitive Urban Design (WSUD) principles reflect best-practice to achieve the approved standards of water quality; and AS 4.2 The water quality treatment train is designed to prevent the inflow of sediment into the waterway system; and	WSUD is implemented upstream of the separation element through design of a treatment train that accords with best-practice for Southeast Queensland. Stormwater out-falls are not concentrated to large flows by a maximum number of small flows, to even discharge over a large number of points. Bio-infiltration basins or trenches

	AS 4.3 Stormwater outfalls are designed to recreate, as far as possible, pre-development sheet-flow characteristics. All scour is prevented.	are designed to maximise infiltration and hence groundwater re-charge. Stream-bed and banks are to be protected from erosion. Rehabilitation will ensure repair where this is of concern, especially in the vicinity of any semi-permanent pools or wetlands.
P5 The riparian and buffer vegetation is maintained free of introduced species of flora and fauna.	AS 5.1 All introduced plants are removed prior to rehabilitation planting. Supplementary removal is carried out on a regular program following rain. AS 5.2 Introduced fauna species are regularly removed after inspection on quarterly basis.	Long-term weed and feral fauna management is also an essential part of the management plan for waterways at Yarrabilba, and must be coordinated with the rehabilitation plantings.
P6 Riparian and wetland vegetation is to be protected from accidental fires through fuel-reduction burns when necessary.	AS 6.1 Regular biodiversity burns are excluded from waterway corridors, but fuel-reduction may be necessary in the buffers from time to time subject to inspection.	Small-scale patch burns may be required from time to time subject to whether fuel loads increase to the point where fire-intolerant flora or fauna are threatened, or where the build-up of fuel causes threats to persons or property.

It is recommended that the Acceptable Solutions from this Code be adopted for the purposes of planning and developing the Precinct One area.

3. Provide a general overview of the quality of remnant vegetation in the mapped area, including the widespread presence of introduced slash pine as a result of the previous plantation use of the land;

Response to 3: The previous use of the Yarrabilba site as a pine plantation is evidenced by the abundance of pine wildlings throughout the site, including within the remnant vegetation areas. Areas thus affected will need to have the pine removed and re-vegetation planting using locally indigenous species.

4. Provide recommendations in relation to refining the extent of remnant vegetation by site survey at the Operational Works stage to clarify the drip-line of assessable vegetation from which to calculate the appropriate set-backs to development;

Response to 4: The extent of remnant vegetation is currently mapped by DERM at a scale of

1:50,000 and the relevant drawings noted above include these polygons obtained as electronic files from DERM. The development set-backs from mapped remnant will ensure that small divergences between mapped remnant and actual extent of the 'drip-line' as surveyed on site can be accommodated within the sub-divisional design.

Once planning approval has been received it is recommended that the applicant undertake a detailed survey of the existing drip-line of assessable vegetation to confirm the extent of remnant, and to overlay this survey information on the detailed design at the Operational Works Application stage.

5. Provide recommendations in relation to the proposed road crossing of the remnant area;

Response to 5: The writer is satisfied that the special design treatment of the proposed road-crossing of the waterway containing remnant vegetation has been located taking the tree distribution into account such that the clearing of existing vegetation will be minimized (Refer road crossing detail sketch plan dated Nov 2010).

Further, the location of the crossing is such that the areas on each side of the road reserve can be rehabilitated to facilitate movement by fauna of all groups, including mammals, reptiles and amphibians, through the provision of fauna-friendly culvert crossings, appropriate plantings and an above-ground arboreal fauna crossing device. Such devices are broadly consistent with best-practice and details should be provided at the OWA stage.

6. Provide general observations regarding the suitability of the design from a bushfire management viewpoint;

Response to 6: The set-backs to development are consistent with the fire management standards and guidelines in the DERM *Concurrence Agency Policy for Reconfiguring a Lot (RaL) _ version 2* (October 2009), and will be integrated into appropriate buffer designs, as addressed in the response to item 2 above Response to 2: The proposed location of active and/or passive local parks in the vicinity of or adjacent to the waterway network is consistent with the conservation and rehabilitation program in the network. The local parks will also act as buffers between remnant vegetation and urban areas and their planting design can be coordinated with the rehabilitation concept.

7. Comment on other relevant environmental considerations including the design of passive and active open space uses such as playgrounds, picnic facilities and pathways in the linear park system that adjoins the mapped remnants along the waterway system.

Response to 7: The location of passive and active local parks next to the waterway corridors at Yarrabilba Precinct One provides a compatible land use that complements the conservation values of the waterways as well as providing a suitable buffer between the waterway and urban development. The landscaping of the open space can also be designed for consistency with the overall aims of the rehabilitation concept.

Further Comment: Yarrabilba is a long-term project where there is sufficient time after approval of the first precinct of development to implement a strategy for rehabilitation of the primary fauna movement corridor networks external to Precinct 1 to contain those elements of vegetation structure and habitat that are considered necessary for effective ecosystem function.

Ecological Report for Yarrabilba Village 1 ILUP application

In some cases, approximately 20 years will be available in which to ensure the growth of trees and other life forms to maturity. Further, this corridor network can be fenced with koala-proof fencing where desired to ensure protection from external predators. Grade-separated vehicle crossings can also be constructed to ensure an unbroken corridor where fauna including koalas are not impacts by traffic.

I trust that this information is suitable for your purposes, but please call me to discuss if you have any further queries.

Yours Sincerely,



David Hassall
BSc (Hons), PhD, Grad Dipl Land Arch, RLA, MEIANZ
Consultant