MOUNT PETER STRUCTURE PLAN

PART 5 - TECHNICAL REPORT

ENVIRONMENTAL CONSTRAINTS AND OPPORTUNITIES
This report is a Technical background report that informs the Mount Peter Structure Plan. Specifically, this report is in support of, and in response to, elements of item 3.7 (Natural Environment & Open Space) of Section 4.1 (Outputs) of the Mount Peter Master Planning Specification.

DISCLAIMER
This Technical Report is one of a series of reports which forms part of the draft Structure Plan for Mount Peter. Please note that this Technical Report is a draft document only.

Whilst every care is taken to ensure the accuracy of this Technical Report and draft Structure Plan, Cairns Regional Council (CRC) accepts no liability for the accuracy of or inferences from the material contained in this publication, or for any action as a result of any person's or group's interpretations, deductions or conclusions relying on this material. The CRC accepts no liability for any loss, damage or injury (including consequential loss, damage or injury) from any use of this Technical Report and draft Structure Plan.

COPYRIGHT
This document is and shall remain the property of the Cairns Regional Council. Using or copying this document or any part of it without specific authorisation is absolutely prohibited.
P.O. Box 359 Cairns, Qld., 4870
Tel: (07) 4044 3044 Fax: (07) 4044 302

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Author</th>
<th>Reviewer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Name</td>
<td>Initials</td>
</tr>
<tr>
<td>Ver A</td>
<td>May 2010</td>
<td>Mark Harris</td>
<td>MH</td>
</tr>
</tbody>
</table>
# ENVIRONMENTAL CONSTRAINTS AND OPPORTUNITIES TECHNICAL REPORT

## TABLE OF CONTENTS

**EXECUTIVE SUMMARY** .......................................................................................................................... 1  

1 **BACKGROUND........................................................................................................................................... 3  
   1.1 INTRODUCTION .................................................................................................................................. 3  
   1.2 SUBJECT AREA DESCRIPTION ........................................................................................................... 4  

2 **ASSUMPTIONS/METHODOLOGY............................................................................................................. 6  
   2.1 ASSUMPTIONS .................................................................................................................................. 6  
   2.2 METHODOLOGY .................................................................................................................................. 6  

3 **CONSTRAINTS AND OPPORTUNITIES ................................................................................................. 8  
   3.1 STEEP LAND AND GEOLOGICAL STABILITY ..................................................................................... 8  
      3.1.1 Recognised Values .................................................................................................................... 8  
      3.1.2 Land Use Constraints and Opportunities .................................................................................. 9  
   3.2 BUSHFIRE ........................................................................................................................................... 10  
      3.2.1 Recognised Values .................................................................................................................... 10  
      3.2.2 Land use constraints and opportunities ..................................................................................... 17  
   3.3 RESERVES ......................................................................................................................................... 18  
      3.3.1 Recognised Values .................................................................................................................... 18  
      3.3.2 Land Use Constraints and Opportunities .................................................................................. 18  
   3.4 WATERWAYS AND RIPARIAN CORRIDORS ................................................................................... 18  
      3.4.1 Recognised Values .................................................................................................................... 19  
      3.4.2 Land Use Constraints and Opportunities .................................................................................. 19  
   3.5 NATIVE VEGETATION COMMUNITIES ............................................................................................ 22  
      3.5.1 Recognised Values .................................................................................................................... 22  
      3.5.2 Land Use Constraints and Opportunities .................................................................................. 27  
   3.6 SIGNIFICANT WILDLIFE SPECIES ................................................................................................. 28  
      3.6.1 RECOGNISED VALUES ................................................................................................................ 29  
      3.6.2 Land Use Constraints and Opportunities .................................................................................. 37  
   3.7 EXTRACTIVE INDUSTRY ..................................................................................................................... 37  
      3.7.1 Recognised Values .................................................................................................................... 38  
      3.7.2 Land Use Constraints and Opportunities .................................................................................. 38  
   3.8 AQUACULTURE AND POULTRY ....................................................................................................... 39  
      3.8.1 Recognised Values .................................................................................................................... 39  
      3.8.2 Land Use Constraints and Opportunities .................................................................................. 39  
   3.9 ACID SULFATE SOILS ......................................................................................................................... 40  
      3.9.1 Recognised Values .................................................................................................................... 40  
      3.9.2 Land Use Constraints and Opportunities .................................................................................. 41  
   3.10 PEST SPECIES ................................................................................................................................... 41
3.10.1 Recognised Values ................................................................. 42
3.10.2 Land Use Constraints and Opportunities ..................................... 42
3.11 AIR QUALITY .............................................................................. 43
3.11.1 RECOGNISED VALUES ......................................................... 43
3.11.2 Land Use Constraints and Opportunities ..................................... 43
3.12 ACOUSTIC ENVIRONMENT ......................................................... 43
3.12.1 Recognised Values ................................................................. 44
3.12.2 Land Use Constraints and Opportunities ..................................... 45
3.13 DECLARED FISH HABITAT AREAS, MARINE PLANTS AND WATERWAY BARRIERS ......................................................... 45
3.13.1 Recognised Values ................................................................. 46
3.13.2 Land Use Constraints and Opportunities ..................................... 46
3.14 CONTAMINATED LAND ............................................................. 48
3.14.1 Recognised Values ................................................................. 48
3.14.2 Land Use Constraints and Opportunities ..................................... 49
3.15 COASTAL AREAS ....................................................................... 50
3.15.1 Recognised Values ................................................................. 50
3.15.2 Land Use Constraints and Opportunities ..................................... 51
3.16 WORLD HERITAGE AREA ......................................................... 53
3.16.1 Recognised Values ................................................................. 53
3.16.2 Land Use Constraints and Opportunities ..................................... 54

4 ISSUES ............................................................................................. 55
4.1 LIMITS OF WATERCOURSES PURSUANT TO THE WATER ACT 2000 ......................................................... 55
4.2 DECLARED FISH HABITAT AREAS ............................................... 56

5 DISCUSSION .................................................................................... 58

6 SUMMARY RECOMMENDATIONS .................................................. 59
6.1 SUMMARY ................................................................................... 59
6.2 ASSUMPTION RECOMMENDATIONS FOR THE STRUCTURE PLAN ................................................................. 59

FIGURES

Figure 1 – Mount Peter Master Planned Area
Figure 2 – Slope Analysis
Figure 3 – Steep Land and Geological Stability Constraints
Figure 4 – Bushfire Hazard Analysis and Required Bushfire Safety Buffers
Figure 5 – Watercourse Stream Order and Development Setbacks
Figure 6 – Extract from Certified Regional Ecosystem Map
Figure 7 – Extractive Industry and Land Identified on Environmental Management Register
Figure 8 – Environmental Constraints Plan

APPENDICES

Appendix A – Supporting Information
Appendix B – Investigation of Mabi Forest in Mount Peter Area – A Report prepared by the Department of Environment and Resource Management
EXECUTIVE SUMMARY

This Environmental Constraints and Opportunities Technical Report has been prepared on behalf of Cairns Regional Council for the Mount Peter Master Planned Area (“MPA”).

The objectives of this report are to provide an analysis of the environmental values of the MPA and associated development constraints and opportunities to assist in the development of a Structure Plan for the MPA. The MPA encompasses approximately 3,330 hectares of land in the Mount Peter locality, located between Edmonton and Gordonvale, to the west and east of the Bruce Highway. The MPA is situated at the base of the Atherton Tablelands and is bordered by Peterson Road in the north, the Bruce Highway to the east, Draper Road and the Wet Tropics World Heritage Area to the south and the Lamb Range (which forms part of the Wet Tropics World Heritage Area) to the west.

In order to provide an analysis of the environmental factors that constrain or are likely to constrain future patterns of land use within the MPA, a series of development assumptions were derived from existing and relevant Commonwealth, State and Local government regulations the applicability of which have been further informed by relevant technical investigations. These assumptions relate to the following environmental values: steep land and geological stability, bushfire, reserves, waterways and riparian corridors, native vegetation communities, significant wildlife species, extractive industry, aquaculture and poultry, acid sulfate soils, pest species, air quality, acoustic environment, fish habitat areas, marine plants and waterway barriers, contaminated land, coastal areas and the adjoining World Heritage Area.

Land use constraints within the MPA were generally derived through application of the relevant Commonwealth, State and Local government regulations, policies and guidelines with, where applicable, appropriate reference and incorporation of additional technical information provided in the reports and investigations prepared and undertaken within the MPA. In addition, contact was made with representatives of the State agencies responsible for the administration of relevant these regulations to further discuss their application to the MPA.

The Land Use Constraints and Opportunities relevant to environmental values within the MPA are outlined in Section 3 of this report. The majority of constraints herein have, with some minor exceptions, been generally recognised by CRC, relevant State agencies and relevant stakeholders as being relevant, reasonable and consistent with relevant legislative requirements.

Two issues, which have the potential to affect finalisation of the development area, were identified during the preparation of this report. These relate to:

- defining the limits of watercourses pursuant to the *Water Act 2000*;
- the provision of a buffer to the Trinity Inlet Declared Fish Habitat Area that will permit landward migration of tidal wetlands associated with sea level rise.

Resolution of these matters has since been agreed to with the relevant State agencies.

The environmental land use opportunities and constraints technical report provided in this report have been compiled to produce an Environmental Constraints Masterplan which classifies the MPA into three “Development Constraint” categories, High, Moderate and Low. The areas of land that these constraints affect are outlined as follows.

- High Development Constraint – 1,645 ha.
• Moderate Development Constraint – 162 ha.
• Low Development Constraint – 1,523 ha.

Areas of High Development Constraint are typically associated with steep land and visual amenity, bushfire hazard, identified waterway envelopes, remnant vegetation, significant wildlife species, existing extractive industry operations and separation areas, the Declared Fish Habitat Area and associated setbacks, the State’s coastal zone and the World Heritage Area. These have been outlined in Map 01 Mount Peter Structure Plan Area – Natural Environment.

Areas of Moderate Constraint are typically associated with development setbacks from remnant vegetation and/or bushfire hazard, waterways not recognised under the Water Act 2000 or else relate to sections of the MPA which currently support primary industry operations or areas of contaminated land which may be included within the development area once current land uses have been concluded and appropriately remediated.
1 BACKGROUND

1.1 INTRODUCTION

This Environmental Constraints and Opportunities Technical Report has been prepared by Cardno (Qld) Pty Ltd (“Cardno”) for the Mount Peter Master Planned Area (“MPA”) on behalf of Cairns Regional Council.

The Mount Peter project aims to create one of Australia’s premier master planned communities; complementing CairnsPlan 2005 and the Far North Queensland Regional Plan 2009-2031 (“FNQ2009-2031”). The project will achieve sustainable, efficient, co-ordinated development to ensure supportive relationships between provisions such as employment, transport infrastructure and population growth.

The objectives of this report are to provide an analysis of the environmental values of the MPA and associated development constraints and opportunities to assist in the development of a Structure Plan for the MPA. The analysis provided in this report is based principally upon a desktop review of existing published material concerning the environmental values and issues of the subject area as well as limited information collated during a field inspection.

This desktop review included analysis of the following information:

- recent aerial photography to identify current vegetation communities which occur within the site and to allow delineation of the boundaries of these communities;
- a copy of the Certified Regional Ecosystem (“RE”) Map for the MPA and surrounding locality which was produced by the Queensland Department of Environment and Resource Management (“DERM”) to ascertain the type and extent of remnant vegetation within the subject area pursuant to the Vegetation Management Act 1999 (VM Act);
- the Commonwealth Department of the Environment, Water, Heritage and the Arts (“DEWHA”) Environment Protection and Biodiversity Act 1999 (EPBC Act) Protected Matters Search Tool and Queensland Wildlife Online database, which were used to identify significant flora, fauna and ecological communities with the potential to occur in the locality;
- strategic planning mapping produced by the Cairns Regional Council particularly that which illustrates the type and extent of environmentally relevant features such as vegetation, waterways, acid sulfate soils and extractive industries;
- assessment reports previously prepared by various consulting firms concerning the environmental values and issues relevant to the MPA or part thereof, including:
i. ARCHAEO (2008) *Historical Assessment of Mount Peter*. Final report for Cairns Regional Council;


vi. NRA Environmental Consultants (2008) *Mt Peter Flora and Fauna Assessment*. Final Report to Cairns Regional Council; and


Information gathered during the desktop review was used to identify areas of the site that contain environmental values or issues formally recognised as such, pursuant to relevant Commonwealth, State or Local Government Legislation.

1.2 SUBJECT AREA DESCRIPTION

The MPA encompasses approximately 3,330 hectares of land in the Mount Peter locality, located between Edmonton and Gordonvale, to the west and east of the Bruce Highway. The extent of the MPA is illustrated in Figure 1. The MPA is situated at the base of the Atherton Tablelands and is bordered by Peterson Road in the north, the Bruce Highway to the east, Draper Road and the Wet Tropics World Heritage Area to the south and the Lamb Range (which forms part of the Wet Tropics World Heritage Area) to the west.

Pursuant to the Cairns Plan the MPA currently consists of freehold land with either a “Rural 1” or “Rural 2” land use designation. The MPA also includes:

- a parcel of land with a “Community Facilities” designation, namely Lot 1 on SP129225;
- a parcel of land with an “Open Space” designation, namely Lot 8 on NR7681; and
- several parcels of land with a “Low Density Residential” designation along Maitland Road.

The majority of the freehold land within the MPA is cleared of native vegetation and is actively cultivated for sugar cane. In addition to these areas the MPA contains areas of native woody vegetation including that associated with:

- the western and southern slopes and foothills of the Lamb Range (Isley Hills section);
- the hill slopes of the North-central Ridge located in the centre of the MPA; and
- the riparian corridors of varying widths associated with the waterways that traverse the MPA.
A number of waterways traverse the MPA including Stony Creek and Blackfellows Creek which traverses the northernmost sections, Wrights Creek which traverses the centre of the MPA and Mackey Creek which traverses the southern sections of the MPA. In addition to these waterways, numerous smaller tributary creeks exist throughout the MPA.

Two Key Resource Areas ("KRAs") as mapped by the Department of Employment, Economic Development and Innovation’s (formerly the Department of Mines and Energy) exist within the MPA, namely KRA 13 and KRA 40. These and other existing land uses are shown on Map 02 Mount Peter Structure Plan Area Existing Land Use.
2 ASSUMPTIONS/METHODOLOGY

2.1 ASSUMPTIONS

In order to provide an analysis of the environmental factors that constrain or are likely to constrain future patterns of land use within the MPA, it has been necessary to establish a series of development assumptions derived from existing and relevant Commonwealth, State and Local government regulations and that, where available, are further informed by relevant technical investigations. These assumptions are summarised within the Mount Peter Master Planning Group’s (November 2008) Draft Mount Peter Master Planning Area Assumptions, Principles and Standards and, with respect to this report, address the following.

- Steep land and geological stability.
- Bushfire.
- Reserves.
- Waterways and riparian corridors.
- Native vegetation communities.
- Significant wildlife species.
- Extractive industry.
- Aquaculture and poultry.
- Acid sulfate soils.
- Pest species.
- Air quality.
- Acoustic environment.
- Fish habitat areas, marine plants and waterway barriers.
- Contaminated land.
- Coastal areas.
- World Heritage Area.

An assessment of the development constraints associated with each of the above matters is detailed within Sections 3.1 to 3.16 herein. A summary of the general methodology used in during this assessment is provided in Section 2.2 below.

2.2 METHODOLOGY


- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (“EPBC Act”);
Queensland Vegetation Management Act 1999 ("VM Act"), the Vegetation Management Regulation 2000 and the associated:
  o Department of Natural Resources and Water’s Concurrence Agency Policy for Reconfiguring a Lot (ROL);
  o the Department of Natural Resources and Water’s Concurrence Agency Policy for Material Change of Use (MCU); and
  o Regional Vegetation Management Code: Coastal Bioregions;
• Queensland Coastal Protection and Management Act 1995 ("CPM Act") and the associated:
  o State Coastal Management Plan 2001; and
  o Wet Tropical Coast Regional Coastal Management Plan;
• Queensland Fisheries Act 1994 and Fisheries Regulation 2008 and the associated:
  o Management and protection of marine plants and other tidal fish habitats (FHMOP 001);
  o Management of Declared Fish Habitat Areas (FHMOP 002);
  o Fisheries Guidelines for Fish Habitat Buffer Zones (FHG 003); and
  o Waterway barrier works approvals and fishway assessments: Departmental procedures (FHMOP 008);
• Queensland Land Act 1994;
• Queensland Water Act 2000;
• Queensland Environmental Protection Act 1994 and the associated:
  o Environmental Protection (Air) Policy 2008; and
  o Environmental Protection (Noise) Policy 2008;
• Queensland State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide ("SPP 1/03") and the SPP 1/03 Guideline;
• Queensland State Planning Policy 2/07 Protection of Extractive Resources ("SPP 2/07");
• Queensland State Planning Policy 2/02 Planning and Managing Acid Sulfate Soils ("SPP 2/02") and Guidelines for the Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland;
• Queensland State Planning Policy 1/92: Separating Agricultural and Residential Land Uses ("SPP 1/92"); and
• Various relevant and applicable Codes contained within the Cairns Plan.

Land use constraints within the MPA were generally derived through application of the above listed regulations, policies and guidelines with, where applicable, appropriate reference and incorporation of additional technical information provided in the reports and investigations outlined in Section 1.1 herein. In addition, contact was made with representatives of the State agencies responsible for the administration of relevant above listed regulations. The purpose of this contact was to further discuss the application of the regulations to the MPA and the agencies’ various positions in relation to the associated land use constraints.
3 CONSTRAINTS AND OPPORTUNITIES

3.1 STEEP LAND AND GEOLOGICAL STABILITY

Within the MPA, use and development of land on steep slopes is regulated by the following regulations.

- *State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (SPP 1/03)*;
- *State Planning Policy 1/03 Guideline – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (SPP 1/03 Guideline)*; and
- The Cairns Plan *Hillslopes Code*.

RECOGNISED VALUES

The land elevations within the MPA range from approximately 1m Australian Height Datum (AHD), adjacent to the estuarine wetlands of the lower reaches of Blackfellows Creek and Wright Creek to 243m AHD on the ridge of the North-central Ridge and to 300m AHD in the Isley Hills in the south of the MPA.

The topography of the MPA is summarily characterised by:

- extensive lowland alluvial plains with land generally sloping at less than 10%; and
- the hillslopes of the North-central Ridge and the hillslopes of the Isley Hills located in the south and west of the MPA which abruptly rise from the lowland plains and support slopes generally greater than 20%.

A slope analysis of the MPA is presented as Figure 2.

Golder Associates Pty Ltd was commissioned by Cairns Regional Council (CRC) to conduct extensive geotechnical investigations within the MPA. The results of the investigations were presented in Golder Associates (2008): *Mount Peter Master Planning – Geotechnical Constraints Mapping*. The data produced through these investigations was then used to produce development constraints mapping with respect to the geotechnical issues/hazards which result from the geotechnical characteristics and conditions present within the MPA.

Golder Associates (2008) describe the universal factors which contribute to geological stability as:

- Slope (i.e. the steepness of the slope);
- Geology (i.e. the nature of the soil/rock); and
- Groundwater (i.e. the presence/absence of groundwater).

Based on extensive previous experience Golder Associates (2008) have assessed the likelihood for geological instability to occur based on slope to be as follows:

- Slopes <9° (10%) = Low
- Slopes >9° (10%) and <18° (20%) = Medium
- Slopes >18° (20%) = High

Golder Associates (2008) identified areas of high and medium geological instability in the far western, far southern and central (associated with the North-
central Ridge) sections of the MPA and they recommended that development be precluded from these areas. An extract of the Golder Associates (2008) mapping illustrating the locations of these areas of instability is presented in Appendix A1.

Golder Associates also identified land within the MPA on slopes between 1:6 (17%) and 1:3 (32%) as having medium slope hazard constraint and land greater than 1:3 as having high slope hazard constraint.

It is also recognised that the visual prominence, amenity and landscape character of the MPA is largely associated with its hillslopes, the majority of which support remnant vegetation and which have been largely protected from environmental disturbances associated with rural land uses within the MPA. Furthermore, the vegetated hillslopes in the western and southern parts of the MPA strongly contribute to the superlative values of the adjoining Wet Tropics World Heritage Area and, for this reason, the importance of maintaining these areas is recognised.

LAND USE CONSTRAINTS AND OPPORTUNITIES

The SPP 1/03 Guideline defines natural hazard management areas (landslide) in Cairns Regional Council as all land with a slope of 15% or greater. The SPP 1/03 adopted the 15% threshold as slopes steeper than this are generally regarded as having a greater potential for landslide hazard.

The SPP 1/03 Guideline has as a specific outcome in relation to natural hazard management areas (landslide) that development must maintain the safety of people, property and hazardous materials manufactured or stored in bulk from the risk of landslide. This specific outcome applies directly to patterns of land use that propose:

- increasing the number of people living or working in a natural hazard management area (e.g. residential development, shopping centres, tourist facilities, industrial or commercial uses) except where the premises are occupied on a short-term or intermittent basis (e.g. by construction/maintenance workers, certain agricultural and forestry workers); or

- involve institutional uses where evacuating people may be particularly difficult (e.g. hospitals, education establishments, child care, aged care, nursing homes and high security correctional centres); or

- involve the manufacture or storage of hazardous materials in bulk; or

- would involve the building or other work as an intrinsic element of the development proposal that would require:
  - earthworks exceeding 50 cubic metres (other than the placement of topsoil); or
  - vegetation clearing; or
  - redirecting the existing flow of surface or groundwater.

With respect to the above, the Structure Plan needs to make appropriate provisions to ensure development within the MPA gives due regard to:

- geological stability;
- erosion potential;
- visual prominence, amenity and landscape character;
- land gradient, with particular emphasis placed on land at or above slopes of 1:4 (25%) and 1:6 (17%).
In order to avoid areas that have a medium to high likelihood of geological instability, to limit the potential of erosion of steep slopes and to preserve the MPA’s existing prominent landscape character and visual amenity values, urban development will not occur on slopes greater than 1:6 and upwards, including ridgelines unless it can be demonstrated that there is an overriding need for such development and that such development is for essential community service infrastructure. It is relevant to note that land on slopes greater than 1:6 and upwards within the MPA also support:

- areas identified by Golder Associates (2008) as supporting high and medium geological instability; and
- the majority of those areas of visual prominence, amenity and landscape character.

In this respect the areas of the MPA which occur at slopes greater than 1:6 are considered to constitute undevelopable land. The areas within that MPA that are determined to be undevelopable due to recognised hillslopes constraints are presented in Figure 3.

3.2 BUSHFIRE

Within the MPA, the use and development of land subject to potential bushfire hazard is regulated by the following regulations:

- State Planning Policy 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (SPP 1/03);
- State Planning Policy 1/03 Guideline – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (SPP 1/03 Guideline); and
- The Cairns Plan Bushfire Management Code.

RECOGNISED VALUES

The majority of the land within the MPA is identified as ‘Medium Risk Hazard’ on the Cairns Plan: Rural Lands District Plan North – Bushfire Risk Analysis Overlay.

Pursuant to the Bushfire Risk Analysis for Cairns Regional Council map produced by the Queensland Fire and Rescue Service (QFRS):

- the sectors of the MPA which support woody vegetation are mapped as having a ‘Medium’ bushfire risk level; and
- the sectors of the MPA which currently support sugarcane cultivation are mapped as having a ‘Low’ bushfire risk level.

The QFRS mapping is presented as Appendix A2.

The SPP 1/03 Guideline can be used to determine appropriate bushfire hazard classifications for the different sectors of the MPA. The guideline identifies three features of the landscape that strongly contribute towards the behaviour of bushfires, namely, vegetation community structure/composition, slope and aspect.

The structure and composition of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons, making the vegetation susceptible
to very destructive bushfires, whilst other vegetation communities may regularly expose fuels to drying and therefore be frequently available for burning.

As a general rule, bushfire intensity and the rate of spread of bushfires rises in proportion to slope, with bushfires burning faster uphill and slower downhill. Steeper slopes also increase the difficulty of constructing ring roads and firebreaks and limit access for emergency crews.

Aspect affects bushfire hazard due to the effects that exposure to direct sunlight has on vegetation communities, including the drying rates of fuels. Aspect also correlates closely with exposure to low humidity winds that increase bushfire intensity. The intensity and rate of spread of bushfires tends to be greater on slopes with north to westerly aspects. The influence of aspect is not considered to be significant on land with a slope less than 5%.

The SPP 1/03 Guideline provides hazard scores for a range of vegetation communities, slopes and aspects, with higher scores reflecting greater potential hazard. The scores for these individual factors are then added together to give a total hazard score as follows:

\[
\text{Total hazard score} = \text{vegetation community hazard score} + \text{slope hazard score} + \text{aspect hazard score}.
\]

The total hazard score determines the severity of bushfire hazard as set out below:

<table>
<thead>
<tr>
<th>Total Hazard Score</th>
<th>Severity of Bushfire Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 or greater</td>
<td>High</td>
</tr>
<tr>
<td>6 to 12.5</td>
<td>Medium</td>
</tr>
<tr>
<td>1 to 5.5</td>
<td>Low</td>
</tr>
</tbody>
</table>

In order to provide a preliminary assessment of bushfire hazard within the MPA, the MPA must be divided into a number of sectors, based on variances in vegetation communities, slope or aspect. Total hazard scores are then determined for each sector and a bushfire hazard analysis can be undertaken to identify areas of High, Medium and Low bushfire hazard.

**Vegetation Type Assessment**

The Certified Regional Ecosystem ("RE") Map, prepared by the DERM for the MPA locality, and the vegetation community descriptions provided by NRA Environmental Consultants (2008) were used in conjunction with a recent aerial photograph of the MPA to determine the vegetation community types that occur within the MPA and its immediate surrounds.

As previously described, the majority of the MPA consists of land cleared of native vegetation and utilised for agricultural activities, predominantly sugarcane cultivation. The MPA does however contain areas of native woody vegetation including that associated with:

- the western slopes and foothills of the Lamb Range (Isley Hills section);
- the hillslopes of the North-central Ridge located in the centre of the MPA south of Edmonton; and
- the riparian corridors of varying widths associated with the waterways that traverse the site.
Table 1 indicates the range of vegetation types that occur within the MPA locality and their equivalent *SPP 1/03* bushfire loading factors. In this regard, it is relevant to note that the *SPP 1/03 Guideline* states:

> Vegetation assessment should be based upon examination of the vegetation on the subject site and surrounding the subject site. Narrow strips of vegetation may be flammable; however, bushfires will not generally reach their full intensity where bushfire fronts are less than 100 metres wide. For this reason the following examples may be viewed as having the next lower hazard score (i.e. paperbark heath would have a score of 6 not 8, cypress pine forest 5 not 6):

- areas with a linear shape (e.g. roadside vegetation beside a cleared paddock); and
- units of vegetation less than 50 hectares in area and more than one kilometre from the nearest extensive vegetation.

### Table 1. Vegetation communities within the MPA and their equivalent bushfire loading factor.

<table>
<thead>
<tr>
<th>Vegetation Communities</th>
<th>Occurrence in the site locality</th>
<th>Fire Behaviour</th>
<th>Loading Factor</th>
<th>Amended Loading Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet sclerophyll forest, tall eucalypts (&gt;30 m), with grass and mixed shrub understorey.</td>
<td>No</td>
<td>Infrequent fires under severe conditions, flame lengths may exceed 40 m, floating embers attack structures for 1 hour, radiant heat and direct flame are destructive for 30 minutes.</td>
<td>10</td>
<td>N/A</td>
</tr>
<tr>
<td>Paperbark heath and swamps, eucalypt forest with dry-shrub ladder fuels.</td>
<td>No</td>
<td>Fire intensity depends on fuel accumulation, but can be severe, with flame lengths to 20 m, spot fires frequent across firebreaks, radiant heat and direct flame for 15 minutes.</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Grassy eucalypt and acacia forest, exotic pine plantations, cypress pine forests, wallum heath.</td>
<td>Yes</td>
<td>Fire intensity may be severe with flame lengths to 20 m, but less attack from embers.</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Native grasslands (ungrazed), open woodlands, canefields.</td>
<td>Yes</td>
<td>Fast moving fires, available to fire annually to 4 years. Usually no ember attack, radiant heat for &gt;10 m, duration &lt;2 minutes.</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Intact acacia forests, with light grass to leaf litter, disturbed rainforest.</td>
<td>No</td>
<td>Fires infrequent, usually burn only under severe conditions, relatively slow fires, usually little ember attack.</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Orchards, farmlands, kikuyu pastures.</td>
<td>No</td>
<td>Fires very infrequent, slow moving, may be difficult to extinguish, frequent fire breaks.</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
The Certified RE Map for the MPA locality identifies nine different REs within the MPA and immediate surrounds. NRA Environmental Consultants (2008) have classified the vegetation communities occurring within the MPA by grouping REs with similar attributes in order to describe the woody vegetation within the MPA as four broad communities. As such, for the purposes of analysing the equivalent SPP 1/03 loading factor of the vegetation communities within the MPA, vegetation communities have been grouped and described in general accordance with the four vegetation communities described by NRA Environmental Consultants (2008). These vegetation communities and the corresponding loading factor as stipulated by the SPP 1/03 Guideline are detailed below.

Open Woodland on hillslopes

The North-central Ridge and the upper hillslopes of the Isley Hills are vegetated with Corymbia/Lophostemon open woodland (RE 7.11.19) and Forest red gum (Eucalyptus tereticornis) open woodland with a rainforest understorey (RE 7.11.44). This vegetation community is dominated by Pink bloodwood (Corymbia intermedia) and Forest red gum with other sclerophyll species including with Swamp Box (Lophostemon suaveolens), Mango bark (Canarium australianum), Black sheoak (Allocasuarina littoralis), Cocky apple (Planchonia careya) and Red wattle (Acacia flavescens) present as common elements. The understory is dominated by rainforest species including Rusty pittosporum (Pittosporum venulosum), Umbrella Cheese Tree (Glochidion sumatranum) and Ribbonwood (Euroschinus falcate). This vegetation community has an equivalent loading factor of 5 unless the area satisfies the SPP 1/03 Guideline criteria for a reduced loading factor in which case the loading factor will be 4.

Open Forest fragments in low-lying areas

The once common Forest red gum medium to tall open forest on well drained forest (RE 7.3.40) is now restricted to a riparian corridor associated with the upper reaches of Sandy Creek and a few small fragments that are generally too small to be mapped by the DERM’s RE mapping method. This vegetation community has an equivalent loading factor of 6 unless the area satisfies the SPP 1/03 Guideline criteria for a reduced loading factor in which case the loading factor will be 5.
Riparian Rainforest fragments along waterways

The riparian rainforest vegetation community (RE 7.3.23) is associated with sections of Sandy Creek and the unmarked creek located to the east of Mount Peter Road in the southern section of the MPA. Other fragments of this vegetation community occur along Wrights Creek and Grays Creek however these fragments are too small to be mapped by the DERM’s RE mapping method. This vegetation community has an equivalent loading factor of 0.

Rainforest on hillslopes and in gullies

The hillslopes and drainage gullies of the Isley Hills located in the western and southern sections of the MPA support rainforest which adjoins the Wet Tropics World Heritage Area. The rainforest types that occur on the hillslopes and in the drainage gullies within this area are simple to complex notophyll vine forests (RE 7.11.7, RE 7.3.10 and RE 7.3.38). This vegetation community is characterised by a diverse range of rainforest species with few if any sclerophyll species. This vegetation community has an equivalent loading factor of 0.

Areas of the MPA which support sugarcane are considered to have an equivalent loading factor of 5.

Slope Assessment

A detailed Slope Analysis of the MPA was conducted to accurately determine the topography of the land within the MPA and to determine the areas of the MPA which fall into the various slope categories stipulated in SPP 1/03.

Table 2 indicates the slope types present within the MPA and their equivalent hazard scores as outlined in the SPP 1/03 Guideline.

<table>
<thead>
<tr>
<th>Slope</th>
<th>Occurrence on the Site</th>
<th>Loading Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gorges and mountains (&gt;30%)</td>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
<td>Steep Hills (&gt;20% to 30%)</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Rolling Hills (&gt;10% to 20%)</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Undulating (&gt;5% to 10% slope)</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>Plains (0 to 5% slope)</td>
<td>Yes</td>
<td>1</td>
</tr>
</tbody>
</table>

The majority of the MPA consists of lowland alluvial plains with land sloping at less than 5%. The land within these lowland sectors of the MPA attracts a loading factor of 1. The slopes of the North-central Ridge and Isley Hills located in the south and west of the MPA abruptly rise from the lowland plains and support slopes ranging from 10% to greater than 30%.
Aspect Assessment

Each sector of vegetation within the MPA is allocated a hazard score relating to the dominant aspect of that sector. Table 3 lists the hazard score attributed to each compass degree range.

Table 3 Hazard score for aspect

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Hazard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>North to North-west (315°-360°)</td>
<td>3.5</td>
</tr>
<tr>
<td>North-west to West (270°-315°)</td>
<td>3</td>
</tr>
<tr>
<td>West to South (180°-270°)</td>
<td>2</td>
</tr>
<tr>
<td>North to East (0°-90°)</td>
<td>1</td>
</tr>
<tr>
<td>East to South (90°-180°) and all land under 5% slope</td>
<td>0</td>
</tr>
</tbody>
</table>

The aspect of the vegetation within and surrounding the MPA is varied and vegetation with each of the above aspect degree ranges can be found within the MPA. As such, under the provisions of the SPP 1/03 Guideline the dominant aspect of the vegetation sectors within the MPA can be allocated a hazard score ranging from 0 to 3.5.

Bushfire Hazard Assessment

Different total hazard scores can be derived for different sectors of the MPA. The total derived hazard scores for the various sectors of the MPA are calculated using the formula provided in the SPP 1/03 Guideline, which is presented as follows:

Vegetation community hazard score + slope hazard score + aspect hazard score = Total hazard score

Table 4 below provides the total hazard score attributed to each sector within the MPA, determined in accordance with the formula provided in the SPP 1/03 Guideline.

Table 4 Total hazard score calculations for each sector within the MPA

<table>
<thead>
<tr>
<th>Slope Aспект</th>
<th>315°-360°</th>
<th>270°-315°</th>
<th>180°-270°</th>
<th>0°-90°</th>
<th>90°-180°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetation Community</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Riparian Rainforest fragments along waterways</td>
<td>0</td>
<td>4.5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Rainforest on hill slopes and in gullies</td>
<td>0</td>
<td>8.5</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>&gt;90%</td>
<td>20% - 30%</td>
<td>10% - 20%</td>
<td>5% -10%</td>
<td>0 to 5%</td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

| Open Woodland on hill slopes | 5 | >30% | 13.5 | 13 | 12 | 11 | 10 |
| 20% - 30% | 12.5 | 12 | 11 | 10 | 9 |
| 10% - 20% | 11.5 | 11 | 10 | 9 | 8 |
| 5% -10% | - | - | - | - | - |
| 0 to 5% | - | - | - | - | - |

| Open Forest fragments in low-lying areas | 6 | >30% | - | - | - | - |
| 20% - 30% | - | - | - | - | - |
| 10% - 20% | - | - | - | - | - |
| 5% -10% | - | - | - | - | - |
| 0 to 5% | - | - | - | - | - |

| Vegetation Community | 6 | >30% | - | - | - | - |
| 20% - 30% | - | - | - | - | - |
| 10% - 20% | - | - | - | - | - |
| 5% -10% | - | - | - | - | - |
| 0 to 5% | - | - | - | - | - |
The total hazard scores for the sectors within the MPA range from 1 to 13.5. The sectors with a total hazard score of:

- 13 or greater, pursuant to SPP 1/03, represent a ‘High Bushfire Hazard Management Area’;
- 6 to 12.5, pursuant to SPP 1/03, represent a ‘Medium Bushfire Hazard Management Area’; and
- 1 to 5.5, pursuant to SPP 1/03, represent a ‘Low Bushfire Hazard Management Area’.

The majority of the lowland areas within the MPA are cleared of native woody vegetation and are utilised for agricultural activities, predominantly sugarcane cultivation. The sugarcane fields within the MPA occur only on lowland alluvial plains with slopes of between <5% to 5-10%. As such, under the current land use the sectors of the MPA which support sugarcane cultivation would attract a total hazard score range of 6 to 10.5 (i.e. vegetation community hazard score of 5 + slope hazard score of 1 – 2 + aspect hazard score of 0 – 3.5) which equates to a ‘Medium’ bushfire hazard rating pursuant to SPP 1/03. It is recognised, however, that when sugarcane is not being produced or when it was been cultivated, this hazard rating would predominantly fall to “Low” as the vegetation would be more analogous to a slashed grassland which, pursuant to Table 1, has an equivalent loading factor of 2 (i.e. vegetation community hazard score of 2 + slope hazard score of 1 – 2 + aspect hazard score of 0 – 3.5 = hazard range of 3 to 8.5).

An indicative bushfire hazard rating for each of the sectors that support woody vegetation within the MPA as determined via the above described methodology is depicted in Figure 3. Despite attracting a “Medium” bushfire hazard rating, the areas of the MPA that support sugarcane are not illustrated as such on Figure 3. Areas of woody vegetation within the MPA are constrained by a number of factors outlined in Sections 3.1, 3.4, 3.5 and 3.6 herein and, as such, represent areas that, generally, will remain undeveloped within the MPA. Areas that currently support canefields within the MPA represent those which, generally, are not constrained by the matters covered in this report and which will support urban development. Whilst it is acknowledged that development within the MPA will need to consider bushfire risk posed by adjacent canefields, and adopt suitable management strategies as outlined in Section 3.2.2 herein, it is also acknowledged that the bushfire risk posed by the canefields will be temporary given:

- seasonality of sugarcane cultivation;
- abandonment of sugarcane cultivation as land is acquired for urban purposes; and
- development progressing within these areas the MPA.

As such, the canefields within the MPA would not constitute permanent Medium Bushfire Hazard Management Areas.
LAND USE CONSTRAINTS AND OPPORTUNITIES

The SPP 1/03 Guideline identifies the following areas as constituting a Natural Hazard Management Area (Bushfire):

- land that has been identified as having either a Medium or High hazard rating; and
- a safety buffer that encompasses land within 50 metres of an area with a Medium (or within 100m of a High) bushfire hazard rating in recognition of the affect bushfires can have on adjacent unvegetated land due to winds fanning flames, smoke, embers and radiant heat.

Indicative locations of the safety buffers within the MPA are illustrated in Figure 3.

The proposed development of the MPA for urban purposes will increase the number of people living and working in or adjacent to areas which attract a 'High' or 'Medium' bushfire hazard rating pursuant to SPP 1/03. It is noted that SPP 1/03 Guideline stipulates that a Bushfire Management Plan (BMP) must be prepared for development that is proposed within a High severity bushfire hazard area, or that involves hazardous materials manufactured or stored in bulk in a High or Medium severity bushfire hazard area. A BMP may also be required for certain types of community infrastructure in either a High or Medium severity bushfire hazard area.

The proposed urban development of the MPA must achieve the objectives of SPP 1/03 as they relate to maintaining the safety of people and property, by:

a. avoiding areas of High or Medium bushfire hazard; or
b. mitigating the risk through:
   i. allotment design and the siting of buildings; and
   ii. including firebreaks that provide adequate:
      • setbacks between buildings/structures and hazardous vegetation, and
      • access for fire-fighting/other emergency vehicles;
   iii. providing adequate road access for fire-fighting/other emergency vehicles and safe evacuation; and
   iv. providing an adequate and accessible water supply for fire fighting purposes.

Development across the majority of the MPA will achieve compliance with objective (a) and, as such, would not be required to demonstrate compliance with SPP 1/03 as it relates to bushfire management. It is, however, recognised that temporary bushfire hazard management strategies, developed as part of the Master Planning stage of development within the MPA, may need to be put in place for developments which occur adjacent to or adjoin agricultural land within which sugarcane is cultivated. The need for these bushfire management strategies could be reviewed if/when such cultivation is abandoned or else the land is used for other purposes.

In those areas of the MPA where it is not possible to achieve compliance with objective (a), it will be necessary to demonstrate compliance with objective (b).
In this respect, it is acknowledged that urban development within the MPA is to be serviced by a reticulated water supply and, as such, residents would not be reliant upon on-site water storage to meet their domestic, including fire fighting/suppression, requirements.

The design of urban development in areas of High or Medium bushfire risk would need to ensure adequate road access for fire-fighting/other emergency vehicles and safe evacuation is provided and should, generally:

- avoid areas of woody vegetation identified as supporting a High or Medium Bushfire Hazard Management Area;
- be setback from existing remnant vegetation within the MPA that is identified as having a medium or high bushfire hazard potential at a distance of 30m (i.e. 1.5 times the height of the tallest vegetation, identified as 20m by DERM in the Queensland Department of Infrastructure and Planning (5 September 2008) Preliminary State Agency Position Paper - Mount Peter Master Planned Area - Planning Studies, Assumptions, Targets, Constraints and State Interests Version 3), to permit the establishment of a firebreak between development and the adjacent bushfire hazard management area.

It is recognised that detailed and site specific bushfire hazard analyses prepared in support of development applications for individual parcels of land within the MPA may present evidence to support a reduction in firebreak width.

3.3 RESERVES

Within the MPA the use and management of Conservation Areas/Protected Reserves is regulated by the Land Act 1994.

RECOGNISED VALUES

Lot 8 on NR7681 is a state owned reserve for park and recreation purposes which was created as part of a small rural residential subdivision. The reserve constitutes 1.51 hectares of land located on the southern bank of Wrights Creek, entirely located within the MPA. The reserve is currently held in trust by CRC.

LAND USE CONSTRAINTS AND OPPORTUNITIES

Reserves are state land and the Structure Plan must recognise the existence of the reserve (i.e. Lot 8 on NR7681) and the purpose it is intended to serve. Zoning and other planning instruments must accord with the purpose of the reserve.

3.4 WATERWAYS AND RIPARIAN CORRIDORS

Patterns of land use and development within and adjacent to waterways within and bordering the MPA must comply with the following regulations:

- the Water Act 2000;
- the Vegetation Management Act 1999 (VM Act);
- the Fisheries Act 1994;
• the Fish Habitat Guideline FHG 003 – Fisheries Guidelines for Fish Habitat Buffer Zones; and
• the Cairns Plan - Vegetation Conservation & Waterway Significance Code.

RECOGNISED VALUES

It is recognised that the MPA supports a number of waterways, a number of which are formally recognised by the DERM as constituting “watercourses” pursuant to the Water Act 2000. “Watercourses” identified by DERM within the MPA are presented in Appendix A3 which provides an extract of Map 7-Watercourses and Wetlands of Ecological Significance from Queensland Department of Infrastructure and Planning (5 September 2008) Preliminary State Agency Position Paper - Mount Peter Master Planned Area - Planning Studies, Assumptions, Targets, Constraints and State Interests Version 3.

It is also recognised that DERM have identified a number of wetlands of general ecological significance within the MPA. These are presented in Appendix A3.

Waterways additional to those recognised by DERM within the MPA are also recognised by CRC within their Cairns Plan, specifically the map entitled Rural Lands District Plan – Vegetation Conservation/Waterway Significance, an extract of which is presented as Appendix A4.

Waterways and riparian corridors within the MPA also provide important known and potential habitat for threatened wildlife species listed under the provisions of the Commonwealth’s Environment Protection and Biodiversity Conservation Act 1999 and Queensland’s Nature Conservation Act 1992.

LAND USE CONSTRAINTS AND OPPORTUNITIES

In order to determine appropriate development setbacks from waterways and riparian areas within the MPA it is first necessary to establish methodology which gives appropriate recognition to those waterways which are formally recognised by both DERM and CRC.

Stream Order
The stream order of all waterways within the MPA has been determined using the methodology developed by DERM and described in DERM’s RVM Code. In this document, DERM explain the methodology as follows.

…When two streams of the same order join, the resulting watercourse becomes one stream order larger. If two streams of different order join, the resultant stream order is that of the larger stream.

Appendix A3 provides a diagrammatical presentation of this methodology by illustrating the differing stream orders (stream order 1 to stream order 4) of the waterways (recognised as constituting watercourses pursuant to the Water Act 2000) which traverse or border the MPA.

It is recognised that pursuant to the Water Act 2000 a watercourse is defined as follows.

1 Watercourse means a river, creek or stream in which water flows permanently or intermittently—
(a) in a natural channel, whether artificially improved or not; or

(b) in an artificial channel that has changed the course of the watercourse;

but, in any case, only—

(c) unless a regulation under paragraph (d), (e) or (f) declares otherwise—at every place upstream of the point (point A) to which the high spring tide ordinarily flows and reflows, whether due to a natural cause or to an artificial barrier; or

(d) if a regulation has declared an upstream limit for the watercourse—the part of the river, creek or stream between the upstream limit and point A; or

(e) if a regulation has declared a downstream limit for the watercourse—the part of the river, creek or stream upstream of the limit; or

(f) if a regulation has declared an upstream and a downstream limit for the watercourse—the part of the river, creek or stream between the upstream and the downstream limits.

2 Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

It is noted that there exist numerous waterways, identified on the Cairns Plan’s Vegetation Conservation / Waterway Significance Plan Rural Lands District North Map which are not recognised as constituting watercourses pursuant to the Water Act 2000. For this reason, these waterways have not been assigned a stream order.

Setbacks

In respect of setbacks to watercourses within the MPA, DERM have indicated the agency’s position is the same as that outlined in FNQ2009-2031 (i.e. 25m from each high bank of a waterway of stream order between one and four).

DERM have provided GIS data which illustrates the high banks, and associated setbacks there from, of the majority of watercourses that occur within the MPA. The areas encompassed by the high banks and setbacks of these watercourses are collectively referred to as “waterway envelopes”. Waterway envelopes within the MPA are illustrated in Figure 5.

Subject to negotiation with Council, setbacks of at least 10m are to be provided to the high bank of waterways that occur within the MPA and which are not recognised by the Department of Environment and Resource Management pursuant to the Water Act 2000.

With respect to the above, it is recommended that:

- development within waterway envelopes is avoided unless it can be demonstrated as constituting essential community infrastructure;

- no pipelines or other below ground infrastructure are located within waterway envelopes where it would result in the clearance of riparian vegetation.

With respect to the second point above, belowground infrastructure should instead be located in floodplain areas or constructed swales. Where there exists the need for such infrastructure to cross a waterway envelope, this infrastructure should be aligned with other infrastructure (e.g. a proposed bridge) to minimise disturbance of the waterway environment.
Wetland areas of general ecological significance identified within the MPA by DERM are, generally, consistent with the waterways identified in Figure 5. It is recognised that DERM’s wetland mapping (refer Appendix A3) has been prepared at a large scale and has not confirmed by field survey. It is also recognised that a number of these wetland areas do not support remnant vegetation as identified on the Certified RE Map. In this respect, it is considered that the development setbacks proposed to the waterway envelopes within the MPA represent sufficient buffers to these wetland areas. It is recommended that, as part of the Master Planning stage, detailed ground truthing be undertaken in support of development proposals within the MPA to accurately identify the current condition and extent of these wetlands. Such ground truthing would provide support or otherwise for a modification to the development setbacks from these mapped wetland areas.
3.5 NATIVE VEGETATION COMMUNITIES

The MPA contains areas of remnant vegetation as identified on the Certified RE Map prepared by the DERM. The clearance and management of remnant vegetation is regulated by:

- the Vegetation Management Act 1999 (VM Act);
- the Vegetation Management Regulation 2000;
- the Vegetation Management (Regrowth Clearing Moratorium) Act 2009;
- DERM’s Concurrence Agency Policy for Reconfiguring a Lot (ROL);
- DERM’s Concurrence Agency Policy for Material Change of Use (MCU); and
- the Regional Vegetation Management Code: Coastal Bioregions.

The VM Act and Vegetation Management Regulation 2000 provide a formal framework for the recognition and management of the biodiversity values of vegetation in Queensland.

The MPA contains areas of vegetation with varying conservation values as identified on the Cairns Plan’s Rural Lands District Plan (Vegetation Conservation/Waterway Significance). The clearance and management of this vegetation, most of which is coincident with areas of remnant vegetation, is regulated by Cairns Plan’s Vegetation Conservation and Waterway Significance Code.

It is recognised that the above vegetation communities have the potential to support Threatened Ecological Communities pursuant to the Commonwealth’s Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Native vegetation communities within the MPA function to maintain biodiversity and ecological integrity. As part of this function, it is recognised that the native vegetation communities provide:

- habitat resources for significant and common wildlife species listed under the provisions of:
  - the Commonwealth’s EPBC Act; and
  - Queensland’s Nature Conservation Act 1992 (NC Act);
- significant wildlife linkages/ecological corridors between core habitat patches (e.g. Sandy Creek, Wright Creek);
- protection of the waterways and other waterbodies within the MPA;
- protection against erosion and other land degradation;
- a contribution to the buffering of areas of significant conservation value (e.g. Wet Tropics World Heritage Area); and
- contributions to scenic amenity.

RECOGNISED VALUES

Vegetation Management Act 1999

VM Act, the VM Regulation and the associated DERM Policies and RVM Code provide a formal framework for the recognition and management of the biodiversity values of vegetation in Queensland.
A copy of the Certified RE Map for the site locality, produced by the DERM and used by DERM in the administration of the VM Act was obtained on the 3rd of October 2008. The location and extent of remnant vegetation on the site as illustrated on the Certified RE Map has been utilised for all reference and reproduction throughout this report. Figure 6 illustrates the location of the remnant vegetation on the site as provided on the Certified RE Map.

Nine RE types are identified as occurring within MPA. These REs are briefly described as follows:

RE 7.3.10 Simple to complex mesophyll to notophyll vine forest on moderate to poorly drained alluvial plains of moderate fertility. This RE has an Endangered status pursuant to the VM Act.

RE 7.3.23 Simple to complex semi-deciduous notophyll to mesophyll vine forest on lowland alluvium. This RE has an Endangered status pursuant to the VM Act.

RE 7.3.38 Complex notophyll vine forest with emergent Agathis robusta on alluvial fans. This RE has an Of Concern status pursuant to the VM Act.

RE 7.3.40 Eucalyptus tereticornis medium to tall open forest on well drained alluvial plains of lowlands. This RE has an Endangered status pursuant to the VM Act.

RE 7.11.1 Simple to complex mesophyll to notophyll vine forest on moderately to poorly drained metamorphics (excluding amphibolites) of moderate fertility of the moist and wet lowlands, foothills and uplands. This RE has a Not of Concern status pursuant to the VM Act.

RE 7.11.7 Complex notophyll vine forest with Agathis robusta emergents, on metamorphics of moist foothills and uplands. This RE has a Not of Concern status pursuant to the VM Act.

RE 7.11.19 Corymbia intermedia and/or Lophostemon suaveolens open forest to woodland of uplands, on metamorphic. This RE has an Of Concern status pursuant to the VM Act.

RE 7.12.29 Corymbia intermedia and/or Lophostemon suaveolens open forest to woodland ± areas of Allocasuarina littoralis and A. torulosa, of uplands, on granite and rhyolite. This RE has a Not of Concern status pursuant to the VM Act.

RE 7.12.61 Eucalyptus tereticornis ± E. granitica woodland to open forest of moist and dry foothills and uplands on granite and rhyolite. This RE has a Not of Concern status pursuant to the VM Act.

It is relevant to note that all areas of RE 7.3.10, RE 7.3.23, RE 7.3.38, RE 7.11.1, RE 7.11.7 and RE 7.11.44 within the MPA are identified on the Certified RE Map as supporting ‘essential habitat’ for the Southern Cassowary (Casuarius casuarius johnsonii) which is listed as Endangered pursuant to both Queensland’s Nature Conservation Act 1992 and the Commonwealth’s EPBC Act.

Vegetation Management (Regrowth Clearing Moratorium) Act 2009

The purpose of this Act (which came into force on the 7th April 2009) is to protect:
regrowth vegetation that is an endangered regional ecosystem in particular areas; and

particular riparian regrowth vegetation in the Burdekin, Mackay, Whitsunday and Wet Tropics catchments.

The purpose is to be achieved mainly by restricting clearing of the endangered regrowth vegetation and riparian regrowth vegetation on freehold and leasehold land (used for agriculture or grazing) for a period of at least 3, but no more than 6, months while the State consults with stakeholders about the optimum way to regulate clearing of regrowth vegetation under the *Vegetation Management Act 1999*.

The MPA contains a number of Moratorium regrowth areas. These are presented in Appendix A5. The majority of these are located within waterway envelopes and, as such, are already subject to significant constraints. The accuracy of this mapping has not been confirmed through any form of ground truthing. Based on a review of current aerial photography for the MPA, the accuracy of this mapping is somewhat questionable. At present, it is not known the extent to which Moratorium regrowth vegetation areas outside of the waterway envelopes will constrain future urban development of the MPA as no policies or codes have yet been developed by the State to assist in such a determination.

**CairnsPlan 2005**

The MPA contains areas of vegetation identified on CRC’s Cairns Plan Overlay Map – Rural Lands District North – Vegetation Conservation/Waterway Significance, as constituting ‘Key Conservation Value’ and areas identified as constituting ‘Moderate Values’. The majority of these areas are consistent with those identified as supporting remnant vegetation on the Certified RE Map.

**Environment Protection and Biodiversity Conservation Act 1999**

The *EPBC Act* requires that a person must receive Commonwealth approval for any action that has, will have, or is likely to have a significant impact on Matters of National Environmental Significance (Matters of NES). Matters of NES that are recognised by the *EPBC Act* and which can act as a trigger for the Commonwealth assessment and approval process include:

- World Heritage properties;
- National Heritage Places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;
- Migratory species;
- Nuclear actions, including uranium mining; and
- The Commonwealth marine environment.

In respect of the Matters of NES recognised by the *EPBC Act*, a search of the Department of Environment, Water, Heritage and the Arts’ (DEWHA) ‘Protected Matters’ online search tool identified one threatened ecological community as having the potential to occur within five kilometres of the boundary of the MPA, namely, the Mabi Forest (Complex Notophyll Vine Forest 5b). The Mabi Forest is listed as “Critically Endangered” pursuant to the *EPBC Act*. Under the *EPBC Act*, Mabi Forest is defined as those areas of RE 7.8.3 and other patches identified as Complex Notophyll Vine Forest 5b in the Wet Tropics bioregion.
Since the listing, the RE framework has been updated such that Mabi Forest is now identified as:

- RE 7.8.3 (Complex Semi-Evergreen Notophyll Vine Forest of uplands on basalt); and
- RE 7.3.37 (Complex Semi-Evergreen Notophyll Vine Forest of uplands on alluvium).

The Mabi Forest distribution mapping produced by the DEWHA (a extract of which is provided herewith in Appendix A6) identifies portions of Sandy Creek that flow through Lot 1 on RP7074174 and Lot 7 on NR6462 and which occur in the western part of the MPA as being likely to support the Mabi Forest. It is recognised that this mapping also carries the disclaimers that “This is an indicative map only and it is not intended for fine scale assessment”.

It is acknowledged that NRA Environmental Consultants (2008) state in Section 2.2.2 of their report that “no Threatened Ecological Communities [pursuant to the EPBC Act] are present within or in the vicinity of the MPPA”. It is however, also recognised that in Section 2.1.2 of this report it is stated:

*The field assessment was conducted from the 12 – 13 February 2008...Field effort was limited to two days due to heavy rainfall during the study period and associated detrimental effects on unsealed road surfaces, which resulted in inaccessibility to areas in the southern and western portions of the MPPA.*

The area identified as supporting Mabi Forest on the DEWHA mapping occurs in the western portions of the MPA and is neither accessible by sealed nor unsealed road. As such, it is reasonable to assume NRA Environmental Consultants did not inspect the areas identified by DEWHA as having the potential to support Mabi Forest. It is also relevant to note that NRA Environmental Consultants (2008) do not refer to or make comment upon the mapping prepared by the DEWHA.

In order to accurately determine whether the above described sections of the MPA support vegetation analogous to the Mabi Forest threatened ecological community, targeted ground surveys of the floristic composition and structure of the areas identified by DEWHA and all vegetation mapped on the Certified RE Map as supporting REs with similar vegetation complexes (i.e. RE 7.3.38, RE 7.3.10 and RE 7.3.23) were completed by Cardno ecologists on the 13th and 14th of November 2008. These surveys also involved the following.

- Completion of ground surveys within a reference site (i.e. an area known to support Mabi Forest) to the west of Yungaburra along Picnic Road and associated with the Barron River and which is identified as supporting RE 7.3.37 (Complex semi-evergreen notophyll vine forest of uplands on alluvium and which together with the RE 7.8.3 forms the vegetation locally known as "Mabi Forest"). The purpose of these surveys was to collate information in respect of the structure and species composition of RE 7.3.37 and obtain visual confirmation of key characteristics of this vegetation community.

As a consequence of the results obtained during the targeted ground surveys, it was determined that the MPA does not support any areas of Mabi Forest. This determination was based on the following.
1. Pursuant to Latch (2008), Mabi Forest is almost entirely restricted to the Atherton Tableland at an altitude of 700-850m above sea level. The areas identified as having the potential to support Mabi Forest within the MPA occur at elevations between approximately 60 to 70m AHD and are located a significant distance from the Atherton Tablelands. Within its range, Mabi Forest typically occurs in areas with a mean annual rainfall of 1200-1600mm. The MPA typically receives an annual rainfall of greater than 2000mm.

2. Communications with the DERM indicated Mabi Forest was considered unlikely to occur within the MPA.

3. Pursuant to Latch (2008), pristine Mabi Forest has mosaics of evergreen and deciduous trees in the canopy. Where there is a high cluster of evergreen trees, correspondingly the shrub zone is less dense below but overall in Mabi Forest the lower vegetation will be dominated by mid dense to dense shrub zones.

Pursuant to Latch (2008), Mabi forest may have up to six layers of vegetation. The vegetation structure is uneven and consists of:

a. Scattered emergent trees, 40-45m tall.

b. A main canopy, 25-40m tall but occasionally as low as 14-20m.

c. A subcanopy, 12-20m tall.

d. A lower layer, 6-8m tall. This layer tends to be absent in areas with lower upper canopies.

e. A predominantly dense shrub and scrambling lawyer vine zone 1-5m tall.

f. A zone of seedling trees, shrubs, vines and herbs 0-1m tall.

Pursuant to Latch (2008) a key characteristic about Mabi Forest structure, even in its most pristine state, is that it has mostly tall canopy trees, many vines and a dense shrub layer. This forest structure is similar to the forest structure that develops after a cyclone has hit a rain forest or when a rain forest has been heavily selectively logged.

The two areas within the MPA mapped by DEWHA as supporting Mabi Forest are identified on the Certified RE Map as supporting RE 7.3.38 which is briefly described as Complex notophyll vine forest with emergent Kauri pine (Agathis robusta) on alluvial fans. During the survey it was noted that areas of RE 7.3.38 within the MPA did not support Kauri pine. Within the northern area, however, it was noted that the canopy layer supported a ubiquitous distribution of the deciduous Candle nut (Aleurites rockinghamensis), a species that occurs within the Mabi Forest. The northern area of RE 7.3.38 supported large gaps in the forest canopy below which a relatively dense layer of emergent rainforest seedlings, shrubs and juvenile trees had established. This dense layer of regrowth was not observed in the relatively undisturbed southern area of RE 7.3.38 or in more intact areas of the northern area. The canopy gaps in the northern area did not appear to have been created by treefall (based on the absence of large canopy trees on the forest floor) or recent cyclonic activity and appeared largely confined to the creek bed and adjacent banks.

During the survey, two disused and degraded vehicular tracks were observed extending into the waterway corridor associated with Sandy Creek from adjacent canefields immediately downstream of the northern area of RE 7.3.38. Large gaps in the canopy layer were also observed immediately upstream of these tracks. It is considered highly likely that,
in the recent past, Kauri pine has been selectively harvested from the upstream sections of Sandy Creek and from within the northern area of RE 7.3.38. The similarity in the forest structure at the northern area to Mabi Forest was, as such, attributed to past logging influences.

4. The two areas of RE 7.3.38 within the MPA along with the other areas investigated did not contain the following structural characteristics of Mabi Forest as outlined by Latch (2008):
   a. a semi-evergreen canopy with trees 25 to 40m, tendency for heavy leaf fall in times of moisture stress;
   b. a well developed medium to dense shrub and scrambling vine understorey generally 1-5 metres high;
   c. common plank buttress roots (except on the larger established canopy trees – within the reference site most canopy trees support these buttress roots);
   d. woody lianas being generally conspicuous with many slender vines (whilst vines were present they were not numerous);
   e. rare occurrence of epiphytes with most being large-sized and usually individual; and
   f. occurring on a seasonally-dry upland (700-850m altitude) on rich, volcanic soil, with mean annual rainfall 1200-1600mm.

Subsequent field investigations completed by representatives of CRC and the former Environmental Protection Agency (now Department of Environment and Resource Management) on the 24th April 2009 have confirmed that the two areas within the MPA do not support Mabi Forest. The report prepared by DERM documenting the findings of these investigations is provided as Appendix B. It is relevant to note that the report indicates that, in a number of locations, the current regional ecosystem mapping for the MPA may not be accurate in a number of locations.

LAND USE CONSTRAINTS AND OPPORTUNITIES

The MPA contains areas of vegetation with varying conservation values as identified on the Cairns Plan’s Overlay Map - Rural Lands District North - Vegetation Conservation/Waterway Significance. The clearance and management of this vegetation, the majority of which is coincident with areas of remnant vegetation pursuant to the VM Act, is regulated by the Cairns Plan’s Vegetation Conservation and Waterway Significance Code.

The Structure Plan should make provisions to ensure that native vegetation communities with formally protected values are not adversely affected by patterns of land use and development within the MPA. The specific provisions that should be incorporated into the Structure Plan in order to achieve this objective include:

1. Ensuring that all development is located outside areas of remnant vegetation identified on the Certified RE Map unless there is an overriding need to locate essential community service infrastructure within these areas. Where it can be demonstrated that there is an overriding need for essential community infrastructure to be located in areas identified as RE, efforts should be made to avoid impacts on the following:
   • remnant vegetation that has an Endangered or Of Concern status pursuant to the VM Act;
• remnant vegetation that provides linkages between core habitat areas (i.e. that associated with Sandy Creek);

• remnant vegetation identified as providing Essential Habitat for significant wildlife species listed under the provisions of:
  o the Commonwealth’s EPBC Act; and
  o Queensland’s NC Act;

• vegetation identified as having ‘Key Conservation Value’ pursuant to the Cairns Plan.

2. Ensuring that any essential community infrastructure proposed within areas of remnant vegetation is consistent with the requirements of the VM Act, the VM Regulation and the RVM Code.

3. Ground truthing the accuracy of the Moratorium regrowth vegetation areas must be undertaken. Following confirmation of mapping accuracy, ensuring any development proposed within Moratorium regrowth vegetation areas is consistent with the provisions of the Vegetation Management (Regrowth Clearing Moratorium) Act 2009 and any subsequent policies or codes which are developed to assist in administration of this regulation.

4. Appropriate buffers/setbacks in the range of 10 to 30 metres are provided between development and areas of remnant vegetation to protect adjacent properties from wind thrown trees and bushfire and to help protect remnant vegetation from weed incursion. The indicative location of a 30 metre development setback from all areas identified as supporting remnant vegetation on the Certified RE Map is presented in Figure 6. These setbacks are consistent with the relevant requirements of SPP 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, as outlined in the following:

• setbacks are achieved from hazardous vegetation (e.g. non-rainforest, eucalypt dominated vegetation) of 1.5 times the predominant mature canopy tree height or 10 metres, whichever is the greater.

• setbacks of 10 metres are achieved from any retained vegetation strips or small areas of vegetation.

Hazardous vegetation pursuant to the SPP 1/03 Guideline is vegetation which attracts a total hazard score of 6 or more (Refer Section 3.2.1 herein).

3.6 SIGNIFICANT WILDLIFE SPECIES

The MPA is known to support a number of significant wildlife species and to support habitat resources which are essential to the ongoing persistence and preservation of these and other significant wildlife species in the region. In this regard, patterns of land use and development of the MPA need to comply with the following regulations:

• the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);

• the Nature Conservation Act 1992 (NC Act);

• the Nature Conservation (Wildlife) Regulation 2006;

• the Vegetation Management Act 1999 (VM Act);

• the Fisheries Act 1994; and

• Cairns Plan - Vegetation Conservation & Waterway Significance Code.
If a species of wildlife recognised by the above regulations is determined to be likely to occur, or suitable habitat for the species is likely to occur within the MPA, the consequent land use constraints are detailed in the following.

RECOGNISED VALUES

Environment Protection and Biodiversity Conservation Act 1999

As stated in Section 3.5.1, the EPBC Act requires that a person must receive Commonwealth approval for any action that has, will have, or is likely to have a significant impact on Matters of NES.

In respect of the Matters of NES recognised by the EPBC Act, a search of the DEWHA's 'Protected Matters' online search tool identified that a number of wildlife species, listed as Critically Endangered, Endangered or Vulnerable pursuant to the EPBC Act, are likely to occur or suitable habitat for the species is likely to occur within five kilometres of the boundary of the MPA. The summarised results of the search are presented as follows:

- World Heritage Properties: 1
- National Heritage Places: 1
- Wetlands of International Significance (Ramsar Sites): None
- Commonwealth Marine Areas: None
- Threatened Ecological Communities: 1
- Threatened Species: 33 species
- Migratory Species: 18 species

The significant species considered to have a moderate to high probability of occurring within or adjacent to the MPA with regard to the suitability of the habitat provided within or adjacent to the MPA are listed in Table 5.

Nature Conservation Act 1992

The NC Act and associated Nature Conservation (Wildlife) Regulation 2006 provide a framework for the conservation of nature within Queensland. One of the primary mechanisms by which this objective is to be achieved is through the declaration of and the specification of management principles and intents for wildlife species of particular conservation significance. The MPA possesses values recognised by the NC Act and its associated Nature Conservation (Wildlife) Regulation 2006 and therefore development or use of the MPA is subject to constraints derived therefrom.

A search conducted on the DERM's Wildlife Online database records several hundred species of flora and fauna as being previously recorded within a ten kilometre radius of the centre of the MPA. This large number of recorded species is an indication of the habitat complexity and species diversity of the Wet Tropics World Heritage Area which borders the MPA to the west and south.

The flora and fauna species of formally recognised conservation significance pursuant to the NC Act that have been previously recorded as occurring within 10 kilometres of the centre of the MPA are listed are Table 5.

Habitat values
A review of the knowledge currently available on the habitat types occurring within the MPA, their structural and floristic condition and the known (i.e. previously recorded) or estimated distribution of recognised significant species was completed to determine the likelihood of the species occurring within the MPA. In this manner it has been determined that 20 fauna species and 18 flora species of recognised conservation significance pursuant to the EPBC Act and/or the NC Act are considered to have a moderate or high potential of occurring within the MPA (Refer Table 7 for the determined likelihood of each significant species occurring within the MPA).

Flora

Vegetation surveys were conducted within the MPA by NRA Environmental Consultants on the 12th and 13th of February 2008, the results of these surveys were detailed in NRA Environmental Consultants (2008): Mt Peter Flora and Fauna Assessment.

The suitability of the types of habitat which currently exist within the MPA for significant flora species is summarised by NRA Environmental Consultants 2008 as follows:

- **Open Forest fragments in low-lying areas** are generally unsuitable habitat for those significant species considered likely to occur in the area. However, the Ant Plant (Myrmecodia beccarii) may occur on older paperbark trees near disturbed creeks.

- **Riparian Rainforest fragments along waterways** have a high potential to support plant species of conservation significance. Pseuduvaria mulgraveana was encountered in rainforest habitat on Sandy Creek. Acalypha lyonsii, Polyalthia sp. (Wyvuri) and Gouania australiana are recorded from similar fragmented areas in the Edmonton area. Other species with a moderate to high likelihood to occur within this habitat include Huperzia phlegmaria, Sphaerantia discolor and Waterhousea. This is particularly true of nonregrowth remnants which represent refugial sites. Sandy Creek and Grey Creek are the best preserved of the riparian rainforests although Stony Creek and the feeder streams of Wrights Creek near hill slopes also have good condition riparian vegetation with a high potential to support significant species.

- **Open Eucalyptus and Corymbia forests** and woodlands occurring on the North-Central Ridge and the ridges coming off the Isley Hills section of the Lamb Range have a low potential for supporting significant species. A single significant species, Plectranthus gratus, is likely to occur within this habitat type where exposed rocky slopes are prominent.

- **Rainforest areas on hill slopes** have a high likelihood for supporting significant plant species. This is due to a generally low level of historic disturbance (e.g. clearing) in these areas. Several species including Acalypha lyonsii, Sphaerantia discolor, Waterhousea mulgraveana, Phyllanthera Graysi, Taeniophyllum muelleri, Pseuduvaria mulgraveana, Gouania australiana and Polyalthia sp (Wyvuri) have been collected from this habitat at nearby locations. The more intact and well developed rainforests further from the cleared landscape are likely to support Hodgkinsonia frutescens and tasslefemrs including Huperzia phlegmaria and H. phlegmarioides (EPBC – Vulnerable, NCWR - Vulnerable).

As noted above, an individual of Pseuduvaria mulgraveana which is listed as ‘Rare’ pursuant to the NC Act was observed within the riparian vegetation fringing Sandy Creek by NRA Environmental Consultants (2008).
It is also relevant to note that *Eleocharis retroflexa* which is listed as ‘Vulnerable’ pursuant to both the *EPBC Act* and the *NC Act* was recorded on Blackfellows Creek in a previous flora study by Environment North (1998). It was considered that the species was restricted to Blackfellows Creek and is unlikely to occur in the other creeks within the MPA (i.e. Wrights Creek, Skeleton Creek, Collinsons Creek, Mackey’s Creek, Sandy Creek, Stony Creek, Grays Creek and their tributaries) (Environment North 1998). Notwithstanding this, NRA Environmental Consultants (2008) consider that the seasonally inundated areas within the MPA which have not undergone significant modification (i.e. used as dry season pasture) may support populations of *Eleocharis retroflexa*.

**Fauna**

Fauna habitat surveys were conducted within the MPA by NRA Environmental Consultants in on the 12th and 13th of February 2008, the results of these surveys were detailed in NRA Environmental Consultants (2008): *Mt Peter Flora and Fauna Assessment.*

The suitability of the types of habitat which currently exist within the MPA for significant fauna species is summarised by NRA Environmental Consultants (2008) as follows:

- **Paperbark** (*Melaleuca sp.*) capable of supporting the larval host plant (*Ant Plant* [*Myrmecodia beccarii*]) of the Apollo Jewel butterfly are present along lowland reaches of the larger creeks including Sandy Creek, Grays Creek, and Wrights Creek.

- **Potential habitat** for Wet Tropics stream-dwelling frogs including the Waterfall Frog (*Litoria nannotis*), Common Mist Frog (*Litoria rheocola*), Green-eyed Tree Frog (*Litoria genimaculata*), and Creaking Nursery Frog (*Cophixalus infacetus*) is likely to occur along sections of Wrights Creek, Sandy Creek, Stony Creek, and some associated tributaries in drainages of hillslopes. These areas are likely to have preferred habitat features for these species including riffles, swift flows, torrents, and waterfalls.

- **Rainforest areas** provide potential habitat for the Australian Lacelid (*Nyctimystes dayi*), Creaking Nursery Frog (*Cophixalus infacetus*), Three-toed Snake-tooth Skink (*Coeranoscincus frontalis*), Double-eyed Fig-parrot (*Cyclopsitta diophthalma macleayana*), Grey Goshawk (*Accipiter novaehollandiae*), Southern Cassowary (*Casuarius casuarius johnsonii*), Golden-tipped Bat (*Kerivoula papuensis*), and Spectacled Flying Fox (*Pteropus conspicillatus*). Rainforest on the slopes along the western and southern boundaries of the MPA generally has the highest potential to support these species.

- **The Common Death Adder** (*Acanthophis antarcticus*), Red Goshawk (*Erythrotiorchis radiatus*), Masked Owl (*Tyto novaehollandiae kimberli*), Greater Large-eared Horseshoe Bat (*Rhinolophus philippinensis maros*), Diadem Leaf-nosed Bat (*Hipposideros diadema reginae*), Square-tailed Kite (*Lophoictinia isura*) may occur in a variety of forest and woodland habitats within the MPA, particularly in larger and continuous vegetation areas.

- **White-rumped Swiftlet** (*Collocalia spodiopygius*) (NCWR - R) is an aerial forager and occurs over most habitats (including cleared areas) within the MPPA.

- **A limited amount of Black-necked Stork** (*Ephippiorhynchus asiaticus*) habitat is present in the MPPA, the species may utilise pools in larger creeks including Grays Creek, Sandy Creek and Wrights Creek.

- **The Northern Quoll** (*Dasyurus hallucatus*) may inhabit open forest areas within the MPA and is most likely to occur on the North-Central Ridge and in open forest patches on hillslopes that bound the western and southern
- The Spotted-tailed Quoll (Dasyurus maculates) may inhabit the upper sections of slopes along the western and southern boundaries of the MPPA. If present, this species is also likely to occur in relatively low population densities.

As noted by NRA Environmental Consultants (2008), none of the flora or fauna species of recognised conservation significance pursuant to the EPBC Act and/or the NC Act (i.e. those listed in Table 7) are likely to occur in the highly modified cleared landscapes within the MPA.

It is noted that matters of National Environmental Significance (NES) will be investigated as part of the flora and fauna survey works and strategic assessment (by others); in parallel to the State Approval process of the Structure Plan.
## Table 5  Wildlife species recognised by the EPBC Act or the NC Act as being of conservation significance and the likelihood of the species occurring within the MPA.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common name</th>
<th>Status*</th>
<th>Habitat requirements</th>
<th>Likelihood of occurrence within the MPA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerodramus terraereginae</td>
<td>Australian swiftlet</td>
<td>QR</td>
<td>Skies over coastal ranges, gorges, islands and woodlands below 1000m. Nests in caves and crevices in cliffs.</td>
<td>Low</td>
</tr>
<tr>
<td>Casuarius casuarius johnsonii</td>
<td>Southern cassowary</td>
<td>CE, QE</td>
<td>Complex tropical vegetation, consisting of dense tropical rainforest and associated habitats, such as woodlands including <em>Melaleuca</em> woodland and swamps, that can provide a year-round supply of fleshy fruit. Within the home range, different habitats are used at different times of year depending on food availability.</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Cyclopsitta diophthalma macleayana</td>
<td>Macleay's fig-parrot</td>
<td>QV</td>
<td>Preferred habitat was probably lowland dry and subtropical rainforest, especially in alluvial areas, however little of this remains. Now inhabits dry or cool subtropical rainforest from sea level to approximately 900m including thin strips of gallery rainforest, littoral rainforest and coastal eucalypt/melaleuca forest where fig densities are high.</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Erythrotriorchis radiatus</td>
<td>Red Goshawk</td>
<td>CV, QE</td>
<td>Tall open forests and woodlands. Nests in trees greater than 20m in height and within 1km of water.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Lophoictinia isura</td>
<td>Square-tailed kite</td>
<td>QR</td>
<td>Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Appears to occupy large hunting ranges of more than 100km².</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Neochmia phaeton</td>
<td>Crimson finch</td>
<td>QV</td>
<td>Preferred habitat types include swampy grasslands with <em>Pandanus</em> sp and Canegrass and open forest with a thick grassy understorey.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Rostratula australis</td>
<td>Australian Painted Snipe</td>
<td>CV</td>
<td>Shallow inland wetlands that are either permanently or temporarily inundated.</td>
<td>Low</td>
</tr>
<tr>
<td>Ninox rufa queenslandica</td>
<td>Rufous owl (southern subspecies)</td>
<td>QV</td>
<td>Roosts in dense vegetation in rainforests, river-edge gallery forest, monsoon scrubs, swamps, mangroves.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Numenius madagascariensis</td>
<td>Eastern curlew</td>
<td>QR</td>
<td>Mudflats and sandflats, often with beds of seagrass, on sheltered coasts, mangrove swamps, bays, harbours and lagoons. At high tide, they move to salt pans, sand dunes and other open areas where they roost above the high water.</td>
<td>Low</td>
</tr>
<tr>
<td>Sterna albifrons</td>
<td>Little tern</td>
<td>QE</td>
<td>Migrates from Asia to Australia each year and establishes breeding colonies along the east Australian coastline, from Cape York to Tasmania. Throughout this range it is primarily encountered in coastal environments where it breeds on undisturbed, unvegetated sites near estuaries and adjacent fresh water lakes.</td>
<td>Low</td>
</tr>
<tr>
<td>Scientific name</td>
<td>Common name</td>
<td>Status*</td>
<td>Habitat requirements</td>
<td>Likelihood of occurrence within the MPA</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Tyto novaehollandiae kimberli</td>
<td>Masked owl (northern subspecies)</td>
<td>CV, QV</td>
<td>Tall open eucalypt forests (especially those dominated by Darwin woollybutt <em>Eucalyptus miniata</em> and Darwin stringybark <em>E. tetrodonta</em>), but also roosts in monsoon rainforests, and forages in more open vegetation types, including grasslands. Although it may roost in dense foliage, it more typically roosts, and nests, in tree hollows.</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bettongia tropica</td>
<td>Northern bettong</td>
<td>CE, QE</td>
<td>Tall and medium sclerophyll habitats in the uplands of the Wet Tropics bio-region. These habitat types occur as a narrow fragmented strip along the western edge of wet tropical rainforests. This narrow band of habitats consists of a cline of eucalypt forest types from very tall and wet <em>Eucalyptus grandis</em> dominated forests through tall <em>E. resinifera-Syncarpia glomulifera</em> dominated forests to medium height and drier <em>E. citriodora</em> or <em>E. platyphylla</em> dominated forests.</td>
<td>Low</td>
</tr>
<tr>
<td>Dasyurus hallucatus</td>
<td>Northern Quoll</td>
<td>CE</td>
<td>Prefers rocky areas and eucalypt forests with areas containing an abundance of hollow logs, rock crevices, caves and hollow trees.</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Dasyurus maculatus gracilis</td>
<td>Spotted-tailed Quoll</td>
<td>CE, QV</td>
<td>Occurs in densely vegetated areas of coastal ranges ranging from rainforest through woodland to coastal heathland (usually 600m or more above sea level) between Townsville and Cooktown. Transient males are sometimes seen in more open areas.</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Hipposideros semoni</td>
<td>Semon's Leaf-nosed Bat</td>
<td>CE</td>
<td>Tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland. This species does not have an obligatory requirement for cave roosts. Daytime roost sites include tree hollows, deserted buildings in rainforest, road culverts and shallow caves amongst granite boulders or in fissures. The species is associated with the threatened Ecological Community 'Mabi forest (Complex notophyll vine forest 5b)'.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Pteropus conspicillatus</td>
<td>Spectacled Flying-fox</td>
<td>CV</td>
<td>Tropical rainforest. The species roosts communally, usually in riparian vegetation or rainforest.</td>
<td>High</td>
</tr>
<tr>
<td>Rhinolophus philippinensis</td>
<td>Greater Large-eared Horseshoe Bat</td>
<td>CE, QE</td>
<td>Tropical rainforest, gallery rainforest, tropical eucalypt woodland, Melaleuca forest with rainforest understorey, and open woodland. They forage within vegetation, at the edge of vegetation, and in gaps, flying within 0.5m of vegetation, remaining below tree top height.</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>Saccolaimus saccolaimus nudiclinatus</td>
<td>Bare-rumped Sheathtail Bat</td>
<td>CCE</td>
<td>Open woodlands, particularly Poplar gum (<em>Eucalyptus platyphylla</em>) woodland, and tall open forest.</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Frogs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cophixalus infacetus</td>
<td>Creaking nursery frog</td>
<td>QR</td>
<td>Montane rainforests in northern Queensland.</td>
<td>High</td>
</tr>
<tr>
<td>Litoria genimaculata</td>
<td>Tapping green eyed frog</td>
<td>QR</td>
<td>Associated with rocky creeks within rainforests.</td>
<td>Moderate</td>
</tr>
<tr>
<td>Scientific name</td>
<td>Common name</td>
<td>Status*</td>
<td>Habitat requirements</td>
<td>Likelihood of occurrence within the MPA</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------</td>
<td>-----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td><em>Litoria nannotis</em></td>
<td>Waterfall Frog</td>
<td>CE, QE</td>
<td>Fast-flowing streams around waterfalls and cascades in rainforest from 80-1300m. Often found on boulders beside or behind waterfalls and cascades, but may be perched on trees or litter beside streams in moist conditions.</td>
<td>Moderate</td>
</tr>
<tr>
<td><em>Litoria nyakalensis</em></td>
<td>Mountain Mistfrog</td>
<td>CCE, QE</td>
<td>Upland rainforest and wet sclerophyll forest along fast-flowing streams where there is white water from riffles and cascades, usually found perched on rocks or overhanging vegetation adjacent to the water.</td>
<td>Low</td>
</tr>
<tr>
<td><em>Litoria rheocola</em></td>
<td>Common Mistfrog</td>
<td>CE, QE</td>
<td>Restricted to fast-flowing rocky creeks and streams in rainforest as well as wet sclerophyll forests. Within these streams they are often found in the slower more open sections, away from waterfalls. Individuals can also be found on rocks, logs and vegetation in or adjacent to streams.</td>
<td>Moderate</td>
</tr>
<tr>
<td><em>Nyctimystes dayi</em></td>
<td>Lace-eyed Tree Frog</td>
<td>CE, QE</td>
<td>Fast-flowing rocky streams within rainforests and rainforest margins although they also frequent slower watercourses where ample vegetation exists along the margins. At low elevations rock soaks, narrow ephemeral streams and rock outcrops in larger watercourses are preferred. It may also be found on rocks, boulders and vegetation in or adjacent to streams.</td>
<td>Moderate-High</td>
</tr>
<tr>
<td><em>Taudactylus acutirostris</em></td>
<td>Sharp-snouted day frog</td>
<td>CEX, QE</td>
<td>Occurs along small creeks in rainforest and wet sclerophyll forest above 300m.</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Reptiles**

<table>
<thead>
<tr>
<th>Acanthophis antarcticus</th>
<th>Common death-adder</th>
<th>QR</th>
<th>Wooded areas and grasslands.</th>
<th>Moderate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coeranoscincus frontalis</td>
<td>Three-toed snake-tooth skink</td>
<td>QR</td>
<td>Found in loose soil, under logs and in rainforest leaf litter.</td>
<td>High</td>
</tr>
</tbody>
</table>

**Insects**

| Hypochrysops apollo apollo  | Apollo jewel (Wet tropics subspecies) | QV | Breeds within the Ant-plants (primarily *Myrmecodia Beccarii*) which grow in coastal paperbark forests.                                                                                                                                                                                                                                                      | Moderate                              |

**Plants**

<table>
<thead>
<tr>
<th>Acalypha lyonsii</th>
<th>Lowland rainforests to 200m altitude. Restricted to the Cairns region.</th>
<th>QV</th>
<th>High</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia hylonoma</td>
<td>Coastal lowland rainforest on red earths and yellow-brown loams over granite and sometimes amongst granite boulders from near sea level to 400 m. Restricted to a few localities around Cairns.</td>
<td>QR</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Amomum dallachyi</td>
<td>Low</td>
<td>QR</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Cleistanthus discolor</td>
<td>Low</td>
<td>QR</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Dendrobium mirbelianum</td>
<td>Coastal swamps &amp; mangroves with strong light Distribution.</td>
<td>CE</td>
<td>Low-Moderate</td>
<td></td>
</tr>
<tr>
<td>Scientific name</td>
<td>Common name</td>
<td>Status*</td>
<td>Habitat requirements</td>
<td>Likelihood of occurrence within the MPA</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td><em>Dendrobium nindii</em></td>
<td></td>
<td>CE</td>
<td>Occurs up to 400 m above sea level, growing on trees (including mangroves and palms) in near-coastal swamps, coastal rainforest, mangroves, and low altitude gorges and streams.</td>
<td>Low</td>
</tr>
<tr>
<td><em>Dendrobium superbiens</em></td>
<td></td>
<td>CV</td>
<td>Exposed locations in rainforests from the McAlister Range to the Torres Straits Islands.</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td><em>Diplazium cordifolium</em></td>
<td></td>
<td>CV, RV</td>
<td>Lowland rainforests in North Queensland.</td>
<td>Low-Moderate</td>
</tr>
<tr>
<td><em>Eleocharis retroflexa</em></td>
<td></td>
<td>CV, QV</td>
<td>Grows on plateaus, in shallow water on the margins of seasonal swamps. Preferred substrates of laterite or clay loam. Usually associated with common species including <em>Melaleuca viridiflora</em>, <em>Eucalyptus phoenicea, Corymbia oocarpa, Capillipedium parviforum, Sorghum plumosum</em> and <em>Heteropogon triticeus</em>.</td>
<td>High (Recorded - Environment North 1998)</td>
</tr>
<tr>
<td><em>Gouania australiana</em></td>
<td></td>
<td>QR</td>
<td>Lowland rainforests in North Queensland.</td>
<td>Moderate</td>
</tr>
<tr>
<td><em>Hodgkinsonia frutescens</em></td>
<td>Atherton Turkey Bush</td>
<td>CV</td>
<td>Occurs within the understory of drier lowland and upland rainforest to 800m altitude.</td>
<td>Moderate</td>
</tr>
<tr>
<td><em>Huperzia filiformis</em></td>
<td>Rat's Tail Tassel-fern</td>
<td>CE, QE</td>
<td>Occurs in canopy trees in the Mt Hypipamee crater area on the Atherton Tableland and possibly on the coastal ranges between Hinchinbrook Island and Cairns and between Mossman and Cooktown.</td>
<td>Low</td>
</tr>
<tr>
<td><em>Huperzia lockyeri</em></td>
<td></td>
<td>CV</td>
<td>Epiphytic on rocks or trees in rainforests above 1000m in north-eastern Queensland.</td>
<td>Low</td>
</tr>
<tr>
<td><em>Huperzia marsupiumformis</em></td>
<td>Water Tassel-fern</td>
<td>CV</td>
<td>Epiphytic on rocks or rainforest trees above 800m.</td>
<td>Low</td>
</tr>
<tr>
<td><em>Huperzia phlegmaria</em></td>
<td>Coarse tassel fern</td>
<td>CV,QR</td>
<td>Epiphytic on mossy rocks in rainforest.</td>
<td>High</td>
</tr>
<tr>
<td><em>Huperzia phlegmarioides</em></td>
<td>Layered Tassel-fern</td>
<td>CV, QV</td>
<td>Epiphytic in North Queensland rainforests.</td>
<td>High</td>
</tr>
<tr>
<td><em>Huperzia prolifera</em></td>
<td>Square Tassel-fern</td>
<td>CV</td>
<td>North Queensland rainforests.</td>
<td>Low</td>
</tr>
<tr>
<td><em>Marsdenia rara</em></td>
<td></td>
<td>QV</td>
<td></td>
<td>Unknown</td>
</tr>
<tr>
<td><em>Myrmecodia beccarii</em></td>
<td></td>
<td>CV, QV</td>
<td>Occurs only in the mangroves and lowland forests found around Cairns and northern Cape York.</td>
<td>High</td>
</tr>
<tr>
<td><em>Parsonsia largiflorens</em></td>
<td></td>
<td>QR</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td><em>Peperomia bellendenkerensis</em></td>
<td></td>
<td>QR</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td><em>Phalaenopsis rosenstromii</em></td>
<td></td>
<td>CE, QE</td>
<td>Shady lowland gorges in rainforest, mostly growing on trees or and occasionally on vines or rocks.</td>
<td>Low-moderate</td>
</tr>
<tr>
<td><em>Phyllanthera Graysi</em></td>
<td></td>
<td>QR</td>
<td>Lowland and upland rainforests to 800m.</td>
<td>High</td>
</tr>
<tr>
<td><em>Plectranthus gratus</em></td>
<td></td>
<td>CV, QV</td>
<td>Open forest or rainforest from 100m to 600m altitude.</td>
<td>High</td>
</tr>
<tr>
<td><em>Polyalthia patinata</em></td>
<td></td>
<td>QR</td>
<td>Lowland rainforest between Innisfail and Cairns to 200m altitude.</td>
<td>High</td>
</tr>
<tr>
<td><em>Polyscias bellendenkerensis</em></td>
<td></td>
<td>CV</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Scientific name</td>
<td>Common name</td>
<td>Status*</td>
<td>Habitat requirements</td>
<td>Likelihood of occurrence within the MPA</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------</td>
<td>---------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Pseuduvaria mulgraveana</td>
<td>QR</td>
<td>Understory of lowland rainforest to 100m in Cairns region.</td>
<td>High (recorded – NRA Environmental Consultants 2008)</td>
<td></td>
</tr>
<tr>
<td>Sauropus macranthus</td>
<td>CV</td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Sphaerantia discolor</td>
<td>Tully penda</td>
<td>QR</td>
<td>Associated with creeks and other wet areas of lowland rainforests from 150m to 300m altitude.</td>
<td>High</td>
</tr>
<tr>
<td>Taeniophyllum muelleri</td>
<td>Minute Orchid</td>
<td>CV</td>
<td>Epiphytic associated with creeks and other wet areas of open forest and rainforest.</td>
<td>High</td>
</tr>
<tr>
<td>Tylophora rupicola</td>
<td>CE, QE</td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Waterhousea mulgraveana</td>
<td>QR</td>
<td></td>
<td>Associated with waterways within lowland and upland rainforests to 700m altitude.</td>
<td>High</td>
</tr>
<tr>
<td>Zeuxine polygonoides</td>
<td>CV</td>
<td></td>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>

* CEX, CCE, CE, CV = Commonwealth (Presumed Extinct, Critically Endangered, Endangered, Vulnerable) - *EPBC Act
  QE, QV, QR = State (Endangered, Vulnerable, Rare) – *NC Act
LAND USE CONSTRAINTS AND OPPORTUNITIES

The Structure Plan must ensure that the development of the MPA does not have a significant adverse impact upon the health, survival or ongoing persistence of any significant wildlife species listed under the provisions of the:

- the *Environment Protection and Biodiversity Conservation Act 1999*;
- the *Nature Conservation Act 1992*;
- the *Nature Conservation (Wildlife) Regulation 2006*; and/or
- the *Fisheries Act 1994*.

Sections of the MPA that provide known or likely habitat resources for significant wildlife species are must be appropriately protected from the impacts of adjacent urban land uses. These areas include:

- areas of vegetation analogous to that protected within the adjacent Wet Tropics World Heritage Area;
- the Trinity Inlet Declared Fish Habitat Area including Blackfellows Creek up to 20m downstream of the Bruce Highway and Wrights Creek up to 20m downstream of the bridge on Page Road;
- areas identified as Essential Habitat on the Certified RE Map consistent with the recommendations in Section 3.5.2;
- areas identified as remnant vegetation on the Certified RE Map consistent with the recommendations in Section 3.5.2;
- waterways, waterbodies and areas which support native vegetation communities and which provide significant wildlife linkages/ecological corridors between core habitat patches; and
- areas in which significant wildlife species have been previously recorded (e.g. riparian vegetation on Sandy Creek and Blackfellow’s Creek, the ridges of the Isley Hills, the riparian rainforest communities associated with Sandy Creek, Grey Creek, Stony Creek and Wrights Creek).

To protect and preserve native wildlife within the MPA, domesticated pets are to be contained within fenced yards or indoors at all times unless restrained when walked. During the MPA Structure Planning process the CRC *Keeping, Control and Impounding of Animals Local Law 2003* should be amended such that it requires the registration of domestic cats, restricts domestic cat ownership to one per dwelling and requires domestic cat owners to keep their cats indoors.

Efforts should also be made as part of the actual development and use of the MPA to actively rehabilitate (i.e. through removal of weed species and planting out of suitable native and endemic flora) those waterway corridors which currently support non-remnant vegetation or are otherwise heavily disturbed. The rehabilitation of these corridors has the potential to enhance and increase native and threatened wildlife movement opportunities and habitat availability within the MPA.

3.7 EXTRACTIVE INDUSTRY

Key Resource Areas and their associated transport routes are to be appropriately protected and managed in accordance with the requirements of:

- *State Planning Policy 2/07 Protection of Extractive Resources (SPP 2/07)*; and
• the Cairns Plan - *Extractive Industry Code*.

Standards for acceptable emission of noise and air impurities including odour from extractive industries are specified in:

• the *Environmental Protection Act 1994*;
• the *Environmental Protection (Air) Policy 2008*; and
• the *Environmental Protection (Noise) Policy 2008*.

**RECOGNISED VALUES**

Sites of extractive industry resources of State and/or regional significance in Queensland are identified pursuant to *SPP 2/07* as Key Resource Areas (KRAs). The size and location of each KRA is determined in order to include:

• the extractive resource and processing areas;
• a transport access route from the extractive resource to a sealed public road; and
• appropriately sized separation areas surrounding the extractive resource, the processing areas and the access route.

Two currently operating KRAs are located within the southern section of the MPA, they are:

• Maitland Road Quarry identified as KRA 40 pursuant to *SPP 2/07*; and
• Wright Creek Quarry identified as KRA 13 pursuant to *SPP 2/07*.

The size and location of these KRAs and their designated access route and separation areas as provided on the Department of Employment, Economic Development and Innovation’s (formerly the Department of Mines and Energy) Key Resource Area Mapping is provided in Figure 7.

**LAND USE CONSTRAINTS AND OPPORTUNITIES**

The Structure Plan is to recognise existing extractive industry operations within and adjacent to the MPA.

The patterns of land use and development proposed by the Structure Plan are not to adversely affect the continued lawful operation of existing extractive industries.

Known Key Resource Areas and their associated transport routes within the MPA are appropriately protected and managed in accordance with the requirements of:

• *SPP 2/07*; and
• the Cairns Plan - *Extractive Industry Code*.

Buffers (i.e. separation areas) consistent with the requirements of *SPP 2/07* to KRA 13 and KRA 40 will be maintained between sensitive (i.e. residential) development and the current/future anticipated boundary of the extractive operations to mitigate the potential for nuisance to be caused by noise and vibration.

The planning designation of land within the KRA separation areas is to remain as Rural until such time as the KRAs are extinguished.
A 100m wide buffer is currently required between the designated KRA transport routes and sensitive development in accordance with SPP 2/07. The indicative location of this 100m buffer is depicted in Figure 7. The appropriateness, applicability and extent of the 100m development buffer to the transport route from KRA 13 and KRA 40 needs to be determined through appropriate noise, dust and odour investigations undertaken as part of the Master Planning stage of development within the MPA.

3.8 AQUACULTURE AND POULTRY

Intensive aquaculture management is regulated under the Fisheries Act 1994. Standards for acceptable emission of noise and air impurities (including odour) from aquaculture and poultry facilities are specified in:

- the Environmental Protection Act 1994;
- the Environmental Protection (Air) Policy 2008; and

RECOGNISED VALUES

An aquaculture facility is currently in operation adjacent to Wrights Creek within Lot 11 on SP173568 in the centre of the MPA.

A poultry farm is currently in operation adjacent to Mount Peter Road within Lot 3 on SP134760 in the north-eastern section of the MPA.

The location of each of these facilities is illustrated in Figure 7.

LAND USE CONSTRAINTS AND OPPORTUNITIES

The Structure Plan is to recognise the existing aquaculture and poultry operations within and adjacent to the MPA but should, however, make provisions for their ultimate removal from the MPA.

In the interim, the patterns of land use and development proposed by the Structure Plan are not to adversely affect the continued lawful operation of existing aquaculture and poultry facilities. In this respect, buffers will need to be maintained between urban development and existing aquaculture and poultry facilities to mitigate the potential for nuisance to be caused by noise and odour emission from the facilities. An interim strategy is to be developed, as part of the Master Planning stage of development within the MPA, to manage development adjacent to the aquaculture and poultry facilities prior to these facilities being removed from the MPA. During the development of this strategy, specific consideration is to be given to Schedule 1 (Acoustic Quality Objectives) of the Environmental Protection (Noise) Policy 2008 and the operating noise levels associated with the aquaculture and, if relevant, poultry facilities.

Further details in this regard are provided in Section 6 herein.

Notwithstanding the above, it must be recognised that neither the existing aquaculture facility nor the existing poultry farm located within will be considered desirable land use types within the MPA and thus are unlikely to remain under the Structure Plan.
3.9 ACID SULFATE SOILS

The use and development of land that has the potential to support acid sulfate soils is regulated by the following regulations:

- State Planning Policy 2/02 - Planning and Managing Acid Sulfate Soils (SPP 2/02); and
- Guidelines for the Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland.

RECOGNISED VALUES

An investigation of the potential for the MPA to support land with Actual Acid Sulfate Soils (AASS) and Potential Acid Sulfate Soils (PASS) was undertaken as a component of the geotechnical investigations completed within the MPA by Golder Associates (2008). Golder Associates (2008) describe the sections of the MPA that have the potential to contain AASS or PASS as follows:

- Two relatively small areas with surface levels between 5m AHD and 20m AHD occur within the portion of the Study Area south of the Bruce Highway in the vicinity of Stony Creek and Wrights Creek.
- The majority of the Study area north of the Bruce Highway has surface levels between 5m AHD and 20m AHD with localised areas towards the northeast boundary with surface levels less than 5m AHD.
- The majority of the Study Area to the south of the Bruce Highway has surface levels above 20m AHD and have not been considered further from an acid sulfate soils point of view.

Golder Associates (2008) determined areas of the MPA which have surface levels below 5m AHD and those which have surface levels between 5m and 20m AHD. These are presented in Appendix A7.

The geotechnical investigations conducted by Golder Associates (2008) involved field screening tests for AASS and PASS within the areas determined to contain moderate or high potential for encountering ASS. The results of the soil sampling conducted is summarised by Golder Associates (2008) as:

- The field screening tests did not indicate the presence of AASS or PASS materials.
- Chromium Reducible Sulfur (S\text{CR}) concentrations in all soil samples were below the Queensland Acid Sulfate Soils Investigation Team (QASSIT) action criteria (0.03%S), confirming that none of the materials analysed were PASS.
- Existing acidity (Titratable Actual Acidity, TAA) concentrations exceeding the QASSIT Action Criteria of 0.003%S were detected in some soil samples. However, the pH of these samples was greater than 4.5 and the potential acidity (in the form of sulfur) was generally not detected in these samples. The existing acidity detected in these samples is considered to be the result of non-sulfidic acidity within the soils rather than sulfidic acidity (i.e. AASS).

The areas of the MPA identified by Golder Associates (2008) as having a medium or high potential for encountering ASS are illustrated in Appendix A8. These areas are associated with the lowest reaches of Blackfellows Creek, Collinson Creek and Wrights Creek. Within these creeks, only those areas which are generally colonised by mangroves (including areas cleared in the past) and are otherwise very low lying are believed to be comprised of marine sourced sediment with a likelihood of containing sulfides.
LAND USE CONSTRAINTS AND OPPORTUNITIES

*SPP 2/02* outlines the Queensland State government interests concerning developments involving Acid Sulfate Soils (ASS) in low lying coastal areas. Pursuant to the *Integrated Planning Act 1997*, *SPP 2/02* has effect when certain development applications are assessed, when planning schemes are made or amended, and when land is designated for community infrastructure (Golder Associates, 2008). Within the CRC area, *SPP 2/02* applies to all land at or below 5 m AHD, in addition to land at or below 20m AHD where there is potential to disturb soils below 5 m AHD. Within this described area, *SPP 2/02* applies to development involving:

- excavating or otherwise removing 100m³ or more of soil or sediment; or
- filling of land involving 500 m³ or more of material with an average depth of 0.5m or greater.

Golder Associates (2008) stated the following.

*Whilst ground proofing studies did not indicate the presence of PASS [in the areas illustrated in Appendix A8], it is recommended that more detailed studies be conducted for development involving disturbances associated with underground services, basements or other excavations of more than 100m³…No acid sulfate soils constraints are considered to be warranted outside of the identified areas shown on [Appendix A8].*

In this regard, the Structure Plan is to make appropriate provisions for the identification and appropriate management of ASS within the MPA.

It is noted that ASS mapping at a scale of 1:50,000 has been completed by DERM and will be published in the near future.

Development of land located below the 20m AHD contour within the MPA will be carried out in accordance with the requirements of *SPP 2/02* until such time as sufficiently comprehensive ASS hazard mapping is undertaken, during the Master Planning stage, or otherwise made available by DERM.

3.10 PEST SPECIES

**Land Protection (Pest and Stock Route Management) Act 2002**

The main purpose of the *Land Protection (Pest and Stock Route Management) Act 2002 (LP Act)* is to provide for pest management for land and stock route network management. The main policy objectives are to protect land and water from the adverse impacts of weeds and pest animals and to manage the stock route network in a sustainable manner for travelling stock and other purposes. Pursuant to the *LP Act* significant species are treated under three classes:

- **Class 1** - These species have the potential to become serious pests if they are ever introduced into the State. The aim is to keep these out of Queensland and eradicate any that are found.

- **Class 2** - These species are major pests in Queensland. Most have the potential to spread over much larger areas of the State. The aim is to reduce the rate at which these species invade new areas and to suppress existing infestations.

- **Class 3** - These species are significant weeds that have spread over most of their potential range but need to be controlled in environmentally significant areas. Their sale needs to be restricted to help avoid re-invasion of areas where these pests have been controlled.
The Cairns City Council Pest Management Plan 2005

The Cairns City Council Pest Management Plan 2005 (CCC PMP) was adopted by Council in September 2005, endorsed by the Minister for Natural Resources and Mines in June 2005. The CCC PMP provides the strategies and objectives for the management of pest species within the CRC authority area.

RECOGNISED VALUES

The field survey conducted by NRA Environmental Consultants (2008) identified the occurrence of a large number of pest plant species (listed under the LP Act and/or the CCC PMP) within the MPA including the LP Act declared Class 3 plants: Lantana (Lantana camara), Asparagus fern (Asparagus plumosum), African Tulip (Spathodea campanulata) and Singapore daisy (Sphagneticola trilobata). NRA Environmental Consultants (2008) noted:

…”Weed species are generally encouraged by disturbances to existing communities especially along the unmanaged edges of disturbances. As approximately 75% of the study area has been modified, and many remnant patches are narrow corridors of riparian vegetation, the associated disturbed and generally unmanaged perimeter wherein weed species thrive is large.

In addition, it is recognised that pest species control practices carried out on adjacent agricultural/rural land may require the establishment and maintenance of buffers in accordance with Appendix 2 of the State Planning Policy 1/92: Separating Agricultural and Residential Land Uses (SPP 1/92) which is presented as Appendix A9.

LAND USE CONSTRAINTS AND OPPORTUNITIES

The Structure Plan is to make appropriate provisions for the management of existing and the potential for future infestations of pest species.

Pest management provisions within the Structure Plan are to be consistent with the provisions of the LP Act and the CCC PMP which outline a range of principles that should be applied to pest management on land including integration of pest management into development, development of regional and local pest management plans, preventing the spread of pests or viable parts of pests by human activity.

With respect to the above, it is recommended that future development applications within the MPA should be accompanied by relevant documentation that identifies the type and extent of pest species that occur within the properties proposed for development. It is further recommended that any subsequent Operational Works applications submitted for such developments are accompanied by a Pest Management Plan which outlines reasonable and achievable management strategies to control the spread and, where practicable, reduce the extent of pest species within the relevant properties.

Applications for landscaping works within the MPA that contain recognised pest plant species should not be approved by Council.

Urban development within the MPA is to be designed such that legitimate pest management practices on adjacent agricultural/rural land are not restricted. In this regard, adequate vegetated buffers are to be maintained between existing agriculture and future urban development.
3.11 AIR QUALITY

The Environmental Protection (Air) Policy 2008 (the Air Policy) identifies environmental values to be enhanced or protected, specifies air quality indicators and goals, and provides a framework for making fair and consistent decisions, and involving the community in achieving air quality goals.

RECOGNISED VALUES

The dominant existing air impurity emissions in and adjacent to the MPA include:

1. bus and truck emissions and noise;
2. dust emissions from extractive industry operations;
3. odour, dust, smoke and spray drift from agricultural, aquaculture, and poultry operations; and
4. vehicle exhaust emissions from road traffic on the Bruce Highway.

LAND USE CONSTRAINTS AND OPPORTUNITIES

The Structure Plan will include provisions for ensuring that potential air quality impacts are managed in accordance with the Air Policy, such that the qualities of the air environment that are conducive to suitability for the life, health and wellbeing of humans.

In this respect, a 10m wide buffer will be established between urban land uses and the Bruce Highway.

As outlined in Section 3.8.1 herein, an interim strategy is to be developed, as part of the Master Planning stage of development within the MPA, to manage development adjacent to the aquaculture/poultry facilities prior to these facilities ceasing activity within the MPA.

Appropriate buffers shall be provided and maintained between residential uses and existing sources of air impurity (including odour) emissions associated with the aquaculture and poultry facilities and the proposed mass transit corridor. The nature and extent of these buffers are to be determined through appropriate dust and odour investigations undertaken as part of the Master Planning stage of development within the MPA.

Buffers (i.e. separation areas) consistent with the requirements of SPP 2/07 to KRA 13 and KRA 40 must be maintained between sensitive development and the current/future anticipated boundary of the extractive operations to mitigate the potential for nuisance to be caused by air impurities.

3.12 ACOUSTIC ENVIRONMENT

The Environmental Protection (Noise) Policy 2008 (the Noise Policy) identifies environmental values, specifies acoustic quality objectives, and provides a framework for making fair and consistent decisions, developing noise management programs, making accurate and consistent noise assessments, and providing consumer information regarding noise.
RECOGNISED VALUES

Ambient noise and vibration investigations were conducted within the MPA in February 2008 by ARUP Acoustics. The results of these investigations were detailed in ARUP Acoustics (2008): Mt Peter Residential Development – Ambient Noise and Vibration Baseline Study, prepared for Cairns City Council (now Cairns Regional Council [CRC]).

The dominant existing noise sources within the MPA are summarised by ARUP Acoustics (2008) as follows:

1. Heavy and light vehicle road traffic on the Bruce Highway.
   
   …The dominant noise source within the development was traffic on the Bruce Highway and the highest noise levels were therefore recorded along this highway corridor. Noise levels recorded adjacent to the Bruce Highway currently exceed the criterion of 60 dBL10,18 hour which is detailed in the Road Traffic Noise Management: Code of Practice which is developed to facilitate the achievement of the Environmental Protection Act. Noise levels are expected to exceed this criterion at distances of up to 200m from the highway (ARUP Acoustics 2008).

2. Extractive industry operation and heavy vehicles servicing extractive industry.
   
   …The noise from heavy vehicles servicing the quarry is contributing to the high ambient LAeq noise levels. Although audible, the quarry operation has little effect on the LAeq or L90 (Background) noise level measured at the Hussey Street south boundary with respect to the local noise environmental (i.e. birds, insects, wind). However, due to the relatively low background noise levels in general, operational noise (including heavy vehicle traffic) from the quarry may be an annoyance for residential properties in the area (ARUP Acoustics 2008).

   …Vibration due to quarry operations was not detectable above background vibration within the study area, during the measuring periods. Vibration due to heavy vehicles associated with the quarries is unlikely to be an annoyance at residential receivers (ARUP Acoustics 2008).

3. Gunfire from the Cairns Target Shooting Club.
   
   …Gunfire from Cairns Target Shooting Club has little effect on the LAeq or L90 (Background) at Davis Road with respect to the local noise environment, however, the noise is impulsive and likely to be annoying for residential receivers in this area (ARUP Acoustics 2008).

   The gunfire noise from the shooting club is also reverberant in nature due to the club’s location amongst the foothills of the Central Range.


   Wind and wildlife including various diurnal and nocturnal birds, frogs and insects were recorded by ARUP Acoustics (2008) as making a significant contribution to background noise within the majority of the surveyed areas of the MPA.

The ARUP Acoustics (2008) report also notes “that a rail network exists which will be used seasonally to transport sugar cane. Rail noise may be a potential noise source during harvesting season if it remains during the residential development. There is also an operating rail network adjacent to the East side of the Bruce Highway for the length of the study area”. Rail noise was not listed as a dominant source of noise in the MPA.

The noise sensitive land uses which are likely to be incorporated into the MPA include:
• residential properties;
• community and child care centres;
• schools and educational facilities;
• hospitals and health care facilities; and
• places of worship.

LAND USE CONSTRAINTS AND OPPORTUNITIES

The Structure Plan is to make appropriate provisions for the protection of the acoustic environment and the management of potential adverse acoustic impacts of transport, industry, rail, extractive industry, agriculture and aquaculture on existing or proposed noise sensitive land uses.

The Structure Plan is to provide appropriate buffers between proposed noise sensitive uses and potentially incompatible land uses within and external to the MPA. The nature and extent of these buffers are to be determined through appropriate noise investigations undertaken at the Master Planning stage of development within the MPA.

A 10m wide buffer will be established between urban land uses and the Bruce Highway.

The Structure Plan is to minimise noise generating infrastructure and activities through the provision of public transport, cycle paths and locating social infrastructure within the MPA.

Guidelines for acoustic considerations will need to be reviewed at the Master Planning stage of development within the MPA in light of the urban approach to development and its inevitable impact on amenity.

Mixed use developments are to determine appropriate mix of uses and or management to ensure a quality of liveability is achieved.

3.13 DECLARED FISH HABITAT AREAS, MARINE PLANTS AND WATERWAY BARRIERS

The MPA includes land, waters and vegetation with fisheries productivity values. The use of these areas and adjacent land is regulated by the following regulations:

• the Fisheries Act 1994;
• the Fisheries Regulation 2008;
• Management and protection of marine plants and other tidal fish habitats (FHMOP 001);
• Management of Declared Fish Habitat Areas (FHMOP 002); and
• Fisheries Guidelines for Fish Habitat Buffer Zones (FHG 003).

The establishment of infrastructure which may interfere with fish passage within watercourses is regulated by the following regulations:

• the Fisheries Act 1994;
• the Fisheries Regulation 2008; and
- Waterway Barrier Works Approvals and Fishway Assessments: Departmental Procedures (FHMOP 008).

RECOGNISED VALUES

The Trinity Inlet Fish Habitat Area: FHA003 Map produced by the Queensland Primary Industries and Fisheries (QPI&F) identifies the Trinity Inlet Declared Fish Habitat Area (FHA) as adjoining the north-east section of the MPA. The FHA includes Blackfellows Creek up to 20m downstream of the Bruce Highway and Wrights Creek up to 20m downstream of the bridge on Page Road. The mapped limits of the FHA are illustrated in Figure 6.

Although not documented in either NRA Environmental Consultants (2008) or ARUP (2008) Mount Peter Area – Review of Environmental Factors, it is reasonable to assume that the sections of the MPA that adjoin the FHA and those waterways within the MPA which are subject to tidal influence support marine plants. Marine plants are protected under the provisions of the Fisheries Act 1994.

A marine plant is defined, pursuant to Section 8 of the Fisheries Act 1994 as follows.

1. Marine plant includes the following—
   a. a plant (a tidal plant) that usually grows on, or adjacent to, tidal land, whether it is living, dead, standing or fallen;
   b. material of a tidal plant, or other plant material on tidal land;
   c. a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.

2. Marine plant does not include a plant that is a declared pest under the Land Protection (Pest and Stock Route Management) Act 2002.

Pursuant to the Fisheries Act 1994, a person may not construct or raise waterway barrier works without addressing the need for fish movement across the barrier.

For the purposes of the Fisheries Act 1994, waterway barriers include dams, weirs or other barriers constructed across waterways. They may block or obstruct the flow of water completely or significantly, and stop movement of fish upstream or downstream of these barriers. Where movement of fish is important along the waterways, it may be necessary to construct a fish way.

LAND USE CONSTRAINTS AND OPPORTUNITIES

Any development proposed within the MPA would be required to protect the values of the adjacent Declared FHA. This will require that:

- appropriate setbacks are provided between development and adjacent areas of fisheries habitat value;
- appropriate water quality and quantity management measures are incorporated into the proposed development.

The QPI&F policy FHMOP 001 sets out the criteria for development which may impact on marine plants and fish habitats and documents those marine plants of recognised value or to fisheries productivity and conservation. The QPI&F guideline FHG 003 recommends a minimum buffer of 100m between developments and marine plants to reduce the risk of impacts on fish habitats from development and sets the criteria for determining the width of the buffer. Section 125 of Fisheries Act 1994 can require rehabilitation of fish habitats if
adequate development control measures are not put in place to prevent degradation of the fish habitat, including marine plants. FHG 003 also identifies that buffers to the Declared FHAs are required to provide one or more of the following functions.

- protection of fisheries species diversity and distribution;
- protection of ecological buffers;
- filtration of nutrients/pesticides/heavy metals;
- water quality;
- stabilisation of bank erosion;
- pedestrian access to fisheries resources;
- provision of other wildlife habitat; and
- mosquito and midge control.

Communications with QPI&F during the MPMP process have identified some concerns that the agency holds in relation to:

- ensuring buffering provisions adjacent to the FHA are sufficient such that the buffer will permit the anticipated sea level rise and the associated landward migration of tidal wetlands and marine vegetation and still enable adequate and appropriate protection of fisheries habitat values; and
- the creation of steep banks during the filling of low-lying land which have the potential to wash away into adjacent FHA during flooding events; and
- the creation of bund/revetment walls during the filling of low-lying land which may not permit landward migration of tidal wetlands and marine vegetation.

It is recognised that the extent of the buffering to the FHA and other areas of tidal influence within the MPA needs to be determined and agreed upon by DIP, CRC and QPI&F to enable progress and finalisation of the development area.

With respect to the above, the Structure Plan is to protect the fisheries productivity values and functions of the locality, with particular emphasis given to the Trinity Inlet FHA. In this regard, open space buffers of at least 100m are to be established between urban development and the FHA. Where necessary, these buffers to the FHA are to be revegetated in order to recreate habitat analogous to that which was present pre-clearance. Further studies, undertaken at the Master Planning stage of development within the MPA, may be required to determine whether a 100m buffer from the level of HAT is sufficient to account for the anticipated sea level rise in the Cairns region whilst still permitting the appropriate protection of adjacent fisheries habitat values.

Water sensitive urban design and best practice stormwater management will be implemented outside of the 100m buffer to avoid offsite impacts to fisheries and fish habitat values.

Disturbance to marine plants is to be avoided. In this respect, it is recommended that ground surveys, undertaken at the Master Planning stage of development within the MPA, be completed to accurately determine the landward limit and extent of marine plants within the MPA.

It is recognised that as part of the orderly development of the MPA there will be an unavoidable requirement to place structures within or across a number of the waterways within the MPA. It is recommended that within the MPA the number of
waterway crossings over waterways that have a stream order 4 or greater, and/or that support remnant or marine vegetation is to be minimised.

In addition, the Structure Plan will include provisions to ensure that any structures proposed within or across a waterway are designed, constructed and maintained to ensure that:

- that fish passage is adequately provided for; and
- alterations to existing flow velocities and/or patterns are minimised.

With respect to the above it is noted that fish movement can be provided for in the following ways:

- incorporation of a suitable fishway to enable fish passage;
- short-term installation of temporary waterway barriers; or
- structure design ensures the barrier drowns-out sufficiently frequently and of sufficient duration to allow fish passage.

3.14 CONTAMINATED LAND

The MPA contains potentially contaminated land that needs to be managed in accordance with the provisions of the Environmental Protection Act 1994 (EP Act).

RECOGNISED VALUES

Any activity that has been identified by DERM as likely to cause land contamination is referred to by the as a ‘notifiable activity’. The notifiable activities recognised in Queensland are listed in Schedule 2 of the EP Act. Pursuant to the EP Act, landowners and local governments must inform the DERM that land has been or is being used for a notifiable activity. When the DERM has been notified that a parcel of land has been or is being used for a notifiable activity it is recorded on the DERM’s Environmental Management Register (EMR).

It should be noted that sites recorded on the EMR generally pose a low risk to human health and the environment under the current land use. The listing of a parcel of land on the EMR does not require that the current land use must stop or that the land must be remediated.

Parcels of land within Queensland that have been proven to be contaminated by substances that are causing or have the potential to cause serious harm to humans or the environmental are listed on the DERM’s Contaminated Land Register (CLR). Parcels of land are registered on the CLR when scientific investigation has proven that the land is contaminated and that action needs to be taken to remediate or manage the land and the contaminants within.

The parcels of land within the MPA which have been registered on the DERM’s EMR and the notifiable activity (pursuant to Schedule 2 of the EP Act) for which each parcel of land has been registered are as follows:

- Lot 3 on RP744407
  1. Asphalt or bitumen manufacture—manufacturing asphalt or bitumen, other than at a single-use site used by a mobile asphalt plant;
- Lot 1 on SP129225 and Lot 194 on SP129225
18. **Gun, pistol or rifle range**—operating a gun, pistol or rifle range.

The location of these areas within the MPA is illustrated in Figure 7.

No parcels of land within the MPA are registered as contaminated land on the CLR.

It should also be noted that the majority of the lowland areas within the MPA have been utilised for sugar cane cultivation for a number of decades. As described by ARUP (2008):

> ...Historically, sugar cane farming has used a variety of pesticides and herbicides including organochlorine and organophosphate pesticides and these are known to persist in the soil for many years and have the potential to bioaccumulate.

Diuron is one of the most commonly used broad spectrum herbicides in sugar cane farming. Although Diuron has a half life of about 100 days, it binds strongly to soil particles and therefore has the potential to be retained in the soil at these sites. The herbicides atrazine and diuron have been reported as present at river mouths, inshore reefs and intertidal seagrass monitoring locations, the Great Barrier Reef Marine Park Authority report (Annual Marine Monitoring Report 2001).

**LAND USE CONSTRAINTS AND OPPORTUNITIES**

Should alternative development be proposed for the parcels of land identified on the EMR, a Human Health and Ecological Risk Assessment (HH&ERA) would need to be undertaken by a consultant who is a member of a prescribed organisation (listed in Schedule 8A of the Environmental Protection Amendment Regulation 1998) to assess contamination levels, exposure risk and remediation requirements. Such an assessment would be undertaken in support of an actual development application. It is not necessary for such an assessment to be undertaken as part of the Strategic Planning stage for the MPA.

Due to the use of areas of land within the MPA for sugarcane farming it would prudent for a HH&ERA to be conducted, in support of individual development applications, on all land to be converted from sugarcane cultivation to sensitive development (i.e. residential, schools, food storage/handling, etc).

The HH&ERA should be conducted according to the DERM’s *Draft Guidelines for the Assessment and Management of Contaminated Land*.

A site investigation report which should be provided by an appropriately qualified consultant conducting the HH&ERA can then be submitted to the DERM for assessment. After considering the site investigation report, the DERM will decide whether the land is contaminated. Subsequent to this decision, the DERM will provide a suitability statement detailing the conditions (regarding contamination) of the land the land uses for which the parcel of land is suitable.

It is relevant to note that the DERM issues suitability statements when:

- land is removed from the EMR, following site investigation and, where necessary, remediation; or
- land is removed from the CLR, following site remediation and validation; or
- a site management plan for land recorded on the EMR is approved.

The Structure Plan is to recognise and make provision for the parcels of land within the MPA which are currently registered in the EMR.
It is likely, given the agricultural land use of much of the MPA, that a number of on-farm fuel or chemical storage areas exist within the MPA. These areas will need to be identified during the Master Planning process and appropriate investigations undertaken during this stage will need to be conducted to assess any potential contamination to determine any site remediation requirements.

The Structure Plan is to ensure that human health and the environment is not placed at risk of harm due to the inappropriate use or development of the parcels of land currently registered on the EMR.

3.15 COASTAL AREAS

The MPA contains areas that are subject to tidal influence and form part of the State’s Coastal Zone.

The Coastal Protection and Management Act 1995 (CPM Act) and the associated State Coastal Management Plan 2001 (“SCMP”) provides for the management and protection of the state’s coastal zone and its economic, social and ecological resources. One of the primary objectives of the State Coastal Plan is to provide a set of key management topics with an associated framework of principles and policies for the achievement of sustainable management of the zone.

The MPA is located within the Wet Tropical Coast Regional Coastal Management Plan (“WTC RCMP”). This plan is used in conjunction with the State Coastal Plan to provide a regional framework to manage and regulate future development in the area whilst protecting the coastal zone. The Wet Tropics Plan includes policies to help implement and achieve the coastal management outcomes, principles and policies of the State Coastal Plan.

As such patterns of land use and development of coastal areas within the MPA would be required to achieve compliance with the following regulations:

- the CPM Act;
- the SCMP; and
- the WTC RCMP.

RECOGNISED VALUES

A review of WTC RCMP Map 33.9 Wet Tropical Coast Coastal Management District – Sheet 8063-1 Gordonvale illustrates that:

- Lot 3 on SP108482, located in the most northern section of the MPA is bordered along the majority of its eastern boundary by the Wet Tropical Coast Coastal Management District (CMD) (associated with Wrights Creek); and
- Lot 9 on N15737 is located approximately 25m south of the CMD boundary (associated with Blackfellows Creek).

Pursuant to the WTC RCMP the landward extent of the CMD with reference to these lots is defined as the extent of HAT for the upstream extent of the creeks and to the extent of Mean High Water Springs (“MHWS”) + 40m adjacent to the creeks. It is recognised that detailed on-ground survey will be required as part of the Master Planning stage for the MPA to determine the precise positions of HAT and MHWS of relevance to the MPA.
The extent of the Erosion Prone Area within the wider CRC area, as well as the MPA, is based on notes in the Beach Authority Plans for CRC (i.e. Plan SC3395). These notes define the limits of the Erosion Prone Area as follows.

(2) On land adjacent to coastal waters the landward boundary of the erosion prone area shall be defined as:

(i) a line measured 40 metres landward of the plan position of the mean high water springs (MHWS) tide level except where approved revetments exist, in which case the line is measured 10 metres landward of the upper seaward edge of the revetment, irrespective of the presence of outcropping bedrock; or

(ii) a line located by the linear distance (in metres) specified on this plan measured [which specifies a distance of 400 m], unless specified otherwise, inland from:

(a) the seaward toe of the frontal dune. (The seaward toe of the frontal dune is normally approximated on aerial photography by the seaward limit of terrestrial vegetation); or

(b) a straight line drawn across the mouth of a waterway between the alignment of the seaward toe of the frontal dune on either side of the mouth; or

(iii) the plan position of Highest Astronomical Tide (HAT); whichever provides the greater erosion prone area width except:

(a) where the linear distance specified on this plan is less than 40 metres, in which case note (2)(i) does not apply, however notes (2)(ii) and (2)(iii) do apply;

(b) where outcropping bedrock is present and no approved revetments exist, in which case the line is defined as being coincident with the most seaward bedrock outcrop within these defined boundaries but not seaward of the line of HAT;

(c) in approved canals in which case the line of HAT applies, irrespective of the presence of approved revetments or outcropping bedrock…

(4) Coastal waters, as referred to in note (2), are defined to be Queensland waters to the limit of HAT.

It is acknowledged that the MPA occurs upstream of the tidally influenced Trinity Inlet, which is identified as supporting:

• Key Coastal Locality 10.1 (Trinity);
• estuarine wetlands which are identified as Significant Coastal Wetlands pursuant to the WTC RCMP and SCMP;
• vegetated dune systems which are identified as Significant Coastal Dune Systems pursuant to the WTC RCMP and SCMP;
• area of High scenic landscape quality pursuant to the WTC RCMP; and
• an area of the Great Barrier Reef Coast Marine Park identified as an “Estuarine Conservation Zone” and which is protected under the Marine Parks Act 2004.

LAND USE CONSTRAINTS AND OPPORTUNITIES

The SCMP seeks the following coastal management outcomes.

The coast is managed to allow for natural fluctuations to occur, including any that occur as a result of climate change and sea level rise, and provide protection for life and property.
This outcome is achieved through the adoption of the following Principles which relate to Physical Coastal Processes.

**2A** Trends in climate change including sea level rise, more extensive storm tide flooding and associated potential impacts are taken into account in planning processes.

**2B** Erosion prone areas which exist on open coasts and along tidal waterways are secured and maintained largely free from development.

**2C** The consequences of physical coastal processes are recognised and such processes generally are allowed to occur naturally.

**2D** Risks associated with all relevant hazards including storm tide inundation and cyclone effects are minimised.

**2E** The natural topography and physical features of coastal dune systems which provide adjacent areas with protection from inland erosion are to be protected and managed on an ecologically sustainable basis.

A number of policies are outlined within the *SCMP* which support the above listed principles in addition to the coastal management outcome.

Policies 2.4 (water quality), 2.4.4 (stormwater management), 2.1.2 (settlement pattern and design) and 2.2.2 (erosion prone areas) of the *SCMP* are of most relevance to the MPA and variously require that proposed development protects environmental values and maintains erosion prone areas and achieves water quality objectives of coastal waters, including:

- to the extent practicable, ensuring erosion prone areas remain undeveloped apart from acceptable temporary or relocatable structures for safety and recreational purposes;
- avoiding or minimising wastewater release to receiving waters;
- incorporating water sensitive urban design principles into development; and
- using best practice urban stormwater quality and quantity management.

In addition to the above, development of the MPA should also give consideration to and avoid adversely affecting the achievement of the Desired Coastal Outcomes (DEOs) for the downstream Key Coastal Locality 10.1 (Trinity). These DEOs, as specified in the *WTC RCMP*, include the following.

- The high natural values and biological productivity of the wetlands, including associated close forest communities, are maintained to ensure the long-term sustainability of the inlet and its coastal resources.
- The mangroves, estuarine crocodiles and migratory birds associated with the inlet are conserved.
- Urban and rural land uses (including agricultural drains) and vessel discharges of waster and bilge water are managed to minimise impacts on water quality.

In this respect, the Structure Plan is to make appropriate provisions for the achievement of the coastal management outcome, principles and policies sought by the *SCMP* and give sufficient and due regard to the DEOs for the downstream Key Coastal Locality.

The Structure Plan is to protect coastal values and resources and achieve water quality objectives of coastal waters.
With respect to the above, it is recommended that development be excluded from the CMD and Erosion Prone Area unless it can be effectively demonstrated that:

- the development is for essential community infrastructure; and
- no suitable alternative location or site exists for this infrastructure; and
- the establishment of the development would achieve compliance with the coastal management outcome, principles and policies of the SCMP and would not adversely affect the DEOs for the downstream Key Coastal Locality 10.1 (Trinity).

### 3.16 WORLD HERITAGE AREA

The MPA adjoins the Wet Tropics World Heritage Area (WTWHA). As such, patterns of land use and development within the MPA must comply with the following regulations:

- The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, which provides a legal framework for the protection of matters of National Environmental Significance (matters of NES), including WHAs.

### RECOGNISED VALUES

As illustrated on Figure 7, the majority of the MPA’s western and southern borders adjoin the WTWHA. At the time it was listed in 1998 as a natural property, the WTWHA met all four World Heritage (WH) criteria. These four criteria were as follows.

1. Outstanding examples representing the major stages of the earth’s evolutionary history.
2. Outstanding examples representing significant ongoing geological processes, biological evolution and man’s interaction with his natural environment.
3. Superlative natural phenomena, formations or features or areas of exceptional natural beauty.
4. The most important and significant natural habitats where threatened species of plants and animals of outstanding universal value from the point of view of science and conservation still survive.

It is important to recognise that the WH values do not extend only to the mapped extent of the WTWHA. Values analogous to those protected within the WTWHA are well represented throughout the natural sections of the MPA (i.e. the intact rainforest and wet sclerophyll forest occurring on the hillslopes of the Isley Hills).

The WH values of highest prominence within the MPA include those protected by the *EPBC Act*, described herein in Section 3.6.1.
LAND USE CONSTRAINTS AND OPPORTUNITIES

Patterns of land use and development within the MPA have the potential to adversely impact upon the WH values of the WTWHA. As such the Structure Plan should make provisions to ensure that the values of the WTWHA are not adversely affected by patterns of land use and development within the MPA.

To mitigate the pressures that the development of the MPA may place upon the values of the WTWHA, a buffer between the boundary of the WTWHA and development in the order of 100m width should be incorporated into the Structure Plan. The indicative location of a 100m buffer to the WTWHA is illustrated in Figure 7.

The WTWHA is listed for its superlative scenic landscapes. As such, development within the adjacent MPA should not impact on this recognised value. The MPA’s scenic landscape values are outlined in Section 3.1.1 and 3.1.2 herein.
4 ISSUES

The Land Use Constraints and Opportunities outlined in Section 3 of this report have been reviewed by CRC, relevant State agencies and relevant stakeholders that have an interest in the future development of the MPA. The majority of constraints herein have, with some minor exceptions, been generally recognised as being relevant, reasonable and consistent with relevant Commonwealth, State and Local government legislative requirements.

Two issues, which have the potential to affect finalisation of the development area, were identified during the preparation of this report. These issues relate to:

- defining the limits of watercourses pursuant to the Water Act 2000; and
- the provision of a buffer to the Trinity Inlet Declared Fish Habitat Area that will permit landward migration of tidal wetlands associated with sea level rise.

4.1 LIMITS OF WATERCOURSES PURSUANT TO THE WATER ACT 2000

Since issue of initial version of this report, agreement has been reached with the former Department of Natural Resources and Water (now Department of Environment and Resource Management) in respect of the limits of watercourses pursuant to the Water Act 2000 and their required setbacks within the MPA.

Figure 5 illustrates the extent of “waterway envelopes” within the MPA. These envelopes incorporate the high banks of watercourses recognised under the Water Act 2000 along with setbacks of approximately 25 metres (all watercourses within the MPA have a stream order of either 1, 2, 3, or 4).

The waterway envelopes represent areas of high constraint wherein development is excluded unless it can be demonstrated to be essential community infrastructure that cannot be built or located elsewhere (i.e. roadway crossings etc.). There are restrictions as to the type of land uses that can occur within a waterway’s high bank setback area. These are outlined as follows.

- Land uses that are intended for conservation, waterway related passive outdoor recreation and required community infrastructure.
- The term “passive outdoor recreation” excludes motorised activities, organised racing (e.g. cars, motorcycles, horses, dogs), showground, theme park, pony club and commercial sports grounds. Playgrounds and informal playing fields related to the public's enjoyment of the waterway may be permitted within the setback if it can be effectively demonstrated that the natural waterway function is protected, maintained and enhanced, including amenity, ecological and hydrological function and water quality.
- Required community infrastructure includes necessary community services (such as telecommunications, power and water supply) and desirable community infrastructure (such as bridges, pathways and cycleways) that are required by State or Local Government for greenfield developments and only where they cannot be feasibly located outside the waterway setback area.
- Stormwater control devices can be included in the setback areas provided that they are located in a manner that does not adversely impact upon other existing or identified environmental constraints.
There exist a number of watercourses (or parts thereof) recognised pursuant to the Water Act 2000 for which information on the limits of waterway envelope have not been provided by DERM (refer Figure 5). Confirmation needs to be provided by DERM, and accepted by CRC, in relation to the limits of these waterway envelopes so that limits of the urban footprint can be appropriately finalised in these locations.

4.2 DECLARED FISH HABITAT AREAS

Communications with QPI&F during the MPMP process identified some concerns that the agency holds in relation to:

- ensuring buffering provisions adjacent to the FHA are sufficient such that the buffer will permit an anticipated sea level rise of at least 1m and the associated landward migration of tidal wetlands and marine vegetation and still enable adequate and appropriate protection of fisheries habitat values; and
- the creation of steep banks during the filling of low-lying land which have the potential to wash away into adjacent FHA during flooding events; and
- the creation of bund/revetment walls during the filling of low-lying land which may not permit landward migration of tidal wetlands and marine vegetation.

QPI&F It is recognised that the extent of the buffering to the FHA and other areas of tidal influence within the MPA needs to be determined and agreed upon by DIP, CRC and QPI&F to enable progress and finalisation of the development area.

Following the Enquiry By Design (“EBD”) workshop in February 2009, agreement was reached with the QPI&F in relation to the above issues through provision of the following recommendations.

1. The fisheries productivity values and functions of the locality, particularly those of the Trinity Inlet Fish Habitat Area are to be protected.
2. Open space buffers of at least 100m are to be established between urban development and tidal lands associated with the Declared Fish Habitat Area consistent with the recommendations provided in the Queensland Primary Industries and Fisheries’ *Fisheries Guidelines for Fish Habitat Buffer Zones* (FHG 003).
3. Buffers to the Declared Fish Habitat Area are to be revegetated. Plant species utilised in such revegetation works can be negotiated with Council according to buffer needs.
4. Development proposed within the Declared Fish Habitat Area (“FHA”) will be consistent with the types of "acceptable development" detailed within the Queensland Primary Industries and Fisheries’ *Fish Habitat Management Operational Policy FHMOP 002 Management of Declared Fish Habitat Areas: Departmental Policy Position*. In addition to the above, specific development must be consistent with the following.
   a. **Boardwalks.** Boardwalks may only be for research, education or monitoring, must be publicly owned, and any impacts minimised and outweighed by the educational benefits. Evidence must be provided that the establishment of any boardwalk will not impact on flood hydrology.
   b. **Bridges.** The abutments for bridges across the Declared FHA must be located outside of the declared FHA and the footprint of the bridge must
be minimised (e.g. piles only) within the declared FHA. Stormwater runoff must be directed outside of the declared FHA for treatment.

c. **Water impoundment structures.** No instream structures for water retention are to be established within the declared FHA.

d. **Industrial water inlet and outlet structures.** Any such structures proposed within the declared FHA must:
   i. be pipeline structures (preferably buried);
   ii. ensure that conveyed volumes of water will have a minimal impact on natural hydrology of the declared FHA;
   iii. ensure that outlet water quality will meet the Department of Environment and Resource Management’s requirements; and
   iv. demonstrate that alternative options are impractical.

e. **Stormwater outlets.** Any such structures proposed within the declared FHA must:
   i. demonstrate that storage and re-use is impractical;
   ii. incorporate current best practice water quality treatment;
   iii. demonstrate that the upstream drainage system (outside the declared FHA) incorporates adequate measures to reduce water velocities and discharge volumes; and
   iv. be located, designed and erected to minimise all adverse environmental, impacts on the declared FHA and community use of the area.

f. **Revetments, groynes and gabions.** Proposals to establish of these structures within the declared FHA must be supported by an effective demonstration that there is a threat (posed by erosion of the existing banks of waterways) to existing infrastructure and that this infrastructure cannot be relocated. Any proposed erosion protection works must minimise impacts on the declared FHA values and community use of the area.

5. Disturbance to marine plants will be avoided.
### 5 DISCUSSION

The environmental land use opportunities and constraints analysis provided in this report have been compiled to produce an Environmental Constraints plan which is presented in Figure 8. In this respect, the MPA has been classified into three “Development Constraint” categories. Descriptions for each category are provided in Table 6.

**Table 6. Summary of ecological constraints and opportunities identified within the site**

<table>
<thead>
<tr>
<th>Constraint Category</th>
<th>Recognised Values</th>
<th>Relevant Section of Report in which Constraint is Addressed</th>
<th>Approximate Area of MPA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
<td>Steep Land &gt; 17% slope and areas of geological instability</td>
<td>3.1</td>
<td>1645 ha</td>
</tr>
<tr>
<td></td>
<td>High and Medium Bushfire Hazard Management Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waterway Envelopes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remnant vegetation</td>
<td>3.4 &amp; 3.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>KRAs 13 and 40 and associated separation areas</td>
<td>3.5 &amp; 3.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trinity Inlet Declared Fish Habitat Area and associated 100m buffer</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coastal Management District and Erosion Prone Areas</td>
<td>3.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100m buffer to World Heritage Area</td>
<td>3.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.16</td>
<td></td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>30m setback to High and Medium Bushfire Hazard Management Areas</td>
<td>3.2</td>
<td>162 ha</td>
</tr>
<tr>
<td></td>
<td>Minor waterways (not recognised by DERM)</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100m buffer along designated KRA transport route</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Existing primary industry operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Areas that support notifiable activities as recorded on the DERM’s EMR</td>
<td>3.14</td>
<td></td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Balance Areas</td>
<td>-</td>
<td>1523 ha</td>
</tr>
</tbody>
</table>

---

**Note:** The Approximate Area of MPA is calculated based on the recognized values and relevant sections of the report.
6 SUMMARY RECOMMENDATIONS

6.1 SUMMARY

With the exception of those land uses outlined in Sections 3.1.2 to 3.16.2 (and summarised in Section 6.2 below), urban development should be excluded from areas identified in Figure 8 as having a "High" Development Constraint. These have been shown in Map 01 Mount Peter Structure Plan Area – Natural Environment.

Land uses consistent with the recommendations outlined in Sections 3.1.2 to 3.16.2 (and summarised in Section 6.2 below) are to be located in areas identified in Figure 8 as having a “Moderate” Development Constraint.

The potential for the anticipated sea level rise within the MPA to affect land within and outside of the proposed 100m buffer to the Declared FHA needs to be investigated as part of the Master Planning stage or stages associated with the development of the MPA. This, at a minimum, will require:

- a review of relevant literature (including previous technical studies) and review of adequacy of coastal modelling completed to date;
- where applicable and if necessary, incorporation of information pertaining to sea level rise into modelling completed for the MPA by an appropriately experienced member of the MPMP Group;
- consideration of modelling results and determination of whether the recommended 100m buffer to the Declared FHA is sufficient to accommodate landward migration of tidal influence;
- communications with QPI&F; and
- if required, amendment of development area layout.

The costs associated with the above actions would be dependent upon the existence and availability of relevant studies into sea level rises within the CRC area and would be provided following a review of same.

6.2 ASSUMPTION RECOMMENDATIONS FOR THE STRUCTURE PLAN

Steep Land & Geological Stability

The Structure Plan will make appropriate provisions to ensure development gives due regard to:

- geological stability;
- erosion potential;
- visual prominence, amenity and landscape character;
- land gradient, with particular emphasis placed on land at or above slopes of 1:4 (25%) and 1:6 (17%).

The visual prominence, amenity and landscape character of the MPA is largely associated with its hillslopes, the majority of which support remnant vegetation and which have been largely protected from environmental disturbances associated with rural land uses within the MPA.
In order to avoid areas that have a medium to high likelihood of geological instability, limit the potential of erosion of steep slopes and to preserve the MPA’s existing prominent landscape character and visual amenity values, urban development will not occur on slopes greater than 1:6 and upwards, including ridgelines unless it can be demonstrated that there is an overriding need for such development and that it is for essential community service infrastructure.

**Bushfire**

The safety of people and property are maintained by making appropriate provisions for development to:

1. avoid areas of High or Medium bushfire hazard; or
2. mitigating the risk through:
   
   v. allotment design and the positioning of buildings; and
   vi. including firebreaks that provide adequate:
      
      • setbacks between buildings/structures and hazardous vegetation, and
      • access for fire-fighting/other emergency vehicles;
   vii. providing adequate road access for fire-fighting/other emergency vehicles and safe evacuation; and
   viii. providing an adequate and accessible water supply for fire fighting purposes.

The State Planning Policy 1/03 Guideline – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (SPP 1/03 Guideline) identifies the following areas as constituting a Natural Hazard Management Area (Bushfire):

- land that has been identified as having either a Medium or High hazard rating;
- a safety buffer that encompasses land within 50 metres of an area with a Medium (or within 100m of a High) bushfire hazard rating in recognition of the affect bushfires can have on adjacent unvegetated land due to winds fanning flames, smoke, embers and radiant heat.

The proposed development of the MPA for urban purposes will increase the number of people living and working in or adjacent to areas which attract a ‘High’ or ‘Medium’ bushfire hazard rating pursuant to SPP 1/03. It is noted that the SPP 1/03 Guideline stipulates that a Bushfire Management Plan (BMP) must be prepared for development that is proposed within a High severity bushfire hazard area, or that involves hazardous materials manufactured or stored in bulk in a High or Medium severity bushfire hazard area. A BMP may also be required for certain types of community infrastructure in either a High or Medium severity bushfire hazard area.

Bushfire Management Plans should be prepared in support of any development applications submitted to CRC for land that either supports land that has a medium or high bushfire hazard management area or which occurs within a safety buffer.

Development should, generally, be setback from existing remnant vegetation within the MPA that is identified as having a medium or high bushfire hazard potential at a distance of 30m (i.e. 1.5 times the height of the tallest vegetation, identified as 20m by DERM in the Queensland Department of Infrastructure and Planning (5 September 2008) Preliminary State Agency Position Paper - Mount
Peter Master Planned Area - Planning Studies, Assumptions, Targets, Constraints and State Interests. Version 3) to permit the establishment of a firebreak. It is recognised that detailed and site specific bushfire hazard analyses prepared in support of development applications for individual parcels of land within the MPA may present evidence to support a reduction in firebreak width.

Reserves

The reserve that exists within the MPA (i.e. Lot 8 on NR7681) is wholly contained within the waterway envelope associated with Wrights Creek. Any landuses proposed within this reserve will need to be consistent with those permitted within waterway envelopes (i.e. required community infrastructure). It is recommended that this reserve ultimately be incorporated into the reserve system that will be associated with the Wrights Creek waterway envelope.

Waterways and Riparian Corridors

Development within waterway envelopes is avoided unless it can be demonstrated as constituting essential community infrastructure.

Water quality devices within overland flow paths are to be in-line, to ensure major creek lines have minimal impacts.

No pipelines or other below ground infrastructure are to be located within the waterway envelopes where it would result in the clearance of riparian vegetation. Belowground infrastructure should instead be located in flood plain areas or constructed swales. Where there exists the need for such infrastructure to cross a waterway envelope, this infrastructure should be aligned with other infrastructure (e.g. a proposed bridge) to minimise disturbance of the waterway environment.

Significant Wildlife Species

Areas that provide known and likely habitat resources for significant wildlife species are appropriately protected from the impacts of adjacent urban land uses. These areas include:

- the Wet Tropics World Heritage Area;
- the Trinity Inlet Declared Fish Habitat Area including Blackfellows Creek up to 20m downstream of the Bruce highway and Wrights Creek up to 20m downstream of the bridge on Page Road;
- areas identified as Essential Habitat on the Certified RE Map;
- areas of remnant vegetation;
- waterways, waterbodies and areas which support native vegetation communities and which provide significant wildlife linkages/ecological corridors between core habitat patches; and
- areas in which significant wildlife species have been previously recorded (e.g. riparian vegetation on Sandy Creek and Blackfellow's Creek, the ridges of Isley Hills, riparian rainforest communities associated with Sandy Creek, Grey Creek, Stony Creek and Wrights Creek).

Efforts should be made to actively rehabilitate (i.e. through removal of weed species and planting out of suitable native and endemic flora) those waterway corridors which currently support non-remnant vegetation or are otherwise heavily disturbed. The rehabilitation of these corridors has the potential to enhance and increase native and threatened wildlife movement opportunities and habitat availability within the MPA.
The *Keeping, Control and Impounding of Animals Local Law 2003* is amended such that it requires the registration of domestic cats, restricts domestic cat ownership to one per dwelling and requires domestic cat owners to keep their cats indoors.

### Extractive Industry

Existing extractive industry operations will remain within the MPA, namely Key Resource Areas KRA 13 and KRA 40. These areas form part of the extractive resource precinct.

Buffers (i.e. separation areas) consistent with the requirements of SPP 2/07 to KRA 13 and KRA 40 will be maintained between sensitive development and the current/future anticipated boundary of the extractive operations to mitigate the potential for nuisance to be caused by noise and vibration.

The planning designation of land within the KRA buffer areas is to remain as Rural until the KRAs are extinguished.

Appropriate buffers need to be established between a transport route’s road or rail reserve boundary and future urban uses. The applicability of a 100m development buffer to the transport route from KRA 13 and KRA 40 needs to be determined through appropriate noise, dust and odour investigations undertaken as part of the Master Planning stage for the MPA.

### Aquaculture & Poultry

An existing poultry farm located within Mount Peter MPA on 3 on SP134760 will not remain under the structure plan.

An existing aquaculture facility located within Mount Peter MPA on Lot 11 on SP173568, is unlikely to remain as a desired use for this area.

In the interim, buffers will need to be maintained between urban development and existing aquaculture/poultry facilities to mitigate the potential for nuisance to be caused by noise and odour emission from the aquaculture facility. An interim strategy is to be developed as part of the Master Planning stage for the MPA to manage development adjacent to the aquaculture/poultry facility prior to these facilities being removed from the MPA.

### Acid Sulfate Soils

The development of land located below the 5m AHD contour has the potential to result in disturbance to ASS.

Development of land located below the 20m AHD contour will be carried out in accordance with the requirements of *State Planning Policy 2/02 - Planning and Managing Acid Sulfate Soils* (SPP 2/02).

### Pest Species

Adequate vegetated buffers are maintained between existing agriculture and future urban development.

Development applications within the MPA should be accompanied by relevant documentation that identifies the type and extent of pest species that occur within the properties proposed for development. Any subsequent Operational Works applications submitted for such developments are to be accompanied by a Pest Management Plan (or similar document) which outlines reasonable and
achievable management strategies to control the spread and, where practicable, reduce the extent of pest species within the relevant properties.

Applications for landscaping works within the MPA that contain recognised pest plant species (weeds) will not be approved by Council.

Urban development within the MPA is to be designed such that legitimate pest management practices on adjacent agricultural/rural land are not restricted

Air Quality
The dominant existing air impurity emissions in and adjacent to the MPA include:

1. bus and truck emissions and noise;
2. dust emissions from extractive industry operations;
3. odour, dust, smoke and spray drift from agricultural, aquaculture, and poultry operations;
4. vehicle exhaust emissions from road traffic on the Bruce Highway.

A 10m wide buffer will be established between urban land uses and the Bruce Highway.

An interim strategy is to be developed as part of the Master Planning stage for the MPA to manage development adjacent to the aquaculture/poultry facility prior to these facilities being removed from the MPA.

Acoustic Environment
Guidelines for acoustic considerations will need to be reviewed as part of the Master Planning stage for the MPA in light of the urban approach to development and its inevitable impact on amenity.

Mixed use developments are to determine appropriate mix of uses and or management to ensure a quality of liveability is achieved.

Fish Habitat Areas, Marine Plants and Waterway Barriers
Where required, buffers to the Declared Fish Habitat Area are to be revegetated.

Disturbance to marine plants will be avoided.

Water sensitive urban design and best practice stormwater management will be implemented to avoid offsite impacts to fisheries and fish habitat values.

Structures proposed within or across a waterway will be located and designed to ensure:
- that fish passage is adequately provided for; and
- alterations to existing flow velocities and/or patterns are minimised.

Contaminated Land
Should alternative development be proposed for sites listed on the Environmental Management Register or the Contaminated Land Register a Human Health and Ecological Risk Assessment would be undertaken in support of individual development applications within the MPA to assess contamination levels, exposure risk and remediation requirements.
Sugar cane farming has the potential to result in land contamination via the use of organochlorine and organophosphate pesticides

**Coastal Areas**

The Structure Plan is to make appropriate provisions for the achievement of the coastal management outcomes, principles and policies sought by the *State Coastal Management Plan (SCMP)* and give sufficient and due regard to the Desired Environmental Outcomes (DEO) for the downstream Key Coastal Locality (namely Trinity Inlet).

Development is to be excluded from the Coastal Management District and the Erosion Prone Area unless it can be effectively demonstrated that:

- the development is for essential community infrastructure; and
- no suitable alternative location or site exists for this infrastructure; and
- the establishment of the development would achieve compliance with the coastal management outcomes, principles and policies of the *SCMP* and would not adversely affect the DEOs for the downstream Key Coastal Locality 10.1 (Trinity).

**World Heritage Area**

If there is any real chance or possibility that the Structure Plan will have a significant adverse impact on the Wet Tropics World Heritage Area, then the Structure Plan must be referred to the Commonwealth Minister for the Environment.

The Wet Tropics Management Authority is to be consulted in respect of the potential impact of the Structure Plan on the WHA.

**Matters of National Environmental Significance (NES)**

Matters of National Environmental Significance (NES) are to be investigated as part of the flora and fauna survey works and strategic assessment (by others); in parallel to the State Approval process of the Structure Plan.
FIGURES

Figure 1 – Mount Peter Master Planning Area
Figure 2 – Slope Analysis
Figure 3 – Steep Land and Geological Stability Constraints
Figure 4 – Bushfire Hazard Analysis and Required Bushfire Safety Buffers
Figure 5 – Watercourse Stream Order and Development Setbacks
Figure 6 – Extract from Certified Regional Ecosystem Map
Figure 7 – Extractive Industry and Land Identified on Environmental Management Register
Figure 8 – Environmental Constraints Plan
Extract of Cairns Plan 2005’s *Rural Lands District Plan – Vegetation Conservation/ Waterway Significance* Map
Extract of Moratorium Map for the MPA pursuant to the Vegetation Management (Regrowth Clearing Moratorium) Act 2009.
Extract of Distribution Map produced by the DEWHA and entitled *Mabi Forest (Complex Notophyll Vine Forest 5b) Threatened Ecological Community.*
Appendix 2 of State Planning Policy 1/92: Separating Agricultural and Residential Land Uses

APPENDIX 2: Vegetated buffer element design

While buffer areas of 300 m width are recommended for forward planning between residential and agricultural areas, 'vegetated buffers' can offer an alternative to this separation requirement. Research into the behaviour of pesticide spray drift has shown that vegetation screens can prove effective barriers to spray drift where they meet the following criteria:

- are of a minimum total width of 40 m;
- contain random plantings of a variety of tree and shrub species of differing growth habits, at spacings of 4-5 m for a minimum width of 20 m;
- include species with long, thin and rough foliage which facilitates the more efficient capture of spray droplets;
- provide a permeable barrier which allows air to pass through the buffer. A porosity of 0.5 is acceptable (approximately 50% of the screens should be air space);
- foliage is from the base to the crown;
- include species which are fast growing and hardy;
- have a mature tree height 1.5 times the spray release height or target vegetation height, whichever is higher;
- have mature height and width dimensions which do not detrimentally impact upon adjacent cropped land;
- include an area of at least 10 m clear of vegetation or other flammable material to either side of the vegetated area;

Vegetated buffers have other advantages in that they:

- create habitat and corridors for wildlife;
- increase the biological diversity of an area, thus assisting in pest control;
- favourably influence the microclimate;
- are aesthetically pleasing;
- provide opportunities for recreational uses;
- contribute to the reduction of noise and dust impacts.

Applications for development, where vegetated buffers are proposed, should include a landscape plan indicating the extent of the buffer, the location and spacing of proposed and existing trees and shrubs and a list of tree and shrub species to be planted. The application should also contain details concerning proposed ownership of the vegetated buffer and the means by which the buffer is to be maintained. Information on appropriate vegetation species is available in the publication Trees and Shrubs or from DNR forestry extension officers.

Based on research by Centre of Pesticide Application and Safety, University of Queensland, Gatton College.

Figure 6. Vegetated buffer element
APPENDIX B

INVESTIGATION OF MABI FOREST IN MOUNT PETER AREA – A REPORT PREPARED BY THE DEPARTMENT OF ENVIRONMENT AND RESOURCE MANAGEMENT
Investigation of Mabi Forest in Mount Peter Area

Dr Bruce Wannan
Department of Environment & Resource Management
83 Main Street Atherton, Qld
PO Box 975 Atherton, Qld, 4883

Introduction

As part of the Mount Peter Master Planning process an investigation was made of two areas within the study area identified by the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) as Mabi Forest which is listed as critically endangered under the EPBC Act.

The two areas recognised by DEWHA are based on vegetation mapping by Kemp (2002: Survey and mapping of regional ecosystems of the Wet Tropics Version 3.1 Interim, Queensland Herbarium, Environmental Protection Agency). The two areas occur close to the boundary of the study area with the Wet Tropics World Heritage Area (see Figure 1 below).

Figure 1 – Commonwealth DEWHA map of Mabi Forest

These two sites were inspected by Rob Jago and Bruce Wannan on 24 April 2009 where notes on structure and floristics were made including CORVEG proforma vegetation data sheets for the Queensland Herbarium.
Results

The two areas of Mabi forest investigated are shown below on Figure 2.

**Figure 2: Location of vegetation study sites**

- **Site 1 - Sandy Creek site (WP 16)**
- **Site 2 - Unnamed Creek site (WP 25)**
- **Site 3 - Vegetation incorrectly mapped as non-remnant**

**Site 1 - Sandy Creek**

This site was reached on foot along the creek and was in the flat alluvial soil of the creek between two channels. It was evident that this vegetation community extended further west along the creek than is currently mapped. The vegetation was in generally good condition with few weeds or exotic species (Figure 3). Over 60 species were recorded at this site including the rare plants *Pseudowintera nitida* and *Gastrolobium gmelinii.*

**Figure 3: Sandy Creek**
Site 2 - Unnamed Creek

This site was quite restricted in area; the mapped polygon includes non-alluvial areas. At least 30% of the alluvial portion of this polygon was in poor condition due to past disturbance now vegetated by exotic grasses (*Panicum maximum, *Pennisetum purpureum – see photo below)). The extent of remnant alluvial Regional Ecosystem in the polygon is likely to be approximately 50% of its mapped area. Only 26 species were recorded at this site.

Other Areas

In addition to the sites visited in relation to the extent of Mabi Forest in the study area, a small area of disturbed/ non-remnant vegetation was inspected near Mount Peter Road and Sandy Creek. This area (Site 3 on Figure 2) is a small hill which has suffered disturbance in the past. A brief inspection of the site suggests that at least 50% of the vegetation of this site should be mapped as remnant regional ecosystem. This site consisted of woodland on metasediments (nearly closed forest) – Tree 1(20-25): *Corymbia tessellaris, Eucalyptus tereticornis*. Tree 2(15): *Lophostemon suaveolens, Acacia mangium*. T3(4-6): *L. tiliacea, Sclerocarya birrea, Myrtus ferrugineus, Glychidion philippicum, Ficus opposita*. Shrubs: *Alphitonia incana, Jagera pseudorhizus, Mallotus philippensis*. Grd: sparse *Dianella*.

Additionally, a brief assessment of riparian vegetation in the vicinity of sites 1 and 2 suggests that its designation as Regional Ecosystem 7.3.40 (*Eucalyptus tereticornis* forest red gum) open-forest. Well-drained alluvial plains of lowland) is not accurate. There appears to be an alluvial vine forest component in the base of the creek and a non-alluvial forest component dominated by *Corymbia tessellaris* and *Eucalyptus tereticornis* above on the much higher creek banks. Further investigation of these would be required to match them with an existing regional ecosystem.

Discussion

The table below shows a floristic comparison of the two Mount Peter Mabi sites with an alluvial Tablelands Mabi site (Barron 2) and an overall Mabi floristic description (McKenna et al. in prep.). The table below indicates the occurrence of species in each structural layer (T1 to Shrub layers) with species occurrence identified as dominant (D) or present (+); absence indicates that the species does not occur.
The table shows that:

- Due to the disturbed nature of Site 2 (Unnamed Creek) approximately half the number of plant species was recorded compared with Site 1 (Sandy Creek).
- Of the 8 species dominant in either the T1 or T2 at Sandy Creek, two (Alstonia scholaris, Semecarpus australensiis) occur as T1/T2 dominants and two (Aleurites rockinghamensis, Syzygium tierneyanum) occur as T1/T2 subdominants at Unnamed Creek. Overall there is five T1/T2 species shared between the sites.
- Of the 8 species dominant in either the T1 or T2 at Sandy Creek none occur at the Tablelands alluvial Mabi site (Barron 2). Indeed, of the 5 species dominant in either the T1 or T2 that occur at the Barron 2 site none occur in the T1/T2 at Sandy Creek.
- Similarly there is only one species (Aleurites rockinghamensis) which occurs in Sandy Creek T1/T2 dominants and the overall Mabi T1/T2 dominants. Of the remaining 7 dominant T1/T2 species from Sandy Creek only one (Alstonia scholaris) occurs in the overall Mabi T1/T2 as an occasional record. Of the 18 dominant T1/T2 species from Mabi only three occur as non-dominants at Sandy Creek (Melocactus polyadenos, Cryptocarya hyposperma, Castanospermum austrole). The species in common between these data sets are elevated by the multiple sites included within the overall Mabi data.
- Of the 4 species dominant in either the T1 or T2 at Unnamed Creek none occur at the Tablelands alluvial Mabi site (Barron 2). Indeed, of the 5 species dominant in either the T1 or T2 at Barron 2 none occur in the T1/T2 at Sandy Creek.
- Similarly, there are two species (Melocactus polyadenos, Melocactus philippensis) which occur in Unnamed Creek T1 or T2 dominants and the overall Mabi T1/T2 dominants. Of the remaining 2 dominant T1/T2 species from Unnamed Creek only one (Alstonia scholaris) occurs in the overall Mabi T1/T2 as an occasional record. Of the 18 dominant T1/T2 species from Mabi only one occurs as a non-dominant at Unnamed Creek (Aleurites rockinghamensis).

<table>
<thead>
<tr>
<th>Species</th>
<th>WP 16 – Mt Peter</th>
<th>WP 23 Mount Peter</th>
<th>Barron 2</th>
<th>Overall Mabi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree 1 Canopy (height in metres)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aleurites rockinghamensis</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Alstonia scholaris</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Maclura orientalis</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Syzygium tierneyanum</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Elaeocarpus grandis</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Syzygium sayeri</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Diplodocus diphylostegia</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Castanospermum austrole</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Argyrodendron peratum</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Melia azedarach</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Tonna ciliata</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Aphramerthe philippensis</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Bellochioides obtusifolia</td>
<td>+</td>
<td></td>
<td>+ (13)</td>
<td></td>
</tr>
<tr>
<td>Cryptocarya hyposperma</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Citrus sinensis</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Malocactus polyadenos</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Neolitsea platia</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Terminalia sanctaria</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Serringtona calpyrida</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Tree 2 Subcanopy (height in metres)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cassilanthus seminapicous</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Ganophyllum tenuifolium</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Myrtietia globosa subsp. mutelieri</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Semecarpus australiensis</td>
<td>D</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>WP 16 – Mt Peter–Sandy Clt</td>
<td>WP 23 Mount Peter</td>
<td>Barron 2</td>
<td>Overall Mabi</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------</td>
<td>-------------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>Syzygium ternaryanum</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ficus hystrix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acronycha acidula</td>
<td></td>
<td></td>
<td>+</td>
<td>D</td>
</tr>
<tr>
<td>Castanospermum australie</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimocarpus australianus</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysopyxylon arborescens</td>
<td>+</td>
<td></td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td>Malotus polyadenos</td>
<td>+</td>
<td></td>
<td>+</td>
<td>D</td>
</tr>
<tr>
<td>Neolyncia glabra</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dendremoine philippinophyla</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Malotus philippensis</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Castanospora alpandi</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Akrifya divaricata</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Anthocarpus nicolata</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Malotus polyadenos</td>
<td></td>
<td></td>
<td></td>
<td>D</td>
</tr>
<tr>
<td>Sarcocephalece simplifolia subsp. simplicifolia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aglaia asparada</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Daphnandra epandula</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Alseirites cockinghamensis</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td><strong>Tree 3 (height in metres)</strong></td>
<td>4-10</td>
<td>5-10</td>
<td>4-12</td>
<td>6-12</td>
</tr>
<tr>
<td>Pantanurus monilcola</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argyrodendron polyandrum</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Aglaia asparada</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Neolycina diaphora</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Calamus radicosa</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Fontanea picrasperma</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Gossia myrsinocarpa</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Harpulliodendron sp. (Topaz L. W Jessup 520)</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Melicope rubra</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Neosperma poweri</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Phylaria stellastriata</td>
<td>+</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Rhodanthis sessiliflora</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Tetraeysandra longipes</td>
<td></td>
<td></td>
<td>+</td>
<td>D</td>
</tr>
<tr>
<td>Malotus philippensis</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Sernocephalus australiens</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td><strong>Shrub layer (height in metres)</strong></td>
<td>2-3</td>
<td>2-4</td>
<td>2-3</td>
<td>1-4</td>
</tr>
<tr>
<td>Adiantum diaphora</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Amomum diaphyl</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Aphananthra philippinensis</td>
<td></td>
<td></td>
<td>+ &amp; T2</td>
<td>T1</td>
</tr>
<tr>
<td>Argyrodonnandry polyandrum</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Asplenium nidus</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Barringtonia papyrifera</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Bellischotria obtusifolia</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Calamus australis</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Cardioplectea moluccana</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Cordyceum voleagum</td>
<td></td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Corymborhiza ventriloba</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Cusparcrips foveolata</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Dendrocidus morales</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Diplopyros helbocarpa</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Dicogramma diaphylostegia</td>
<td></td>
<td></td>
<td>+</td>
<td>T1</td>
</tr>
<tr>
<td>Doodia media</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Dyosoxylum oppositifolium</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Elatostachys microcarpa</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Epipremnum pinnatum</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Eupomatia barbata</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Feronia splendida</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Flaggelia indica</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Harpullia frutescens</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Piper caninum</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Pouteria myrsinodendron</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Pseudovaria mulgraveana var. glabrescens</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Pycnanthera novoguineensis</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>WP 16 – Mt Peter - Sandy Cl</td>
<td>WP 23 Mount Peter</td>
<td>Barron 2</td>
<td>Overall Mabi 1</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>-------------------</td>
<td>----------</td>
<td>----------------</td>
</tr>
<tr>
<td>Rhodamnia spongiosa</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rhodomyrtus macrocarpa</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salacia dasyphylla</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetragenia nitens</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calamus radicalis</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castanospermum australe</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dendrococca moroides</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dichopodium papuanum</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hodgekinsoria frutescens</td>
<td>+ D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phalaris extensa</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sauraurops maconnatus</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alpinia caerulea</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elettrostachys microcarpa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryptocarya hypoglottida</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysoxylum grandifolium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipturus argentus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melicope rubra</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brevynia cernua</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimocarpus australianus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryptocarya tripinensis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afractocarpus fitzalanii</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinanthes ramblera</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gomophyllum falcatum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1: Data from McKenna, Jensen R. and Wannan B. In prep. Mabi Forest Survey. Report for Threatened Species Unit, Environmental Protection Agency.

The vegetation at sites 1 and 2 is mapped as 7.3.38 - Complex notophyll vine forest with emergent Agathis robusta alluvial fans. An assessment of the floristics at both sites provides little support for this designation. It is likely that the vegetation at sites 1 and 2 is more closely related to Regional Ecosystem 13.3.23 Simple-complex semi-deciduous notophyll to mesophyll vine forest on lowland alluvium, creeks and river levees which occurs on nearby streams.

**Conclusion**

A floristic and structural analysis of vegetation mapped by the Commonwealth as Mabi in the Mount Peter study area has indicated that neither site presents a match for this vegetation type. Whilst alluvial Mabi is represented by few extant sites on the Tablelands, it is clear that the Mount Peter examples are floristically unrelated to either these or to the broader Mabi forest which occurs on basalt soils.

The lack of similarity between the Tableland alluvial Mabi and the Mount Peter sites is not surprising given the different landscape context and climate of the two areas, in particular:

- Altitude – alluvial Mabi 700 m ASL compared with Mount Peter sites at 60 m ASL
- Rainfall – alluvial Mabi 1400 mm compared with Mount Peter sites at 2000 mm

The floristics of the two Mount Peter sites do not support their mapped identity as Regional Ecosystem 7.3.38 Complex notophyll vine forest with emergent Agathis robusta alluvial fans. The complete absence of the diagnostic Agathis robusta from both sites suggests that the sites may be closer to Regional Ecosystem 7.3.23 which occurs nearby. However, the paucity of floristic data for many of the Wet Tropics alluvial regional ecosystems makes a reliable match more difficult.

Brief assessments of other vegetation within the Mount Peter study area suggest that the current regional ecosystem mapping may not be accurate at a number of locations.