



KOALA PLAN OF MANAGEMENT (VOLUME 2)

Kings Forest

A Report Prepared for
Project 28 Pty Ltd

JANUARY 2020

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PREFACE

The preparation of the Kings Forest KPoM has been based on detailed ecological and hydrological assessments, a comprehensive review of the latest literature relating to the protection of Koalas and their habitat, and recommendations from TSC, DoPE, OEH and the NSW IPC.

The KPoM has been prepared as two (2) Volumes:

- VOLUME 1 is the plan itself, containing discussion of threatening processes, specific actions for management of koalas and their habitat during the pre-development, construction and operational phases of the Kings Forest development, as well as providing for ongoing monitoring, management and review.
- This is VOLUME 2 and contains the appendices.

TABLE OF CONTENTS

APPENDIX 1 - James Warren - CV	4
APPENDIX 2 - Approvals Process and Stakeholder Consultation	8
APPENDIX 3 - Compliance with Relevant Approval Conditions.....	11
Compliance Table: CP06_0318 (MODS 1 - 8)	12
Compliance Table: MP08_0194 (MODS 1 - 7)	18
Compliance Table: EPBC ACT APPROVAL 2012/6328	32
APPENDIX 4 - Additional Kings Forest Management Plans and Their Relationship To The KPoM.....	36
APPENDIX 5 - Koala Population and Habitat Assessment	39
APPENDIX 6 - Assessment of Threatening Processes	55
APPENDIX 7 - Compensatory Habitat Selection Criteria	64
APPENDIX 8 - Rehabilitation Specifications and Monitoring	67
APPENDIX 9 - Independent Verification Report - Koala Habitat (MJD Environmental 2019)	77

APPENDIX 1 - JAMES WARREN - CV

APPENDIX 2 – APPROVALS PROCESS AND STAKEHOLDER CONSULTATION

Development of this KPoM has been an iterative and consultative process. It has included input from relevant experts and agencies as well as data from scientific studies with respect to Koala populations and habitat within the Kings Forest area.

Public authorities consulted have included:

- Tweed Shire Council - Councillors and officers;
- NSW Department of Environment and Climate Change (now NSW Office of Environment and Heritage (OEH)) - Northern Region;
- NSW Roads and Traffic Authority (now NSW Roads and Maritime Services);
- NSW Department of Planning and Infrastructure (now NSW Department of Planning and Environment);
- NSW National Parks and Wildlife Service;
- NSW Environmental Protection Agency;
- NSW Department of Primary Industries;
- NSW Rural Fire Service; and
- NSW Office of Water.

A summary of the process for preparing this KPoM is detailed below.

- A Kings Forest KPoM (Carrick 2009) was approved as part of the Concept Plan approval in 2010;
- A Revised Kings Forest KPoM (JWA 2013) was approved as part of the Major Project approval in 2013.
- A modification to Project Approval 08_0194 (MOD 2) was approved in 2014. A Revised KPoM was prepared (JWA 2014) which removed proposed Koala compensatory habitat from the golf course.
- Commonwealth approval for the Kings Forest project was received in May 2015 which required the completion of a KPoM.
- A final draft of the KPoM in accordance with the EPBC Act approval conditions (2012/6328) was completed in May 2017.
- A number of Commonwealth Approval conditions were varied in June 2017.
- Also in June 2017 the proponent, Project 28 Pty Ltd (Project 28), lodged a Section 75W modification request (MOD 4) seeking approval to implement a revised KPoM and amend a number of conditions of approval. This draft KPoM was submitted to the NSW DoPE. The application (including the revised KPoM) was publicly exhibited between 29 June 2017 and 28 July 2017. During the exhibition period, a number of submissions were received by DoPE including submissions from:
 - Tweed Shire Council;
 - Office of Environment and Heritage;

- EcoLogical Australia on behalf of DoPE; and
- Members of the public (Total of approximately 2,009 submissions received during the extended exhibition period)
- On 19 December 2017 a Response to Submissions Report (DAC Planning Pty Ltd) was forwarded to the Department addressing issues raised in relation to a KPoM prepared by JWA Pty Ltd dated 19 May 2017 (Version 9). Attached to the RTS was a further revised KPoM (Version 11) - JWA Pty Ltd dated 19 December 2017.
- Following lodgement of the Response to Submissions Report a number of meetings were held between representatives of Project 28 (including James Warren and Associates) and representatives from DoPE, OEH and TSC and a revised KPoM was provided on 23 March 2018.
- JWA Pty Ltd provided a further information and a cover letter detailing amendments on 26 March 2018, following which EcoLogical Australia (on behalf of DoPE) provided further comments on 28 March, 3 and 11 April 2018.
- In response to the EcoLogical Australia comments, JWA Pty Ltd prepared a revised KPoM (May 2018) and a response to EcoLogical Australia comments.
- DoPE under their discretionary powers did not publicly exhibit the May 2018 KPoM but invited key stakeholders to provide comments. Submissions were received from Tweed Shire Council (dated 13 July 2018), NSW Office of Environment & Heritage (dated 23 July 2018), EcoLogical Australia (for Department of Planning and Environment) (dated 16th July 2018) and Team Koala (dated 11 July 2018).
- On 20 August 2018, a meeting was held on site between representatives of Project 28 (including James Warren and Associates) and representatives from DoPE, OEH and TSC. The meeting was convened at the request of DoPE to allow officers from their referral agencies to inspect several proposed compensatory habitat areas. Following this meeting, some further consolidated comments regarding the KPoM were received (7th September 2018).
- A Response to Submissions (RTS) was subsequently prepared by JWA Pty Ltd addressing the issues contained in the most recent submissions and final consolidated comments referred to above. A revised KPoM (October 2018) accompanied the RTS.
- On 15 November 2018 TSC prepared a review of the October 2018 KPoM (version 16);
- NSW DoPE referred the MOD 4 assessment report to the NSW Independent Planning Commission (IPC) for determination on 13 December 2018. The IPC provided their MOD 4 report on 8 May 2019.
- Subsequent to the publishing of the IPC report in May 2019 Project 28 and JWA met with Tweed Shire Council on ten (10) occasions (including a site inspection of the proposed offsite offset site - Turners). These meetings occurred between 14 May 2019 and November 29 2019;
- Project 28 and JWA also met with the Department of Planning Infrastructure & Environment (DPI&E) on the 15 May 2019 and the Commonwealth Department of the Environment and Energy on 23 July 2019;
- A further draft KPoM (version20) was prepared in October 2019;

- On 21 November 2019 TSC prepared a response to the October 2019 draft KPoM.

APPENDIX 3 - COMPLIANCE WITH RELEVANT APPROVAL CONDITIONS

The Kings Forest project received NSW planning approval in 2010 (Concept Plan) and 2013 (Project Approval). Commonwealth approval under the EPBC Act was received in May 2015.

The following Tables contain the relevant Consolidated Approval Conditions and also note where they are addressed in this KPoM:

- Concept Plan 06_0318 Consolidated Approval Conditions incorporating the following:
 - Modification No. 1, approved on 22 December 2010;
 - Modification No. 2, approved on 11 August 2013;
 - Modification No. 3, approved on 16 May 2014;
 - Modification No. 4, approved on 20 November 2014;
 - Modification No. 5, approved on 10 November 2015;
 - Modification No. 8, approved on 24 May 2018;
- Project Approval 08_0194 Consolidated Approval Conditions incorporating the following:
 - Modification No. 1, approved on 16 May 2014;
 - Modification No. 2, approved on 20 November 2014;
 - Modification No. 3, approved on 20 February 2017;
 - Modification No. 4, approved on 08 May 2019;
 - Modification No. 6, approved on 21 December 2017;
 - Modification No. 7, approved 24 May 2018; and
- the EPBC Act Approval Conditions (2012/6328) incorporating the Approved Variation to Conditions (June 2017).

COMPLIANCE TABLE: CP06_0318 (MODS 1 - 8)

CP06_0318 CONDITION	SECTION OF KPoM
<p><i>B1 Koala Plan of Management - Ongoing Review</i></p> <p>The Koala Plan of Management, and the measures contained therein to offset the impact of the development on existing and future koala populations, shall be updated at each stage of development so that these measures remain relevant and effective and based on contemporary scientific data throughout the development of the Project the subject of this concept plan.</p> <p>Each stage update shall be prepared in accordance with the requirements in C2 and subject to independent review by a suitably qualified person/s to the satisfaction of the Secretary.</p>	<p>SECTION 1.8 of the KPoM provides for the revision of the KPoM as appropriate (when necessary or as directed by the Minister).</p>
<p><i>B2 Annual Flora and Fauna Monitoring Report</i></p> <p>Within 12 months of this approval, or as otherwise determined by the Secretary, the Proponent shall prepare a draft outline of a Flora and Fauna Monitoring Report to the satisfaction of the Secretary. The aim of the report is to collate and synthesise all monitoring and reporting requirements contained in the documents listed in A3.</p> <p>The draft outline of the Flora and Fauna Monitoring Report shall set out the proposed timeframe and duration for ongoing monitoring with reference to locations within Kings Forest, stages of development and the specific issues listed below.</p> <p>The Flora and Fauna Monitoring Report shall be prepared by a suitably qualified person/s and include, but not be limited to:</p> <ol style="list-style-type: none"> (1) Aims, objectives and methodology for monitoring and reporting; (2) Baseline monitoring data focusing on existing populations of threatened species, including Wallum frog species and Koala; (3) Performance criteria against which the effectiveness of the various separate management plans required as part of this approval dealing with Koala, threatened species, buffers, weeds, vegetation and feral animals can be measured. Relevant benchmark reference vegetation communities are to be nominated from within surrounding conservation estates; (4) Actual performance against the above criteria; (5) Any required corrective actions; (6) Monitoring and reporting of fauna usage within the Environmental Projection zones, ecological buffers and the golf course; (7) Adaptive management procedures to ensure that the various separate management plans remain relevant and effective; (8) Monitoring and reporting of Koala injury and mortality; and (9) Specific monitoring to measure any impact of the development on the adjacent Cudgen Nature Reserve and adaptive management procedures to ensure impacts are minimised. <p>The Monitoring Reports are to be provided to the Department of Planning, OEH, Tweed Shire Council and Industry and Investment - Fisheries.</p>	<p>SECTION 1.9</p>
<p><i>B4 East-West Wildlife Corridors</i></p> <ol style="list-style-type: none"> 1) A fully revegetated east-west wildlife corridor generally 100 metres wide (with a minimum of 50 metres at any one point) shall be constructed between the existing central east-west wildlife corridor and the existing native vegetation separating Precinct 9 and 10 from Precinct 11, (as identified in the plan entitled "East-West Wildlife Corridor", as Attachment A to this approval) and extending to the north of the site between the existing native vegetation and ecological buffers separating Precinct 9 and 10 from Precinct 11. The corridor shall be designed to maximise fauna use (especially koalas), continuity with existing vegetation and should consider restoration works on surrounding properties. The details of this modification, including regeneration / revegetation of the corridor and the preferred long term protection mechanism are to be submitted to the satisfaction of the Secretary within 6 months of the date of determination of the application (No. 2012/2328) made under sections 130(1) and 133 of the Commonwealth Environment Protection and Biodiversity Conservation Act or prior to the lodgement of the first development application for the project or prior to the issue of the first construction certificate for the project, whichever occurs first. 	<p>Improving habitat connectivity and linkage corridors, including the East-West corridor, is dealt with in SECTION 7.7 of the KPoM.</p>

CP06_0318 CONDITION	SECTION OF KPoM
<p><i>B7 Implementation of Environmental Management Plans</i></p> <p>1) The proponent is responsible for the management of all Potential Council Land and the Future OEH Land for conservation purposes and the implementation of ongoing management and maintenance activities specified in all Environmental Management Plans from the date of the commencement of the project or at another time directed by the Secretary, until such time that an agreement is reached with OEH and /or Tweed Shire Council regarding the dedication of that land.</p> <p>Note: For the purpose of this condition, commencement is taken to mean any physical works including clearing vegetation, the use of heavy duty equipment for the purpose of breaking ground for bulk earthworks, or infrastructure for the proposed project.</p>	<p>SECTION 7.10</p>
<p><i>C2 Management Plans</i></p> <p>All future applications are to include precinct-specific management plans providing details on timelines for implementation of recommended works including both establishment and maintenance periods and measurable performance criteria. Each plan is to include an annual maintenance schedule of works following the initial establishment period and ongoing monitoring requirements. It is not necessary for new plans to be prepared if an application relies on, and does not affect, a plan that was included with an earlier application relating to the same period.</p> <p>Each plan must consider all other existing plans for the site to ensure management strategies do not conflict and that each plan can be implemented without negatively impacting on the objectives of another. Final plans are to be prepared in consultation with Council and endorsed by the Secretary prior to the lodgement of the relevant development application for each stage.</p> <p>Koala Plan of Management</p> <p>For each stage of development an update to the KPoM shall be provided to the satisfaction of the Secretary, confirming that the measures identified and proposed in the KPoM to offset the impact of the development on existing and future Koala populations are adequate.</p> <p>(1) The update should take into account:</p> <ul style="list-style-type: none"> (a) contemporary data/literature on koala management; (b) the results of the monitoring of management measures operating as part any approved stage/s, in accordance with B2; (c) the role of additional koala habitat created in protecting koala numbers, and (d) the provision of any additional koala management measures, specifically those relating to dogs. <p>(2) The update should include, but not be limited to, the following:</p> <ul style="list-style-type: none"> (a) The identification of dog breeds known to present a significant threat to koalas; (b) Measures to effectively mitigate the threat posed to koalas by dogs. Such measures may include prohibitions/restrictions on particular breeds; limitations on the number of dogs per property; and specifications on the way dogs are to be housed from dusk to dawn. 	<p>SECTION 1.8 of the KPoM provides for the revision of the KPoM as appropriate (when necessary or as directed by the Minister).</p> <p>As provided in SECTION 7.4 of the KPoM and confirmed by Dr Steve Phillips, the proposed exclusion fencing design is more than adequate to exclude dogs from entering Koala habitat areas.</p>

CP06_0318 CONDITION	SECTION OF KPoM
<p>(3) The update must provide stage specific detail on the following:</p> <ul style="list-style-type: none"> (a) revegetation and rehabilitation measures; (b) measures to ensure that no identified koala food trees are removed within adjacent ecological buffers or identified core koala habitat within adjacent Environmental Protection zoned land; (c) all obligations regarding the keeping of dogs, including regulatory and enforcement measures; (d) specific road design, lighting and signage requirements aimed at protecting koalas and maintaining their safe passage between habitat areas. These requirements shall include fencing to road verges, fauna underpasses and like measures; (e) detail of procedures to be adopted in the event that koalas are sighted within construction zones or the urban areas; (f) specifications for any off-leash dog exercise areas to ensure appropriate separation from koala habitat; (g) the detail of the location and construction specification of dog exclusion fencing to any adjacent Environmental Protection Zones and the timing of its completion; (h) the detail, content and distribution of koala education and awareness measures aimed in particular at contractors and staff engaged in construction and at future residents of that stage; and (i) a protocol for the reporting of any deaths or injuries to any koala within Kings Forest including collection and recording procedures and where necessary autopsy procedures or laboratory tests to identify the cause of death to any koala. 	<p>SECTION 1.8 of the KPoM provides for the revision of the KPoM as appropriate (when necessary or as directed by the Minister).</p> <p>The KPoM provides details of:</p> <ul style="list-style-type: none"> a. Revegetation and rehabilitation measures (SECTION 7.6 & APPENDIX 8) b. Retention of existing Koala habitat (SECTION 7.5) and identification of vegetation to be cleared in order to prevent clearing outside of nominated areas c. Measures to prevent Koala contact with dogs (SECTION 7.4) d. Procedures to be adopted in the event that Koalas are sighted within the construction or urban zones (TABLES 15, 16 and 17) e. Off leash dog exercise areas are not proposed for Stage 1 but will be considered in future Project/Development Applications (SECTION 7.4) f. Exclusion fencing SECTION 7.3 and FIGURES 18, 19 and 31 - 35 g. Environmental awareness and extension (SECTION 7.13) h. Fauna incident reporting (SECTION 7.2.6 and TABLES 15 - 17)

CP06_0318 CONDITION	SECTION OF KPoM
<p>Vegetation Management Plan Each Vegetation Management Plan update is to provide details on:</p> <ol style="list-style-type: none"> (1) the short, medium and long-term measures to be implemented to rehabilitate degraded areas, and manage remnant vegetation and habitat within the buffers and Environmental Protection zoned land within the site. (2) revegetation and regeneration including establishment of appropriate canopy (including koala feed trees), sub-canopy, understorey and ground strata. (3) rehabilitation of creeks and drainage lines. (4) conserving and re-using, where appropriate, the soil seed bank where good quality native vegetation is being removed. (5) collection and propagation of endemic native seed for revegetation on the site. (6) monitoring of water quality and vegetation health within buffers and environmental protection zoned areas. (7) the design, regeneration/revegetation and management of the east-west wildlife corridor/s. (8) measurable performance criteria are to be based on appropriate reference sites within the adjacent Cudgen Nature Reserve. 	<p>The following updated Vegetation Management Plans have been prepared for the Kings Forest site and should be read in conjunction with this KPoM:</p> <ul style="list-style-type: none"> • Kings Forest Precincts 1 and 5 Vegetation Management Plan (JWA 2019a); • Kings Forest Precincts 2-4 and 6-11 Vegetation Management Plan (JWA 2019b); and • Kings Forest Precincts 12-14 Vegetation Management Plan (JWA 2019c).
<p>Feral Animal Management Plan Each Feral Animal Management Plan update is to provide further details on collaboration with adjoining land owners and the incorporation of measures which include shooting and baiting.</p>	<p>The Kings Forest Feral Animal Management Plan (JWA 2019i) has been updated and should be read in conjunction with this KPoM.</p>
<p>Weed Management Plan Each Weed Management Plan update is to detail ongoing weed management measures for each relevant stage.</p>	<p>The following updated Weed Management Plans have been prepared for the Kings Forest site and should be read in conjunction with this KPoM:</p> <ul style="list-style-type: none"> • Kings Forest Precincts 1 and 5 Weed Management Plan (JWA 2019k); • Kings Forest Precincts 2-4 and 6-11 Weed Management Plan (JWA 2019l); and • Kings Forest Precincts 12-14 Weed Management Plan (JWA 2019m).
<p>Buffer Management Plan Each Buffer Management Plan update is to detail bushfire protection measures, access control, signage and fencing.</p>	<p>The following updated Buffer Management Plans have been prepared for the Kings Forest site and should be read in conjunction with this KPoM:</p> <ul style="list-style-type: none"> • Kings Forest Precincts 1 and 5 Buffer Management Plan (JWA 2019g); and • Kings Forest Precincts 2-4 and 6-14 Buffer Management Plan (JWA 2019h).

CP06_0318 CONDITION	SECTION OF KPoM
<p>Threatened Species Management Plan</p> <p>Each Threatened Species Management Plan update is to provide further details on specific habitat management measures to safeguard existing populations of the two Wallum frog species that occur within the Environmental Protection Zones, ecological buffers and the golf course. These measures are to be determined with reference to contemporary scientific literature and current best practice.</p>	<p>The following updated Threatened Species Management Plans have been prepared for the Kings Forest site and should be read in conjunction with this KPoM:</p> <ul style="list-style-type: none"> • Kings Forest Precincts 1 and 5 Threatened Species Management Plan (JWA 2019d); • Kings Forest Precincts 2-4 and 6-11 Threatened Species Management Plan (JWA 2019e); and • Kings Forest Precincts 12-14 Threatened Species Management Plan (JWA 2019f).
<p>Golf Course Management Plan</p> <p>The Golf Course Management Plan is to demonstrate consistency with the Koala Plan of Management and the Threatened Species Management Plan.</p>	<p>The Golf Course Management Plan (Gilbert & Sutherland 2008) will need to be amended) as required by Condition 39 of the MP 08_0194.</p> <p>The revision of the Golf Course Management Plan must not be inconsistent with this KPoM, which addresses the requirements of Condition C2 of the Concept Plan Approval 06_0318 and Condition 39 of the MP 08_0194 (as modified).</p>
<p><i>C3 Dedication of Land to OEH</i></p> <p>Prior to the release of the first subdivision certificate for the project, or as otherwise determined by the Secretary (at the request of the Proponent). The Proponent must provide evidence of an agreement for the dedication by Project 28 Pty Ltd to the OEH of the Future OEH Land being no less than approximately 150ha of land as addition to the Cudgen Nature Reserve.</p> <p>Such an agreement must outline the proponent's commitment to establish boundary fences and trails to the satisfaction of the OEH prior to the Future OEH Land being added to Cudgen Nature Reserve. The Proponent must ensure suitable funding for the amendment of existing reserve specific fire, pest, weed and management plans. The funding should be sufficient to ensure actions within the amended plans relevant to the new additions are able to be completed.</p> <p>Future OEH Land means the land identified in the "Plan of Proposed Areas to be Dedicated to NPWS Kings Forest Development" prepared by Landsurv Pty Ltd dated 23 August 2012, Revision C. Note: the dedicated lands may be used as an offset for biodiversity impacts in accordance with the policy applicable from time to time under which offsets for such impacts are assessed.</p>	<p>SECTION 7.10 provides details of the transfer of land to public ownership.</p>

CP06_0318 CONDITION	SECTION OF KPoM
<p><i>C8 Traffic and Wildlife Protection Measures</i> All future development applications are to demonstrate that: (1) Provision has been made to maintain the safe passage of wildlife between habitat areas through specific road design, lighting and signage requirements and, where considered appropriate, fencing to road verges, fauna underpasses and like measures; and (2) Road crossings of waterways maintain existing fish passage.</p>	<p>SECTION 7.3 provides details of fauna exclusion fencing, fauna underpasses, road crossing and other infrastructure (e.g. grids, signage, lighting).</p>
<p>C28 East West Wildlife Corridors The development application for subdivision in Precinct 6, 7, 9 or 10 (whichever occurs first) must include a detailed Management Plan to include the precise location, restoration methodology, schedule and timing of works to be undertaken, maintenance and monitoring schedule, completion criteria and a mechanism for long-term protection of the new southern east-west corridor as required by term B4 of this approval.</p>	<p>SECTION 7.7</p>

COMPLIANCE TABLE: MP08_0194 (MODS 1 - 7)

MP08_0194 CONDITION	SECTION OF KPoM
<p>A13. The proponent is responsible for the management of all Potential Council Land and Future OEH Land for conservation purposes and the implementation of all establishment period and maintenance period works specified in <u>all Environmental Management Plans</u> from the date of the commencement of the project, or at another time directed by the Secretary, until such time that an agreement is reached with OEH and /or Tweed Shire Council regarding the dedication of that land.</p> <p>Note: For the purpose of this condition, commencement is taken to mean any physical works including clearing vegetation, the use of heavy duty equipment for the purpose of breaking ground for bulk earthworks, or infrastructure for the proposed project.</p>	<p>SECTION 9.2 provides the definition of “commencement”. SECTION 7.10 provides details of the transfer of land to public ownership.</p>
<p>Environmental Offset Areas</p> <p>3. Prior to commencing any Bulk Earthworks in a Precinct, or as otherwise agreed between the Proponent and the Secretary, the Proponent shall:</p> <p>a) engage a registered surveyor to prepare survey plan(s) and permanently mark the boundaries of the:</p> <p>i) the contiguous area of Potential Council Land; and</p> <p>ii) the contiguous area of Future OEH Land</p> <p>immediately adjacent to the Precinct (unless the relevant contiguous area has already been marked due to the earlier commencement of Bulk Earthworks in another Precinct). A staging plan for the survey works is to be submitted to the Department prior to the commencement of the project.</p> <p>b) where relevant, submit amended plans of proposed subdivision to the Secretary for approval that show the relevant contiguous Potential Council Land and the relevant contiguous Future OEH Land as separate lots;</p> <p>c) ensure that the boundaries marked by the surveyor remain marked at all times in a permanent manner that allows operating staff, the landowner and inspecting officers to clearly identify those boundaries; and</p> <p>d) submit for the Secretary's approval, a form of dealing(s) to be registered on the title to the Potential Council Land and the Future OEH Land that must:</p> <p>i. bind all future landowners;</p> <p>ii. provide for the management of the Potential Council Land and the Future OEH Land for conservation purposes including the implementation of relevant Environmental Management Plans, in perpetuity;</p> <p>iii. permit access to the Potential Council Land and the Future OEH Land by the Department, the OEH and Council at all times for the purpose of monitoring compliance with relevant covenants and the Environmental Management Plans; and</p> <p>iv. provide for a release of any registered dealings in circumstances where all or part of the Potential Council Land or the Future OEH Land are transferred to a public authority.</p> <p>e) Where the Potential Council Land or the Future OEH Land is not subject to any amended plans of subdivision, the Proponent must within 1 month of the Secretary's approval of the dealing(s) referred to in condition 3(1)(d), lodge for registration the dealing(s) on the relevant titles to the Potential Council Land or the Future OEH Land and provide to the Secretary evidence of such registration within 10 days of the dealing(s) being registered.</p> <p>f) Where Potential Council Land or the Future OEH land is subject to any amended plans of subdivision, the Proponent must within 3 months of the later of the Secretary's approval of the amended plans of subdivision under condition 3(b) or the Secretary's approval of dealing(s) referred to in condition 3(d), lodge for registration the dealing(s) on the relevant titles to the Potential Council Land or the Future OEH Land to the Director-General evidence of such registration within 10 days of the dealing(s) being registered.</p> <p>Note: For the purpose of this condition, commencement is taken to mean any physical works including clearing vegetation, the use of heavy duty equipment for the purpose of breaking ground for bulk earthworks, or infrastructure for the proposed project.</p>	<p>SECTION 7.10</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>Bushfire Risk Management Plan 34. The Bushfire Risk Management Plan (BRMP) shall be amended to address the following:</p> <ol style="list-style-type: none"> 1) Co-operative relations between neighbours to minimise the potential for wildfires and work towards fire frequencies and intensities that do not impact on Koala populations 2) Management actions required for future ongoing fire related Koala management in environmental protection zones. 3) The revised BRMP shall be endorsed by OEH prior to the issue of a construction certificate for civil works. 	<p>SECTION 7.11 provides details of fire management</p>
<p>Baseline Monitoring 37.</p> <ol style="list-style-type: none"> 1) Prior to the issue of the first Construction Certificate, the proponent must demonstrate to the satisfaction of the Department that sufficient baseline monitoring has commenced in accordance with the relevant Environmental Management Plans, including the following: <ol style="list-style-type: none"> a. Flora and Fauna Monitoring Report; 	<p>SECTION 8.2</p>
<p>Environmental Management Plans 39.</p> <ol style="list-style-type: none"> 1) All Environmental Management Plans shall be revised to address management actions to be undertaken throughout the life of the project as relevant to the development precincts that the plan covers. This includes a detailed set of agreed establishment and maintenance phase performance completion criteria, ongoing monitoring and an annual maintenance schedule of works following the initial establishment period. This includes the following plans: <ol style="list-style-type: none"> a. Flora and Fauna Monitoring Report b. Buffer Management Plan c. Vegetation Management Plan d. Koala Plan of Management e. Feral Animal Management Plan f. Weed Management Plan g. Threatened Species Management Plan 2) Performance criteria for all management plans are reviewed to ensure they are specific to each precinct and action, measurable, achievable, relevant and timely. 3) The implementation schedule of all Environmental Management Plans shall be revised to include the following details as relevant to the precincts that the plan covers: <ol style="list-style-type: none"> a. Actions that are specific to the precinct for which they are addressing b. Specific map references to identify locations of works for all actions c. Total areas to be planted (m²) d. Planting density (per m²) e. Number of permanent signs to be erected and maintained f. Total areas for weed management activities (m²) g. Length of any fencing (temporary and permanent) h. Total areas for heath regeneration and revegetation (m²) i. Locations and areas (m²) of proposed threatened species habitat 	<p>SECTION 1.9 and APPENDIX 4 refer to all other relevant Management Plans</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>j. Timing and frequency of actions k. Monitoring requirements (frequency) that are specific to the action</p>	
<p>Vegetation Management Plans 40.</p> <ol style="list-style-type: none"> 1) The Works Schedule of all Vegetation Management Plans shall be amended to include “Assisted natural regeneration” as the preferred Proposed Measure for Works Areas 2, 13 and Additional Work Areas and wherever significant natural regeneration is occurring within the EPZ and/or ecological buffer areas. This approach should be adopted in preference to revegetation or rehabilitation programs, incorporated as a guiding principle in the Statement of Commitments and relevant plans. 2) The final Vegetation Management Plans shall be prepared in consultation with Council and submitted to the Secretary for approval within 6 months of the date of determination of the application (No. 2012/2328) made under sections 130(1) and 133 of the Commonwealth Environment Protection and Biodiversity Conservation Act or prior to issue of any construction certificate, whichever occurs first. 	<p>The following updated Vegetation Management Plans have been prepared for the Kings Forest site and should be read in conjunction with this KPoM:</p> <ul style="list-style-type: none"> • Kings Forest Precincts 1 and 5 Vegetation Management Plan (JWA 2019a); • Kings Forest Precincts 2-4 and 6-11 Vegetation Management Plan (JWA 2019b); and • Kings Forest Precincts 12-14 Vegetation Management Plan (JWA 2019c).
<p>Buffer Management Plans 41.</p> <ol style="list-style-type: none"> 1) Figures 11 and 11A to 11L shall be revised as necessary to ensure that spatial overlap of heath revegetation, <u>Koala food</u> tree planting and Wallum Sedge Frog compensatory habitat is minimised. 2) Tree plantings are to be minimised in areas that are identified as naturally regenerating. 3) The final Buffer Management Plans shall be prepared in consultation with Council and submitted to the Secretary for approval within 12 months of this approval of the date of determination of the application (No. 2012/2328) made under sections 130(1) and 133 of the Commonwealth Environment Protection and Biodiversity Conservation Act or prior to issue of any construction certificate, whichever occurs first. 	<p>The following updated Buffer Management Plans have been prepared for the Kings Forest site and should be read in conjunction with this KPoM:</p> <ul style="list-style-type: none"> • Kings Forest Precincts 1 and 5 Buffer Management Plan (JWA 2019g); and • Kings Forest Precincts 2-4 and 6-14 Buffer Management Plan (JWA 2019h). <p>FIGURE 26 of the KPoM (SECTION 7.6) shows the location of the proposed compensatory Koala habitat.</p>
<p>Weed Management Plans 42.</p> <p>The Weed Management Plans shall be amended to ensure that:</p> <ol style="list-style-type: none"> 1) Control of all weeds will occur: <ol style="list-style-type: none"> a. in Environmental Protection Zones located on the Kings Forest site; and b. for a distance of 20 metres into the adjacent Cudgen Nature Reserve. 	<p>The following updated Weed Management Plans have been prepared for the Kings Forest site and should be read in conjunction with this KPoM:</p> <ul style="list-style-type: none"> • Kings Forest Precincts 1 and 5 Weed Management Plan (JWA 2019k); • Kings Forest Precincts 2-4 and 6-11 Weed Management Plan (JWA 2019l); and

MP08_0194 CONDITION	SECTION OF KPoM
	<ul style="list-style-type: none"> Kings Forest Precincts 12-14 Weed Management Plan (JWA 2019m).
<p>Feral Animal Management Plan</p> <p>44.</p> <ol style="list-style-type: none"> 1) The implementation schedule of the Feral Animal Management Plan shall be revised to include the following details as relevant to the Precincts that the plan covers: <ol style="list-style-type: none"> a. Estimated number of resources required for trapping activities, capture activities and habitat removal activities b. Estimated resources required for monitoring actions 2) The Feral Animal Management Plan is to be revised to include mitigation and management actions for the control of Biting Insects, and consistent with Section A6 Biting Midge and Mosquito Controls of the Tweed DCP 2008. 3) The final Feral Animal Management Plan shall be prepared in consultation with Council and submitted to the Secretary for approval within 6 months of the date of determination of the application (No. 2012/2328) made under Sections 130(1) and 133 of the Commonwealth Environment Protection and Biodiversity Conservation Act or prior to issue of any construction certificate, whichever occurs first. 	<p>The Kings Forest Feral Animal Management Plan (JWA 2019i) has been updated and should be read in conjunction with this KPoM.</p>
<p>Koala offsets</p> <p>45. The following offsets must be provided to compensate for the loss of 1.59 ha of primary and 6.42 ha of secondary (Class A) koala habitat on-site:</p> <ol style="list-style-type: none"> a. the restoration and planting of koala food trees on an additional 27 ha of land within Cudgen Nature Reserve; or where the full 27 ha are not planted within Cudgen Nature Reserve, the entire or balance of the koala food tree planting will be undertaken on other lands in a Koala Activity Precinct or Koala Linkage Precinct (as defined in the Tweed Coast Comprehensive Koala Plan of Management 2015) in the Tweed Shire Council local government area, or on the Kings Forest Site as approved by the Secretary b. the creation of 6.26 ha of compensatory koala habitat within the east-west corridor c. the creation of 62.51 ha of compensatory koala habitat on residual lands on-site d. the on-site compensatory koala habitat, inclusive of the east-west corridor must comprise: <ol style="list-style-type: none"> i. 65.44 ha of primary koala habitat; ii. 3.33 ha of secondary koala habitat; and iii. the planting of primary and secondary koala food trees, e. All compensatory koala habitat must be located in the areas identified in the updated Koala Plan of Management approved by the Secretary under Condition 45A of this approval. 	<p>The restoration of additional land offsite is discussed in SECTION 7.6.3 of the KPoM.</p> <p>SECTION 7.6 and APPENDIX 8 provide details of the offset strategy.</p> <p>SECTION 7.6 and APPENDIX 8 provide details of Koala food tree planting</p>
<p>Koala Plan of Management Update(s)</p> <p>45A. Prior to the issue of any Construction Certificate, the Proponent must submit an updated Koala Plan of Management prepared in consultation with Council and submitted to the Secretary for approval. The updated Koala Plan of Management must address the following:</p> <ol style="list-style-type: none"> 1) Verification of Habitat and Vegetation Mapping <ol style="list-style-type: none"> a. the boundaries of the retained koala habitat and the compensatory koala habitat identified in Figures 19 to 21 of the Koala Plan of Management dated 4 October 2018, must be verified by a suitably qualified independent ecologist, with skills in GIS mapping; and b. provide offset areas with a minimum of 1,000 m2 in area; and c. the updated KPoM must include GIS shapefiles, including metadata describing each shapefile and what it represents, and how each polygon is coded for the following GIS layers: <ol style="list-style-type: none"> i. retained koala habitat; 	<ol style="list-style-type: none"> 1) <ol style="list-style-type: none"> a. An Independent Verification Report - Koala Habitat prepared by MJD Environmental (2019) is contained in APPENDIX 9 of Volume 2. b. The MJD Environmental (2019) report confirms that all offset areas are a

MP08_0194 CONDITION	SECTION OF KPoM
<p>ii. compensatory koala habitat; iii. retained Wallum Sedge Frog habitat; iv. compensatory Wallum Sedge Frog habitat; v. retained heathland; vi. heathland regeneration areas; and vii. any other conservation outcomes affecting the implementation of the Koala Plan of Management.</p> <p><u>Note:</u> For clarity, the management outcomes identified within the GIS layers required under b) iii) to vi) above will not form part of the final Koala Plan of Management approved by the Secretary.</p> <p>These layers will be used to confirm:</p> <ul style="list-style-type: none"> • there are no overlaps between the retained and compensatory koala habitat, or the compensatory Wallum Sedge Frog habitat as outlined in Section 10.5.3 of the Koala Plan of Management dated 4 October 2018, and • overlaps between the compensatory koala habitat and heathland regeneration areas do not exceed 10% of the total on-site offset area, as identified in the Koala Plan of Management dated 4 October 2018. <p>2) 27 ha of additional Offset</p> <p>Update Section 10 of the Koala Plan of Management dated 4 October 2018, to include a framework for securing and implementing the 27 ha of additional offset required under Condition 45 above. This framework must specify:</p> <ol style="list-style-type: none"> a. that the additional 27 ha off-set must be identified, and the mechanisms required to secure the in-perpetuity conservation of any koala food tree planting(s) on that land be in place to the satisfaction of the Secretary prior to the issue of the first Construction Certificate and commencement of construction for either vegetation clearing or bulk earthworks. b. that the 27 ha of additional koala food tree planting will be undertaken in Cudgen Nature Reserve, or on other lands within a Koala Activity Precinct or Koala Linkage Precinct (as defined in the Tweed Coast Comprehensive Koala Plan of Management 2015) in the Tweed Shire Council local government area, or on the Kings Forest Site, as approved by the Secretary, or; c. all additional koala food tree planting will occur prior to the issue of a Construction Certificate; d. all additional koala food tree planting that will occur: <ol style="list-style-type: none"> i. in Cudgen Nature Reserve must commence within 12 months of the OEH identifying the lands available for koala food tree planting; ii. in an alternate offset location as approved by the Secretary pursuant to Condition 45 of this approval, planting must commence within 12 months of the Secretary approving an alternate offset location; and e. all off-site koala food tree planting will be finalised, unless otherwise approved by the Secretary within 2 years of planting commencing in accordance with d) above. <p>3) Staging of Retained and Compensatory Koala Habitat</p> <ol style="list-style-type: none"> a) Update the Staging Plan in Table 10 of the Koala Plan of Management dated 4 October 2018, to: <ol style="list-style-type: none"> i. ensure compensatory koala habitat is provided at a ratio of at least 1:8.6 for each stage of the project where koala habitat clearing is proposed; ii. require koala food tree planting within the east-west corridor prior to the commencement of works within Stage 2; and 	<p>minimum of 1,000 m2 in area.</p> <p>c. Accompanying GIS files were prepared by MJD Environmental and have been provided to the Department separately.</p> <p>2) The restoration of additional land offsite is discussed in SECTION 7.6.3 of the KPoM. Details of the 27 ha of additional offsite offsets are provided in TABLE 7 and FIGURE 28. Specifically:</p> <ol style="list-style-type: none"> a. The securing of the offsets in perpetuity is discussed in SECTION 7.10. b. Approximately 21.36 ha of koala food tree plantings will take place on the 'Turners Land' as shown in FIGURE 28. The balance of the 27 ha will be provided on the Kings Forest site (FIGURE 28). c. Offsite offset planting will be commenced prior to the issue of the first construction certificate (SECTION 7.6.5); d. see above; and e. SECTION 7.6.5. <p>3) Staging of offsets is discussed SECTION 7.6.5 - TABLE 8 of the KPoM.</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>iii. clarify all retained koala habitat will be managed in accordance with the approved Vegetation Management Plan following the commencement of the project, as per the requirements of Condition A13.</p> <p><u>Note:</u> 3. a) ii. above will require the Management Plan for the east-west corridor to be lodged and approved by the Secretary prior to the commencement of works within Stage 2.</p> <p>4) Vegetation Management</p> <p>a) update Appendix 6 of the Koala Plan of Management dated 4 October 2018, to specify:</p> <ul style="list-style-type: none"> i. the performance indicators, performance criteria and corrective actions only apply to the compensatory koala habitat (i.e. the koala offset plantings) ii. the establishment and maintenance period performance criteria will be adopted for the following indicators: seedling survival, native canopy cover, weed presence, shrub and ground cover recruitment, and infrastructure (e.g. associated fencing and signage). In order to achieve an open forest structure, the following performance criteria will apply; establishment criteria will consist of 90% species survival and maintenance criteria will consist of 80% canopy cover, unless otherwise approved by the Secretary. iii. the management measures required to ensure the removal of slash pine will not result in the clearing of retained koala habitat; iv. the tree species selection and planting densities for all planting proposed within the off-site offset area; and v. the details of any on-going monitoring and management measures, and the standards for achievement for all off-site koala food tree planting. 	<ul style="list-style-type: none"> i. the proposed staging of offsets exceeds the required ratio. ii. the east-west corridor compensatory plantings will be completed in Stage 1. iii. the management of retained vegetation is discussed in SECTION 7.5 of the KPoM and reference is made to the relevant Vegetation Management Plans. <p>4) Relevant performance indicators, performance targets (during both the establishment and maintenance periods) and corrective actions are now discussed in SECTION 8.4.6 of the KPoM.</p> <ul style="list-style-type: none"> i. The performance indicators, performance criteria and corrective actions in TABLE 14 refer, and are relevant, to both retained and compensatory habitat. ii. Performance criteria for all indicators during the establishment and maintenance phases are provided in TABLE 14 with the exception of infrastructure. Specific performance measures are provided for infrastructure where relevant during the pre-construction, construction and operational phases of the development in TABLES 15 - 17 (SECTIONS 9.4 - 9.6) of the KPoM. iii. SECTION 7.5 iv. Tree planting species selection and planting densities are provided in APPENDIX 8 - TABLE 3.

MP08_0194 CONDITION	SECTION OF KPoM
<p>5) Bushfire Management</p> <ul style="list-style-type: none"> a) specify site specific bushfire management measures, including the location of fire breaks and details of fuel reduction burns (i.e. frequency) required to facilitate the persistence of Koalas on-site. <p>6) Consistency with other Environmental Management Plans (EMP)</p> <ul style="list-style-type: none"> a) specify the koala management measures that must be incorporated into the residual EMPs for the project; and b) specify the management of roaming domestic dogs must be included in the Feral Animal Management Plan. <p>7) Fencing and Koala Crossings</p> <ul style="list-style-type: none"> a) the Fencing Plan(s) contained in the Koala Plan of Management dated 4 October 2018 must be revised to demonstrate temporary or permanent fencing will not result in: <ul style="list-style-type: none"> i. the clearing of any retained koala or Wallum Sedge Frog Habitat ii. clearing within any heathland regeneration areas; or iii. the creation of isolated patches of compensatory koala or Wallum Sedge Frog habitat, or heathland revegetation areas within the environmental protection zone or the ecological buffers; iv. barriers to wildlife movement, including koalas, during the construction period; v. barriers to wildlife movement, including koalas, over the proposed golf course (Precinct 14); b) amend the bridge abutments for the Blacks Creek underpass to provide a setback of 2 m either side of the creek bed to provide underpass opportunities for koalas. <p>8) Contingency and Offset Strategy</p> <ul style="list-style-type: none"> a) Revise section 13.1 of the Koala Plan of Management dated 4 October 2018, to specify: <ul style="list-style-type: none"> Contingency Measures for the Establishment of the Compensatory Koala Habitat i. offsets will be provided on an area for area basis, for any compensatory koala habitat that does not meet the required performance targets within 7 years; an 	<p>v. Detailed monitoring and reporting measures are outlined in SECTIONS 8.4 and 8.6.</p> <p>5) The Kings Forest Bushfire Risk Management Plan is to be updated to comply with MP08_0194 Conditions 21, 34, 45A (5), 121, 141, 162. The plan should be updated with consideration of SECTION 7.11 of the KPoM, which outlines considerations for fire control in koala habitat areas.</p> <p>6) a. SECTION 1.9 and APPENDIX 4 discuss other relevant EMPs and their relationship to the KPoM. b. Noted.</p> <p>7) a. Revised fencing plans are shown in FIGURES 18, 19 and 31-35. It is noted however that permanent fencing arrangements over the proposed golf course will be determined at a later stage. b. Amended underpass design over Black Creek is shown in FIGURE 21B.</p> <p>8) a) A revised Contingency and Offset Strategy is provided in SECTION 11 of the KPoM.</p>

MPO8_0194 CONDITION	SECTION OF KPoM
<p>ii. identify the timing for providing any offsets required to achieve consistency with (i) above.</p> <p>iii. a bond or bank guarantee must be provided for the implementation of suitable conservation measures should the compensatory koala habitat not be provided in accordance with the requirements of the KPOM;</p> <p>iv. the sum of the bond or bank guarantee must be agreed by the Secretary prior to the issue of the first Construction Certificate permitting the clearing of vegetation on-site; and</p> <p>v. the bond or bank guarantee must be paid to and held by the Secretary from the issue of the first Construction Certificate permitting the clearing of vegetation, until 7 years after the Proponent has demonstrated to the Secretary that the compensatory habitat has been provided in accordance with the requirement of the KPOM;</p> <p>9) Administrative Changes</p> <p>a) remove all references to a “horticultural or environmental specialist” confirming “substantial establishment” of compensatory koala habitat has occurred, and replace them with references to a “an independent restoration ecologist approved by the Secretary”;</p> <p>b) remove all references to the Proponent forfeiting the environmental bond where substantial establishment of the compensatory koala habitat is not achieved;</p> <p>c) ensure establishment and maintenance phase performance criteria are identified for all mitigation actions included in the updated Koala Plan of Management;</p> <p>d) remove all references to the Proponent nominating a representative to sit on the Tweed Coast Management Committee;</p> <p>e) confirm the Friends of the Koala are the relevant licenced koala care group in the Tweed local government area;</p> <p>f) specify corrective actions for implementation if the koala offset plantings do not initially survive on-site; and</p> <p>g) address the relevant administrative changes recommended in Tweed Shire Council’s submission dated 15 November 2018, in consultation with Council and to the satisfaction of the Secretary.</p> <p>h) Provide specifications for an off-leash dog exercise area which is to be located outside of environmental areas and ecological buffers and well away from existing or proposed koala habitat.</p>	<p>i. SECTION 11.3.3 of the KPoM states that if monitoring results indicate that the created compensatory habitat relevant to each precinct does not meet the defined performance criteria, the contingency measures detailed in TABLE 20 will be implemented.</p> <p>ii. Refer above.</p> <p>iii. The relevant Bond for Environmental Restoration and Maintenance Works is discussed in SECTION 7.6.7 of the KPoM.</p> <p>iv. SECTION 7.6.7.</p> <p>v. SECTION 7.6.7.</p> <p>9) a. completed</p> <p>b. completed</p> <p>c. Establishment and maintenance phase performance criteria are provided for retained habitat and proposed offsets/compensatory habitat plantings in SECTION 8.4.6 of the KPoM. Performance measures for all other mitigation measures are provided where relevant during the pre-construction, construction and operational phases of the development in TABLES 15 - 17 (SECTIONS 9.4 - 9.6) of the KPoM.</p> <p>d. SECTION 7.13.2 of the KPoM states that a Project 28 employee may attend meetings of the Koala Management Committee (KMC) but does not state they will be nominated to sit on the committee as such</p> <p>e. Confirmed in SECTION 7.2.5 of the KPoM</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>10) Prior to the issue of any Construction Certificate, the Koala Plan of Management must be updated to be consistent with this Determination in consultation with Council and submitted to the Secretary for approval.</p>	<p>f. Corrective actions are provided in SECTION 11.3.3 - TABLE 20 of the KPoM.</p> <p>g. these 'administrative changes' have previously been addressed in the Response to the NSW Department of Planning & Environment Part 3A 75W Modification Assessment (MP08_0194 MOD 4).</p> <p>h. SECTION 7.4 of the KPoM discusses off leash areas but states that none are planned for Stage 1. To be addressed future versions of the KPoM prepared for future development stages if necessary.</p> <p>10) The KPoM has been updated as discussed above.</p>
<p>Delivery of On-Site Compensatory Koala Habitat 45B</p> <ul style="list-style-type: none"> a) All on-site compensatory koala habitat must be provided at a ratio of 1:8.6 (i.e. for every hectare (ha) of koala habitat removed, 8.6 ha must be provided) over the life of the project; and b) Prior to the issue of each Construction Certificate authorising the clearing of koala habitat, the Proponent shall provide evidence to the Certifying Authority that the compensatory koala habitat in the preceding stage meets the relevant establishment period completion criteria. <p>Note: Condition 45B only applies to each Construction Certificate issued after the first Construction Certificate authorising the clearing of koala habitat.</p>	<ul style="list-style-type: none"> a) Staging of offsets is discussed SECTION 7.6.5 - TABLE 8 of the KPoM. b) SECTION 7.6.5
<p>Environmental Management Plan (EMP) Updates 45C</p> <p>1) The Proponent must update the residual EMPs to incorporate the relevant koala management measures identified in the Koala Plan of Management approved by the Secretary under Condition 45A, prior to the issue of any Construction Certificate issued under Condition A18.</p>	<p>SECTION 1.9</p>
<p>Koala Infrastructure 46.</p> <ul style="list-style-type: none"> 1) Until final roads, fencing and underpasses are completed in accordance with Condition 46. 3. koala connectivity must be maintained at all times outside of daytime construction periods with details to be submitted to and approved by the Secretary. 2) Any roads through the environmental areas of the site must include the following, with details submitted to and approved by the Secretary: <ul style="list-style-type: none"> a. fencing on both sides of the road of a design that will prevent the crossing by dogs and koalas; b. any other temporary measures necessary to maintain habitat connectivity and minimise the risks to wildlife including koalas during construction. 3) Koala infrastructure must comply with the following requirements <ul style="list-style-type: none"> a. There is no a) in the Instrument of Approval. 	<p>SECTION 7.3 and FIGURES 18, 19 and 31 - 35 provide the details and location of temporary and permanent exclusion fencing and associated infrastructure</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>b. prior to the commencement of construction works in each precinct, the Proponent must install temporary or permanent fencing identified for that precinct in the updated Koala Plan of Management approved by the Secretary;</p> <p>c. prior to the issue a Subdivision Certificate for each precinct, the Proponent must install all permanent koala fencing and underpasses identified for that precinct in the updated Koala Plan of Management approved by the Secretary;</p> <p>d. fauna underpasses must be constructed in the locations identified in the updated Koala Plan of Management approved by the Secretary. All fauna underpasses must be constructed concurrent to the road works approved under the Construction Certificates for precincts 2 - 5, 6, 11 and 12 - 14 of the project.</p> <p>4) There is no 4. in the Instrument of Approval.</p> <p>5) The design and precise location of fauna exclusion fencing must ensure that the buffer area available to fauna is maximised and makes provision for a functional maintenance zone each side of the fencing in order to allow sufficient room for replacement and maintenance of the infrastructure.</p> <p>6) Precinct 1 fauna exclusion fencing should be sited at the outer edge of the 50m ecological buffer.</p> <p>7) Signage shall be erected in strategic locations within Precincts 1, 2, 3, 4 and 5, at 100m intervals such as in the public open space areas within Precinct 5 and at fauna underpasses, advising residents that Koalas are active in the area and dogs should be kept on a leash at all times and encourage residents to keep dogs in enclosed yards between the hours of 6pm and 6am.</p> <p>8) Erection of permanent vandal proof signs shall be erected at regular intervals to inform people about the purpose of the Koala exclusion fencing and the importance of maintaining the fence.</p>	<p>SECTION 7.4 and TABLES 15 - 17 discuss appropriate signage</p>
<p>Flora and Fauna Monitoring Report</p> <p>47. The Flora and Fauna Monitoring Report (FFMR) should be revised to the satisfaction of OEH as follows:</p> <p>1) The FFMR framework should be revised to ensure that monitoring of impacts in relation to threatened wetland bird species (black-necked stork, black bittern) takes suitable account of any measures proposed in relation to drainage maintenance of Blacks Creek.</p> <p>2) Table 4 - Threatened Fauna shall include the requirement to report fauna monitoring results to Council and OEH.</p> <p>3) The discussion of methodology in relation to monitoring of Koala should be more fully developed than that provided in Table 5 and Section 5.3, to the satisfaction of OEH.</p> <p>4) The monitoring of impacts in relation to threatened wetland bird species (Table 12) should take suitable account of any measures proposed in relation to drainage maintenance of Blacks Creek, and be consistent with actions specified in the Drain Maintenance Management Plan and Threatened Species Management Plans.</p> <p>5) The results of all monitoring of feral animals (Table 13) shall be additionally reported to OEH to assist in efforts to co-manage any feral animal problems on and adjacent to the site.</p> <p>6) The final Flora and Fauna Monitoring Report shall be prepared in consultation with Council and submitted to the Secretary for approval within 6 months of the date of determination of the application (No. 2012/2328) made under sections 130(1) and 133 of the Commonwealth Environment Protection and Biodiversity Conservation Act or prior to issue of any construction certificate, whichever occurs first.</p>	<p>The Kings Forest Flora and Fauna Monitoring Report (JWA 2019j) has been updated and should be read in conjunction with this KPoM.</p>
<p>Summary of Management Plans</p> <p>48. The Summary of Management Plans (SOMP) shall be revised to ensure consistency with all relevant management plans to the satisfaction of the Secretary for approval within 6 months of the date of determination of the application (No. 2012/2328) made under Sections 130(1) and 133 of the Commonwealth Environment Protection and Biodiversity Conservation Act or prior to issue of any construction certificate, whichever occurs first.</p>	<p>The Kings Forest Summary of Management Plans (JWA 2019n) has been updated and should be read in conjunction with this KPoM.</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>Environmental Audit Reports 49.</p> <ol style="list-style-type: none"> 1) Within 3 months of the establishment period, the proponent must conduct an environmental audit ("Initial Audit") for each part of the Potential Council Land to confirm that the establishment period and any relevant maintenance period criteria have been met. The Initial Audit(s) must be prepared by a suitably qualified independent environmental consultant, reviewed by Council and approved by the Secretary. 2) Within 3 months after each of the first and third anniversaries, and then subsequently every 2 years, of the Secretary's approval of the Initial Audit(s) for each part of the Potential Council Land, the Proponent shall submit to Council for review, and the Secretary for approval, environmental audits prepared by a suitably qualified independent environmental consultant. Those environmental audits must review the condition of the Potential Council Land against the agreed maintenance period performance criteria specified in each Environmental Management Plan until the affected lands have been transferred into public ownership. Environmental audit reports shall itemize all costs associated with the implementation, monitoring and reporting of all maintenance period works and include audited financial statements. 3) Within 6 weeks of completing this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary with a response to any recommendations contained in the audit report. 4) Within 3 months of submitting an audit report to the Secretary, the Proponent shall review and if necessary revise the relevant management plans and undertake additional mitigation measures as required under this approval to the satisfaction of the Secretary. 	<p>Environmental Audit reports will be prepared and submitted in accordance with Condition 49.</p>
<p>Bond for Environmental Restoration Works 50.</p> <ol style="list-style-type: none"> a) Prior to commencement of bulk earth works for each precinct a cash bond or bank guarantee shall be lodged with Council to ensure that the relevant environmental management plans for the associated Potential Council Land (as outlined by the Potential Council Land Plan detailed in condition B5 of the concept plan) is implemented. The amount of such bond will be based on 135% of the cost of the environmental works (repair and/or enhancement) for the associated precinct/Potential Council Land for the establishment period specified in the approved environmental management plans. Two written quotes from suitably experienced and qualified contractors must be submitted to the Council which detail the cost of all works required. The cash bond or bank guarantee will be refunded, following the written approval from the Secretary of the environmental audit for the associated Potential Council Land as per condition 49(1). b) Once the establishment period has been completed, every 2 years the Proponent shall lodge a cash bond or bank guarantee with Council to ensure that the relevant environmental management plans for the Potential Council Land are implemented for that 2 year maintenance period. The amount of such bond will be based on 135% of the cost of the environmental maintenance works for the associated precinct/Potential Council Land (as outlined by the Potential Council Land Plan detailed in condition B5 of the concept plan) for that 2 year period, or until the completion criteria specified in the environmental management plans are met as required by Condition 39, and the land is transferred to public ownership. Two written quotes from suitably experienced and qualified contractors must be submitted to the Council which detail the cost of all works required in the relevant 2 year maintenance period. c) The cash bond or bank guarantee will be refunded at the end of each two year maintenance period subject to the Audit Report confirming that the requirements of the approved environmental management plans have been implemented by the Proponent. d) Monitoring of the effectiveness of the environmental works (repair, enhancement and/or maintenance) is to be undertaken in accordance with Condition 49. Any supplementary or approved adaptive management works deemed necessary by the independent contractor shall be promptly undertaken once the need is identified. e) Bi-annual bonding will no longer be required following the Proponent providing evidence to the Secretary that the final audit has been conducted in accordance with Condition 49 which demonstrates that the relevant works have been completed and written evidence is provided to the Secretary that the lands have been transferred into public ownership. 	<p>SECTION 7.6</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>Construction Environmental Management Plan</p> <p>52.</p> <p>1) Prior to the commencement of construction works for each stage of the project a Construction Environmental Management Plan (CEMP) shall be prepared that covers the area of works. The CEMP shall be consistent with the Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004). The CEMP shall include details sufficient to understand and avoid, mitigate and remedy all potential environmental impacts of the project during construction. The CEMP shall include, but not be limited to:</p> <ul style="list-style-type: none"> a) a description of all relevant activities to be undertaken on the site during construction (including an indicative timeline); b) a description of relevant environmental management objectives for the site; c) a detailed construction management strategy for each sequence / stage of the bulk earthworks; d) details of measures to be installed to separate construction areas from publicly accessible areas; e) statutory and other obligations that the Proponent is required to fulfil during construction including all relevant approvals, licences and consultations; f) a description of the roles and responsibilities for all relevant employees involved in construction g) hours of work (including standard hours of work for the Environmental Officer); h) a 24-hour contact telephone number shall be provided to all adjoining owners and occupants. <p>Note: the nominated telephone number may contain provision for a voice message service outside of normal working hours.</p> <ul style="list-style-type: none"> i) Measures to be implemented during bulk earthworks operations to ensure the existing 600mm trunk water main is protected j) Details of the Aboriginal Cultural Heritage Program for personnel and contractors (the program should be developed and implemented in collaboration with the local Aboriginal community) k) A subset of the following management plans: <ul style="list-style-type: none"> i. traffic and pedestrian management (see condition 55); ii. noise and vibration management (see condition 56); iii. construction waste management (including the proposed method and location of excess spoil from bulk earthworks) (see condition 57); iv. erosion and sediment control for the entire Kings Forest Estate (see condition 54); v. dust management to include: <ul style="list-style-type: none"> • identification of all dust emission/sources for each stage of the project; • identification of appropriate air quality goals/management criteria; and • details of all dust management and/or dust mitigation measures required to achieve the air quality goals/criteria for the construction works. l) Note: other conditions in this approval may specify relevant objectives or requirements for or in addition to any of the matters listed directly above. <p>2) Bulk earthworks are limited to one sequence area at a time, with the maximum exposed disturbed area (that has not been permanently vegetated) not exceeding a maximum of 5 hectares unless otherwise approved as part of this approval in Condition 9, at any time to reduce exposed areas.</p> <p>3) The CEMP shall be prepared in consultation with the Council and submitted for the approval by the Secretary no later than one month prior to the commencement of construction works. Notwithstanding, where construction work is to be undertaken in stages, the Proponent may, subject to the agreement of the Secretary, stage the submission of the CEMP consistent with the staging of activities relating to that work. The Proponent shall also forward copy of the CEMP to the Secretary and Council for information. Construction shall not commence until written approval has been received from the certifying authority.</p>	<p>An updated Construction Environmental Management Plan (MUS 2019) has been prepared for the Kings Forest site and should be read in conjunction with this KPoM.</p>

MP08_0194 CONDITION	SECTION OF KPoM
<p>Construction Management Measures 53. All measures contained in the Construction Environmental Management Plan under Condition 52 and the Sediment and Erosion Control Plan under Condition 54 are to be implemented prior to the commencement of construction and be maintained throughout construction. A copy of the approved Plans shall be maintained on site and made available upon request.</p>	SECTION 7.2.4
<p>Exclusion Fencing and Underpasses 64. Prior to the commencement of construction works in each precinct where roads traverse the Environmental Protection Areas, the Proponent must install all temporary and/or permanent fauna exclusion fencing identified for that precinct in the updated Koala Plan of Management approved by the Secretary. All fauna underpasses on roads traversing the Environmental Protection Areas must be constructed concurrent to the road works approved under the Construction Certificates for precincts 2 - 5, 6, 11 and 12 - 14 of the project.</p>	SECTION 7.3 discusses the timing of construction
<p>Community Liaison 70. 1) Details of the contact person and telephone number shall be clearly displayed at the site entry. 2) A sign is to be erected at the entry of the site to clearly advise the community liaison officer's details and contact number. 3) These details are to be documented in the Construction Environmental Management Plan.</p>	SECTION 7.13.3
<p>Environmental and Community Liaison Officer(s) 71. 1) An appropriately qualified Environmental Officer(s), that is to receive the prior approval of the department, must be engaged by the Proponent for the duration of works. Their role shall be to oversee environmental compliance of the project until completion conditions have been satisfied. 2) A community liaison officer shall be available during construction works. 3) The Environmental Officer(s) may also act as the community liaison officer required by 2) above, to consult with potentially affected property owners and the department before and during construction works and shall respond to complaints of an environmental impact nature. 4) The Environmental Officer(s) must submit a report to the Secretary Director-General in accordance with reporting timetables in the management plans and within 3 weeks of the completion of each earthworks stage detailing the project's compliance with relevant conditions, management plans and progress onsite. 5) A sign is to be erected at the entry of the site to clearly advise the environmental/community liaison officer's details and contact number. These details are to be documented in the CEMP required by Condition 52.</p>	SECTION 7.13.3
<p>Implementation of Environmental Management Plans 72. 1) Evidence of commencement of implementation of all Environmental Management Plans shall be provided to the Secretary prior to commencement of bulk earthworks.</p>	SECTION 9.1
<p>Incident Reporting 76. Within 24 hours of detecting any incidents during construction that causes (or may cause) significant harm to the environment, the Proponent shall notify the Council and other relevant agencies of the incident and identify the following: 1) Describe the date, time, and nature of the incident. 2) Identify the cause (or likely cause) of the incident. 3) Describe what action has been taken to date. 4) Describe any proposed measures to address the incident.</p>	SECTION 7.2.6

MP08_0194 CONDITION	SECTION OF KPoM
<p>Fauna Spotter-Catcher 96.A registered Fauna spotter-catcher is to be present during all vegetation clearing works to ensure safe dispersal of fauna as required by the Environmental Management Plans.</p>	SECTION 7.2.2
<p>Protection of the Environment 97. All practicable measures must be taken to prevent and minimise harm to the environment as a result of the construction and operation of the development.</p>	An updated Construction Environmental Management Plan (MUS 2019) has been prepared for the Kings Forest site and should be read in conjunction with this KPoM.
<p>Monitoring 98. All monitoring shall be undertaken in accordance with the site Environmental Management Plans, including, but not limited to, the following:</p> <ol style="list-style-type: none"> 1) Flora and fauna 2) Groundwater quality and levels 3) Groundwater seepage 4) Surface water quality 5) Sediment and erosion control 6) Acid sulfate soils 7) Dust monitoring (as required) 	SECTION 8
<p>Koala Plan of Management 121.</p> <ol style="list-style-type: none"> 1) All Koala exclusion fencing must: <ol style="list-style-type: none"> a. be installed along the eastern and northern boundary of the service station/food and drink premises as identified in 'Proposed Site Plan' prepared by Push (ref: Job No. 738.12, Drawing 1000, Issue P3, dated December 2016); and b. be constructed in accordance with the with the revised Koala Plan of Management approved by the Secretary in accordance with MP06_0318 Condition C2 and MP08_0194 Condition 45. 2) The Koala fence must be constructed and functional prior to the issue of an Occupation Certificate for any building in Precinct 1. Evidence must be obtained from a suitably qualified ecological professional that certifies management measures have been constructed in accordance with the approved Koala Plan of Management. 	SECTION 7.3.2
<p>Koala Plan of Management 148. All necessary management measures relevant to Precinct 5 (exclusion fencing, road grids, traffic calming devices, underpasses etc) required by the updated Koala Plan of Management approved by the Secretary under Condition 45A, must be constructed and functional prior to the release of a Subdivision Certificate for the first stage of the subdivision in Precinct 5. Evidence is to be obtained from a suitably qualified ecological professional that certifies management measures have been constructed in accordance with the updated Koala Plan of Management approved by the Secretary.</p>	SECTIONS 7.3.2, 7.3.3 and 7.3.4

COMPLIANCE TABLE: EPBC ACT APPROVAL 2012/6328

EPBC 2012/6328 CONDITION	SECTION OF KPoM
Protecting Koala populations	
1. The approval holder must not clear more than 14.92 hectares of Koala habitat, as identified at Annexure 1.	SECTION 6.2 - TABLES 2 and 3, and FIGURE 15.
<p>2. The approval holder must submit for the Minister’s approval a Koala Plan of Management to support the conservation management of the Koala in the project area. The approved action must not commence until the plan has been approved by the Minister in writing. The Koala Plan of Management must be implemented. The plan must include, but is not limited to:</p> <ul style="list-style-type: none"> a. measures to protect and conserve the Koala population in the project area to ensure the ongoing survival of the Kings Forest Koala population through appropriate management of project impacts; b. details of Koala exclusion fencing (including temporary fencing to mitigate potential impacts to Koala’s during bulk earthworks), faunal underpasses, Koala grids, signage and traffic calming devices and location and design, for all precincts (including measures detailed in section 5 of the preliminary documentation); c. measures to encourage the building of community awareness and stewardship of Koalas, including appropriate education programs to encourage care and protection of the species; d. details of specific and measurable trigger levels must be identified, that will result in corrective actions being implemented to prevent the objectives of Conditions 2a-c being compromised; e. costing of the management measures required and how the management measures will be funded for the duration of the approval; f. monitoring and reporting to be undertaken to assess the effectiveness of the measures referred to in Condition 2a and 2c, including the parameters to be monitored, methods, timing, frequency and location of monitoring; g. measures to report to the Department on any exceedance of identified trigger levels, the implementation of corrective actions, and the outcome of these; h. the person responsible for the management measures and corrective actions; i. a contingency and offset strategy, including defined success criteria; j. requirements for re-planting Koala feed trees in the 43.45ha created habitat areas at <u>Annexure 5</u>. Details of Koala feed tree plantings, including species, density of plantings, performance criteria and monitoring, must not be less than that described in section 5.3 of the Final Response Document and criteria defining ‘substantial establishment’ of the created habitat for the purposes of Condition 8. 	<ul style="list-style-type: none"> a. SECTION 7 (Proposed Management Actions) and SECTION 9 (Implementation Schedules) b. SECTION 7.3 and FIGURES 18 - 25 and 31 - 35 c. SECTION 7.13 and TABLES 16 and 17 d. SECTION 8.2.4 e. SECTION 10 f. SECTION 8 g. SECTION 8.5 h. TABLES 15, 16 and 17 i. SECTION 11 j. SECTION 7.6 and APPENDIX 8 (Note: 68.77 ha, including 6.26 ha comprising the east-west corridor, of created habitat now proposed)
The Koala Plan of Management must be developed by a suitably qualified person.	SECTION 1.2 and APPENDIX 1. James Warren (JWA Pty Ltd) BSc (UNE) and M App Sc (UTS) 31 years’ experience as an ecological consultant
Koala Exclusion Structures	
3. Prior to the commencement of construction and on completion of bulk earthworks in each precinct, Koala exclusion fencing, faunal underpasses, Koala grids, signage and traffic calming devices must be in place. Koala exclusion fencing should be located in accordance with Annexure 9 of these conditions and designed in accordance with Figure 35A of the preliminary documentation provided at Annexure 2 of these conditions.	SECTION 7.3
4. Prior to the commencement of construction, Koala exclusion fencing must be constructed on both sides of all roads in environmental protection zones (Annexure 8) within the project area, and faunal underpasses at intervals as advised by a suitably qualified person and be sufficient to allow unimpeded movement by wildlife, including Koalas	SECTION 7.3.2 and FIGURES 18, 19 and 31 - 35 provide details of fauna exclusion fencing. SECTION 7.3.3 and FIGURES 21 - 24 provide details of faunal underpasses.

EPBC 2012/6328 CONDITION	SECTION OF KPoM
<p>5. Prior to the commencement of construction associated with each precinct, inspections, monitoring and maintenance of Koala mitigation measures must be undertaken in accordance with the Koala Plan of Management and, in any case, at intervals not less than 6 monthly. If the condition of these structures compromises the structures' function, the structures must be restored to fully functional condition within 2 working days.</p>	<p>SECTION 7.3.7 and TABLES 15 - 17</p>
<p>Retention of Koala habitat and movement corridors onsite</p>	
<p>6. The approval holder must ensure the dedication of the 150 hectares of conservation land, including additional areas (subject to agreement with New South Wales Office of Environment and Heritage (OEH)) approved by OEH, to OEH, or its successors, as shown in Annexure 4.</p>	<p>SECTION 7.10 provides details of the transfer of land to public ownership.</p>
<p>7. The approval holder must ensure the protection and conservation management of 183.05ha of existing Koala habitat and 43.45ha of created Koala habitat identified in Annexure 5 and described as follows:</p> <ul style="list-style-type: none"> a. 29ha of existing Koala habitat and 12.45ha of created Koala habitat must be protected by a legal instrument under relevant New South Wales legislation on the title prior to commencement of bulk earthworks associated with Stage 1; b. 139.7ha of existing Koala habitat and 14.67ha of created Koala habitat must be protected by a legal instrument under relevant New South Wales legislation on the title prior to commencement of bulk earthworks associated with Stage 2; c. 5.6ha of existing Koala habitat and 9.92ha of created Koala habitat must be protected by a legal instrument under relevant New South Wales legislation on the title prior to commencement of bulk earthworks associated with Stages 4 and 5; and d. 8.68ha of existing Koala habitat and 6.41ha of created Koala habitat must be protected by a legal instrument under relevant New South Wales legislation on the title prior to commencement of bulk earthworks associated with Stage 8. 	<p>SECTION 7.6 - TABLES 4 - 6, and FIGURE 27.</p> <p>FIGURE 27 shows the location of 206.05 ha of retained Koala habitat and 68.77 ha (including 6.26 ha comprising the east-west corridor) of created Koala habitat (i.e. an additional 25.32 ha has been identified across the Kings Forest site that is suitable for the provision of compensatory Koala habitat). It is noted that the area of Koala habitat to be retained on the site has increased from the original 183.05 ha identified on site and referred to in Condition 7. This increase is because of a combination of the following:</p> <ul style="list-style-type: none"> i. ground-truthing of native vs. non-native vegetation during the preparation of this revised KPoM has revealed that additional areas of suitable native vegetation had not been previously identified as Koala habitat by Phillips <i>et al.</i> 2011); and/or ii. corrections of Tweed Coast Koala mapping projection issues. <p>FIGURES 31 - 35 show the areas of existing habitat to be retained and the habitat creation works associated with each development precinct.</p>

EPBC 2012/6328 CONDITION	SECTION OF KPoM
<p>8. As defined in the Koala Plan of Management (refer Condition 2j.), the created Koala habitat must be substantially established prior to the commencement of bulk earthworks associated with each precinct.</p>	<p>SECTION 7.6.5 provides that created koala habitat will be substantially established¹ prior to the commencement of construction associated with each precinct. An independent restoration ecologist approved by the Secretary should provide a short report confirming that the plantings are established. This short report will be provided to the Department and confirmation provided that the Koala habitat is substantially established prior to commencement of construction associated with each precinct.</p>
<p>9. The instrument/s referred to in Condition 7 must:</p> <ul style="list-style-type: none"> a. provide for the protection of the land referred to in Condition 7 for the duration of this approval; b. prevent any future development activities; c. ensure the active management of the land referred to in Condition 7 in accordance with the Koala Plan of Management. 	<p>SECTION 7.10 provides details of the transfer of land to public ownership.</p>
<p>10. Prior to commencement of construction associated with each precinct, for the Minister’s written approval, the approval holder must submit a detailed Koala Contingency and Offset Strategy, that will be implemented should the created habitat not meet the defined success criteria detailed in the Koala Plan of Management. The Strategy must incorporate the requirements of Conditions 6-9. The approved strategy must be implemented. Details must include, but not limited to:</p> <ul style="list-style-type: none"> a. offset attributes of the proposed areas referred to in Condition 6 and 7; b. details of proposed arrangements for legal protection for the duration of the approval; c. details of management actions to be undertaken and how they will be costed; d. details of arrangements and responsibility for the ongoing management for the duration of the approval. 	<p>SECTION 11 provides details of the proposed Koala Contingency and Offset Strategy. The final Contingency and Offset Strategy will be completed prior to commencement of construction within each relevant Precinct if the created compensatory habitat relevant to each precinct does not meet the defined success criteria outlined in SECTION 8.</p> <p>Compliance with the requirements of Conditions 6-9 are addressed above.</p> <p>Compliance with the requirements of Conditions 10a-d are as follows:</p> <ul style="list-style-type: none"> a) Refer to compliance with the requirements of Conditions 6-7. b) Refer to compliance with the requirements of Conditions 6, 7 and 9. c) Management actions are addressed in SECTIONS 7-9. Indicative costings are provided in SECTION 10. d) Refer to SECTION 9.
<p>Surveys for the Koala and Wallum Sedge Frog</p>	

¹ “Substantial establishment” of the Koala habitat plantings means “the plantings have progressed beyond the need for intensive maintenance e.g. weed control, watering etc. and are clearly established by way of persisting through a recognised growth period and an independent restoration ecologist approved by the Secretary has provided a short report confirming that the plantings are established.”

Kings Forest - Koala Plan of Management (KPoM) - Volume 2

EPBC 2012/6328 CONDITION	SECTION OF KPoM
<p>18. Prior to the commencement of construction associated with each precinct, pre-clearance surveys for Koala and Wallum Sedge Frog must be conducted and any individuals safely relocated from the area to be disturbed. Pre-clearance surveys and relocation must:</p> <ul style="list-style-type: none"> a. be undertaken by a suitably qualified person and in consultation with the Department; b. must not be of lower standard than described for Wallum Sedge Frogs in sections 5.4.3 and 5.4.4 of the Preliminary Documentation and for the Koala in Section 5.3 of the Preliminary Documentation. c. be undertaken no more than one day prior to commencement of bulk earth moving activities within each precinct. 	SECTION 7.2.2 and TABLE 15
<p>19. All survey data collected for the project must be collected and recorded so as to conform to draft or approved EPBC Act survey guidelines and/or policy statements relevant to the Koala and Wallum Sedge Frog as made available on the Department's website. When requested by the Department, the approval holder must provide to the Department all species and ecological survey data and related survey information from ecological surveys undertaken for the Koala and Wallum Sedge Frog. This survey data must be provided within 30 business days of request, or in a timeframe agreed to by the Department in writing. The Department may use the survey data for other purposes.</p>	SECTION 8.6
<p>21. Within three months of every 12 month anniversary of the commencement of the approved action, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the -Wallum Sedge Frog Management Plan and Koala Plan of Management as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the Department at the same time as the compliance report is published. The approval holder must also notify any non-compliance with this approval to the Department in writing within two business days of becoming aware of the non-compliance.</p>	SECTION 8.6
<p>23. If the approval holder wishes to carry out any activity otherwise than in accordance with the Wallum Sedge Management Plan and Koala Plan of Management, as specified in the conditions, the approval holder must submit to the Department for the Minister's written approval a revised version of that plan. The varied activity shall not commence until the Minister has approved the revised management plan in writing. The Minister will not approve a revised plan, unless the revised plan would result in an equivalent or improved environmental outcome. If the Minister approves the revised plan that plan must be implemented in place of the plan originally approved.</p>	SECTION 1.8
<p>24. If the Minister believes that it is necessary or convenient for the better protection of listed threatened species and communities to do so, the Minister may request that the approval holder make specified revisions to the management plan specified in the conditions and submit the revised plan for the Minister's written approval. The approval holder must comply with any such request. The revised approved plan must be implemented. Unless the Minister has approved the revised plan then the approval holder must continue to implement the originally approved plan, as specified in the conditions.</p>	SECTION 1.8
<p>25. If, at any time after 5 years from the date of this approval, the approval holder has not substantially commenced the action, then the approval holder must not substantially commence the action without the written agreement of the Minister.</p>	SECTION 1.1
<p>26. The approval holder must maintain accurate records substantiating all activities and outcomes associated with or relevant to the above conditions of approval, including measures taken to implement the Wallum Sedge Management Plan and approved Koala Plan of Management required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.</p>	APPENDIX 2 and more detailed records held by the proponent.
<p>27. Unless otherwise agreed to in writing by the Minister, the approval holder must publish the Wallum Sedge Management Plan and approved Koala Plan of Management referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved.</p>	TABLE 15

APPENDIX 4 - ADDITIONAL KINGS FOREST MANAGEMENT PLANS AND THEIR RELATIONSHIP TO THE KPoM

Management Plan	Relationship to the KPoM
Kings Forest Vegetation Management Plans (VMPs) (JWA 2019a, b, c)	<p>These VMPs provides details of management of vegetation during construction and rehabilitation works within retained Koala habitat and Koala compensatory habitat in EPZs and associated buffers. The VMPs contain the following objectives:</p> <ul style="list-style-type: none"> • to assist Project 28 in managing existing native vegetation and other environmentally sensitive areas within buffers and EPZs before, during and after development; • to develop a comprehensive and integrated approach to guide the immediate and long-term management of retained and compensatory native vegetation within buffers and EPZs and to ensure its protection and enhancement; and • to ensure ongoing sustainable management of native vegetation within buffers and EPZs and that land clearing and land modification activities associated with the development are effectively remediated. <p>These objectives show a clear relationship to the weed management plans, the vegetation management plans, the buffer management plans, the KPoM and the WSFMP.</p>
Kings Forest Threatened Species Management Plans (TSMPs) (JWA 2019d, e, f)	<p>These TSMPs have been prepared to address the management of other Threatened species and their habitat/s occurring in in EPZs and associated buffers. The TSMPs contain the following objectives:</p> <ul style="list-style-type: none"> • weed control measures specific to areas containing listed threatened flora and fauna; • guidelines for the control of human and animal access to areas containing threatened species; • strategies for the embellishment of threatened species habitat through revegetation works and/or the creation of compensatory habitat areas where required. <p>These objectives show a clear relationship to the weed management plans, the vegetation management plans, the buffer management plans, the KPoM and the WSFMP.</p>
Kings Forest Buffer Management Plans (BMPs) (JWA 2019g, h)	<p>The aim of these BMPs is to provide guidelines, strategies and methods for the treatment and management of ecological buffers to Cudgen Nature Reserve and EPZs. This BMP provides details</p>

Management Plan	Relationship to the KPoM
	of the protection of retained Koala habitat and Koala compensatory habitat where these areas occur within ecological buffers.
Kings Forest Feral Animal Management Plan (FAMP) (JWA 2019i)	<p>The aim of this FAMP is to develop a comprehensive and integrated approach to guide the immediate and long-term management of feral animals within buffers and EPZs associated with the development of the Kings Forest site and to ensure the protection of native fauna species, with a primary focus on threatened species.</p> <p>Specific objectives of this FAMP are to:</p> <ul style="list-style-type: none"> • Review relevant literature on feral animal control; • Identify feral animals which have been recorded at the site; • Prioritise species considered to warrant priority management; • Examine control and/or eradication methods for ‘high priority’ feral animals; and • Recommend long-term control methods, including monitoring and reporting. <p>Of particular importance for the Kings Forest Koala population is the control of dogs (both feral and domestic) within retained Koala habitat and Koala compensatory habitat areas.</p>
Kings Forest Flora and Fauna Monitoring Report (JWA 2019j)	The Kings Forest Flora and Fauna Monitoring Report summarises all flora and fauna monitoring requirements of the development including the Koala monitoring program.
Kings Forest Weed Management Plans (WMPs) (JWA 2019k, l, m)	<p>These WMPs provide details of weed control works required within retained Koala habitat and Koala compensatory habitat in EPZs and associated buffers. Specific objectives of this WMP are to:</p> <ul style="list-style-type: none"> • Provide a weed assessment of the subject site; • Prevent the further spread of weeds resulting from the development; • Designate areas requiring targeted weed control measures; • Outline specific tasks to be undertaken in each targeted weed control area; • Provide guidelines for the removal of weed species including Slash pine seedlings;

Management Plan	Relationship to the KPoM
	<ul style="list-style-type: none"> • Provide guidelines for a maintenance programme; and • Outline a monitoring and reporting schedule. <p>These objectives show a clear relationship to the vegetation management plans, the buffer management plans, the KPoM and the WSFMP.</p>
Kings Forest Stage 1 Bushfire Risk Management Plan (BushfireSafe 2012)	The Kings Forest Stage 1 Bushfire Risk Management Plan (BushfireSafe 2012) should be updated with consideration of SECTION 7.11 of the KPoM.
Golf Course Management Plan (Gilbert & Sutherland 2008)	The Golf Course Management Plan, once amended, will no longer be relevant to the management of the Kings Forest Koala population as it is no longer proposed to allow Koalas to access the Golf Course.
Construction Environmental Management Plan (MUS 2018)	The Construction Environmental Management Plan (MUS 2018) provides details sufficient to understand and avoid, mitigate and remedy all potential environmental impacts of the project during construction and should be read in conjunction with this KPoM.
Kings Forest Summary of Management Plans (SOMP) (JWA 2018n)	The Kings Forest SOMP has been prepared to summarise all of the management requirements of the various management plans including the KPoM.

APPENDIX 5 - KOALA POPULATION AND HABITAT ASSESSMENT

1 Introduction

This section provides details of the Koala population (listed as an Endangered population) and habitat resources of the Tweed Local Government Area and the Kings Forest site.

2 Conservation Status

The Koala (*Phascolarctos cinereus*) is listed as a vulnerable species within schedules of the Biodiversity Conservation Act (2016).

The Koala (combined population in Queensland, New South Wales and the Australian Capital Territory) is listed as a vulnerable species within schedules of the EPBC Act (1999).

The Koala, between the Tweed and Brunswick Rivers east of the Pacific Highway, is listed as an endangered population within the schedules of the Biodiversity Conservation Act (2016).

3 Koala Population Size

3.1 Tweed Local Government Area

DoE (2014) notes that the number of Koalas in north-east NSW is uncertain and population surveys are required to establish current population size. Nevertheless, they likely numbered in the low thousands in 2010 (approximately 7000), but the nature and extent of exposure to threats suggests that declines have occurred, and will continue, in many areas (TSSC 2012a).

Koala records remain widely distributed throughout the Tweed LGA, which covers approximately 103,000 ha (FIGURE 1). While a reduction in the extent of occurrence of Koalas across the Tweed LGA of at least 18% has previously been documented (Phillips *et al.* 2011), the size of the LGA's Koala population is unknown and beyond the scope of this KPoM.

The Tweed LGA is the fastest growing urban area on the North Coast of NSW; its population is expected to grow from 82,955 (the 2006 census) to a potential 120,000 by 2025. It is predicted that most of this growth will occur along the coastal strip (i.e. Cobaki, Bilambil Heights, South Tweed Heads, Kingscliff to Bogangar and Pottsville) which covers approximately 21,200 ha. This population growth will potentially impact on the density and distribution of the Koala population within the Tweed LGA.

3.2 Tweed Coast

Evidence of generational persistence is widespread throughout this area indicating a long history of occupancy and successful reproduction by Koalas. Historically, the Tweed Coast's Koala population has persisted within a fragmented habitat affected by a range of threatening processes. The study by Phillips *et al.* (2011) indicates that north of the Tweed River there are small relic populations in the Terranora-Bilambil Heights and Tweed Heads South areas. South of the Tweed River, three (3) disjunct sub-populations occur: Bogangar/Kings Forest/Forest

Hill; Tanglewood/Round Mountain/Koala Beach; and Pottsville Wetlands/Black Rocks. A further small population occurs around Duranbah and Eviron Road. Phillips *et al* (2011) identified that the three (3) main areas of Koala habitat on the Tweed Coast totalled approximately 1,260 ha i.e.

- Area 1: Bogangar-Kings Forest-Forest Hill (358 ha);
- Area 2: Tanglewood-Round Mountain-Koala Beach (578 ha) - this metapopulation occupies a large proportion of Cudgen Nature Reserve, and
- Area 3: Pottsville Wetlands-Black Rocks (316 ha). Tweed Shire Council manage most of this area.

Of the approximately 360 ha identified by Phillips *et al* (2011) in Area 1, the Kings Forest site contains 32.63 ha of Primary Koala habitat and 181.42 ha of secondary habitat.

Based on the above data, the main stakeholders responsible for the management of the Tweed Coast Koala population are NSW Office of Environment & Heritage (managers of Cudgen Nature Reserve) and Tweed Shire Council (managers of the Pottsville Wetlands reserve and Pottsville Environment Park).

The work of Phillips *et al.* (2011) determined that occupancy rates by Koalas within the Tweed Coast Study Area (TCSA) (i.e. Tweed coastal strip) had halved in the years immediately preceding their study to result in an estimated population size (i.e. inferred by density data) of approximately 145 Koalas (TABLE 1).

TABLE 1
KOALA POPULATION ESTIMATES (N) FOR CURRENTLY OCCUPIED AREAS OF THE TCSA
BASED ON THE DENSITY ESTIMATE DETERMINED BY FIELD SURVEY
(SOURCE: PHILLIPS *et al.* 2011)

Locality	Cell Size (ha)	Available Habitat	Population Estimate		
			Lower 95% CI	N	Upper 95% CI
Bogangar / Kings Forest / Forest Hill	358	71%	5	36	66
Tanglewood / Round Mountain / Koala Beach	578	80%	9	64	120
Pottsville Wetlands / Black Rocks	316	79%	10	35	65
Duranbah / Eviron	625	10%	1	9	16
TOTAL			25	144	267

Fire frequency and intensity within remaining habitat areas over the last decade has been identified as the major contributor to recent population attrition, with recovery potential now impeded in remaining habitat areas by ongoing incidental mortality rates due mostly to motor vehicle strike (Phillips *et al.* 2011). Phillips *et al.* (2011) have stated that the Tweed Coast Koala population is in serious decline and may be extinct within 20-30 years (from 2011). Active intervention is required to ensure the persistence of the Tweed Coast population. The

amelioration of threatening processes such as road kill, dog attack, disease, lack of habitat and isolation is pivotal to its recovery.

3.3 Bogangar/Kings Forest/Forest Hills

The Koala sub-population of the Bogangar/Kings Forest/Forest Hills area, as modelled by Phillips *et al.* (2011), currently occupies an area of approximately 360 ha, that includes part of the habitat to which this KPoM applies (FIGURE 2). The area extends from Depot Road in the north to Cudgen Lake in the south encompassing some of Cudgen Nature Reserve and from Forest Hills to the Tweed Coast Road. Approximately 70% of this area is vegetated. It is estimated that thirty-six (36) Koalas could occur in this area (Phillips *et al.* 2011).

3.4 Kings Forest

Multiple assessments for the occurrence of Koalas at Kings Forest have been completed. These assessments have included direct observation (including spotlight surveys); short-term radio tracking studies; faecal pellet surveys (to detect Koala presence); faecal cuticle analysis (to determine diet) and vegetation assessments (Warren 2000, Callaghan *et al.* 2004, Phillips and Pereoglou 2004, Sainty 2006, Phillips *et al.* 2011). Koalas have been recorded over much of the site (FIGURE 3). Estimates of the population of Koalas occupying Kings Forest have varied. Warren (2000) estimated that Kings Forest itself could support around fifteen (15) Koalas. Phillips and Pereoglou (2004) estimated the population of seventy-six (76) Koalas in the wider Kings Forest area.

4 Koala Activity Levels and Habitat Occupancy Rates

4.1 Tweed Coast

Subsequent to the study by Phillips *et al.* (2011), Tweed Shire Council prepared the Tweed Coast Comprehensive Koala Plan of Management (TCCCKPoM) (TSC 2014). The plan was adopted by Council on 19 February 2015 and was prepared in conjunction with the Tweed Coast Koala Advisory Group, in accordance with State Environmental Planning Policy No. 44 - Koala Habitat Protection. The strategies within the plan are based on the outcomes of the Tweed Coast Koala Habitat Study.

The work of Phillips *et al.* (2011) determined that occupancy rates by Koalas within the Tweed Coast Study Area (TCSA) (i.e. Tweed coastal strip) had halved in the years immediately preceding their study to result in an estimated population size (i.e. inferred by density data) of approximately 145 Koalas (TABLE 2).

TABLE 2
KOALA POPULATION ESTIMATES (N) FOR CURRENTLY OCCUPIED AREAS OF THE TCSA
BASED ON THE DENSITY ESTIMATE DETERMINED BY FIELD SURVEY
(SOURCE: PHILLIPS *et al.* 2011)

Locality	Cell Size (ha)	Available Habitat	Population Estimate		
			Lower 95% CI	N	Upper 95% CI
Bogangar / Kings Forest / Forest Hill	358	71%	5	36	66
Tanglewood / Round Mountain / Koala Beach	578	80%	9	64	120
Pottsville Wetlands / Black Rocks	316	79%	10	35	65
Duranbah / Eviron	625	10%	1	9	16
TOTAL			25	144	267

One of the priority actions of the TCCKPoM was the re-assessment of the status of the Tweed Coast Koala population, as it had been five (5) years since survey work was completed for the original Tweed Coast Koala Habitat Study (Phillips *et al.* 2011). The Tweed Coast Koala Study (Tweed Shire Council 2015a) was completed in December 2015 and describes the methods, results and implications of the most recent survey. However, it is noted that the Tweed Coast Koala Study (Tweed Shire Council 2015a) did not attempt to provide an estimate of population size.

Sixty-one (61) sites were sampled in both the 2015 and the previous survey, allowing comparisons of koala activity levels between the two survey periods. When results of the 2015 survey are compared to those reported in the 2011 Habitat Study, activity levels were found to have decreased across the study area. For sites that were active during either of the sampling occasions, and sampled on both, the mean activity level during this study was found to be significantly lower than that recorded during by Phillips *et al.* (2011). FIGURE 4 illustrates changes in activity category at each of the field sites between the 2015 study and the previous study (Tweed Shire Council 2015a).

Since the commencement of the TCCKPoM, Council has been implementing the priority actions of the plan. Progress towards the implementation of the works program is reported to Council on a quarterly basis by the Natural Resource Management Unit. Further, annual summaries are prepared for general distribution and information and detail key outcomes from the reporting period. In accordance with the Year 4 priority actions of the TCCKPoM, reassessment of koala activity throughout the Tweed Coast was completed in 2018.

Sixty-nine (69) sites were sampled in the 2018 study. The results of the study (Tweed Shire Council 2019) suggest that the previously observed population decline may have slowed. The amount of available habitat that was observed to be occupied by permanent resident koala populations showed a slight increase since 2015, however this was still well below that recorded in 2010. When areas of low and infrequent use are also included in the results, overall, koalas were observed to also be using a larger proportion of the study area than was recorded in 2015

and 2010. In terms of areas that were observed to be subject to any koala use (whether occasional or frequent), the occupancy rate within these sites of 78% was higher than the 2015 and 2010 rates of 62% and 70%, respectively. This means that koala activity, in its broadest sense, has returned to some of the areas that were vacated between 2010 and 2015, and that a similar, if not slightly higher, proportion of the habitat is being used on a transient or occasional basis as was being used in 2010 (Tweed Shire Council 2019). FIGURE 4 illustrates changes in activity category at each of the field sites between the 2018 study and the previous study (Tweed Shire Council 2019).

4.2 Kings Forest

Phillips and Pereoglou (2004) utilised SAT (Spot Assessment Technique) analysis to produce an empirical index of koala “activity” on the Kings Forest site. The measure of this “activity” index was simply obtained by dividing the number of trees that had koala faecal pellets recorded beneath them by the total number of trees sampled in each site. Evidence of koalas was found not to be uniformly distributed throughout the Kings Forest site. Koala faecal pellets were recorded in 56 of the 87 SAT sites, with activity levels ranging between 3.33% and 93.33%. The mean activity level (active sites only) was $25.54\% \pm 20.20$ (SD).

During 2015 Koala activity was assessed as being widespread throughout the eastern portion of the Kings Forest IKPoM area and adjacent Cudgen Nature Reserve (Tweed Shire Council 2015a). Overall activity levels had declined however since the Phillips *et al.* (2011) assessment, and the previously modelled contiguous area of significant activity had contracted to two (2) smaller cells, within which activity levels were similar to those recorded previously (FIGURE 5). The northern cell straddles Depot Road and extends south into Cudgen Nature Reserve. The southern cell is associated within a large area of swamp sclerophyll forest between the Cudgen Paddock and Cudgen Lake. Active low use sites occurred to the north, west and southwest of this cell. A number of additional sites within the Kings Forest property were recorded as ‘inactive’ (FIGURE 5).

During October 2018 Koala activity was assessed as remaining widespread throughout the eastern portion of the Kings forest IKPoM area and adjacent Cudgen Nature Reserve (Tweed Shire Council 2019). An area of significant activity continued to persist in the Depot Road area in the north, and had expanded to cover an additional site to the west, since the previous 2015 study (FIGURE 6). One site in an area of forest that was subject to fire in January 2018 was found to be used on an occasional basis with a male koala observed at this site during field work. No koala activity had been previously recorded at this location during the 2015 study. The small population occupying the area between Cudgen Paddock and Cudgen Lake (represented by three adjacent sites of significant activity) had persisted, however it remained more restricted and activity levels here remain lower than observed in 2010. As in 2015, active low use sites connected the northern and southern areas of significant activity where they were previously contiguous (FIGURE 6). The two (2) south-western sites were receiving some use by koalas, showing slight improvement since 2015 but again not yet reaching 2010 levels.

5 Preferred Koala Food Trees

5.1 Introduction

There are numerous documents that have been prepared by Commonwealth, state and local government agencies that identify and list tree species considered as preferred food sources for the Koala. The following sections provide a summary of recognised Koala food tree species in the following areas:

- NSW;
- North Coast Region of NSW;
- Tweed Coastal Strip; and
- Kings Forest site.

5.2 NSW

A review of Koala food tree preferences across NSW was undertaken during the course of preparing the NSW Koala Recovery Plan, the results of which specified all Eucalypt species known to be preferentially utilised by Koalas in the form of Primary, Secondary and Supplementary food tree species (DECC 2008) (TABLE 3).

Furthermore, Schedule 2 within SEPP 44 includes a list of Koala feed tree species applicable to the implementation of the SEPP (TABLE 3).

TABLE 3
RECOGNISED PREFERRED KOALA FOOD TREE SPECIES

Common name	Scientific name
Primary Food Tree Species*	
Tallowwood	<i>Eucalyptus microcorys</i> *,#
Forest red gum	<i>E. tereticornis</i> *,#
Swamp mahogany	<i>E. robusta</i> *,#
Parramatta red gum	<i>E. parramattensis</i> *
Orange gum	<i>E. bancroftii</i> *
Cabbage gum	<i>E. amplifolia</i> *
Secondary Food Tree Species*	
Narrow-leaved red gum	<i>E. seeana</i> *
Craven grey box	<i>E. largeana</i> *
Slaty red gum	<i>E. glaucina</i> *
Grey gum	<i>E. biturbinata</i> *
Small-fruited grey gum	<i>E. propinqua</i> *
Large-fruited grey gum	<i>E. canaliculata</i> *
Red mahogany	<i>E. resinifera</i> *
Steel box	<i>E. rummeryi</i> *
Mountain mahogany	<i>E. notabilis</i> *
Rudder's box	<i>E. rudderi</i> *
Grey box	<i>E. moluccana</i> *
White-topped box	<i>E. quadrangulata</i> *

Common name	Scientific name
Yellow box	<i>E. melliodora</i> *
Stringybarks/Supplementary Species*	
Stringybark	<i>E. tindaliae</i> *
Blue-leaved stringybark	<i>E. agglomerata</i> *
Thin-leaved stringybark	<i>E. eugeniodes</i> *
Diehard stringybark	<i>E. cameronii</i> *
White stringybark	<i>E. globoidea</i> *
Additional Species#	
Grey gum	<i>E. punctata</i> #
Ribbon or Manna gum	<i>E. viminalis</i> #
River red gum	<i>E. camaldulensis</i> #
Broad leaved scribbly gum	<i>E. haemastoma</i> #
Scribbly gum	<i>E. signata</i> #
White box	<i>E. albens</i> #
Notes:	
*Taken from Appendix 2 of NSW Koala Recovery Plan (DECC 2008) (and listed as Primary, Secondary and Supplementary species)	
#Taken from SEPP 44 - Koala Habitat Protection (no differentiation between Primary, Secondary and Supplementary species)	

5.3 North Coast Region of NSW

The Tweed LGA is located in the North Coast Koala Management Area (KMA) for purposes of the approved Koala Recovery Plan (DECC 2008). The North Coast KMA extends from the Hunter Valley to the NSW-QLD border and is bounded in the west by higher elevations of the Great Escarpment which otherwise limit the distribution of the North Coast KMA's indicative preferred food tree species Tallowwood (*E. microcorys*). Additional to Tallowwood, a further five (5) Primary, thirteen (13) Secondary and five (5) Supplementary food tree species are known to occur in the North Coast KMA (APPENDIX 8).

5.4 Tweed Coastal Strip

Phillips *et al.* (2011) established that four (4) species - Forest red gum (*E. tereticornis*), Swamp mahogany (*E. robusta*), Tallowwood (*E. microcorys*) and Grey gum (*E. propinqua*) - were the most preferred species within the Tweed Coast Study Area. All four (4) of these species were confirmed as Primary food species when growing on high nutrient soil landscapes as mapped by Morand (1996). Biochemical volatility (implied by size-class dependent levels of use) relegated Tallowwood and Grey gum to the status of Secondary food tree species when growing on the lower nutrient Neranleigh-Fernvale soil landscapes.

Narrow-leaved scribbly gum (*E. racemosa*), Red mahogany (*E. resinifera*), Grey ironbark (*E. siderophloia*), Blackbutt (*E. pilularis*) and thick leaved and/or white mahogany (*E. carnea/acmenoides*) in addition to Coastal cypress pine (*Callitris columellaris*), Broad-leaved paperbark (*Melaleuca quinquenervia*), Brushbox (*Lophostemon confertus*), Swamp Box (*L. suaveolens*), Pink bloodwood (*Corymbia intermedia*), Red bloodwood (*C. gummifera*) and

Swamp Oak (*Casuarina glauca*) were identified by Phillips *et al.* (2011) as non-preferential and/or opportunistically browsed food tree species.

5.5 Kings Forest Site

Records of Koalas at Kings Forest are primarily associated with vegetation communities that contain the preferred food trees species Swamp mahogany (i.e. PCT 1230: Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion / TVMS 305: Coastal Swamp Mahogany Open Forest to Woodland). Based on cuticle scale analysis of Koala faecal pellets, Swamp mahogany comprises nearly half (46%) of the dietary intake. The remainder is comprised of a mix of more opportunistically browsed species including Swamp box and other non-eucalypt species such as Brushbox and Broad-leaved paperbark (JWA 2000).

Scribbly gum is a notable omission in the various studies of food tree use by the Kings Forest Koalas. While Scribbly gum is a commonly occurring tree species on the Kings Forest site, it has not been recognised as a preferred food tree species in either the cuticle scale analysis work completed by JWA (2000), or other site-specific assessments (Phillips and Callaghan 1996; Phillips and Pereoglou 2004; Phillips *et al.* 2011). Moreover, Scribbly gum is also not recognised as either a Primary, Secondary or Supplementary food tree species by the Approved Recovery Plan. On this basis, the value of Scribbly gum as a preferred Koala food tree on the Kings Forest site has been disregarded for the purposes of this KPoM.

6 Resource Availability

6.1 Tweed Shire

Tweed Shire vegetation mapping describes forty-six (46) vegetation communities for consideration as Koala habitat within the Tweed LGA (Kingston *et al.* 2004). All of these vegetation communities have been categorised by Phillips *et al.* (2011) into three (3) habitat categories. These habitat categories are recognised by the approved Koala Recovery Plan (DECC 2008) and are described as follows:

- Primary Habitat - areas of forest and/or woodland wherein primary food tree species comprise the dominant or co-dominant (i.e. $\geq 50\%$) overstorey tree species (most often associated with breeding habitat).
- Secondary (Class A) Habitat - areas of forest and/or woodland wherein primary food tree species are present but not dominant or co-dominant and usually (but not always) growing in association with one or more secondary food tree species.
- Secondary (Class B) Habitat - areas of forest and/or woodland wherein primary food tree species are absent, habitat containing secondary and/or supplementary food tree species only.

Areas of each habitat category within the Tweed LGA have been calculated as follows:

- Primary Habitat is limited to 200 ha (1.04%) of mapped vegetation and consists of communities that are dominated by *Eucalyptus robusta* and/or *E. tereticornis* ± *E. microcorys* growing on TAEBAS² soil landscapes.
- Secondary (Class A) Habitat comprises the bulk of potential Koala habitat, encompassing 2,300 ha (12%) of mapped vegetation communities growing on TAEBAS soil landscapes wherein on average *E. robusta* and/or *E. tereticornis* ± *E. microcorys* are sub-dominant elements.
- Secondary (Class B) Habitat comprises 1,315 ha (6.8%) of mapped vegetation communities containing *E. microcorys* and/or *E. propinqua*³, growing on NFM⁴ soil landscapes.

Koala habitat occurring in the wider Tweed locality is shown in FIGURE 7.

6.2 Tweed Coast

Phillips *et al.* (2011) identified that the three (3) main areas of Koala habitat on the Tweed Coast totalled approximately 1,260 ha i.e.

- Area 1: Bogangar-Kings Forest-Forest Hill (358 ha);
- Area 2: Tanglewood-Round Mountain-Koala Beach (578 ha) - this metapopulation occupies a large proportion of Cudgen Nature Reserve, and
- Area 3: Pottsville Wetlands-Black Rocks (316 ha). Tweed Shire Council manage most of this area.

Of the approximately 360 ha identified by Phillips *et al.* (2011) in Area 1, the Kings Forest site contains 32.63 ha of Primary Koala habitat and 181.42 ha of secondary habitat.

6.3 Kings Forest

The original Koala habitat mapping completed by Phillips *et al.* (2011) has been refined during the completion of more recent assessments by JWA between 2015 - 2019. Existing koala habitat on the Kings Forest site covers a total area of approximately 214.49 ha and is comprised of three (3) habitat categories:

- Primary Habitat - predominantly comprised of Swamp mahogany (i.e. PCT 1230: Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion / TVMS 305: Coastal Swamp Mahogany Open Forest to Woodland).
- Secondary (Class A) Habitat - predominantly comprised of Broad-leaved paperbark in low-lying areas with minor occurrences of Swamp mahogany (i.e. PCT 1064: Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion / TVMS 401: Broad-leaved Paperbark Closed Forest to Woodland). There are also some occurrences of Narrow-leaved scribbly gum in more elevated areas.

² TAEBAS refers to those of transferral, alluvial, estuarine, beach, aeolian and swamp (TAEBAS) landscapes respectively.

³ Apparent inconsistency in statement that Secondary (Class B) habitat should not contain any Primary habitat trees.

⁴ NFM refers to sites on all erosional/residual landscapes (i.e. Neranleigh-Fernvale Metamorphics).

- Secondary (Class B) Habitat - predominantly comprised of Blackbutt with minor occurrences of Tallowwood (i.e. PCT 693: Blackbutt - Tallowwood dry grassy open forest of the central parts NSW North Coast Bioregion / TVMS 201: Blackbutt Open Forest Complex).

The distribution and area calculations for Koala habitat occurring on the Kings Forest site are provided in FIGURE 8 (in the KPoM) and TABLE 4.

TABLE 4
EXISTING KOALA HABITAT ON KINGS FOREST SITE

Habitat Type (PCT* / TVMS#)	Existing Area
Primary Habitat (PCT 1230 / TVMS 305)	33.17 ha
Secondary (Class A) Habitat (PCT 1064 / TVMS 401)	169.11 ha
Secondary (Class B) Habitat (PCT 693 / TVMS 201)	12.21 ha
TOTAL	214.49 ha

*Relevant Plant Community Type (PCT) descriptions which were accessed via the NSW Office of Environment & Heritage (OEH) database (i.e. the BioNet Vegetation Classification System).
#Refer to Tweed Vegetation Management Strategy (Kingston *et al.* 2004)

7 Koala Habitat Linkages and Koala Dispersal

7.1 Introduction

Linkages between areas of suitable habitat are known to be important for the dispersal of individual Koalas within their home ranges and the dispersal of individuals to form new home ranges. The following sections provide a review of relevant literature and discusses habitat connectivity and opportunities for dispersal in a regional, sub-regional/local and Kings Forest site context.

7.2 Review of Relevant Literature

Fauna dispersal has the potential to play a critical role in the maintenance and regulation of existing populations and in the establishment of new populations (Sharp 1997). Competition for mates, competition for resources and the avoidance of inbreeding are the three (3) mechanisms for dispersal that are most commonly postulated within the literature (Greenwood 1980 and 1983; Dobson 1982; Johnson 1986; Johnson and Gaines 1987; Dique *et al.* 2003). Eberhard (1978) and Gall (1980) separate populations of Koalas into three (3) groups:

- Residents;
- Nomads; and
- Dispersing young.

Upon reaching maturity (1-2 years) the young may remain for a time within the maternal home range area, even persisting until their third year (Eberhard 1978), but invariably disperse from the maternal home range area (Dr S. Phillips, 2013 *pers. comm.*). They may travel many kilometres, often in excess of 40-50 km over a period of a few weeks (AKF undated; Gall 1980). This is the group which would most depend upon adequate corridors between habitat patches. Gall (1980) found that three (3) dispersing Koalas had moved distances of 1 km, 4 km and 11 km and were capable of ranging widely. Studies of dispersal patterns in a regional Koala population in south-east Queensland (Dique *et al.* 2003), demonstrated that the mean straight-line distance between the natal and breeding home ranges for males and females was similar, being 3.5 km (range 1.1 - 9.7 km) and 3.4 km (range 0.3 - 10.6 km) respectively.

Koalas have also been shown to go for random wanders/exploratory movements (Smith 1979; Dique *et al.* 2003) and may disappear from a colony for a time with females tending to travel less distances (Gall 1981).

Research has shown that habitat links for Koalas include both forested and cleared areas, as studies have shown that Koalas will travel over cleared land containing only scattered trees (Ellis *et al.* 2009). Radio tracking data has provided evidence that Koalas will utilise culverts in order to traverse the landscape (Taylor and Goldingay 2003) and studies by Callaghan and Phillips (1997, 1998a and 1998b), Hopkins and Phillips (2009), and AMBS (2012) also document the use of underpasses by Koalas.

The maintenance of habitat patches of sufficient size to support existing populations and provide for future population expansion is fundamental to Koala population and habitat management within the Tweed Coast (Phillips *et al.* 2011). Three (3) recommendations are proposed by Phillips *et al.* (2011) as follows:

- 1) Retention of potential koala habitat *in-situ* in the first instance, with a focus on occupied habitat, and adjoining areas of potential Koala habitat. Protection of bushland containing large size-class Tallowwood and Grey gum is also necessary to preserve the habitat resource on NFM soil landscapes.
- 2) Maintenance and creation of vegetated linkages between habitat patches and source populations.
- 3) Strategic revegetation work with the aim of consolidation of existing habitat patches and habitat creation. Revegetation work should focus primarily on “gap-filling” in large habitat blocks within and adjacent to mapped source populations, edges of habitat blocks and within linkage areas.

7.3 Habitat Connectivity and Opportunities for Dispersal

7.3.1 Introduction

The following sections discuss Koala habitat connectivity and opportunities for Koala dispersal at a regional, sub-regional/local and Kings Forest site level.

7.3.2 Regional Context

In a regional context, the Kings Forest site is significantly isolated (in terms of wildlife movement) from areas of regionally significant habitat. This is due to physical barriers to movement including the Tweed River and extensive agricultural and residential development to the north, Tweed Coast Road and the Pacific Ocean to the east and the Pacific Motorway, and agricultural lands to the west. Thus, currently the only effective connections with other significant habitat areas are to the south of the site (Carrick 2009). The Pacific Motorway in particular is discussed within the NSW Scientific Committee final determination to list Koalas between the Tweed and Brunswick Rivers east of the Pacific Highway as an endangered population as a significant barrier to the movement of Koalas and likely cause of significant fatalities.

7.3.3 Sub-regional/Local Context

The lack of habitat connections to the north of Kings Forest is demonstrated within the Tweed Coast Koala Habitat Study (Phillips *et al.* 2011) in which indicative meta-population boundaries and linkages between habitat areas are provided (FIGURE 2). Phillips *et al.* (2011) has identified three (3) distinct Koala populations that occur in the general locations of Kings Forest, Round Mountain and Pottsville Wetlands. Although Koala activity was detected outside of these localities, primarily to the north and west outside of the above-mentioned localities, the long-term prognosis for these outliers is poor in the absence of recruitment from other source populations (Phillips *et al.* 2011).

It should be noted that the TCCKPoM (2015) identifies three (3) Koala Precincts immediately adjacent to the Kings Forest site i.e. the Cudgen Lake Koala Activity Precinct (KAP), the Duranbah Koala Linkage Precinct (KLP) and the Cudgen Koala Linkage Precinct (KLP). The Kings Forest site has been identified, in the TCCKPoM, as an Individual Koala Plan of Management (IKPoM). The Kings Forest IKPoM area and the adjacent Precincts are shown in FIGURE 4. The strategy is to maintain linkages between these precincts and the IKPoM area where possible. Linkages, therefore, need to be established or maintained to the east, south, south-west and north-east.

7.3.4 Kings Forest Site

The Kings Forest site abuts agricultural and rural lands to the north, west and south west. Cudgen Nature Reserve (including Cudgen Lake and Cudgen Creek) abuts the site boundaries to the south and east. Although Koalas have been demonstrated to traverse areas that are predominantly cleared, the results of radio-tracking of Koalas across the Kings Forest site (JWA 2000) suggest that Koalas generally move through vegetated corridors on and adjacent to the site. These movement corridors have been designated as the East-West, Cudgen Creek, Cudgen Lake and Forest Hills corridors (FIGURE 9).

The Tweed Coast Road to the east of this site forms a significant barrier to movement offsite in this direction. A radio-tracking survey completed by Callaghan and Phillips (1998a and b) showed that Koalas were utilising dual 1.2 metre diameter stormwater pipes underneath Tweed Coast Road prior to the upgrade of Tweed Coast Road and the consequent construction of the

fauna exclusion fencing along both sides of Tweed Coast Road. A proposal to reinstate koala movement under Tweed Coast Road is discussed in SECTION 7.3.3 of the KPoM.

At the request of Tweed Shire Council, an assessment of the potential to link Koala habitat on the Kings Forest site to the Eviron Road overpass to the west of the site was completed. FIGURE 9 shows the general location of a wildlife corridor to the Eviron Road underpass. This area is recognised as a Koala Linkage Precinct (KLP) in the TCCCKPoM (Duranbah Koala Linkage Precinct) and as such is considered a priority for habitat embellishment in the future. A proposed East-West corridor extension (subject of condition B4 of the Concept Plan Approval 06_0318) will be revegetated with the aim of habitat creation and extending the site corridor network to the west (FIGURE 9). This proposal to create and extend the East-West corridor is discussed further in SECTION 7.7 of the KPoM.

The Kings Forest Concept Plan application discussed the efficacy of promoting a corridor to the north-west, linking Kings Forest and Stotts Island Nature Reserve. Carrick (2009) noted that, whilst there are some sparsely vegetated linkages extending from the eastern side of the Cudgen road fauna overpass to Stotts Island Nature Reserve, several kilometres of open agricultural fields occur to the west of the Pacific Motorway. An extension of the East-West corridor to the north-west may facilitate the dispersal of wildlife from Cudgen Nature Reserve to Stotts Island Nature Reserve. However, the value this would provide for Koalas is negligible due to limited suitable habitat and the barrier effect of the water between the south side of the island and the southern bank of the Tweed River. It is also unlikely to provide an effective linkage between other habitats of regional importance due to intervening land-uses and major barriers such as the Pacific Motorway and Tweed River.

The following actions would be necessary if an East-West corridor in the northern portion of the Kings Forest site were to provide effective fauna movement to the north-west:

- Revegetation of cleared grazing lands and portions of sugar cane land; and
- Structures provided to funnel fauna to the Motorway land bridge (Cudgen Road fauna overpass).

However, the prospect of the long-established sugar cane fields to the north and west of the Kings Forest site becoming revegetated, so as to offer meaningful habitat for native wildlife, is considered extremely remote.

Regardless of the fact that a corridor to the north-west was promoted in the Concept Plan application, it has been agreed by TSC, OEH and DoPE that a more appropriate location for an extension of the East-West corridor would be in the direction of the Eviron Road underpass to the south-west (FIGURE 9). Project 28 will complete the revegetation of the relevant Environmental Protection Zones and buffer zones between Precincts 9/10 and Precinct 11 and including a generally 100m wide (minimum 50m wide) vegetated corridor along the southern boundary of Precinct 10, as required in Condition B4 and C28 of the Concept Plan Approval 06_0318. It is anticipated that these Environmental Protection Zones and vegetated buffers, and the proposed offsite offset area, will form part of the long-term provision of a habitat linkage to the south-west of the site (i.e. to the Eviron Road underpass).

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APPENDIX 6 - ASSESSMENT OF THREATENING PROCESSES

1 Introduction

In 2008 the DECC completed an Approved Recovery Plan for the Koala (*Phascolarctos cinereus*). The Recovery Plan lists the recognised current threats to Koalas as follows:

- Habitat Loss and fragmentation;
- Habitat degradation;
- Road kills;
- Dog attacks;
- Predation by foxes;
- Bushfire;
- Logging (not relevant to this KPoM);
- Disease;
- Severe weather conditions; and
- Swimming pools.

Additionally, the following Key Threatening Processes listed in the TSC Act are identified in the Koala Recovery Plan as potentially threatening to the survival of the Koala:

- Anthropogenic climate change;
- Clearing of native vegetation;
- Forest eucalypt dieback associated with over-abundant Psyllids and Bell miners;
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation; and
- Predation by the European red fox (*Vulpes vulpes*).

Each of the above threats to Koalas are discussed in further detail in the following sections (logging, over-browsing and Bell miner die-back have been excluded as they are not relevant to the proposed development).

2 Habitat Loss and Fragmentation

Reed and Lunney (1988) (in a paper submitted for Koala Summit - Managing Koalas in New South Wales), identify habitat loss as the key problem for the long-term survival of Koalas. Loss of potential Koala habitat continues to contribute to population decline across the Koala's range (Phillips *et al.* 2011).

A 1986 survey of the distribution of Koalas revealed that the majority of Koalas occurred on the North Coast of New South Wales, although their distribution west of the Great Divide and in the southern portion of the state was extensive but highly fragmented (Reed *et al.* 1990). The relatively widespread distribution 'masks' the significant losses of Koala habitat since

European settlement and reflects the preferential selection of tree species by Koalas. The preferred species typically are restricted to higher nutrient soils (Moore and Foley 2000) of which substantial portions have been converted to farmland and residential development.

The increase in urban development of the coastal areas of Northern NSW has caused a habitat conflict with Koalas. The removal of high quality Koala habitat to accommodate development forces Koalas to occupy sub-optimal habitat, causes fragmentation of core populations and reduces dispersal options. Approximately 965 ha of bushland vegetation was removed between 2000/2001 and 2007 across the Tweed Valley (BRS 2008). It is estimated that about 100 ha of this loss was potential Koala habitat (Phillips *et al.* 2011).

Along with overall habitat destruction, habitat fragmentation is also a significant problem associated with decreasing Koala numbers (Lunney *et al.* 2007; TSSC 2012a, 2012b). The influence of patch size, shape and connectivity are key factors determining the ability of a landscape to support viable Koala populations (Phillips *et al.* 2011). Additionally, the chance of Koalas being present declines as patch sizes become smaller than ~150 ha. Koalas are more likely to occur in patches within ~100 m of one another compared to patches of vegetation that are more isolated. Small populations that are highly isolated tend to suffer higher extinction risks than populations that are connected to each other via animal movement. Immigration or recruitment into a population can provide a 'rescue' effect and can help maintain genetic diversity (McAlpine *et al.* 2007).

A significant result of this process of habitat loss and fragmentation is the increased likelihood of Koalas coming to the ground to access increasingly fragmented habitat.

3 Habitat Degradation

Apart from the loss of habitat and fragmentation the following degrading processes can occur as a result of habitat loss:

- 1) Edge effects - Fragmented habitats may be subject to edge effect. When habitats become fragmented, their edges often become more abrupt and transition less smoothly than they would naturally. Edges usually have less diversity and are dominated by a small number of species specially adapted to those areas (usually weeds). Weeds such as Lantana can block access to preferred food and roost trees (BSC 2010). Weeds may also can prevent recruitment of new Koala habitat trees. Also, since habitat fragmentation breaks the original habitat into smaller, isolated patches, movement between these patches can become dangerous.
- 2) Elevation of water table and salinity levels - Higher salt levels in the root zone of habitat trees will cause die-back and eventual loss of the affected trees. There will be no successful recruitment of habitat trees in the affected areas. More salt tolerant species will recruit. These new, more salt adapted species are unlikely to be useful to Koalas.
- 3) Fluctuation of water table levels - Earthworks, drainage and filling for agricultural and urban development purposes can lead to alterations in the normal water table levels in nearby habitats. Pollution of the water table is also possible due to these activities.

4 Road Kills/Vehicular Collisions

The impact of motor vehicles on Koalas nation-wide is clearly significant although virtually impossible to quantify (Phillips 1990). The construction of roads through Koala habitat or between habitat areas forces Koalas to cross roads as part of their natural foraging or dispersal behaviours. Phillips (2002) documented that approximately 34% of Koala mortality on the Tweed Coast was due to vehicle-strike and Phillips *et al.* (2011) reported that this figure has decreased to 19% in the intervening decade. However, it is acknowledged that this decline in mortalities is likely to be attributable to overall population decline (Phillips *et al.* 2011). It should also be noted that the majority of Koala mortalities resulting from vehicle strike occur within high-speed areas rather than in residential areas with 50 kph speed limits, as documented by the “road mortality hotspots” identified by Phillips *et al.* (2011) (FIGURE 1).

Two (2) roads close to the Kings Forest site are known to be road mortality hotspots (FIGURE 1). These two (2) hotspots are discussed below:

- Clothiers Creek Road

Clothiers Creek Road runs east-west for approximately 4.6 km between the Pacific Highway and the coastal village of Cabarita. Approximately 2.7 km of the eastern section of the road passes through Cudgen Nature Reserve, with the entire length of this section bounded on at least one side by vegetation communities mapped as Primary, Secondary (Class A) and Secondary (Class B) Koala habitat. Twenty-eight (28) records of koala sightings are present for the vicinity of the road, of which eighteen (18) are located in the eastern section. Clothiers Creek Road is a known vehicle strike hotspot for the Tweed Coast, with Phillips (2002) reporting that it accounted for 47% of known road-kills between 1991 and 2000. The eastern section of the road poses greatest threat to individual Koalas occupying or moving through habitat adjacent to the road.

- Tweed Coast Road

A cluster of twelve (12) records of koala sightings at Cudgen between Kings Forest and Casuarina coincides with the road passing through a vegetated area consisting of Primary and Secondary (Class A) habitat, adjacent to the road on both sides, and adjoining Cudgen Nature Reserve. Traffic data from the south of this location indicates high traffic volumes, the most recent count being 9,954 vehicles per day. The statutory speed limit in this section is 80km/h, while vehicle speeds of between 86km/h and 89km/h on average have been recorded (Tweed Shire Council traffic data, T. Fountain *pers. comm.*).

5 Domestic Dog Attack

Koalas moving between habitat areas sometimes encounter domestic dogs. The incidence of Koala injuries and deaths resulting from altercations with dogs is growing and, in urban areas and adjoining forest habitat, uncontrolled dogs have a serious impact on Koala populations (TSC 2015; Phillips *et al.* 2011; DECC 2008; Qld EPA 2006). The Australian Koala Foundation estimates that approximately 4000 Koalas are killed by dogs and cars each year (AKF undated). On average, approximately 110 koalas are attacked and killed by dogs each year in QLD (DERM 2009). No comparable data is available for NSW.

Most dog attacks are fatal, making dog attacks the third most common cause of death after disease (relating to habitat loss) and vehicle strikes. However, not all dogs attack Koalas. Dogs over 10 kg are attributed to 96% of attacks on koalas (DERM 2009). Generally, the larger the dog, the greater the likelihood that it could be responsible for a fatal attack on a Koala.

6 Predation by the European Red Fox (*Vulpes vulpes*)

It is not considered that the European red fox is a significant predator of Koalas (NSW NPWS 2001). Mortality due to fox predation was positively identified on only one (1) occasion throughout extensive long-term (up to 3 years) telemetry studies of Koalas carried out at a range of sites across New South Wales including Port Stephens, Yamba, the Pilliga and Coffs Harbour (NSW NPWS 2001).

7 Bushfire

Koalas are sedentary animals and not especially mobile and, therefore, stand little chance of surviving large-scale bushfires. Throughout the east coast of NSW, fire continues to threaten Koala populations and is increasingly being recognised as a key factor influencing long-term population viability (Phillips and Pereoglou 2004, Phillips and Hopkins 2010). Bushfire is highlighted by Phillips *et al.* (2011) as one of, if not, the dominant factor responsible for recent declines in koala numbers on the Tweed Coast. Wildfire has the potential to exacerbate Koala population decline by removing animals in a breeding population at a rate faster than the time required for the loss to be replaced by successive Koala generations (Starr 1990; Melzer *et al.* 2000). Regeneration of fire-affected areas is typically slow, so the food resource is reduced for the remaining Koalas not killed by fire. Widespread canopy scorch presumably results in starvation for the remaining animals (Melzer *et al.* 2000).

The NSW Scientific Committee, in their Final Determination to list a population of the Koala *Phascolarctos cinereus* between the Tweed and Brunswick Rivers east of the Pacific Highway as an Endangered Population, have identified inappropriate fire regimes, particularly high intensity or high frequency fires, as representing a significant threat.

Fire frequency and intensity within remaining habitat areas over the last decade has been identified as the major contributor to recent population attrition, with recovery potential now impeded in remaining habitat areas by ongoing incidental mortality rates due mostly to motor vehicle strike (Phillips *et al.* 2011). Phillips *et al.* (2011) have stated that the Tweed Coast Koala population is in serious decline and may be extinct within 20-30 years (from 2011). Active intervention is required to ensure the persistence of the Tweed Coast population. The amelioration of threatening processes such as road kill, dog attack, disease, lack of habitat and isolation is pivotal to its recovery.

The largest area of natural vegetation, and potential Koala habitat, remaining in the Tweed coastal lowlands occurs around Cudgen Lake/Round Mountain (Phillips *et al.* 2011). Much of this area has been burnt multiple times in the last fifteen (15) years with time between fires being as short as three (3) years. Fires during 2004 and 2009 were of high-intensity and much of the area burnt by these fires is currently unoccupied by Koalas, despite containing areas mapped as high-quality Koala habitat (Phillips *et al.* 2011).

More recently (i.e. January 2018) a large portion of the northern SEPP 14 wetland on the Kings Forest site, including areas of Secondary Koala habitat proposed to be retained, were burnt by a high-intensity fire. These areas, despite being mapped as Koala habitat (Phillips *et al.* 2011) are currently not considered to be suitable as habitat and are not considered likely to regenerate as habitat without considerable intervention.

It has been noted (SECTION 2.7 of the KPoM) that continued infestation of native vegetation with Slash pine wildings is occurring over the Kings Forest site. As well as decreasing the diversity and competing with native species, pine invasions can also lead to altered fire regimes. There is often a complete absence of fire where pine plantations occur due to the need to maintain the plantation as an economic resource. However, when fires do occur, they are of high intensity due to the highly flammable nature of pine trees and accumulated leaf litter (Skull 1995, 1998). One and two year old slash pine are killed by low-severity fire. After 3 to 4 years, seedlings survive low-severity fire but not moderate-severity fire. Ten to fifteen foot tall (3.0-4.6 m) saplings survive moderate-severity fires (Carey 1992). Once slash pine is 10 to 12 years old, it is tolerant of crown scorch. Scorched foliage is replaced by new shoots. Slash pine as young as five (5) years old may recover from 100% crown scorch (de Ronde, 1982; Wade 1983). Slash pine taller than 5 feet (1.5 m) seldom die if less than 70 percent of the crown is scorched (McCulley, 1950). The control of Slash pine wildings at the Kings Forest site is therefore a key consideration for the control of any future wildfires.

8 Disease

Disease is a fundamental element of wildlife population dynamics and is generally recognised as a density dependent mechanism enacting population regulation (Phillips and Hopkins 2012). There are four (4) common Koala diseases caused by the Chlamydia organism:

- Conjunctivitis which can cause blindness;
- Pneumonia;
- Urinary tract infections; and
- Reproductive tract infections which can cause female infertility.

Elevated levels of Chlamydiosis can result from increased levels of stress due to reduced food availability and/or more anthropogenic catalysts such as habitat loss, dog attack and motor vehicle strike. This can in turn affect reproductive output/population size (Phillips *et al.* 2011). Koalas most at risk of disease are those which occupy disturbed or isolated habitats and those which are subject to continual human related disturbance.

9 Severe Weather Conditions (Including Climate Change)

The Tweed region occurs in a sub-tropical climatic environment. Rainfall is generally plentiful and temperature fluctuations are moderate (mild winters and warm summers). The region does experience cyclones on occasions. These cyclones bring severe wind conditions and flood rains. CSIRO (2010) have indicated that:

The observed changes in the hydro-climatic data may indicate a shift in the climate for south-eastern Australia. A similar shift in climate evidenced via a reduction of rainfall

and streamflow has also been experienced beginning in the 1970s in south-west Western Australia. That shift also has been linked to global warming and a range of other factors.

Climate model projections for the coming decades indicate an increasing risk of below average rainfall for south-eastern Australia. South East Australian Climate Initiative (SEACI) research also shows that short-duration storms may become more intense across the region, especially over the inland plains.

The current rainfall decline is at least in part attributed to climate change, raising the possibility that the current dry conditions may persist, and possibly intensify, as has been the case in south-west Western Australia.

It is prudent to plan for conditions that are likely to be drier than the long-term historical average conditions because the current drought appears to be at least partly linked to climate change and climate model projections of a drier future across the south-east.

There are questions remaining about how to apply climate change projections given that the recent observed changes in rainfall and streamflow are larger than the projected changes to mean climate for 2030. Further research is planned for Phase 2 of SEACI aimed at better understanding the relative roles of natural variability and climate change in the recent rainfall decline. This will assist in determining how to best combine the observed climate records with future projections.

Climate change may impact on Koalas by exacerbating the effects of drought (IUCN 2009). In general, drought causes loss of leaves and loss of leaf quality, which can have deleterious impacts on Koala populations. Koalas currently occur throughout eastern Australia in fragmented habitats, where they are under pressure from land-clearing, dogs, motor vehicles and disease. Some inland and coastal koala populations have experienced significant declines due to drought, heatwaves and threats associated with urbanisation (ACEAS 2012). Rapid climate change may compound these stressors and cause their range to contract to many regions where these threats are amplified by intensified urbanisation (Adams-Hosking *et al.* 2011). The likely greatest threat to Koalas from climate change is sea level induced changes to water tables and salinity intrusion affecting existing Koala habitat.

10 Swimming Pools

Although drowning in swimming pools is a relatively low order threat, any Koala mortality can be significant in a particular context (NPWS 2003). Whilst Koalas can swim, pools without a gently sloping side, or a rope/ladder as a means for a Koala to climb out, can cause a Koala to become trapped and drown (AKF undated).

It should be noted that mandatory child-exclusion fencing to swimming pools will not necessarily exclude Koalas, particularly small juveniles (EPA 2006).

The philosophy with the Kings Forest development is to separate the conserved habitat and the terrestrial and non-flying arboreal mammals contained therein (i.e. including Koalas) from the

residential development. Hence, there is not considered to be a requirement for any specific construction or design standards, for pools or their fences, to protect Koalas who wander into the residential development area.

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APPENDIX 7 - COMPENSATORY HABITAT SELECTION CRITERIA

It should be noted that as part of the reconciliation of Commonwealth and State conditions, the exhibition process and the subsequent assessment of submissions, a number of supplementary recommendations from DoPE, OEH and TSC have been incorporated into the compensatory habitat selection process.

The methodology utilised in the selection and confirmation of Koala habitat compensatory habitat areas and types involved a tiered or “top-down” approach, which, essentially means starting with the big picture and working down to the finer detail. A summary of each major step in the process is described below. Each step often involved review and amendments to vegetation and/or habitat mapping:

- Step One - An initial assessment/review of pre-clearing vegetation types (Terrestria 2014) across all of the Environmental Protection Zones and relevant buffer areas was completed. The New South Wales VIS database was interrogated to determine the appropriate PCT's which equated to the pre-clearing vegetation types. The Tweed Vegetation Management Strategy (Kingston *et al.* 2004) was also reviewed to determine appropriate corresponding vegetation codes.
- Step Two - Areas of the Environmental Protection and Buffer Zones committed to other uses were then filtered out of the candidate Koala compensatory habitat. The areas filtered out were:
 - Intact native vegetation communities (i.e. considered likely to contain a full suite of native species i.e. groundcovers, shrubs and canopy trees);
 - Retained or regenerating heath - avoided as far as practicable in accordance with MP08_0194 (MOD 4) Condition 41; and
 - Compensatory Wallum Sedge Frog Habitat (JWA 2017) - avoided/no overlaps in accordance with MP08_0194 (MOD 4) Condition 41.
- Step Three - Small areas (<1,000 m²) isolated from any other similar compensatory or retained habitat area were excluded (as requested by OEH during the exhibition and submission phases in 2017/2018 and also by the EPBC Approval of 2015).
- Step Four - Site inspections of the (remaining) candidate compensatory habitat polygons were completed via a random meander (Cropper 1993) throughout each of the polygons. The following attributes were considered during the assessment of each of the individual compensatory habitat polygons:
 - Presence/absence of Koala food tree species, other native flora species, and weed species; and
 - Abundance of Koala food tree species, other native flora species in each stratum, and weed species in each stratum.

An estimate was made of the percentage cover of each the above attributes within the groundcover, mid-storey and canopy strata. Representative photographs were taken in many of the compensatory habitat areas (JWA 2018).

If an area was observed to currently contain a significant amount (>50% Foliage Projective Cover - FPC) of regenerating Koala food tree species and/or other native tree and/or shrub species, then these areas were excluded from the proposed Koala compensatory habitat mapping.

Conversely, if an area contained a significant amount (>50% FPC) of non-native vegetation (particularly Slash pine which are likely to restrict the growth to maturity of the Koala food trees), the area was included within the proposed Koala compensatory habitat mapping.

- Step Five - The post development groundwater levels were used to further refine species selection/habitat type based on each particular plant species physiological water requirements. The extent of each habitat category was determined based on the following post-development groundwater depth ranges:
 - Dry Primary Koala habitat: Depth to groundwater = 1m to >2m (areas to be planted with a majority primary food tree species *Eucalyptus tereticornis*);
 - Dry Primary Koala habitat plus dry heath: Depth to groundwater = 1m to >2m (areas with regenerating heath to be planted with a majority primary food tree species *Eucalyptus tereticornis*);
 - Wet Primary Koala habitat: Depth to groundwater = 0.2 to 1m (areas suitable for planting majority primary food tree species *Eucalyptus robusta*);
 - Wet Primary Koala habitat plus wet heath: Depth to groundwater = 0.2 to 1m (areas suitable for planting majority primary food tree species *Eucalyptus robusta*); and
 - Wet Secondary Koala habitat: Depth to groundwater = 0 to 0.2m (areas suitable for planting majority secondary food tree species *Melaleuca quinquenervia*).
 - No potential areas of Dry Secondary Koala Habitat were identified.
- Step Six - Each of the above habitat types were allocated to a relevant Plant Community Type (PCT). Koala compensatory habitat types to be recreated on the Kings Forest site need to be consistent with NSW OEH standards to allow comparison with relevant vegetation descriptions and their benchmarks. In this regard, the PCT benchmark descriptions were accessed via the NSW OEH database (i.e. the BioNet Vegetation Classification System) to determine appropriate PCT descriptions for each proposed compensatory habitat type. It is noted however that PCT descriptions are still undergoing revision, and many remain undescribed for the IBRA subregion and therefore corresponding Tweed Vegetation Management Strategy 2004 (TVMS) codes were also provided.
- Step Seven - Based on steps one to six above, areas of Dry 'Primary' Habitat were actually identified as suitable for rehabilitation as Dry 'Secondary' Habitat. During the exhibition and submission phases in 2017/2018, TSC recommended that the above methodology be varied to allow for:
 - The planting of high densities of preferred browse tree species at the expense of those listed for the relevant plant communities that were preferable for planting in the designated compensatory habitat areas; and

- The increase in density of the actual tree plantings from 1 tree/25 m² to 1 tree/9 m² with no plantings of shrubs or groundcovers.

The aim was to significantly increase the number of primary browse species in the compensatory habitat areas, with reliance on the natural regeneration of shrubs and groundcovers over time. Specifically, TSC requested that high densities of Forest red gum (*Eucalyptus tereticornis*) be planted, despite this species not having been previously recorded in these areas of the site or indicated in pre-clearing mapping.

The above resulted in > 50% of trees planted in proposed Dry 'Secondary' Habitat being allocated as Forest red gum, thus resulting in a Dry 'Primary' Habitat designation.

- Step Eight - A final filter was applied in the process whereby any small, thin or irregularly shaped polygons of a particular habitat type were merged with adjacent habitat types to create larger, more intact, and more manageable habitat areas.

References

Cropper, S.C. (1993) Management of Endangered Plants. CSIRO, East Melbourne, Victoria.

JWA (2018) Assessment of Proposed Compensatory Koala Habitat, Kings Forest. Report to Project 28 Pty Ltd.

Kingston, M. B., Turnbull J. W. and Hall P. W. (2004) Tweed Vegetation Management Strategy. Volumes 1, 2 & 3 - Strategy Plan. Prepared for Tweed Shire Council. Ecograph.

Terrestria (2014) Pre-clearing Mapping of Vegetation of Kings Forest Site, Depot Road, Cudgen. March 2014. Report prepared for JWA Pty Ltd.

APPENDIX 8 – REHABILITATION SPECIFICATIONS AND MONITORING

1 Rehabilitation Phases

Site rehabilitation works will be completed by a suitably qualified⁵ Bush Regeneration company and be undertaken in six (6) phases as follows:

- Phase 1: Site preparation of retained Koala habitat (where necessary) and offset habitat areas.
- Phase 2: Initial planting - will commence as soon as the Bush Regeneration team is satisfied that weed species have been successfully controlled.
- Phase 3: Establishment and initial maintenance - It is planned that the establishment period will be of a minimum length of twelve (12) months during which time weeds will be controlled and watering will be undertaken on an ‘as needs’ basis.
- Phase 4: Supplementary planting to replace dead seedlings - will commence within two (2) months of the initial planting in each area. Replacement of seedlings/saplings that have died will continue during the approved monitoring period at a rate that will ensure a >90% survival of planted stock. Forest red gum replacement plantings within Dry Primary compensatory habitat areas will not occur if losses are greater than 15%.
- Phase 5: Additional plantings - works can commence where advanced canopy growth is evident and the Bush Regeneration team determines that additional planting is necessary to satisfy the objectives of the offset strategy.
- Phase 6: Ongoing maintenance - will continue indefinitely on an as needed basis until performance targets have been met. If the performance targets have not been met, corrective actions will be implemented in accordance with SECTION 8.4.6 of the KPoM.

2 Site Preparation

Site preparation will include the following actions:

- Erection of protective fencing and signage in accordance with SECTION 7.3 of the KPoM;
- Identification of retained vegetation (SECTION 7.5 of the KPoM);
- Each retained Koala habitat area and rehabilitation (compensatory habitat) area will be allocated an individual identifying number. Each different rehabilitation area will be separated by flat (5 cm x 1 cm) pegs painted in white at the top with the allocated identifying area number written on the white paint faced towards the relevant area;
- Primary and Secondary weed control in accordance with the following sections; and
- Sourcing and/or propagation of revegetation stock.

It should be noted that no slashing, clearing, filling or other impacts upon native vegetation within retained or offset areas should occur to achieve the KPoM outcomes.

⁵ A Bush Regeneration company that has demonstrable experience in the rehabilitation or revegetation of native vegetation communities in the Tweed region.

3 Weed Control

3.1 Primary Weeding

Weed eradication will be undertaken within the retained Koala habitat (as necessary) and the proposed offset areas on a progressive basis through localised treatment of grass species via mechanical removal (hoe/rake, hand pulling and/or slashing) or with Roundup Biactive®. Woody weed species will be hand pulled or controlled using best practice weed control techniques.

All chemical users should be experienced and licensed in accordance with the relevant legislation. Utmost care must be taken when utilising chemicals to ensure that no drift occurs outside of the treatment area. Spraying should not occur on windy days or within 24 hours of predicted rainfall. Preparation before spraying, in the form of manual clearing weeds from around native plants, must be carried out.

Primary weeding should commence prior to the commencement of construction, ideally at the start of the active growing period (approximately November), and on an as needed basis.

Weed material that does not contain any fertile parts will be mulched and spread on the ground and any weeds that may have fertile parts present will be disposed of at an approved waste disposal facility such as Council landfills or transfer stations.

3.2 Secondary Weeding

Secondary weeding involves the eradication of weeds that have been overlooked or re-shoot after primary treatment. Secondary weeding will occur three (3) to four (4) months after primary weeding and no later than six (6) months.

4 Natural Regeneration

Natural regeneration refers to the natural process by which plants replace or re-establish themselves. Natural regeneration can be described as the “regrowth” or “vegetative recovery” which occurs spontaneously, by seed or otherwise, after a stress or disturbance (Temple & Bungey 1980). As long as mature and healthy native plants occur on the subject site, natural regeneration is an option.

Natural regeneration is a powerful tool that can be used to re-establish native vegetation. It ensures that the new growth is derived from genetic material (i.e. parents) that currently occupies the site and as such is adapted to local conditions. Additionally, the chance of outbreeding depression is reduced.

Natural regeneration will be encouraged within all retained Koala habitat and rehabilitation areas. Natural recruitment will be monitored for the life of the rehabilitation project however it is not intended that native shrub and groundcover species are planted if/where natural recruitment is poor due to canopy closure, as the aim of the revised planting schedule (as agreed by the relevant agencies) is to provide large numbers of preferred Koala food trees rather than fully structured vegetation communities.

5 Revegetation Works

5.1 Introduction

Revegetation will commence no later than six (6) months after the primary weeding is completed. Successful completion of primary weeding will be determined by the appointed Bushland restoration team. At this time, an assessment will be made as to level of natural regeneration present within retained Koala habitat and rehabilitation areas. Any areas where the native seedling germination is considered to be low and impeding the achievement of rehabilitation objectives will require revegetation.

5.2 Propagation

Plants to be used for revegetation are to be either propagated in a nursery using material (seeds, cuttings, tissues, etc.) from species which occur onsite or obtained from a local nursery able to supply stock from local provenance. Where existing nursery stock from local provenance is not available, collection of propagation material should be carried out as detailed below.

Whenever possible, seed will be removed directly from plants by shaking or cutting branches over a tarpaulin. Secateurs will be sterilised between each use. Seed will be placed in small envelopes with the collection details clearly marked. If the seed is extremely small, it will be stored in glass or plastic vials to avoid undue loss. The seed will be cleaned, its viability checked and prepared for storage. Seed that has lost viability will not be used in the revegetation works due to the dangers of genetic aberration.

The amount of seed collected will not exceed 5% per plant. Seed will not be collected from isolated populations or rare plants. The following details will be collected from each source plant:

- Location (GPS position);
- Date of collection;
- Name of collector;
- Soil type;
- Health of plant; and
- Collection method.

It is expected that during the seed collection program, a site will be visited on several occasions to ensure optimum seed ripeness. The seed collection program will be prepared by the bushland restoration team in consultation with TSC and NSW NPWS prior to commencement. .

If seed collection proves difficult or impossible, other forms of propagation, such as cuttings, may be attempted.

6 Planting Program

Tube stock seedlings will primarily be used for the plant-out. Seedlings will be sufficiently developed so as to have a significant chance of survival. Seedlings will be at least the sixth

leaf stage and/or 20cm in height. Tube stock will be sun hardened (plants should be held in full sunlight and systematically stressed to the point of wilting for at least two (2) months prior to planting).

All exclusionary fencing will be in place prior to the commencement of construction and before planting occurs.

Planting will occur at the optimum time of year when there is high soil moisture (between January and May), unless irrigation is available and accessible. In this regard, water may be sourced either from bores or from a large lake that occurs on adjacent land (owned by the proponent) known as 'Turners'.

If required, the restoration team may make minor alterations to this revegetation strategy depending on the site requirements. The following strategy will be employed:

- Secondary weeding - Seedling sites will be spot sprayed with Roundup Biactive© one (1) week prior to commencement;
- All seedlings will be soaked in water overnight prior to planting;
- All seedlings will be provided with a wetting agent such as rain-saver⁶ crystals;
- Weeds will be controlled, in the short term, through the application of suitable mulch around individual plantings and with spot applications of an appropriate herbicide.
- All seedlings will be protected by a tree guard (commercial tubing or equivalent); and
- Watering will be undertaken after the seedlings have been planted on an 'as needed' basis.

The seedlings shall be planted on the same day (or as soon as practicable) as their transport from the nursery. No seedlings will be left unprotected on the site whilst awaiting planting. Planted seedlings will be marked with a piece of biodegradable tape and staked.

The plants growing medium should be soaked prior to planting and the plant cores should be buried to approximately 1-2cm deep. Only nitrogenous fertilisers will be used to avoid the introduction of Phosphorous, Potassium and other micronutrients. Planting in areas exposed to full sun or westerly sun will be avoided in the peak summer months, where possible.

7 Planting Density and Species Selection

A list of species to be used for planting within the proposed offset habitat areas is provided in TABLE 1. The overall plant numbers to be installed in each of the proposed Compensatory Koala habitat areas within each Precinct are provided in TABLE 2.

During the exhibition and submission phases in 2017/2018, TSC recommended that the proposed planting methodology be varied to allow for:

⁶ Rain-saver is a polymer water crystal that has been specifically developed for plants. The polymer absorbs and holds water and nutrients at a specific tension which makes it available to plant roots but does not release to the soil. Rain-saver has proven very successful in more difficult environments (e.g. Roadside plantings on the Pacific Motorway between Brisbane and the Gold Coast and in frontal dunes at Pottsville (R. Keene *pers comm.* 2000).

- The planting of high densities of preferred browse tree species at the expense of those listed for the relevant plant communities that were preferable for planting in the designated compensatory habitat areas; and
- The increase in density of the actual tree plantings from 1 tree/25 m² to 1 tree/9 m² with no plantings of shrubs or groundcovers.

The aim was to significantly increase the number of primary browse species in the compensatory habitat areas, with reliance on the natural regeneration of shrubs and groundcovers over time.

It is therefore not intended to plant native shrub and groundcover species as it is considered likely that natural regeneration in these strata will occur over the majority of the proposed compensatory habitat areas. Natural recruitment will be monitored for the life of the rehabilitation project however it is not intended that native shrub and groundcover species are planted if/where natural recruitment is poor due to canopy closure, as the aim of the revised planting schedule (as agreed by the relevant agencies) is to provide large numbers of preferred Koala food trees rather than fully structured vegetation communities.

Condition 45 (a) of the Major Project (MP08_0194) approval states that 27 hectares of land has to be restored and planted with Koala food trees. To satisfy this condition, Project 28 have elected to restore and plant 21.36 ha of Koala food trees on adjacent land (“Turners”) to the south of Precincts 6 and 10 in the Kings Forest site. Turners is owned by Project 28 and is located within the Duranbah Koala Linkage Precinct. The balance of the 27 ha will be planted on the Kings Forest site itself - 6.05 ha will be planted within the 50 metre buffer zone in Precincts 12 - 14.

TABLE 3 outlines the proposed offsite compensatory koala habitat including habitat types, vegetation community type and structure to be recreated, numbers of koala food trees to be planted and the species to be used for planting. The overall plant numbers to be installed in each of the proposed offsite Compensatory Koala habitat areas are also provided in TABLE 3.

TABLE 1
PLANTING DETAILS

Koala Compensatory Habitat Type	Total Area	Depth to groundwater	Vegetation community plant community type to be recreated	Broad structure of the vegetation type to be created	Minimum total number of koala food trees to be planted	Species list*
Dry primary koala habitat	25.80 ha	-1m to > -2m	PCT 1136 / TVMS 306	Open Forest	Primary Trees: 14,339 Secondary Trees: 14,339	<i>Eucalyptus tereticornis</i> ($\geq 50\%$) +/- <i>Eucalyptus racemosa</i> , <i>Eucalyptus robusta</i> , <i>Corymbia intermedia</i>
Dry primary koala habitat plus dry heath	6.00 ha	-1m to > -2m	PCT 1136 / TVMS 306	Open Forest	Primary Trees: 3,333 Secondary Trees: 3,333	<i>Eucalyptus tereticornis</i> ($\geq 50\%$) +/- <i>Eucalyptus racemosa</i> , <i>Eucalyptus robusta</i> , <i>Corymbia intermedia</i> , <i>Lophostemon confertus</i>
Wet primary koala habitat	27.15 ha	-0.2 to -1m	PCT 1230 / TVMS 305	Open/Closed Forest	Primary Trees: 21,109 Secondary Trees: 9,047	<i>Eucalyptus robusta</i> ($\geq 70\%$) +/- <i>Eucalyptus tereticornis</i> , <i>Melaleuca quinquenervia</i> , <i>Lophostemon suaveolens</i> and <i>Cupaniopsis anacardioides</i>
Wet primary koala habitat plus wet heath	0.23 ha	-0.2 to -1m	PCT 1230 / TVMS 305	Open/Closed Forest	Primary Trees: 179 Secondary Trees: 77	<i>Eucalyptus robusta</i> ($\geq 70\%$) +/- <i>Eucalyptus tereticornis</i> , <i>Melaleuca quinquenervia</i> , <i>Lophostemon suaveolens</i> and <i>Cupaniopsis anacardioides</i> .
Wet secondary koala habitat	3.33 ha	0 to -0.2m	PCT 1064 / TVMS 401	Open/Closed Forest	Primary Trees: 370 Secondary Trees: 3,330	<i>Melaleuca quinquenervia</i> ($\geq 90\%$) +/- <i>Eucalyptus robusta</i> , <i>Eucalyptus tereticornis</i> , <i>Lophostemon suaveolens</i> .
Subtotal	62.51 ha				Primary Trees: 39,330 Secondary Trees: 30,126	
East-West Corridor - Dry primary koala habitat	2.90 ha	-1m to > -2m	PCT 1136 / TVMS 306	Open Forest	Primary Trees: 1,611 Secondary Trees: 1,611	<i>Eucalyptus tereticornis</i> ($> 50\%$) +/- <i>Eucalyptus racemosa</i> , <i>Eucalyptus robusta</i> , <i>Corymbia intermedia</i>

Koala Compensatory Habitat Type	Total Area	Depth to groundwater	Vegetation community plant community type to be recreated	Broad structure of the vegetation type to be created	Minimum total number of koala food trees to be planted	Species list*
East-West Corridor - Wet primary koala habitat	3.36 ha	-0.2 to -1m	PCT 1230 / TVMS 305	Open/Closed Forest	Primary Trees: 2,613 Secondary Trees: 1,120	<i>Eucalyptus robusta</i> ($\geq 70\%$) +/- <i>Eucalyptus tereticornis</i> , <i>Melaleuca quinquenervia</i> , <i>Lophostemon suaveolens</i> and <i>Cupaniopsis anacardioides</i> .
Subtotal - East-West Corridor	6.26 ha				Primary Trees: 4,224 Secondary Trees: 2,731	
TOTALS	68.77 ha				Primary Trees: 43,554 Secondary Trees: 32,857	

* Other suitable canopy species may also be included.

TABLE 2
TOTAL NUMBER OF PLANTINGS IN EACH PRECINCT

Precinct/EMA	Dry Primary Koala Habitat	Dry Primary Koala Habitat Plus Dry Heath	Wet Primary Koala Habitat	Wet Primary Koala Habitat Plus Wet Heath	Wet Secondary Koala Habitat	East-West Corridor - Dry Primary Koala Habitat	East-West Corridor - Wet Primary Koala Habitat	TOTAL
Precinct 2	356	811	0	0	0	0	0	1167
Precinct 3	656	0	400	0	0	0	0	1056
Precinct 5	4611	4689	8256	256	656	0	0	18467
Precinct 6	5322	0	2956	0	1300	0	0	9578
Precinct 7	6122	1167	4133	0	1611	0	0	13033
Precinct 8	0	0	0	0	0	0	0	0
Precinct 9	3322	0	5578	0	144	0	0	9044
Precinct 10	5489	0	3022	0	0	0	0	8511
Precinct 11	0	0	0	0	0	0	0	0
Precincts 12-14	2789	0	5822	0	0	0	0	8611
E-W Corridor	3222	0	3733	0	0	3222	3733	13911
TOTAL	31889	6667	33900	256	3711	3222	3733	83378

TABLE 3
PROPOSED OFFSITE KOALA COMPENSATORY HABITAT PLANTING DETAILS

Koala Compensatory Habitat Type	Total Area	Vegetation community PCT to be recreated	Broad vegetation structure to be created	Minimum total number of koala food trees to be planted (1 tree / 9 m ²)	Species list*
Dry primary koala habitat	12.03 ha	PCT 1136 / TVMS 306	Open Forest	Primary Trees: 6,683 Secondary Trees: 6,683	<i>E. tereticornis</i> , <i>E. microcorys</i> , <i>E. propinqua</i> (>50%) +/- <i>E. resinifera</i> , <i>Corymbia intermedia</i> , <i>Lophostemon confertus</i>
Wet primary koala habitat	15.38 ha	PCT 1230 / TVMS 305	Open/Closed Forest	Primary Trees: 11,962 Secondary Trees: 5,126	<i>Eucalyptus robusta</i> (≥ 70%) +/- <i>Eucalyptus tereticornis</i> , <i>Melaleuca quinquenervia</i> , <i>Lophostemon suaveolens</i> and <i>Cupaniopsis anacardioides</i>
TOTAL	27.41 ha			Primary Trees: 18,645 Secondary Trees: 11,809	

* Other suitable canopy species may also be included.

References

Temple, J. and Burngey, D (1980) Revegetation : methods and management. State Pollution Control Commission, Sydney.

APPENDIX 9 - INDEPENDENT VERIFICATION REPORT - KOALA HABITAT (MJD ENVIRONMENTAL 2019)