

1. BACKGROUND

- 1.1. These technical specifications have been developed with particular reference to NSW Government 2011, "Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects - Guide 8: Nest boxes", prepared by the Roads and Traffic Authority, September 2011 and NSW Government 2008, "Guidelines for the design, construction and placement of nest-boxes", prepared by the Department of Environment, Climate Change and Water, Biodiversity Conservation Section.
- 1.2. In October 2007, the State Government formally listed the "loss of hollow-bearing trees" as a Key Threatening Process under the Threatened Species Conservation Act 1995. This was in recognition that the loss of hollow-bearing trees adversely affects threatened species, populations or ecological communities and could cause species, populations or ecological communities that are not threatened to become threatened.

2. PERFORMANCE CRITERIA

- 2.1. The performance criteria for this Technical Specification is that there will be no net loss of significant habitat resources including hollow logs and tree nesting hollows, with materials cleared from the construction area re-used in adjacent areas where possible.

3. DEFINITIONS

- 3.1. Compensatory nesting offsets are the provision nesting habitat to offset the loss of hollows from trees approved for felling. Examples include:
 - hollow bearing trees relocated from the development area
 - the creation of artificial habitat hollows in standing dead or dying trees
 - artificial nest boxes
- 3.2. Hold point: A defined position in the construction stages beyond which work shall not proceed without mandatory verification and acceptance by Council.
- 3.3. Witness Point: A nominated position in the construction stages where the option of attendance may be exercised by Council, after notification of the requirement.

4. MANAGEMENT REQUIREMENTS

- 4.1. The need to provide compensatory nesting offsets for the loss of hollow-bearing trees will be assessed and reported by a qualified ecologist prior to clearing activities.
- 4.2. A qualified ecologist will be on-site during the installation of compensatory nesting offsets, including artificial nest boxes.
- 4.3. A habitat tree hollow assessment will be carried out prior to clearing activities.
- 4.4. The habitat tree hollow assessment will outline the number of hollows, their size, location and likely or recorded species utilising the hollow in the area to be cleared and the area where compensatory nesting offsets are to be provided.
- 4.5. The habitat tree hollow assessment will be carried out in accordance with State Government's BioMetric Terrestrial Biodiversity Assessment Tool, as outlined in DECCW 2011, "Operational Manual for BioMetric 3.1" Department of Environment, Climate Change and Water, NSW Sydney or later version.

- 4.6. After installation and prior to clearing, a compensatory nesting offsets report (including GIS map)) will be provided (in paper and digital versions) outlining the number, type, location and orientation of compensatory nesting offsets to be provided.
- 4.7. Appropriate temporary signage will be installed while installation, monitoring and maintenance operations are being carried out.
- 4.8. For each monitoring/maintenance event, a similar report will be required and include observations regarding evidence of fauna occupancy and any presence of pest activity (including feral bees and Indian mynas).
- 4.9. The following Hold Points apply to this Technical Specification:
 - Provision of the habitat tree hollow assessment
 - Provision of the compensatory nesting offsets report
- 4.10. The following Witness Points apply to this Technical Specification:
 - Prior to commencement of installation of artificial nest boxes, inspection of the proposed artificial nest boxes
 - At least one month before the start of any clearing when seventy per cent of artificial nest boxes have been installed
 - At least one week prior to the commencement of the clearing phase
 - At least one week prior to each monitoring/maintenance event

5. DESIGN REQUIREMENTS

- 5.1. Where hollows are felled, they will be recovered and reinstalled into suitable adjacent bushland where possible.
- 5.2. Re-use of hollows will be carried out in preference to the construction of artificial nest boxes as compensatory nesting offsets.
- 5.3. Compensatory nesting offsets will be provided at a minimum ratio of one to one for each hollow removed during clearing. Note there may be more than one hollow in a tree approved for felling.
- 5.4. Compensatory nesting offsets will be provided as close as possible to the location of the original hollows.
- 5.5. The design of artificial nest boxes will be appropriate for the species targeted for mitigation, and be designed in accordance with the Gould Group 2008, "The Nestbox Book", Wilkinson Publishing Pty Ltd or similar.

6. MATERIAL REQUIREMENTS

- 6.1. Artificial nest boxes will be constructed from recycled local hardwoods (un-machined if possible).
- 6.2. Where local hardwoods are unavailable marine/external grade ply wood with a minimum thickness of 18mm can be substituted.
- 6.3. The inside face of the artificial nest boxes will have slots cut into it, to assist with internal access to the exit hole.

- 6.4. Boxes will be screwed using stainless steel or galvanised screws (not nails) and the base will have a minimum of three drainage holes of not more than 10mm diameter.
- 6.5. Toxic substances will not be used in the construction.
- 6.6. A 40 mm to 50 mm thick layer of sawdust will be provided in the base of the artificial nest box to replicate the inside of decaying hollows.

7. INSTALLATION REQUIREMENTS

- 7.1. Seventy per cent of artificial nest boxes will be installed at least one month before the start of any clearing to provide alternative shelter for hollow-dependant fauna displaced during clearing.
- 7.2. All artificial nest boxes and salvaged tree hollows will be preferentially positioned on the southern side of the tree trunk to avoid exposure to direct sunlight.
- 7.3. All artificial nest boxes and salvaged tree hollows will be preferentially positioned to avoid exposure to night-time light sources and the predominant aspects of severe storms.
- 7.4. Where the target species are territorial, then the minimum distance between artificial nest boxes or salvaged tree hollows will be based on the breeding territory of that species or other species-specific information, to maximise the use of the artificial nest boxes or salvaged tree hollows.
- 7.5. All artificial nest boxes and salvaged tree hollows will be located in close proximity to potential food sources of the target species to reduce their travelling distances and conserve their energy.
- 7.6. Only one artificial nest box will be installed per tree, to prevent overcrowding.
- 7.7. Artificial nest boxes will be fixed to suitable retained vegetation in a way that does not damage the tree. Artificial nest boxes will be attached using the *Habisure* system, or equivalent. The fixing arrangements of artificial nest boxes with rear facing entrance holes will allow spaces between the artificial nest boxes and trees for fauna to access the nest boxes.
- 7.8. Artificial nest boxes will not be fixed to trees of cultural significance. The State Government's Aboriginal Heritage Information Management System will be utilised where appropriate.
- 7.9. Artificial nest boxes will not be fixed to trees with existing hollows.
- 7.10. In areas of preferred koala habitat, artificial nest boxes will not be fixed to the following trees: Parramatta red gum (*Eucalyptus parramattensis subsp. Decadens*), Small-fruited Grey Gum (*Eucalyptus propinqua*), Swamp mahogany (*Eucalyptus robusta*) and Forest red gum (*Eucalyptus tereticornis*).
- 7.11. All artificial nest boxes and salvaged tree hollows will be mounted at a height appropriate for the target species.
- 7.12. Following installation of each artificial nest box and salvaged tree hollow, a report (including GIS map) will be prepared that records the identification number, artificial nest box or salvaged tree hollow type, GPS location, species and diameter at breast height of the host tree, artificial nest box or salvaged tree hollow height and orientation.

8. MAINTENANCE AND MONITORING REQUIREMENTS

- 8.1. Artificial nest boxes will be monitored:
- every three months during the first year after installation
 - every six months during the construction period
 - every year for the maintenance period
- 8.2. Monitoring of artificial nest boxes will be undertaken by an ecologist with a camera on the end of an extendable pole.
- 8.3. Artificial nest boxes will be maintained for a minimum of six years after the last subdivision certificate is issued.
- 8.4. Maintenance works could include repairing artificial nest boxes, repositioning, re-erection or relocation of nest boxes to trees, checking each box is not holding water or leaking and removing pests.
- 8.5. Monitoring observations will be recorded in a report format and submitted in digital format.
- 8.6. If an artificial nest box needs to be removed from the site for repair, then an alternative nest box will be installed in the same location upon removal of the damaged nest box.

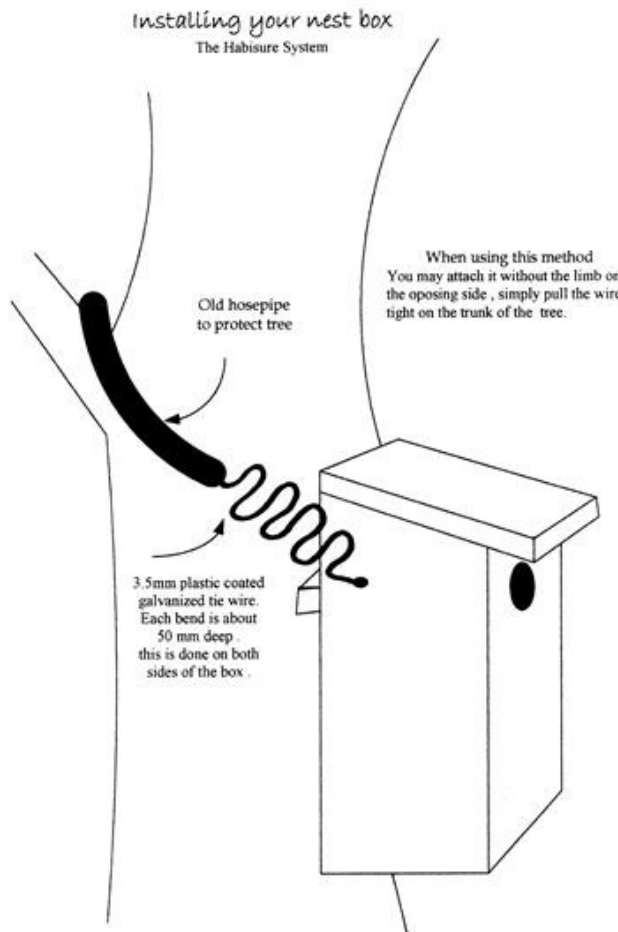


Figure 1.1 The Habisure System