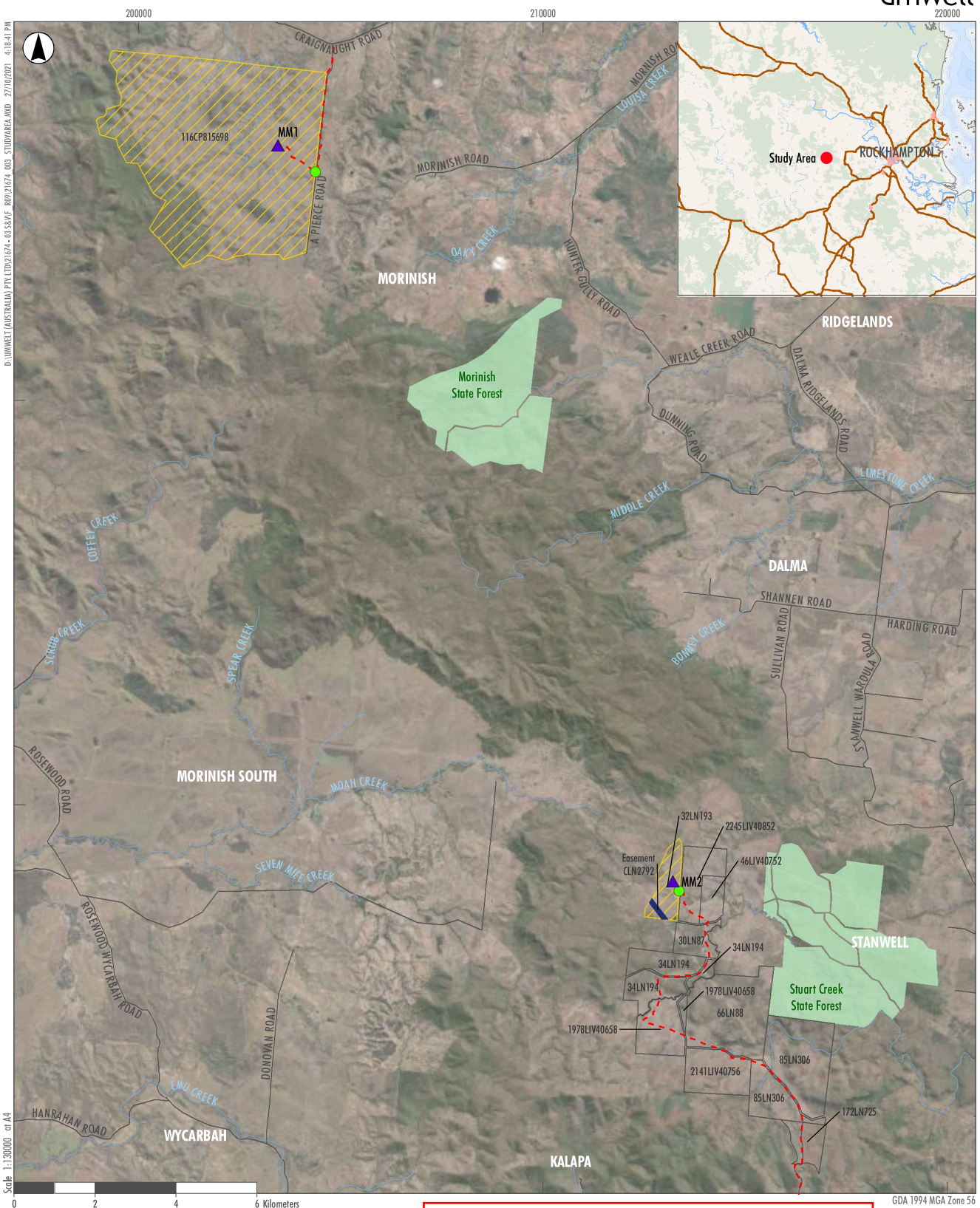


Legend

- Study Areas
- Proposed Meteorological Mast Locations
- Access Point
- Access Tracks
- Lot Boundaries
- State Forest
- Easement
- Watercourses
- Roads

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

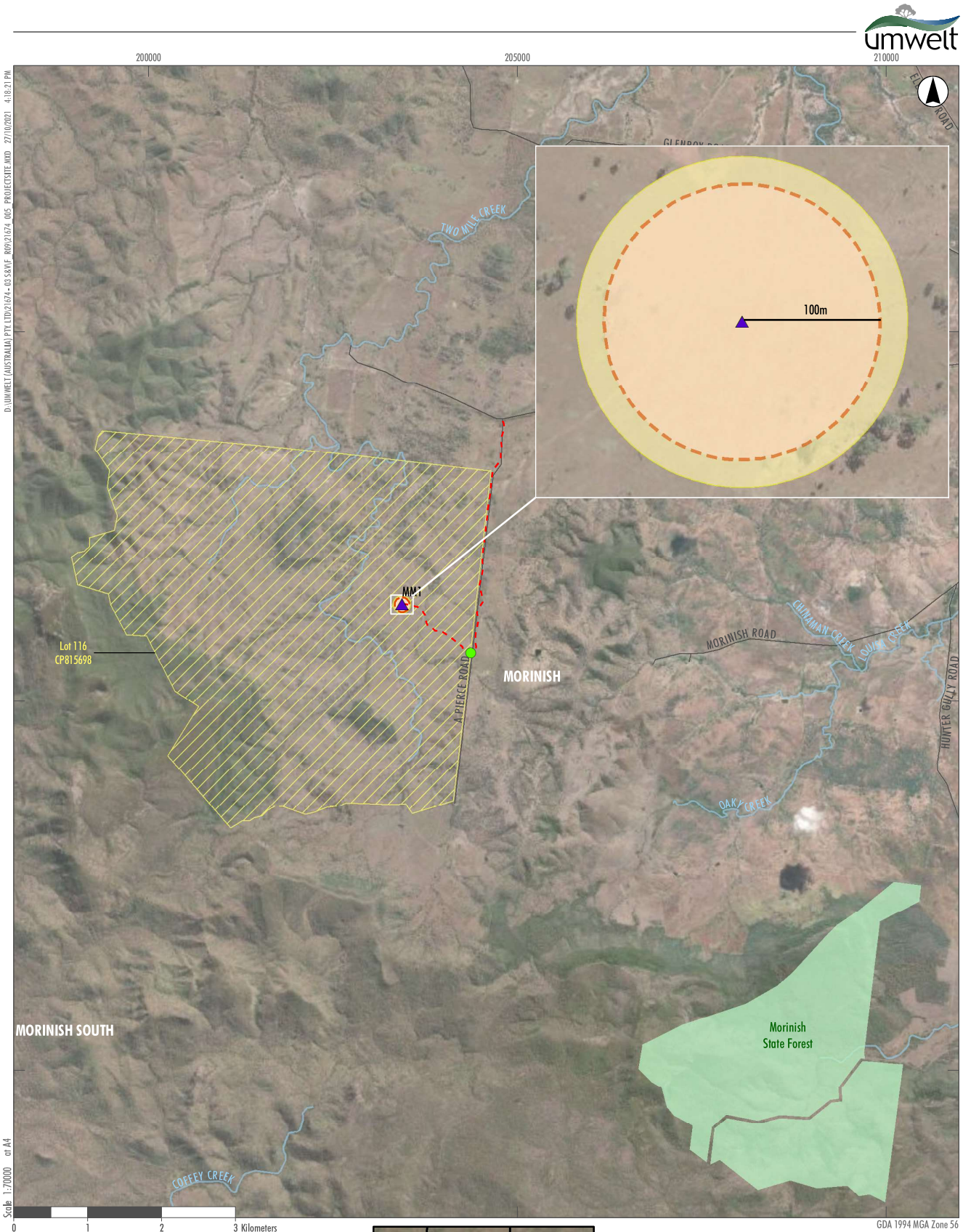
These plans are approved subject to the current conditions of approval associated with

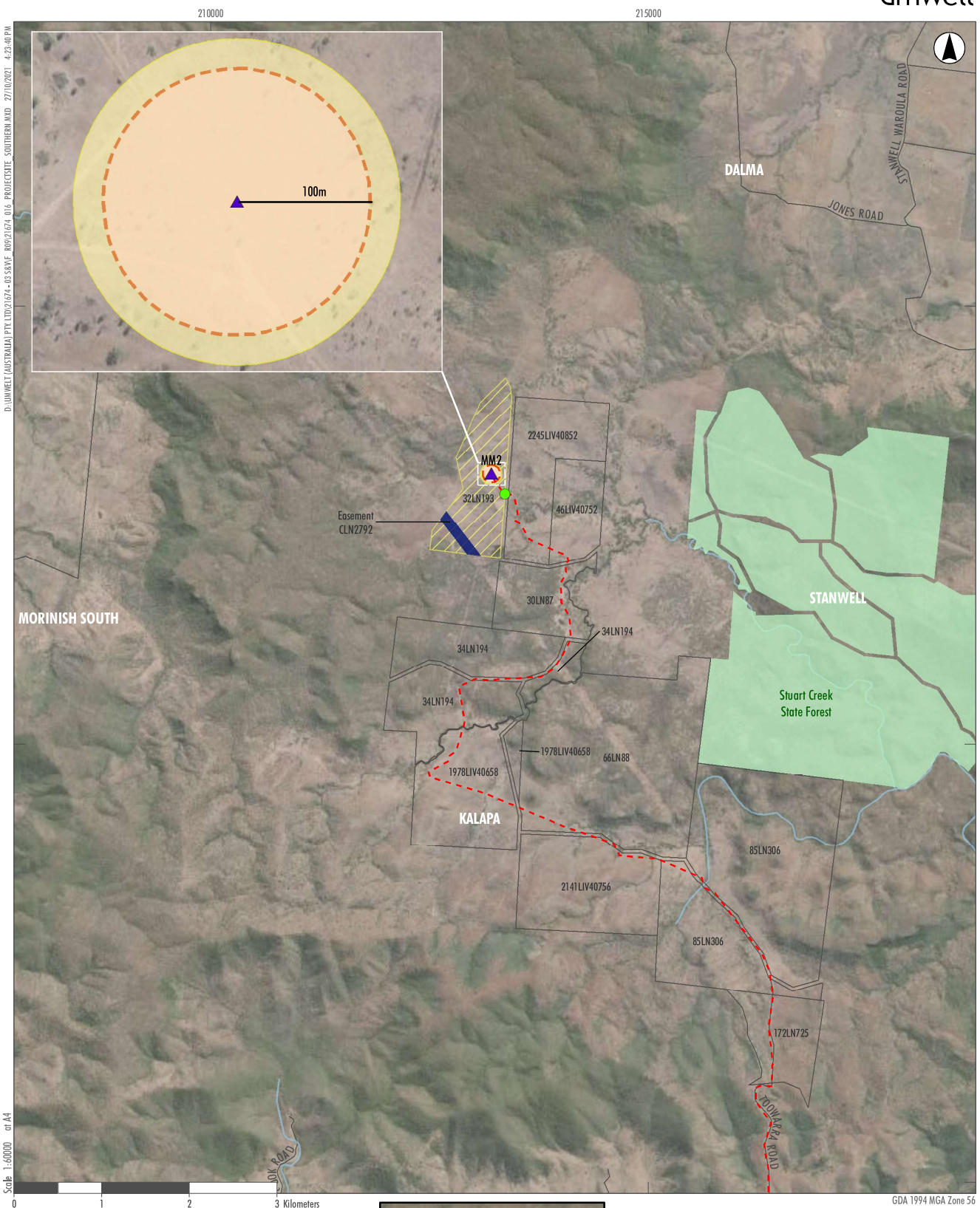
Development Permit No.: D/152-2021

Dated: 15 March 2022

Location Plan

Image Source: ESRI Imagery (2020) Data source: QSpatial (2020)





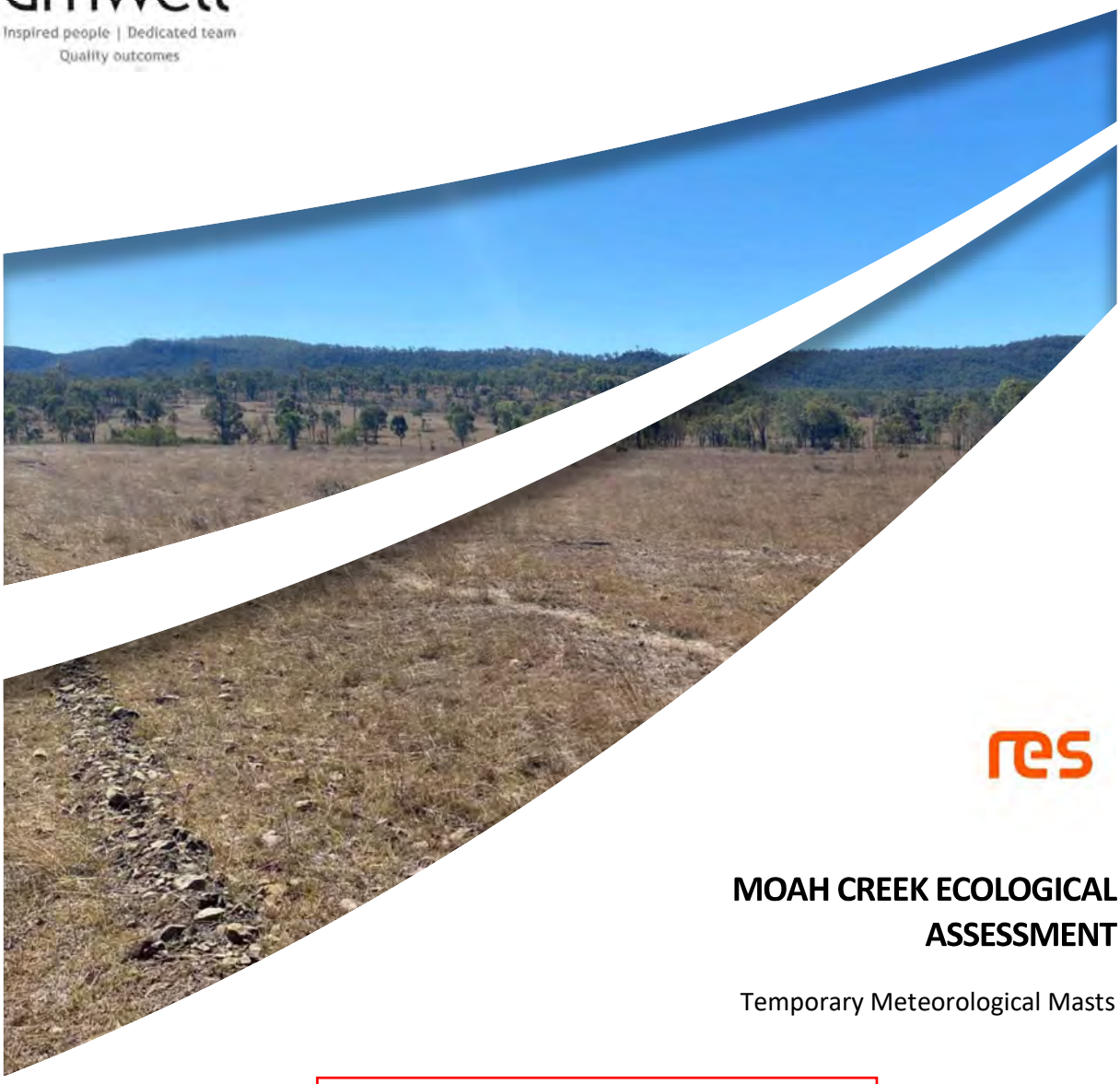
Southern Project Site
(Lot 32 LN193)

Image Source: ESRI Imagery (2020) Data source: QSpatial (2020)

umwelt

Inspired people | Dedicated team

Quality outcomes



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MOAH CREEK ECOLOGICAL ASSESSMENT

Temporary Meteorological Masts

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/152-2021

Dated: 15 March 2022

FINAL

November 2021

MOAH CREEK ECOLOGICAL ASSESSMENT

Temporary Meteorological Masts

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
RES Australia Pty Ltd

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Report No.	21674/R12
Date:	November 2021

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Final	Mandy Allonby	05/11/2021	David Gatfield	05/11/2021

Table of Contents

Figures

Photos

Tables

Appendices

1.0 Introduction

Umwelt (Australia) Pty Ltd (Umwelt) was commissioned by RES Australia Pty Ltd (RES) to provide an ecological planning assessment for the proposed development of two temporary meteorological masts (the Project), located near Rockhampton, Queensland (Qld) in the Rockhampton Regional Council Local Government Area (LGA). The development of the two temporary meteorological masts is required to obtain meteorological data that will be used to inform the design, layout and economic viability of the proposed Moah Creek Renewable Energy Project (MCREP), which will include a wind and solar farm and battery energy storage system. The temporary masts require an assessment of ecological values to support a development application (DA) for a Material Change of Use (MCU) in accordance with the *Planning Act 2016* (Planning Act).

This ecological assessment builds on previous studies and field surveys conducted between 2020 and 2021 to support the separate DA and environmental approvals for the MCREP.

1.1 Study Boundaries

The Project is located approximately 30 km northwest of Stanwell and 40 km west of Rockhampton. For the purposes of this ecological assessment, three distinct boundaries have been referred to in this report:

- **Study Areas –** The two land parcels (Lot 116 CP815698 and Lot 32 LN193) within which the two proposed meteorological masts are situated.
- **Project Sites –** The footprints of the two meteorological masts which includes a 100 metre (m) buffer around the central mast footing, and encloses ancillary infrastructure.
- **Ecology Study Area –** The broader area (which includes the two parcels that make up the Study Area) that has been the basis of ecological surveys.

1.1.1 Study Areas and Project Sites

The Study Areas are the two land parcels (Lot 116 CP815698 and Lot 32 LN193), within which the Project is proposed to occur. The Project Sites are identified as the two locations within the Study Areas identified to host meteorological mast infrastructure (MM1 and MM2), with a 100 m buffer applied to the central mast location to accommodate ancillary infrastructure. Each Project site covers an area of 3.1 ha for a combined total area of 6.2 ha. An additional 20 m buffer around the proposed mast MM1 and a 22.5 m buffer around the proposed mast MM2 will be provided as necessary firebreaks required under the Planning Act.

The Study Area and Project Sites are depicted in **Figure 1.1**.

1.1.2 Ecology Study Area

The Ecology Study Area (**Figure 1.1**) comprises 104 land parcels (including the two parcels that make up the Study Area) covering an area of 25,329 ha. The Ecology Study Area has been identified as an area that will potentially host future proposed renewable energy infrastructure that are associated with the MCREP. The Ecology Study Area has been the basis of ecological surveys undertaken to date by Umwelt for the MCREP.

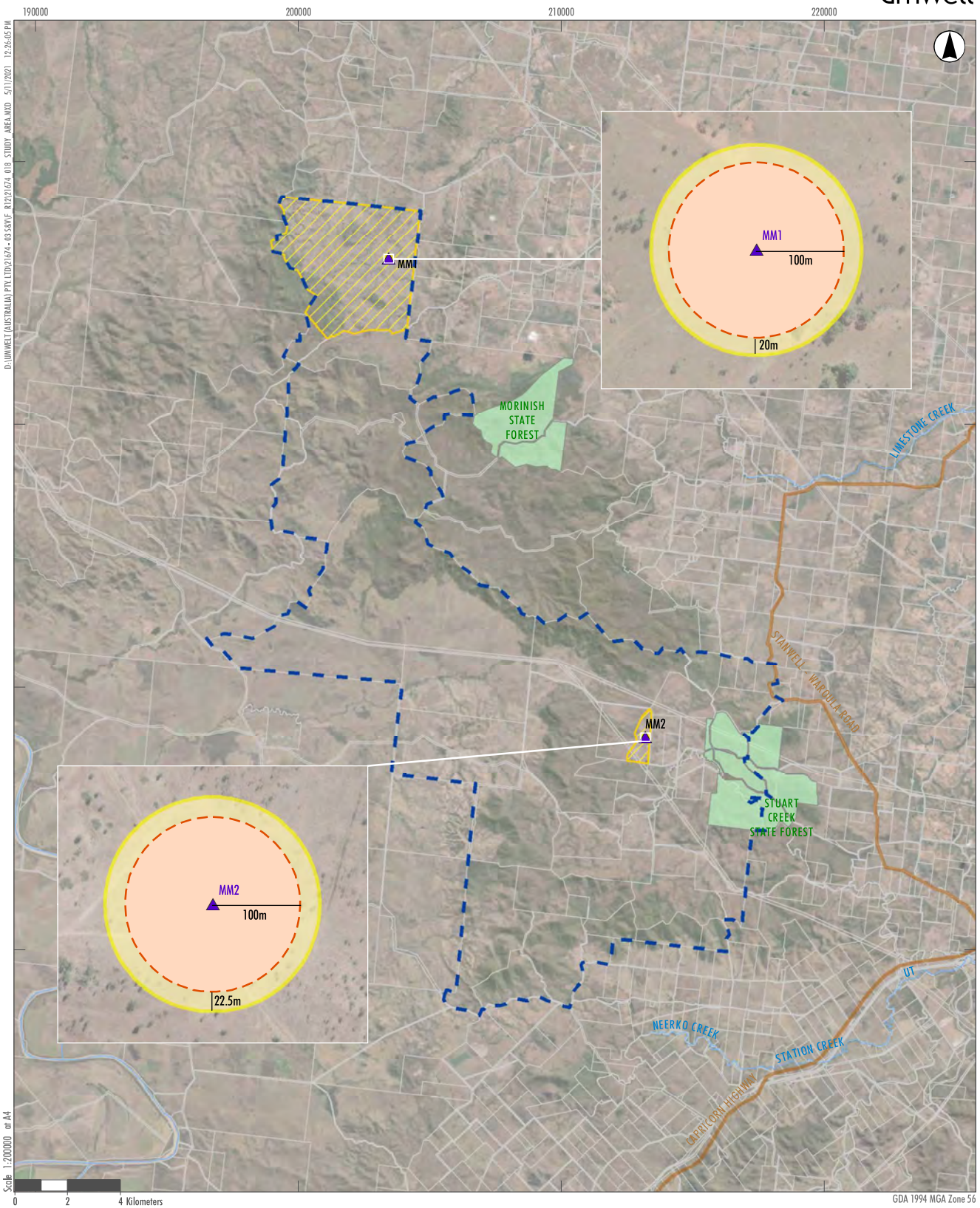

FIGURE 1.1

Study Boundaries

Image Source: ESRI Basemap (2021) Data source: QSC (2021); Umwelt (2021)

1.2 Scope of Works

The aim of this assessment is to characterise the potential impacts on both flora and fauna from the establishment of two temporary meteorological masts. To achieve this, the following works were completed:

- Verify through desktop assessment and field survey, the presence/location of ecological constraints within the Study Area and Project Sites.
- Validate vegetation units within the Project Sites in accordance with *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland* (Neldner et al. 2020).
- Identify and characterise fauna habitat for the Project Sites though habitat assessments in accordance with *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre et al. 2018).
- Identify potential impacts on ecology values, including any significant residual impacts on Matters of State Environmental Significance (MSES).

2.0 Legislative Context

The legislation relevant to this ecological assessment is summarised below in **Table 2.1**.

Table 2.1 Legislative Context

Legislation	Governing Agency	Summary	Relevance
Environment Protection and Biodiversity Conservation Act 1999 **(EPBC Act)**	Department of Agriculture, Water and the Environment (DAWE)	The EPBC Act is Australia's key piece of environmental legislation. It outlines nine Matters of National Environmental Significance (MNES). Actions that adversely affect MNES may be deemed to be a controlled action under the EPBC Act.	MNES relevant to the Project include: • Threatened species and ecological communities • Migratory species.
Nature Conservation Act 1992 **(NC Act)**	Department of Environment and Science (DES)	The purpose of the NC Act is to conserve biodiversity by creating and managing protected areas, managing, and protecting wildlife, and managing the spread of non-native wildlife.	Where a proposed development will result in such impacts flora and or fauna protected under the NC Act, authorisation from the Director General of the DES is required.
Vegetation Management Act 1999 **(VM Act)**	Department of Resources (DoR)	The VM Act establishes the vegetation management framework for Queensland which applies to all vegetation with the exception of State forests, National Parks, forest reserves and certain other tenures defined under the NC Act and the Forestry Act 1959.	Essential habitat is vegetation in which threatened species listed under the NC Act have been known to occur. Essential habitat is regulated under the VM Act. Where clearing cannot be reasonably avoided or minimised, an offset may occur.
Biosecurity Act 2014 **(Biosecurity Act)**	Department of Agriculture and Fisheries	The Biosecurity Act lists fauna and flora pest species as either a prohibited or restricted biosecurity matter.	The Biosecurity Act defines specific requirements for notification and management actions for all listed biosecurity matters, including specific requirements for the disposal of restricted matters.
Environmental Offsets Act 2014 **(EO Act)**	DES	An environment offset condition may be imposed under certain Queensland legislation that applies to development assessment where the activity is prescribed activity under the Environmental EO Act. Activities which have an impact on MSES may require offsetting under the EO Act.	Matters of State Environmental Significance (MSES) relevant to the Project include: • protected wildlife habitat

3.0 Methodology

3.1 Desktop Assessment

A review of ecological data and literature was undertaken to characterise the ecological values relevant to the Project and to identify the potential presence of threatened species and vegetation communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or Qld *Nature Conservation Act 1992* (NC Act) within the Project Sites. The following sources were accessed to complete the desktop assessment:

- Department of Agriculture, Water and the Environment (DAWE) (2021) EPBC Protected Matters Search
- DAWE (2021b) Species Profile and Threats (SPRAT) Database
- DES (2021) Wildlife Online database
- DES (2019) Protected Plants Flora Survey Trigger Map
- DoR Vegetation Management Supporting Map including essential habitat mapping
- DoR (2021) Regional Ecosystem Map (Version 11)
- Queensland Herbarium (2021) Regional Ecosystem Description Database (REDD) (Version 12)
- Atlas of Living Australia (ALA) (2021) database.

For the purpose of the database searches, a 10 km buffer was applied to the Ecology Study Area boundary.

3.2 Field Survey

Several field surveys have been undertaken for the MCREP between 2020 and 2021, as outlined in **Table 3.1**. The field surveys have employed a range of techniques to identify the presence of ecological values within the Ecology Study Area, as outlined in **Table** 3.2. Field survey locations in the vicinity of the Project Sites are shown on **Figure 3.1**.

Table 3.1 Field Surveys Undertaken for the Moah Creek Renewable Energy Project

Survey	Dates Undertaken
Phase 1 Ecological Survey	29 September – 8 October 2020
Bird and Bat Utilisation Survey	8 – 16 December 2020
Bird and Bat Utilisation Survey	18 – 25 February 2021
Baseline Fauna Survey	12 – 22 May 2021
Bird and Bat Utilisation Survey	6 – 12 September 2021
Baseline Flora Survey*	9 – 13 October 2021
Nocturnal Fauna Survey	18 – 22 October 2021
Baseline Flora Survey*	19 – 25 October 2021

* The baseline flora assessment is being undertaken at the time of preparation of this report; therefore, survey results have not been reported

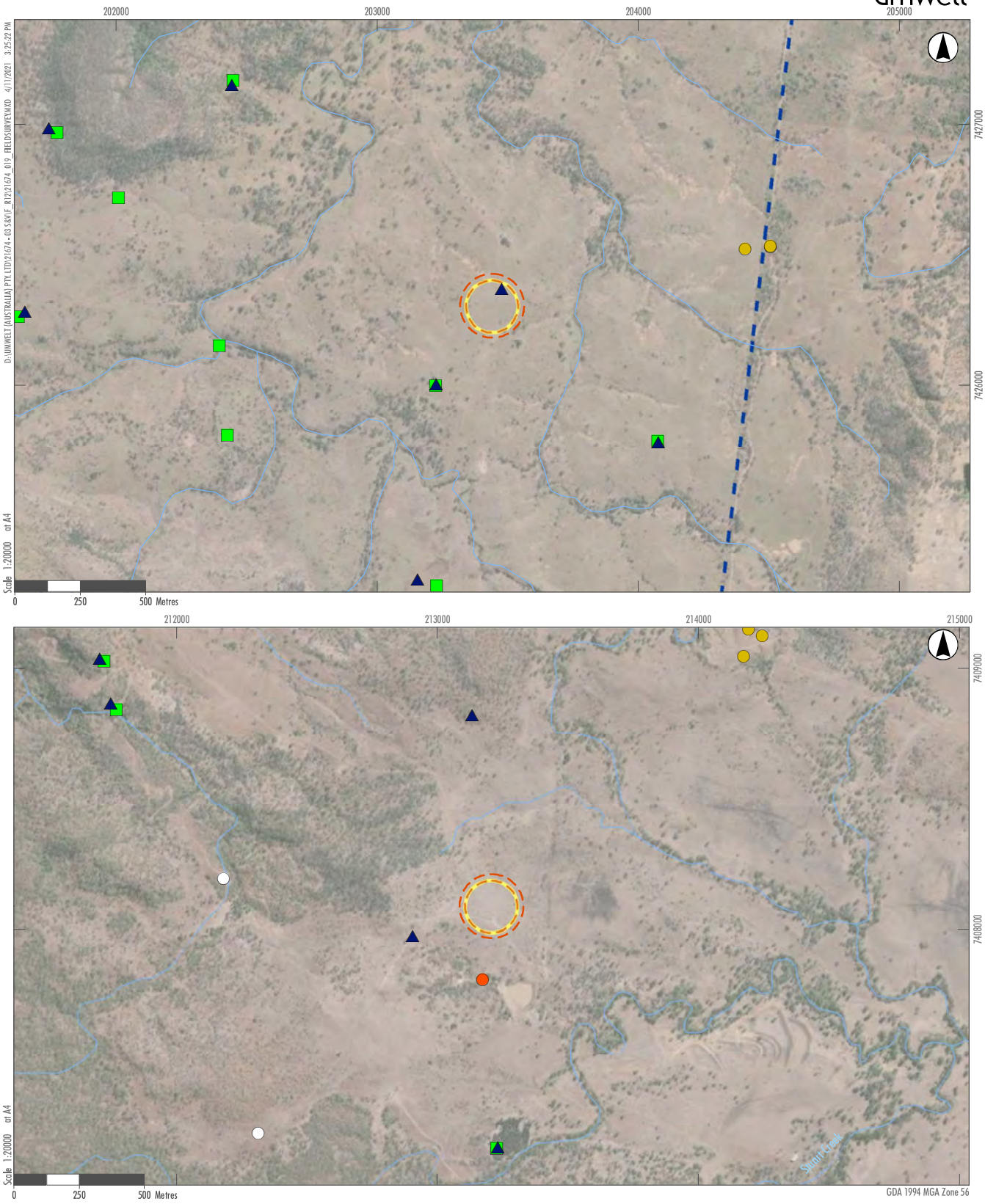

FIGURE 3.1

Field Survey Locations Near the Project Sites

Image Source: ESRI Basemap (2021) Data source: QSC (2021); Umwelt (2021)

Table 3.2 Field Survey Methods

Method	Description
Secondary Sites	The identification and mapping of Regional Ecosystems (REs) was completed in accordance with the Queensland Herbarium *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland* (Neldner et al. 2020). Secondary surveys included recording a full species list and vegetation structural description including strata, height and cover values for each species.
Quaternary Sites	In accordance with Neldner et al. (2020), dominant species were recorded including a vegetation structural description of the dominant overstorey species.
Fauna Habitat Assessment	Detailed descriptions of the habitat values present within the Ecology Study Area were recorded using the Eyre et al. (2018) fauna habitat assessment methodology.
Koala Spot Assessment Technique (SAT)	At each site, 30 known koala feed trees greater than 10 cm diameter at breast height (DBH) were searched at the base for koala faecal pellets.
Diurnal Bird Surveys	Bird surveys were undertaken across the Ecology Study Area, targeting a range of eucalypt and vine thicket habitats.
Remote Camera Monitoring	Remote cameras baited with chicken neck, sardines, and/or a peanut butter/oat mix were deployed in representative habitats to record visitation by fauna.
Acoustic Bat Call Monitoring	Anabat Swift units were deployed in representative habitats to record microchiropteran calls. These calls were later analysed by *Balance! Environmental* for species identification.
Harp Trapping	Harp traps were deployed in natural flyways and checked each morning before dawn to identify and release captured fauna.
Mammal Trapping	Type A aluminium Elliot traps baited with a mixture of rolled oats, peanut butter, honey and vanilla essence were placed at approximately 10 m intervals along two transects, targeting small mammals and reptiles Traps were checked each morning to identify and release captured fauna.
Spotlighting	Spotlighting was undertaken in representative habitats on foot using handheld spotlights and binoculars as well as from the passenger window of a slow-moving vehicle along tracks, targeting terrestrial and arboreal mammals and nocturnal birds.
Active Searches	Active diurnal searches for reptiles, amphibians, and small mammals were undertaken, involving searching beneath microhabitat such as rocks, fallen timber and peeling bark, and digging through leaf litter and soil at the base of trees.
Opportunistic Sightings	All fauna observed incidentally throughout the Ecology Study Area were recorded. Tracks and traces of fauna species were also opportunistically identified.

3.3 Likelihood of Occurrence Assessment

The likelihood of occurrence of a species or community listed under the EPBC Act and/or the NC Act was determined following a review of existing observations and an assessment of the suitability of habitat in the Project Sites. Species were assigned to a category based on the outcomes of the assessment, as outlined in **Table 3.3**.

Table 3.3 Likelihood of Occurrence Definitions

Potential to Occur	Description
Known	The species or community has been recorded in the immediate vicinity of the Project Sites during field surveys, or The species or community has been recorded within equivalent habitat in the Ecology Study Area during field surveys.
High	The species has been previously recorded within or in the immediate vicinity of the Project Sites, or The species has been recorded within non-equivalent habitat in the Ecology Study Area and the Project Sites contain preferred habitat which may support a population of the species.
Moderate	The species is known from the broader area (desktop search extent) and some of the preferred habitat is present within the Project Sites, or The species is an aerial forager or other migratory bird that may overfly the Study Area.
Low	The Project Sites support some, though often marginal, suitable habitat. The species may disperse through the Study Area infrequently and is unlikely to depend on the habitat for their survival, or The species has been recorded within non-equivalent habitat in the Ecology Study Area and based on field survey results, habitat within the Project Sites is unsuitable for the species (e.g., vine thicket or wet forest specialists).
Unlikely	This category includes those species for which the Project Sites offer limited or no potential habitat, is outside their known range and/or is without broader habitat requirements or the species are considered locally extinct according to literature and/ or expert knowledge

3.4 Significant Residual Impact Assessment

For potential impacts on MSES values within the Project Sites, an assessment of significance was undertaken in accordance with the *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (DEHP 2014). MSES relevant to the Project include protected wildlife habitat for threatened/special least concern species assessed in the likelihood of occurrence assessment as being known to occur or having a moderate or high likelihood of occurring within the Project Sites.

4.0 Results

This section provides an overview of the results of the desktop assessment and field survey undertaken for the MCREP as they relate to the Project Sites.

4.1 Flora

4.1.1 Flora Diversity Including Threatened Flora

Database search results indicated the potential presence of 15 threatened flora species listed under the NC Act and/or EPBC Act within the Ecology Study Area. A summary of the database results for threatened flora are available as **Appendix A**.

Phase 1 flora surveys undertaken across the Ecology Study Area identified 101 flora species from 33 families and 64 genera (**Appendix B**). Three species listed under the NC Act and/or EPBC Act were recorded in the Ecology Study Area:

- *Cycas megacarpa* (Endangered under both)
- black ironbox (*Eucalyptus raveretiana*) (Vulnerable under EPBC Act)
- *Cerbera dumicola* (Near Threatened under NC Act).

Cycas megacarpa was recorded throughout the Ecology Study Area in remnant and non-remnant habitats including narrow-leaved ironbark (*Eucalyptus crebra*) and lemon-scented gum (*Corymbia citriodora*) woodland. *Eucalyptus raveretiana* was recorded along an ephemeral watercourse in the southeast of the Ecology Study Area, co-dominant with forest red gum (*E. tereticornis*). *Cerbera dumicola* was recorded on two occasions in the north and southeast of the Ecology Study Area from within *E. crebra* and *Corymbia citriodora* woodland.

None of these species nor any other threatened flora have been identified as occurring within the Project Sites or Study Area.

4.1.2 Vegetation Communities

4.1.2.1 Regional Ecosystems

Regional ecosystem (RE) mapping provided by DoR (2021) indicates that the Project Sites comprise non-remnant vegetation.

As outlined in **Section 3.2**, a field assessment of the DoR vegetation mapping was conducted across the Ecology Study Area as part of the MCREP. The field surveys determined that non-remnant vegetation exists throughout the Project Sites (**Photo 4.1** and **Photo 4.2**).

Photo 4.1 View of non-remnant vegetation within MM1 footprint

Photo 4.2 View of non-remnant vegetation within MM2 footprint

4.1.2.2 Threatened Ecological Communities

Database search results indicated the potential presence of five threatened ecological communities (TECs) within the Ecology Study Area. Field surveys found no TECs occur within the Project Sites nor have any been identified within the Ecology Study Area.

4.1.2.3 Regulated Vegetation

Review of regulated vegetation mapping (DoR 2021b) indicates that the Project Sites comprise approximately 6.2 ha in total of Category X (non-remnant) unregulated vegetation.

4.1.3 Protected Plants Flora Survey Trigger Map

No mapped high risk trigger areas intersect the Project Sites. No protected plants were detected within the Project Sites or Ecology Study Area during field surveys.

4.2 Fauna

4.2.1 Fauna Diversity Including Threatened and Special Least Concern Fauna

Database search results indicate the potential presence of 27 threatened fauna species listed under the NC Act and/or EPBC Act within the Ecology Study Area. Searches also indicated the potential presence of 17 special least concern/migratory species listed under the NC Act and EPBC Act respectively. A summary of the database results for threatened fauna are available as **Appendix A**.

Fauna surveys undertaken across the Ecology Study Area for the MCREP identified 160 fauna species, comprising 120 birds, 21 mammals, 10 reptiles and 9 amphibians (**Appendix B**). Of the recorded species, five are listed as threatened under the NC Act and EPBC Act:

- greater glider (*Petauroides volans*) (Vulnerable under both the NC Act and EPBC Act)
- koala (*Phascolarctos cinereus*) (Vulnerable under both the NC Act and EPBC Act)
- squatter pigeon (southern) (*Geophaps scripta scripta*) (Vulnerable under both the NC Act and EPBC Act)
    - A record for this species was recorded approximately 100 m of the proposed MM2 mast, as depicted on **Figure 4.1**
- white-throated needletail (*Hirundapus caudacutus*) (Vulnerable under NC Act, Vulnerable and Migratory under EPBC Act)
- fork-tailed swift (*Apus pacificus*) (Special Least Concern under NC Act, Migratory under EPBC Act).

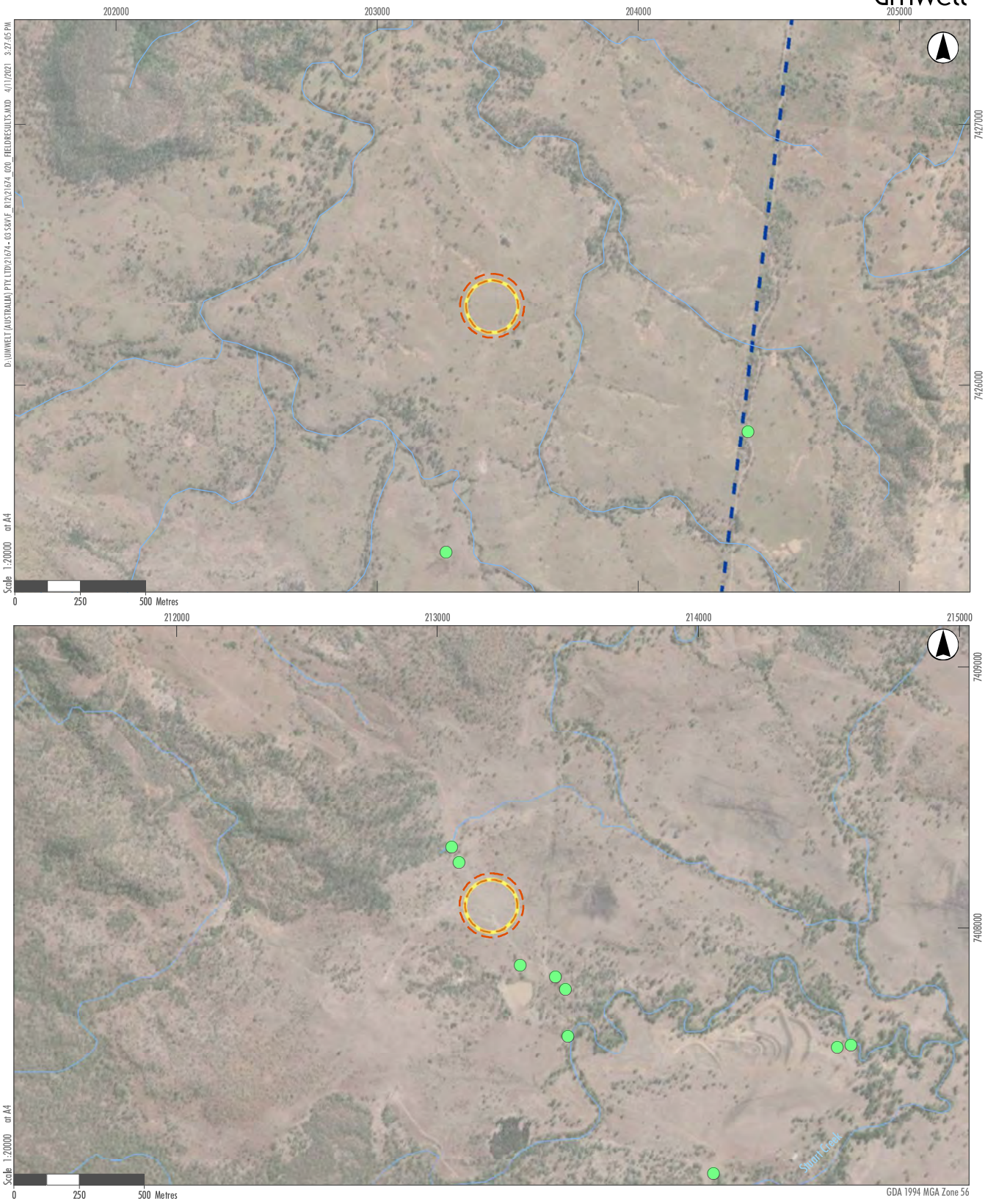

FIGURE 4.1

Project Sites Field Results

Image Source: ESRI Basemap (2021) Data source: QSC (2021); Umwelt (2021)

4.2.2 Fauna Habitat

The Project Sites offer limited fauna habitat and supports one main habitat type covering a total of 6.2 ha: modified grassland.

4.2.3 Essential Habitat

No mapped essential habitat areas intersect the Project Sites or Study Area. The closest mapped essential habitat to MM1 within the Ecology Study Area is approximately 5 km south and is associated with *Cycas megacarpa*. The closest mapped essential habitat to MM2 within the Ecology Study Area is approximately 2.5 km northwest and is associated with ornamental snake (*Denisonia maculata*).

4.2.4 Connectivity

Large areas of remnant vegetation remain throughout the northern portions of the Ecology Study Area that provide internal connectivity and dispersal pathways more broadly throughout the wider region. Internal minor watercourses throughout the landscape provide opportunities for fauna to disperse and forage. The Project Sites are relatively isolated from these areas of remnant vegetation, with the closest remnant patch to both Project Sites occurring approximately 300 m away.

Review of Biodiversity Planning Assessment (BPA) mapping indicates that MM2 is located within a Statewide Biodiversity Corridor. MM1 is not located within a within a Statewide Biodiversity Corridor. Given the disturbed, non-remnant nature of the Project Sites, they do not represent connectivity areas.

4.2.5 Likelihood of Occurrence Assessment

The likelihood of occurrence assessment found that one species is known to occur in the immediate vicinity of the Project Sites. Three species were assessed as having a moderate likelihood of occurring due to the probability they will overfly the Project Sites. No species were assessed as having a high likelihood of occurring within the Project Sites. Key results are presented in **Table 4.1** and the complete likelihood of occurrence assessment is available in **Appendix C**.

Table 4.1 Key Likelihood of Occurrence Results

Common Name	Scientific Name	NC Act Status	EPBC Act Status
Known			
squatter pigeon (southern)	*Geophaps scripta scripta*	Vulnerable	Vulnerable
Moderate			
fork-tailed swift	*Apus pacificus*	Special Least Concern	Migratory
white-throated needletail	*Hirundapus caudacutus*	Vulnerable	Vulnerable, Migratory
Low			
grey-headed flying-fox	*Pteropus poliocephalus*	Least Concern	Vulnerable

4.3 Matters of State Environmental Significance

The following MSES have been identified as relevant to the development of the Project Sites:

- Protected wildlife habitat for an animal that is endangered or vulnerable wildlife:
    - squatter pigeon (southern) (*Geophaps scripta scripta*)
    - white-throated needletail (*Hirundapus caudacutus*).
- Protected wildlife habitat for an animal that is special least concern wildlife:
    - fork-tailed swift (*Apus pacificus*).

5.0 Potential Impacts

5.1 Construction Impacts

Potential impacts to identified ecological values may occur during the construction and operation of the meteorological masts, and include:

- Construction impacts:
    - vegetation clearance including threatened flora
    - loss or degradation of fauna habitat including threatened/special least concern species habitat
    - fauna injury or mortality
    - loss of fauna movement opportunities
    - indirect impacts such as disturbance from noise and incursion of weeds/pests
- Operational impacts:
    - fauna injury or mortality from collisions with mast infrastructure (e.g. guy wires).

5.1.1 Vegetation Clearance

Each proposed meteorological mast covers an area of 3.1 ha for a combined total area of 6.2 ha. Therefore, the maximum potential disturbance area for both masts will be approximately 6.2 ha of Category X (non-remnant) unregulated vegetation. An additional 20 m buffer around the proposed MM1 and a 22.5 m buffer around the proposed MM2 will be provided as necessary firebreaks required under the Planning Regulation (**Figure 1.1**).

Vegetation within the Project Sites comprise non-remnant vegetation, and therefore does not constitute a MSES.

5.1.1.1 Threatened Flora

No threatened flora or high-risk areas were identified within the Project Sites. Therefore, no impacts are anticipated to occur to threatened flora as part of this development.

5.1.2 Loss of Degradation of Fauna Habitat

Vegetation within the Project Sites is expected to provide limited suitable habitat for fauna that are known to occur or have been identified as potentially occurring within the Ecology Study Area. The Project Sites may, however, provide suitable habitat for squatter pigeon which have been recorded nearby from equivalent non-remnant habitat. Potential impacts associated with habitat loss are localised and considered negligible given the disturbed nature of vegetation within the Project Sites, limited extent of clearance and availability of similar habitat in the Ecology Study Area. Additionally, a large portion of the Project Sites will continue to function as habitat following installation of the meteorological masts.

5.1.2.1 Threatened and Special Least Concern Fauna

The proposed clearance of up to 3.1 ha of vegetation for each of the two temporary meteorological masts will result in the loss of habitat associated with threatened/special least concern fauna that are known to occur or are considered to have a moderate likelihood of occurring (**Section 4.2.5**). The predicted worst-case impact to potential habitat for these fauna species has been quantified in **Table** 5.1 based on the fauna habitat type (modified grassland) mapped within the Project Sites.

Table 5.1 Potential Habitat Loss Impacts to Threatened/Migratory Fauna

Common Name	Scientific Name	Area (ha)		
		MM1	MM2	Total
Threatened Species				
squatter pigeon (southern)	*Geophaps scripta scripta*	3.1	3.1	6.2
white-throated needletail	*Hirundapus caudacutus*	3.1	3.1	6.2
grey-headed flying-fox	*Pteropus poliocephalus*	3.1	3.1	6.2
Special Least Concern Species				
fork-tailed swift	*Apus pacificus*	3.1	3.1	6.2

5.1.3 Loss of Fauna Movement Opportunities

The Project Sites represent previously cleared areas of modified grassland used for cattle grazing. Given the open and disturbed nature of the Project Sites, no loss of fauna movement opportunities is expected to occur as a result of the Project.

5.1.4 Fauna Injury or Mortality

Fauna mortality may occur during the construction phase as a result of the removal of a small number of trees to accommodate the meteorological mast infrastructure. Inspection of trees for fauna will be undertaken prior to felling to avoid fauna injury and mortality.

5.1.5 Indirect Impacts

5.1.5.1 Construction Noise

During the construction phase there will be short-term, localised disturbance associated with the clearance of vegetation and transport of materials to the Project Sites via trucks. This may result in the short-term avoidance of the area for the duration of these activities. As alternative remnant habitat is available throughout the broader landscape, an overall loss of fauna diversity as a result of construction is considered unlikely, with many if not all species likely to resume normal activities following completion of construction. Long-term impacts from construction noise are not anticipated to occur.

5.1.5.2 Weeds and Pests

The Ecology Study Area supports several introduced fauna species including cane toad (*Rhinella marina*), cat (*Felis catus*) and rabbit (*Oryctolagus cuniculus*). Restricted flora species such as lantana (*Lantana camara*), rubber vine (*Cryptostegia grandiflora*) and parthenium (*Parthenium hysterophorus*) are also present throughout the Ecology Study Area in both remnant and non-remnant vegetation.

Given the current status of weeds and pests within the landscape, and that best-practice weed hygiene measures to control weeds will be implemented for the Project, it is unlikely that the proposed works will result in further introductions or exacerbation of introduced species.

5.2 Operational Impacts

5.2.1 Fauna Injury or Mortality

The injury or mortality of fauna may occur during the operation of the meteorological masts as a result of collisions with the tower or guy wires. The consequence of mortality resulting from collision for any given species is largely influenced by the species' population size and life history traits, such as longevity and fecundity which combine to determine a species' capacity to replace individuals lost. Due to the expected low frequency of collisions, long-term impacts to species are not anticipated to occur.

6.0 Conclusion

This report has outlined the findings of the ecological assessment undertaken for the two temporary meteorological masts proposed to be constructed at the MCREP site, located approximately 30 km northwest of Stanwell and 40 km west of Rockhampton within the Rockhampton Regional Council LGA. Ecological values have been identified via desktop review and field assessments employing a range of survey methods conducted by Umwelt between 2020 and 2021.

Field surveys did not identify the presence of any threatened ecological communities (TECs) or threatened flora within or nearby the Project Sites. One threatened fauna species was confirmed in the vicinity of the Project Sites within equivalent habitat:

- squatter pigeon (southern) (*Geophaps scripta scripta*) (Vulnerable under both EPBC and NC Act)

Three additional threatened/special least concern species are considered to have a moderate likelihood of occurring within the Project Sites given the probability they may overfly the Project Sites:

- fork-tailed swift (*Apus pacificus*) (Special Least Concern under NC Act, Migratory under EPBC Act)
- white-throated needletail (*Hirundapus caudacutus*) (Vulnerable under NC Act, Vulnerable and Migratory under EPBC Act)
- Fork-tailed swift and white-throated needletail have both been recorded from the Ecology Study Area.

One additional threatened/special least concern species is considered to have a low likelihood of occurring within the Project Sites:

- grey-headed flying-fox (*Pteropus poliocephalus*) (Vulnerable under EPBC Act).

The assessment identified one MSES as occurring within the Project Sites: protected wildlife habitat (fauna). Sources of potential impacts associated with the construction and operational phases of the Project were identified with consideration of this MSES. Given the short-term and localised extent of disturbance, these potential impacts are considered minor and manageable.

A significant residual impact assessment was conducted for the identified MSES, with the assessment concluding that the temporary meteorological masts will not result in a significant residual impact to MSES.

7.0 References

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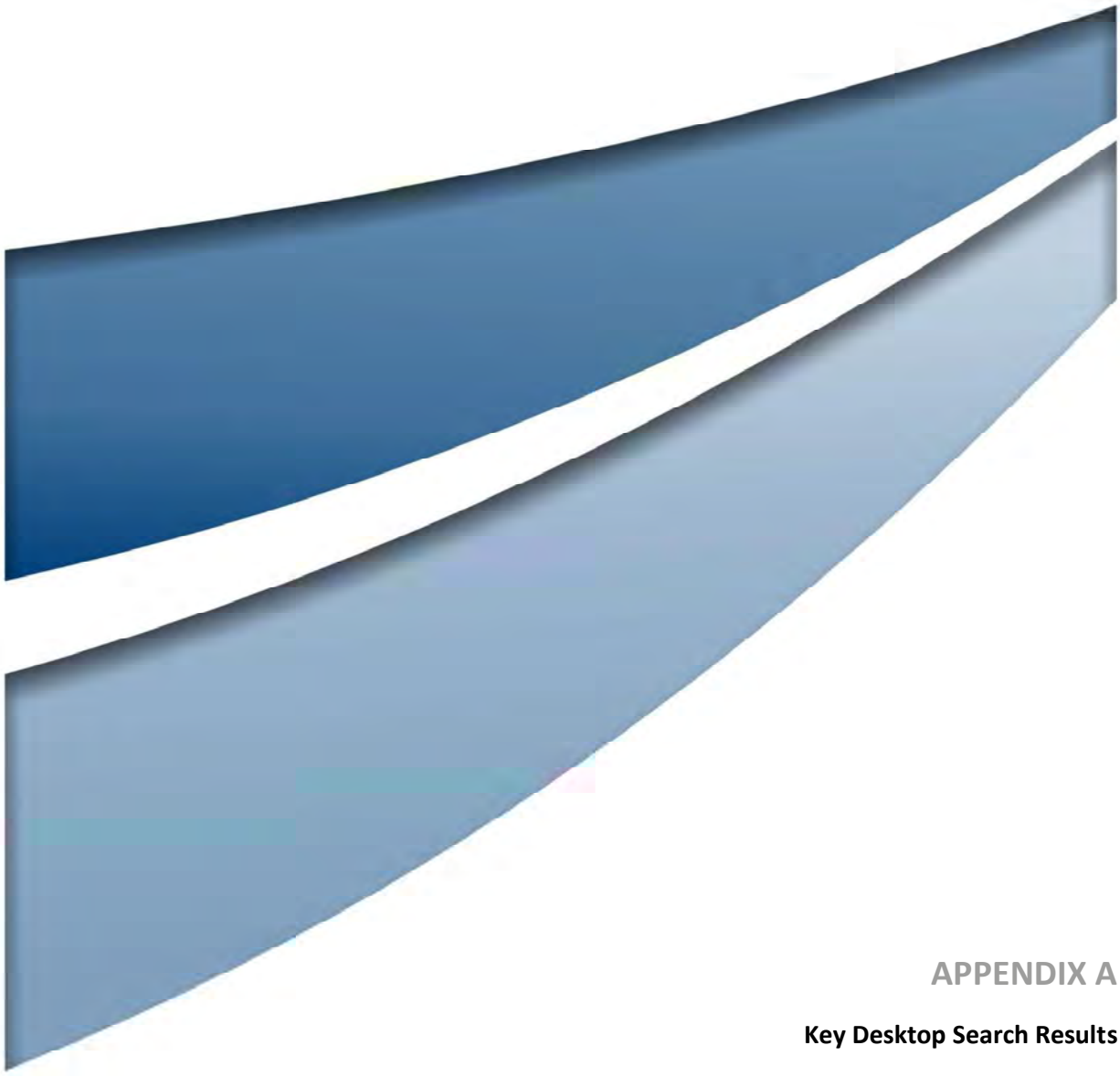


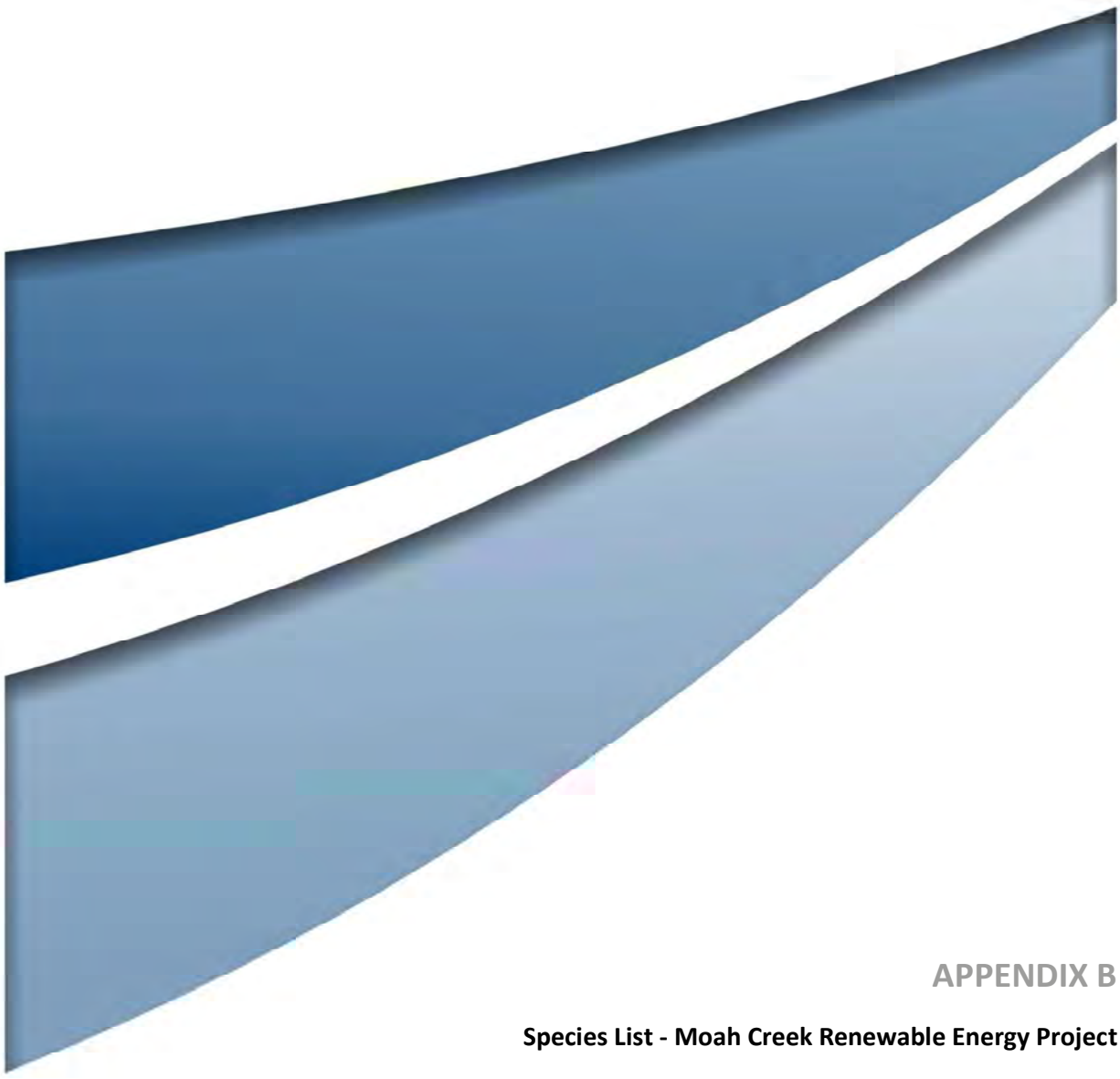
APPENDIX A

Key Desktop Search Results

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]
Threatened Species			
Birds			
curlew sandpiper	*Calidris ferruginea*	CE, M	CE
glossy black-cockatoo (northern)	*Calyptorhynchus lathami erebus*		V
red goshawk	*Erythrotriorchis radiatus*	V	E
grey falcon	*Falco hypoleucos*	V	V
squatter pigeon (southern)	*Geophaps scripta scripta*	V	V
white-throated needletail	*Hirundapus caudacutus*	V, M	V
star finch (eastern, southern)	*Neochmia ruficauda ruficauda*	E	E
eastern curlew	*Numenius madagascariensis*	CE	E
powerful owl	*Ninox strenua*		V
southern black-throated finch	*Poephila cincta cincta*	E	E
Australian painted snipe	*Rostratula australis*	E	E
black-breasted button-quail	*Turnix melanogaster*	V	V
Mammals			
large-eared pied bat	*Chalinolobus dwyeri*	V	V
northern quoll	*Dasyurus hallucatus*	E	
ghost bat	*Macroderma gigas*	V	E
south-eastern long-eared bat	*Nyctophilus corbeni*	V	V
greater glider	*Petauroides volans*	V	V
koala (combined populations of Qld, NSW and the ACT)	*Phascolarctos cinereus*	V	V
grey-headed flying-fox	*Pteropus poliocephalus*	V	
Reptiles			
collared delma	*Delma torquata*	V	V
ornamental snake	*Denisonia maculata*	V	V
yakka skink	*Egernia rugosa*	V	V
southern snapping turtle	*Elseya albagula*	CE	CE
Dunmall's snake	*Furina dunmalli*	V	V
grey snake	*Hemiaspis damelii*		E
Fitzroy river turtle	*Rheodytes leukops*	V	V
Frogs			
tusked frog	*Adelotus brevis*		V
Flora			
miniature moss-orchid	*Bulbophyllum globuliforme*	V	NT
ooline	*Cadellia pentastylis*	V	V
-	*Capparis humistrata*		E
cossinia	*Cossinia australiana*	E	E
-	*Cycas megacarpa*	E	E
-	*Cycas ophiolitica*	E	E

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]
bluegrass	*Dichanthium setosum*	V	
black ironbox	*Eucalyptus raveretiana*	V	
-	*Graptophyllum excelsum*		NT
three-veined hakea	*Hakea trineura*	V	V
-	*Macrozamia serpentina*		E
-	*Marsdenia brevifolia*	V	
lesser swamp-orchid	*Phaius australis*	E	E
-	*Pimelea leptospermoides*	V	
quassia	*Samadera bidwillii*	V	V
Migratory Species			
Marine Birds			
fork-tailed swift	*Apus pacificus*	M	SLC
Marine Species			
salt-water crocodile	*Crocodylus porosus*	M	SLC
Terrestrial Species			
oriental cuckoo	*Cuculus optatus*	M	SLC
black-faced monarch	*Monarcha melanopsis*	M	SLC
spectacled monarch	*Monarcha trivirgatus*	M	SLC
yellow wagtail	*Motacilla flava*	M	SLC
satin flycatcher	*Myiagra cyanoleuca*	M	SLC
rufous fantail	*Rhipidura rufifrons*	M	SLC
Wetlands Species			
common sandpiper	*Actitis hypoleucos*	M	SLC
sharp-tailed sandpiper	*Calidris acuminata*	M	SLC
pectoral sandpiper	*Calidris melanotos*	M	SLC
Latham's snipe	*Gallinago hardwickii*	M	SLC
eastern osprey	*Pandion haliaetus*	M	SLC
common greenshank	*Tringa nebularia*	M	SLC

[1]**Abbreviations**:
NT – Near Threatened V – Vulnerable E – Endangered CE – Critically Endangered M – Migratory SLC – Special Least Concern



APPENDIX B

Species List - Moah Creek Renewable Energy Project

Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Amphibians	Bufonidae	cane toad	*Rhinella marina*		
Amphibians	Hylidae	common green treefrog	*Litoria caerulea*	LC	
Amphibians	Hylidae	eastern sedgefrog	*Litoria fallax*	LC	
Amphibians	Hylidae	bumpy rocketfrog	*Litoria inermis*	LC	
Amphibians	Hylidae	broad palmed rocketfrog	*Litoria latopalmata*	LC	
Amphibians	Hylidae	striped rocketfrog	*Litoria nasuta*	LC	
Amphibians	Hylidae	ruddy treefrog	*Litoria rubella*	LC	
Amphibians	Limnodynastidae	scarlet sided pobblebonk	*Limnodynastes terraereginae*	LC	
Amphibians	Limnodynastidae	ornate burrowing frog	*Platyplectrum ornatum*	LC	
Birds	Acanthizidae	yellow-rumped thornbill	*Acanthiza chrysorrhoa*	LC	
Birds	Acanthizidae	white-throated gerygone	*Gerygone olivacea*	LC	
Birds	Acanthizidae	white-browed scrubwren	*Sericornis frontalis*	LC	
Birds	Acanthizidae	weebill	*Smicrornis brevirostris*	LC	
Birds	Accipitridae	brown goshawk	*Accipiter fasciatus*	LC	
Birds	Accipitridae	wedge-tailed eagle	*Aquila audax*	LC	
Birds	Accipitridae	Pacific baza	*Aviceda subcristata*	LC	
Birds	Accipitridae	whistling kite	*Haliastur sphenurus*	LC	
Birds	Aegothelidae	Australian owlet-nightjar	*Aegotheles cristatus*	LC	
Birds	Anatidae	grey teal	*Anas gracilis*	LC	
Birds	Anatidae	Pacific black duck	*Anas superciliosa*	LC	
Birds	Anatidae	Australian wood duck	*Chenonetta jubata*	LC	
Birds	Anatidae	wandering whistling-duck	*Dendrocygna arcuata*	LC	
Birds	Anatidae	cotton pygmy-goose	*Nettapus coromandelianus*	LC	
Birds	Anhingidae	Australasian darter	*Anhinga novaehollandiae*	LC	
Birds	Apodidae	fork-tailed swift	*Apus pacificus*	SLC	
Birds	Apodidae	white-throated needletail	*Hirundapus caudacutus*	V	V, M
Birds	Ardeidae	great egret	*Ardea alba*	LC	
Birds	Ardeidae	white-necked heron	*Ardea pacifica*	LC	
Birds	Ardeidae	white-faced heron	*Egretta novaehollandiae*	LC	
Birds	Artamidae	black-faced woodswallow	*Artamus cinereus*	LC	
Birds	Artamidae	white-breasted woodswallow	*Artamus leucorynchus*	LC	
Birds	Artamidae	white-browed woodswallow	*Artamus superciliosus*	LC	
Birds	Artamidae	pied butcherbird	*Cracticus nigrogularis*	LC	
Birds	Artamidae	grey butcherbird	*Cracticus torquatus*	LC	

Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Birds	Artamidae	Australian magpie	*Gymnorhina tibicen*	LC	
Birds	Artamidae	pied currawong	*Strepera graculina*	LC	
Birds	Burhinidae	bush stone-curlew	*Burhinus grallarius*	LC	
Birds	Cacatuidae	sulphur-crested cockatoo	*Cacatua galerita*	LC	
Birds	Cacatuidae	red-tailed black-cockatoo	*Calyptorhynchus banksii*	LC	
Birds	Cacatuidae	galah	*Eolophus roseicapilla*	LC	
Birds	Cacatuidae	cockatiel	*Nymphicus hollandicus*	LC	
Birds	Campephagidae	black-faced cuckoo-shrike	*Coracina novaehollandiae*	LC	
Birds	Campephagidae	white-bellied cuckoo-shrike	*Coracina papuensis*	LC	
Birds	Campephagidae	cicadabird	*Coracina tenuirostris*	LC	
Birds	Campephagidae	varied triller	*Lalage leucomela*	LC	
Birds	Casuariidae	emu	*Dromaius novaehollandiae*	LC	
Birds	Charadriidae	black-fronted dotterel	*Elseyornis melanops*	LC	
Birds	Charadriidae	masked lapwing	*Vanellus miles*	LC	
Birds	Climacteridae	brown treecreeper	*Climacteris picumnus*	LC	
Birds	Columbidae	bar-shouldered dove	*Geopelia humeralis*	LC	
Birds	Columbidae	peaceful dove	*Geopelia striata*	LC	
Birds	Columbidae	peaceful dove	*Geopelia striata*	LC	
Birds	Columbidae	squatter pigeon (southern)	*Geophaps scripta scripta*	V	V
Birds	Columbidae	wonga pigeon	*Leucosarcia melanoleuca*	LC	
Birds	Columbidae	brown cuckoo-dove	*Macropygia amboinensis*	LC	
Birds	Columbidae	crested pigeon	*Ocyphaps lophotes*	LC	
Birds	Columbidae	common bronzewing	*Phaps chalcoptera*	LC	
Birds	Coraciidae	dollarbird	*Eurystomus orientalis*	LC	
Birds	Corcoracidae	white-winged chough	*Corcorax melanorhamphos*	LC	
Birds	Corcoracidae	apostlebird	*Struthidea cinerea*	LC	
Birds	Corvidae	Torresian crow	*Corvus orru*	LC	
Birds	Cuculidae	fan-tailed cuckoo	*Cacomantis flabelliformis*	LC	
Birds	Cuculidae	pheasant coucal	*Centropus phasianinus*	LC	
Birds	Cuculidae	Horsfield's bronze-cuckoo	*Chalcites basalis*	LC	
Birds	Cuculidae	eastern koel	*Eudynamys orientalis*	LC	
Birds	Cuculidae	channel-billed cuckoo	*Scythrops novaehollandiae*	LC	
Birds	Dicruridae	spangled drongo	*Dicrurus bracteatus*	LC	
Birds	Estrildidae	double-barred finch	*Taeniopygia bichenovii*	LC	
Birds	Estrildidae	zebra finch	*Taeniopygia guttata*	LC	

Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Birds	Eurostopodidae	spotted nightjar	*Eurostopodus argus*	LC	
Birds	Falconidae	brown falcon	*Falco berigora*	LC	
Birds	Falconidae	nankeen kestrel	*Falco cenchroides*	LC	
Birds	Falconidae	peregrine falcon	*Falco peregrinus*	LC	
Birds	Gruidae	brolga	*Antigone rubicunda*	LC	
Birds	Halcyonidae	blue-winged kookaburra	*Dacelo leachii*	LC	
Birds	Halcyonidae	laughing kookaburra	*Dacelo novaeguineae*	LC	
Birds	Halcyonidae	forest kingfisher	*Todiramphus macleayii*	LC	
Birds	Hirundinidae	welcome swallow	*Hirundo neoxena*	LC	
Birds	Hirundinidae	tree martin	*Petrochelidon nigricans*	LC	
Birds	Maluridae	variegated fairy-wren	*Malurus lamberti*	LC	
Birds	Maluridae	red-backed fairy-wren	*Malurus melanocephalus*	LC	
Birds	Megaluridae	tawny grassbird	*Megalurus timoriensis*	LC	
Birds	Megapodiidae	Australian brush-turkey	*Alectura lathami*	LC	
Birds	Meliphagidae	blue-faced honeyeater	*Entomyzon cyanotis*	LC	
Birds	Meliphagidae	brown honeyeater	*Lichmera indistincta*	LC	
Birds	Meliphagidae	yellow-throated miner	*Manorina flavigula*	LC	
Birds	Meliphagidae	noisy miner	*Manorina melanocephala*	LC	
Birds	Meliphagidae	Lewin's honeyeater	*Meliphaga lewinii*	LC	
Birds	Meliphagidae	white-throated honeyeater	*Melithreptus albogularis*	LC	
Birds	Meliphagidae	scarlet honeyeater	*Myzomela sanguinolenta*	LC	
Birds	Meliphagidae	white-eared honeyeater	*Nesoptilotis leucotis*	LC	
Birds	Meliphagidae	silver-crowned friarbird	*Philemon argenticeps*	LC	
Birds	Meliphagidae	little friarbird	*Philemon citreogularis*	LC	
Birds	Meliphagidae	noisy friarbird	*Philemon corniculatus*	LC	
Birds	Meropidae	rainbow bee-eater	*Merops ornatus*	LC	
Birds	Monarchidae	magpie-lark	*Grallina cyanoleuca*	LC	
Birds	Monarchidae	satin flycatcher	*Myiagra cyanoleuca*	SLC	
Birds	Monarchidae	restless flycatcher	*Myiagra inquieta*	LC	
Birds	Monarchidae	leaden flycatcher	*Myiagra rubecula*	LC	
Birds	Motacillidae	Australasian pipit	*Anthus novaeseelandiae*	LC	
Birds	Nectariniidae	white-throated treecreeper	*Cormobates leucophaea*	LC	
Birds	Nectariniidae	mistletoebird	*Dicaeum hirundinaceum*	LC	
Birds	Neosittidae	varied sittella	*Daphoenositta chrysoptera*	LC	
Birds	Oriolidae	olive-backed oriole	*Oriolus sagittatus*	LC	
Birds	Oriolidae	Australasian figbird	*Sphecotheres vieilloti*	LC	
Birds	Otididae	Australian bustard	*Ardeotis australis*	LC	

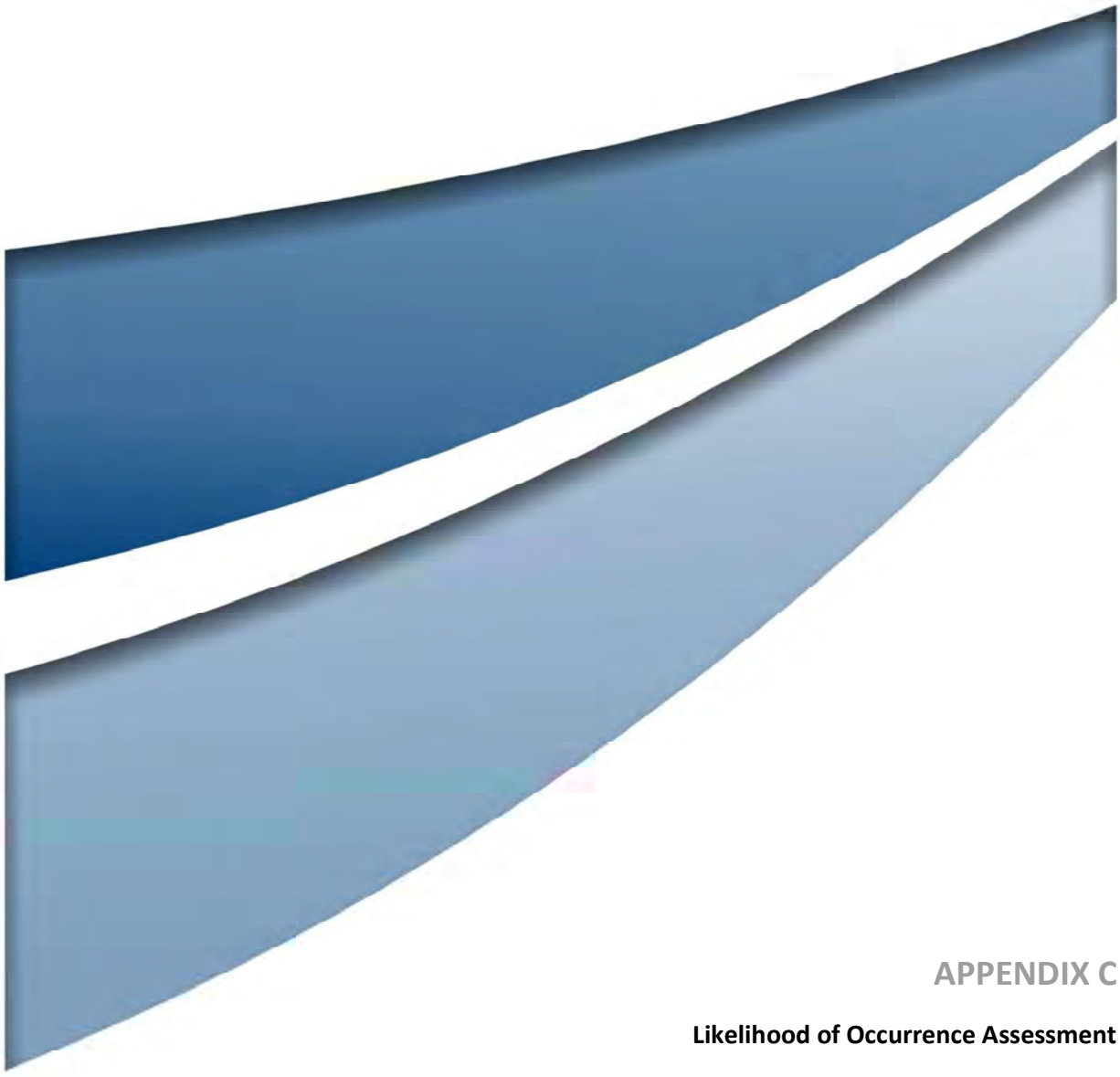
Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Birds	Pachycephalidae	grey shrike-thrush	*Colluricincla harmonica*	LC	
Birds	Pachycephalidae	little shrike-thrush	*Colluricincla megarhyncha*	LC	
Birds	Pachycephalidae	rufous whistler	*Pachycephala rufiventris*	LC	
Birds	Pardalotidae	striated pardalote	*Pardalotus striatus*	LC	
Birds	Pelecanidae	Australian pelican	*Pelecanus conspicillatus*	LC	
Birds	Petroicidae	rose robin	*Petroica rosea*	LC	
Birds	Phasianidae	brown quail	*Coturnix ypsilophora*	LC	
Birds	Podargidae	tawny frogmouth	*Podargus strigoides*	LC	
Birds	Podicipedidae	Australasian grebe	*Tachybaptus novaehollandiae*	LC	
Birds	Pomatostomidae	grey-crowned babbler	*Pomatostomus temporalis*	LC	
Birds	Psittacidae	Australian king-parrot	*Alisterus scapularis*	LC	
Birds	Psittacidae	red-winged parrot	*Aprosmictus erythropterus*	LC	
Birds	Psittacidae	little lorikeet	*Parvipsitta pusilla*	LC	
Birds	Psittacidae	pale-headed rosella	*Platycercus adscitus*	LC	
Birds	Psittacidae	scaly-breasted lorikeet	*Trichoglossus chlorolepidotus*	LC	
Birds	Psittacidae	rainbow lorikeet	*Trichoglossus moluccanus*	LC	
Birds	Rallidae	Lewin's rail	*Lewinia pectoralis*	LC	
Birds	Rhipiduridae	grey fantail	*Rhipidura albiscapa*	LC	
Birds	Rhipiduridae	willie wagtail	*Rhipidura leucophrys*	LC	
Birds	Strigidae	southern boobook	*Ninox boobook*	LC	
Birds	Sturnidae	common myna	*Acridotheres tristis*		
Birds	Threskiornithidae	straw-necked ibis	*Threskiornis spinicollis*	LC	
Birds	Tytonidae	eastern barn owl	*Tyto delicatula*	LC	
Mammals	Canidae	dingo	*Canis familiaris dingo*		
Mammals	Felidae	cat	*Felis catus*		
Mammals	Leporidae	rabbit	*Oryctolagus cuniculus*		
Mammals	Macropodidae	eastern grey kangaroo	*Macropus giganteus*	LC	
Mammals	Macropodidae	whiptail wallaby	*Notamacropus parryi*	LC	
Mammals	Macropodidae	Herbert's rock-wallaby	*Petrogale herberti*	LC	
Mammals	Macropodidae	swamp wallaby	*Wallabia bicolor*	LC	
Mammals	Muridae	water rat	*Hydromys chrysogaster*	LC	
Mammals	Muridae	house mouse	*Mus musculus*		
Mammals	Muridae	delicate mouse	*Pseudomys delicatulus*	LC	
Mammals	Peramelidae	northern brown bandicoot	*Isoodon macrourus*	LC	
Mammals	Petauridae	sugar glider	*Petaurus breviceps*	LC	
Mammals	Petauridae	squirrel glider	*Petaurus norfolcensis*	LC	
Mammals	Phalangeridae	common brushtail possum	*Trichosurus vulpecula*	LC	

Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Mammals	Phascolarctidae	koala	*Phascolarctos cinereus*	V	V
Mammals	Potoroidae	rufous bettong	*Aepyprymnus rufescens*	LC	
Mammals	Pseudocheiridae	greater glider	*Petauroides armillatus*	V	V
Mammals	Pteropodidae	little red flying-fox	*Pteropus scapulatus*	LC	
Mammals	Suidae	pig	*Sus scrofa*		
Mammals	Tachyglossidae	short-beaked echidna	*Tachyglossus aculeatus*	SLC	
Mammals	Vespertilionidae	Gould's wattled bat	*Chalinolobus gouldii*	LC	
Plants	Anacardiaceae		*Euroschinus falcatus*	LC	
Plants	Apocynaceae	bitterbark	*Alstonia constricta*	LC	
Plants	Apocynaceae		*Alyxia ruscifolia*	LC	
Plants	Apocynaceae		*Carissa lanceolata*	LC	
Plants	Apocynaceae	currantbush	*Carissa ovata*	LC	
Plants	Apocynaceae		*Cerbera dumicola*	NT	
Plants	Apocynaceae	rubber vine	*Cryptostegia grandiflora*		
Plants	Apocynaceae	balloon cottonbush	*Gomphocarpus physocarpus*		
Plants	Araliaceae	celery wood	*Polyscias elegans*	LC	
Plants	Asteraceae	cobblers' pegs	*Bidens pilosa*		
Plants	Asteraceae	parthenium	*Parthenium hysterophorus*		
Plants	Asteraceae	applebush	*Pterocaulon sphacelatum*	LC	
Plants	Boraginaceae	weeping koda	*Ehretia membranifolia*	LC	
Plants	Cactaceae	harrisia cactus	*Harrisia martinii*		
Plants	Cactaceae		*Opuntia* sp.		
Plants	Casuarinaceae	belah	*Casuarina cristata*	LC	
Plants	Casuarinaceae		*Casuarina cunninghamiana*	LC	
Plants	Combretaceae		*Terminalia oblongata*	LC	
Plants	Cycadaceae		*Cycas megacarpa*	E	E
Plants	Cyperaceae		*Gahnia aspera*	LC	
Plants	Ebenaceae	scaly ebony	*Diospyros geminata*	LC	
Plants	Ebenaceae	small-leaved ebony	*Diospyros humilis*	LC	
Plants	Euphorbiaceae	soft acalypha	*Acalypha eremorum*	LC	
Plants	Euphorbiaceae	native holly	*Alchornea ilicifolia*	LC	
Plants	Euphorbiaceae	red kamala	*Mallotus philippensis*	LC	
Plants	Fabaceae		*Erythrina vespertilio*	LC	
Plants	Fabaceae		*Lysiphyllum* sp.		
Plants	Fabaceae		*Stylosanthes scabra*		
Plants	Laxmanniaceae		*Lomandra longifolia*	LC	
Plants	Lecythidaceae	cockatoo apple	*Planchonia careya*	LC	
Plants	Malvaceae		*Hibiscus* sp.		

Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Plants	Malvaceae		*Malvastrum americanum*		
Plants	Malvaceae		*Sida cordifolia*		
Plants	Mimosaceae	pretty wattle	*Acacia decora*	LC	
Plants	Mimosaceae		*Acacia excelsa*	LC	
Plants	Mimosaceae	sickle wattle	*Acacia falcata*	LC	
Plants	Mimosaceae	scaly bark	*Acacia fasciculifera*	LC	
Plants	Mimosaceae	brigalow	*Acacia harpophylla*	LC	
Plants	Mimosaceae		*Acacia leiocalyx*	LC	
Plants	Mimosaceae	ringy rosewood	*Acacia rhodoxylon*	LC	
Plants	Mimosaceae		*Acacia* sp.		
Plants	Moraceae		*Ficus* sp.		
Plants	Myrtaceae	lemon-scented gum	*Corymbia citriodora*	LC	
Plants	Myrtaceae		*Corymbia clarksoniana*	LC	
Plants	Myrtaceae		*Corymbia dallachiana*	LC	
Plants	Myrtaceae	variable-barked bloodwood	*Corymbia erythrophloia*	LC	
Plants	Myrtaceae		*Corymbia* sp.		
Plants	Myrtaceae	Moreton Bay ash	*Corymbia tessellaris*	LC	
Plants	Myrtaceae		*Eucalyptus acmenoides*	LC	
Plants	Myrtaceae	narrow-leaved ironbark	*Eucalyptus crebra*	LC	
Plants	Myrtaceae	Queensland peppermint	*Eucalyptus exserta*	LC	
Plants	Myrtaceae		*Eucalyptus melanophloia*	LC	
Plants	Myrtaceae	gum-topped box	*Eucalyptus moluccana*	LC	
Plants	Myrtaceae	black ironbox	*Eucalyptus raveretiana*	LC	V
Plants	Myrtaceae	river red gum	*Eucalyptus tereticornis*	LC	
Plants	Myrtaceae		*Leptospermum* sp.		
Plants	Myrtaceae	brush box	*Lophostemon confertus*	LC	
Plants	Myrtaceae	swamp box	*Lophostemon suaveolens*	LC	
Plants	Myrtaceae	river tea-tree	*Melaleuca bracteata*	LC	
Plants	Myrtaceae	weeping tea-tree	*Melaleuca fluviatilis*	LC	
Plants	Oleaceae		*Jasminum didymum*	LC	
Plants	Oleaceae		*Jasminum simplicifolium*	LC	
Plants	Picrodendraceae	quinine tree	*Petalostigma pubescens*	LC	
Plants	Pittosporaceae	-	*Bursaria incana*	LC	
Plants	Pittosporaceae		*Pittosporum spinescens*	LC	
Plants	Poaceae		*Aristida calycina*	LC	
Plants	Poaceae	feathertop wiregrass	*Aristida latifolia*	LC	
Plants	Poaceae		*Aristida* sp.		
Plants	Poaceae	reedgrass	*Arundinella nepalensis*	LC	
Plants	Poaceae	buffel grass	*Cenchrus ciliaris*		

Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Plants	Poaceae		*Chloris* sp.	LC	
Plants	Poaceae		*Chrysopogon fallax*	LC	
Plants	Poaceae	barbed-wire grass	*Cymbopogon refractus*	LC	
Plants	Poaceae		*Cymbopogon* sp.		
Plants	Poaceae		*Enneapogon* sp.		
Plants	Poaceae	black speargrass	*Heteropogon contortus*	LC	
Plants	Poaceae	Guinea grass	*Megathyrsus maximus*		
Plants	Poaceae	red natal grass	*Melinis repens*		
Plants	Poaceae		*Panicum decompositum*	LC	
Plants	Poaceae		*Paspalidium* sp.		
Plants	Poaceae		*Poaceae* sp.		
Plants	Poaceae	fairy grass	*Sporobolus caroli*	LC	
Plants	Poaceae		*Themeda* sp.		
Plants	Poaceae	kangaroo grass	*Themeda triandra*	LC	
Plants	Proteaceae		*Hakea* sp.		
Plants	Rhamnaceae	soap tree	*Alphitonia excelsa*	LC	
Plants	Rubiaceae		*Psydrax* sp.		
Plants	Rutaceae	broad-leaved leopard tree	*Flindersia collina*	LC	
Plants	Rutaceae	wilga	*Geijera parviflora*	LC	
Plants	Rutaceae	brush wilga	*Geijera salicifolia*	LC	
Plants	Santalaceae		*Eustrephus latifolius*	LC	
Plants	Santalaceae		*Exocarpos latifolius*	LC	
Plants	Sapindaceae	scrub boonaree	*Alectryon diversifolius*	LC	
Plants	Sapindaceae		*Atalaya hemiglauca*	LC	
Plants	Solanaceae		*Solanum* sp.		
Plants	Sterculiaceae	broad-leaved bottle tree	*Brachychiton australis*	LC	
Plants	Sterculiaceae		*Brachychiton rupestris*	LC	
Plants	Verbenaceae	lantana	*Lantana camara*		
Plants	Xanthorrhoeaceae		*Xanthorrhoea johnsonii*	LC	
Plants	Xanthorrhoeaceae		*Xanthorrhoea* sp.		
Plants	Zamiaceae		*Macrozamia moorei*	LC	
Reptiles	Agamidae	tommy roundhead	*Diporiphora australis*	LC	
Reptiles	Carphodactylidae	spiny knob-tailed gecko	*Nephrurus asper*	LC	
Reptiles	Colubridae	brown tree snake	*Boiga irregularis*	LC	
Reptiles	Diplodactylidae	wood gecko	*Diplodactylus vittatus*	LC	
Reptiles	Diplodactylidae	ocellated velvet gecko	*Oedura monilis*	LC	
Reptiles	Diplodactylidae	southern spotted velvet gecko	*Oedura tryoni*	LC	
Reptiles	Gekkonidae	dubious dtella	*Gehyra dubia*	LC	

Class	Family	Common Name	Scientific Name	NC Act Status[1]	EPBC Act Status[1]
Reptiles	Gekkonidae	Bynoe's gecko	*Heteronotia binoei*	LC	
Reptiles	Scincidae	open-litter rainbow skink	*Carlia pectoralis*	LC	
Reptiles	Scincidae	striped snake-eyed skink	*Cryptoblepharus virgatus*	LC	



APPENDIX C

Likelihood of Occurrence Assessment

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
Threatened Species					
Birds					
curlew sandpiper	*Calidris ferruginea*	CE, M	CE	The species mainly occurs on intertidal mudflats in sheltered coastal areas such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded less often inland, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand, occurring in both fresh and brackish waters.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
glossy black-cockatoo (northern)	*Calyptorhynchus lathami erebus*	-	V	The species prefers woodland areas dominated by *Allocasuarina* (she-oak), or open sclerophyll forests and woodlands with a stratum of she-oak beneath Eucalyptus, Corymbia or Angophora. They have also been observed in mixed *Allocasuarina*, *Casuarina*, *Callitris* and *Acacia harpophylla* woodland assemblages.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
red goshawk	*Erythrotriorchis radiatus*	V	E	The species occurs in coastal and sub-coastal tall open forests and woodlands, preferring areas with a mosaic of vegetation types, permanent water and abundant small birds. Associated with gorge and escarpment country in partially cleared country in eastern Queensland. In eastern Australia, populations seem to move from inland nest sites to coastal plains in winter, thus occupying home ranges of 50-220 km^2.	**Unlikely** – There are no recent records for this species in the region and the Project Sites are unlikely to provide suitable habitat.
grey falcon	*Falco hypoleucos*	V	V	The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. It has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
squatter pigeon (southern)	*Geophaps scripta scripta*	V	V	The species occurs in open, dry woodland with a grassy understorey in proximity to permanent water. Prefers areas of sandy soil with sparser cover of low grasses; and less common on heavier soils with dense grass cover.	**Known** – The species was recorded on 14 occasions during surveys, the majority being from the south-eastern portion of the site, including tracks in close proximity to MM2.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
white-throated needletail	*Hirundapus caudacutus*	V, M	V	The species is found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial, though it roosts in tree hollows and the foliage canopy. It forages for insects aerially, flying anywhere between "cloud level" and "ground level", often forming mixed feeding flocks with other species. The species roosts in tall trees at night, mainly in forests.	**Moderate** – The species has been previously recorded in the Ecology Study Area and may overfly and forage over the Project Sites.
star finch (eastern, southern)	*Neochmia ruficauda ruficauda*	E	E	The species inhabits tall grass and reed beds associated with swamps and watercourses. It may also be found in grassy woodlands, open forests and mangroves. The condition of preferred habitat varies according to season, grazing pressure and fire.	**Unlikely** – The Project Sites are unlikely to provide suitable habitat and the species is presumed extinct.
eastern curlew	*Numenius madagascariensis*	CE	E	The species occurs in sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. The species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. They are often recorded among saltmarsh and on mudflats fringed by mangroves, sometimes within the mangroves. They are also found in coastal saltworks and sewage farms.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
powerful owl	*Ninox strenua*	-	V	The species is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses.	**Unlikely –** The species has been previously recorded from adjacent Morinish State Forest however suitable habitat is not present within the Project Sites.
southern black-throated finch	*Poephila cincta cincta*	E	E	The species inhabits grassy, open woodlands and forests, typically dominated by Eucalyptus spp. (including *E. crebra*, *E. camaldulensis* and *E. melanophloia), Corymbia* spp. and *Melaleuca* spp, and occasionally in tussock grasslands or other habitats often along or near watercourses, or in the vicinity of water.	**Unlikely** – The Project Sites are unlikely to provide suitable habitat and the species is presumed extinct in the region.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
Australian painted snipe	*Rostratula australis*	E	E	The species occurs in shallow freshwater wetlands or saltmarshes, including inundated grasslands, dams and bore drains, generally with good cover of grasses or low scrub.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
black-breasted button-quail	*Turnix melanogaster*	V	V	The species is restricted to rainforests and forests, mostly in areas with 770-1200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest. They may also be found in low, dense acacia thickets and, in littoral areas, in vegetation behind sand dunes.	**Unlikely** – The species has been previously recorded in close proximity (<1 km) to the Ecology Study Area however there is no suitable habitat within the Project Sites.
Mammals					
large-eared pied bat	*Chalinolobus dwyeri*	V	V	In south-east Qld, the species has primarily been recorded from higher altitude moist tall open forest adjacent to rainforest. Most records are from canopied habitat, although narrow connecting riparian strips in otherwise cleared habitat are sometimes quite heavily used. Rainforest and moist eucalypt forest habitats on rhyolite, trachyte and basalt at high elevation are important roosting habitat for the species.	**Unlikely** – The species is known to the region and suitable habitat including cave systems is present within the Ecology Study Area, however the Project Sites are unlikely to provide suitable habitat.
northern quoll	*Dasyurus hallucatus*	E	-	The species occupies a diversity of habitats including rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. The species is also known to occupy non-rocky lowland habitats such as beach scrub communities in central Queensland. The species generally encompasses some form of rocky area for denning purposes, with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected.	**Unlikely** – The species is known to the region and suitable habitat including vine thicket gullies are present within the Ecology Study Area, however the Project Sites are unlikely to provide suitable habitat.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
ghost bat	*Macroderma gigas*	V	E	The species occurs throughout a wide range of habitats from rainforest, monsoon and vine scrub, to open woodlands in arid areas. These habitats are used for foraging, while roost habitat is more specific. Favoured roosting sites of the species are undisturbed caves or mineshafts which have several openings.	**Low** – The species has been previously (in 1979 and 1983) recorded in the south portion of the Ecology Study Area. Marginal foraging habitat may occur within the Project Sites.
south-eastern long-eared bat	*Nyctophilus corbeni*	V	V	The species inhabits a range of inland dry forest habitats including *Eucalyptus camaldulensis*, *Acacia harpophylla* and other arid and semi-arid habitats; in southern Queensland it is more common in box, ironbark and cypress pine forests on sandy soils. The species is most abundant in vegetation with a distinct canopy and a dense, cluttered shrub layer, and in large, continuous remnants. Roosts solitarily in tree hollows, crevices, and under loose bark (particularly on dead *Allocasuarina luehmannii* or *Casuarina cristata*).	**Unlikely** – The Ecology Study Area is located north of the known range of the species and the Project Sites are unlikely to provide suitable habitat.
greater glider	*Petauroides volans*	V	V	The species is largely restricted to eucalypt forests and woodlands; it is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows.	**Low –** The species was recorded twice during surveys from riparian woodland in the south-eastern portion of the Ecology Study Area, however the Project Sites are unlikely to provide suitable habitat.
koala (combined populations of Qld, NSW and the ACT	*Phascolarctos cinereus*	V	V	The species inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by eucalypt species. The species is limited by habitat (restricted to below 800 m asl (above sea level)), temperature and, at the western and northern ends of the range, leaf moisture.	**Unlikely** – The species is known from the search extent; however, the Project Sites are unlikely to provide suitable habitat.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
grey-headed flying-fox	*Pteropus poliocephalus*	V	-	The species occurs in rainforests, open forests, woodlands and Melaleuca swamps. Roosting camps are usually in dense riparian vegetation.	**Moderate** –There is an active roost site near the Ecology Study Area at Kabra, east of Stanwell, where the species was recorded in 2017. The species may overfly the Project Sites while foraging or commuting to/from the camp.
Reptiles					
collared delma	*Delma torquata*	V	V	The species normally inhabits eucalypt-dominated woodlands and open-forests in the following land zones: alluvium, undulating country on fine-grained sedimentary rocks, and sandstone ranges. The presence of rocks, logs, coarse woody debris and leaf litter are essential characteristics of the species' microhabitat.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
ornamental snake	*Denisonia maculata*	V	V	The species inhabits lower-lying subtropical areas with deep-cracking clay soils and adjacent slightly elevated ground of clayey and sandy loams. The species is also found in vegetation of woodland and shrub land, including *Acacia harpophylla*, riverside woodland and open forest, particularly on natural levees.	**Unlikely** – The species is known from the wider region however the Project Sites are unlikely to provide suitable habitat.
yakka skink	*Egernia rugosa*	V	V	The species occurs in a variety of drier forests and woodlands, usually on well-drained, gritty soils, including *Eucalyptus populnea* on alluvial soils, *Callitris glaucophylla* on sands, *Allocasuarina luehmannii*, *Acacia harpophylla*, *A. catenulata* and *A. aneura*. The species inhabits burrows, abandoned rabbit warrens, and hollow logs or in deep rock crevices.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
southern snapping turtle	*Elseya albagula*	CE	CE	The species is only found in the Burnett, Fitzroy, Raglan and Mary river drainages of south-east Queensland. It prefers permanent flowing water habitats where there are suitable shelters and refuges.	**Unlikely** – The species has been recorded in the wider region from Fitzroy River however the Project Sites lack suitable watercourses to support this species.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
Dunmall's snake	*Furina dunmalli*	V	V	The species has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay/ clay loams dominated by including *Acacia harpophylla* and other *Acacia* spp., *Callitris* spp. or *Allocasuarina luehmannii,* and various *Corymbia citriodora*, *Eucalyptus crebra* and *E. melanophloia*) *and Callitris glaucophylla* open forest and woodland associations on sandstone derived soils.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
grey snake	*Hemiaspis damelii*	-	E	The species favours woodlands, typically *Acacia harpophylla* and *Casuarina cristata*, usually on heavier, cracking clay soils, particularly in association with water bodies or in areas with gilgais.	**Unlikely** – The species is not known from the search extent and the Project Sites are unlikely to provide suitable habitat.
Fitzroy river turtle	*Rheodytes leukops*	V	V	The species is a benthic feeder that occurs in flowing rivers with large deep pools with rocky, gravelly or sandy substrates, connected by shallow riffles. Preferred areas have high water clarity and are often associated with beds of *Vallisneria* sp.. Commonly associated riparian vegetation includes *Eucalyptus tereticornis*, *Casuarina cunninghamiana*, *Melaleuca viminalis* and *M. linariifolia*.	**Unlikely** – The species has been recorded in the wider region from Fitzroy River however the Project Sites lack suitable watercourses to support this species.
Frogs					
tusked frog	*Adelotus brevis*	-	V	The species inhabits wet eucalypt forest, rainforest, and sometimes dry eucalypt forest, where it can be found in close proximity to suitable breeding habitat such as ponds and slow-moving sections of streams.	**Unlikely –** The species has been previously recorded from adjacent Morinish State Forest; however, the Project Sites are unlikely to provide suitable habitat.
Flora					
miniature moss-orchid	*Bulbophyllum globuliforme*	V	NT	The species is host-specific, only growing on *Araucaria cunninghamii*, where it colonises the upper branches of mature trees. *Araucaria cunninghamii* occurs in upland (usually 100-900 m asl) subtropical rainforest communities.	**Unlikely** – The species is not known from the search extent and no suitable habitat occurs within the Project Sites.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
ooline	*Cadellia pentastylis*	V	V	The species occurs in a range of vegetation types including semi-evergreen vine thicket, *Acacia harpophylla - Casuarina cristata*, *Eucalyptus populnea* and *A. catenulata* communities. It often occurs on the edges of sandstone and basalt escarpments, 200 to 500 m asl. In most areas of its range, it grows on the moderately fertile soils preferred for agriculture and pasture development.	**Unlikely** – The species is known from the wider region however no suitable habitat occurs within the Project Sites.
-	*Capparis humistrata*	-	E	The species grows in eucalypt woodland with a shrubby understorey, on stony hard ridges and serpentinite soil. It also occurs on the margins of brigalow forest on sandy soil.	**Unlikely** – The species is known from the search extent however no suitable habitat occurs within the Project Sites.
-	*Cerbera dumicola*	-	NT	The species occurs across a range of habitats in central and southern Queensland. Associated vegetation and species include: open eucalypt woodland with species such as *Eucalyptus umbra* subsp. *carnea*, *E. melanophloia*, *E. populnea*, *E. brownii, E. thozetiana*, *Corymbia dolichocarpa* and *C. tessellaris* sometimes with *Acacia shirleyi*, *A. catenulata* and/or *A. aneura*; notophyll-microphyll vine forest including *Brachychiton australis Gyrocarpus americanus*, *Flindersia australis* etc.; and semi-evergreen vine thicket with *C. citriodora* and *C. aureola* emergent.	**Unlikely** – The species was recorded during surveys in the Ecology Study Area; one in the southeast at proposed turbine location at the top of a large ridge, and one on a rocky slope in the north. Surveys of the Project Sites did not confirm the species.
cossinia	*Cossinia australiana*	E	E	The species is known from fragmented relict patches of araucarian vine forests or vine thickets on fertile soils. At most sites it is recorded as uncommon, usually as scattered individuals.	**Unlikely** – The species is known from the wider region however no suitable habitat occurs within the Project Sites.
-	*Cycas megacarpa*	E	E	The species is found in woodland, open woodland and open forests, often in conjunction with a grassy understory. This species is found in habitat dominated by *Eucalyptus crebra* and *Corymbia citriodora* as well as *C. erythrophloia, E. melanophloia* and *Lophostemon confertus*. There are also reports that it can be found in or on the edge of rainforest habitat.	**Unlikely –** The species was recorded during surveys in the south-eastern portion of the Ecology Study Area. Surveys of the Project Sites did not confirm the species.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
-	*Cycas ophiolitica*	E	E	The species occurs on hills and slopes in sparse, grassy open forest at altitude ranges from 80–400 m asl. It is frequently found on shallow, stony, infertile soils developed on sandstone and serpentinite, and is often associated with species such as *Corymbia dallachiana*, *C. erythrophloia*, *C. xanthope* and *Eucalyptus fibrosa*. Climate in the habitat of the species is tropical with hot, humid summers and mild, dry winters.	**Unlikely** – The species is known from the search extent however no suitable habitat occurs within the Project Sites.
bluegrass	*Dichanthium setosum*	V		The species occurs on heavy soils (predominantly cracking clays or alluvium, often in gilgai) in woodland or open woodland usually dominated by Acacia and/or Eucalyptus species. Associated climate is tropical to subtropical and seasonal, with the habitat drying out for part of the year.	**Unlikely** – The species is not known from the search extent and no suitable habitat occurs within the Project Sites.
black ironbox	*Eucalyptus raveretiana*	V	-	The species usually grows along watercourses, to a lesser extent river flats or open woodland at 0-300 m asl in sub-tropical climates. Soil varies from sand to heavy clays. The species does not occur in pure stands, but is co-dominant with species including *Melaleuca leucadendra*, *M. fluviatilis*, *Eucalyptus tereticornis*, *Corymbia tessellaris*, and occasionally in semi evergreen vine thicket.	**Unlikely –** The species was recorded in a creek line in the south-eastern corner of the Ecology Study Area. There is no suitable riparian habitat within the Project Sites.
-	*Graptophyllum excelsum*	-	NT	The species primarily occurs in semi-evergreen vine thicket, although it has also been recorded growing in grassy woodland in association with *Eucalyptus cullenii* and *Corymbia erythrophloia*.	**Unlikely** – The species is known from the wider region however no suitable habitat occurs within the Project Sites.
three-veined hakea	*Hakea trineura*	V	V	This species is confined to soils derived from serpentinite rocks mostly on gravelly ridges and slopes. It grows in open eucalypt forest over hummock grassland. Associated species include *Eucalyptus fibrosa* subsp. (Glen Geddes), *Corymbia xanthope*, *Alphitonia excelsa*, *Grewia latifolia*, *Jasminum simplicifolium* subsp. *australiense* and *Triodia mitchellii*.	**Unlikely** – The species is not known from the search extent and no suitable habitat occurs within the Project Sites.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
-	*Macrozamia serpentina*	-	E	The species occurs in low eucalypt woodland with a mixed grassy understorey at elevations between 80-160 m asl. It grows on steep rocky slopes on red clay loams and serpentinite soils.	**Unlikely** – The species is known from the wider region however no suitable habitat occurs within the Project Sites.
-	*Marsdenia brevifolia*	V	-	The species grows on serpentine rock outcrops or crumbly black soils derived from serpentine in eucalypt woodland, often with *Eucalyptus fibrosa* and *Corymbia xanthope*.	**Unlikely** – The species is not known from the search extent and no suitable habitat occurs within the Project Sites.
lesser swamp-orchid	*Phaius australis*	E	E	The species is commonly associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where *Melaleuca quinquenervia* or *Eucalyptus robusta* are found. Typically restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest, swampy rainforest, or fringing open forest.	**Unlikely** – The species is not known from the search extent and no suitable habitat occurs within the Project Sites.
-	*Pimelea leptospermoides*	V	-	The species is restricted to stony ridges, slopes and flats in sandy clay soils derived from serpentine. It typically occurs in open *Eucalyptus fibrosa* subsp. *fibrosa–Corymbia xanthope* woodland, often with a shrubby understorey including *Xanthorrhoea johnsonii*, *Macrozamia serpentina* and *Acacia* species. The species also occurs in tall to low open forest with a grassy/ heathy understorey, and woodland with a *Melaleuca bracteata* understorey, where prolonged flooding occurs.	**Unlikely** – The species is known from the search extent however no suitable habitat occurs within the Project Sites.
quassia	*Samadera bidwillii*	V	V	The species occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. It is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils.	**Unlikely** – The species is known from the search extent however no suitable habitat occurs within the Project Sites.

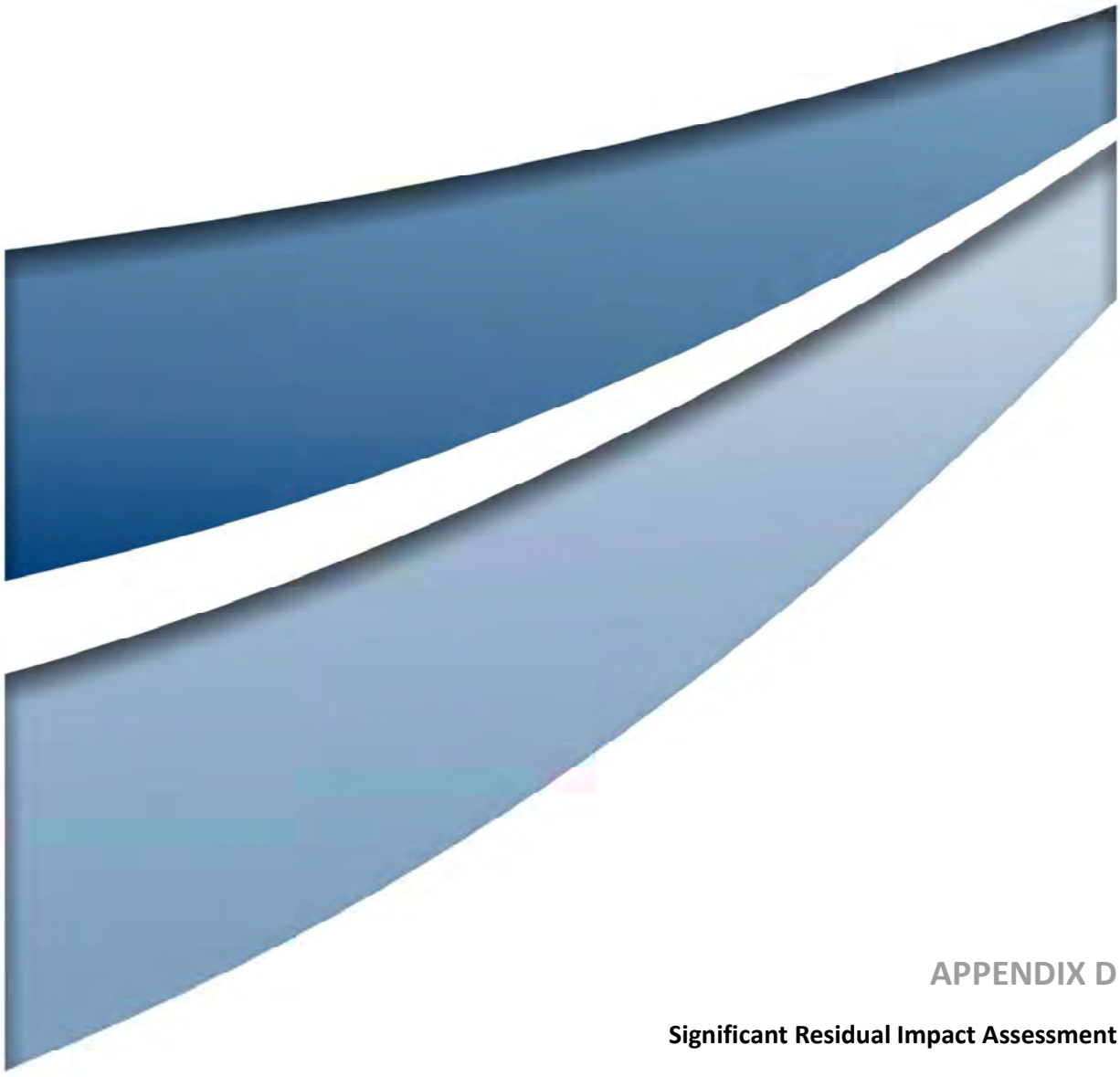
Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
Migratory Species					
Marine Birds					
fork-tailed swift	*Apus pacificus*	M	SLC	The species is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher.	**Moderate** – The species has been previously recorded in the Ecology Study Area and may overfly and forage over the Project Sites.
Marine Species					
salt-water crocodile	*Crocodylus porosus*	M	SLC	The species mostly occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast. It usually inhabits the estuarine reaches of rivers. In Queensland, the species is usually restricted to coastal waterways and floodplain wetlands. Floating rafts of vegetation provide important nesting habitat.	**Unlikely** – The species has been recorded in the wider region from Fitzroy River however the Project Sites lack suitable watercourses to support this species.
Terrestrial Species					
oriental cuckoo	*Cuculus optatus*	M	SLC	The species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and often along edges of forests, or ecotones between forest types.	**Unlikely** – The species is known from the wider region however no suitable habitat occurs within the Project Sites.
black-faced monarch	*Monarcha melanopsis*	M	SLC	The species is a wet forest specialist, occurring mainly in rainforests and riparian vegetation. In wet sclerophyll forest, the species mostly frequents sheltered gullies and slopes with a dense understorey of ferns and/or shrubs. They forage from trees and shrubs or by taking insect prey from the air (sallying).	**Unlikely –** This species has been previously recorded in the south portion of the Ecology Study Area and from adjacent Morinish State Forest; however, there is no suitable riparian habitat within the Project Sites.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
spectacled monarch	*Monarcha trivirgatus*	M	SLC	The species occurs in thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	**Unlikely –** This species has been previously recorded in the south portion of the Ecology Study Area; however, there is no suitable riparian habitat within the Project Sites.
yellow wagtail	*Motacilla flava*	M	SLC	Habitat requirements for the species are highly variable, but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves.	**Unlikely** – The species is not known from the search extent and no suitable habitat occurs within the Project Sites.
satin flycatcher	*Myiagra cyanoleuca*	M	SLC	The species inhabits heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	**Unlikely** – The species is not known from the search extent and no suitable habitat occurs within the Project Sites.
rufous fantail	*Rhipidura rufifrons*	M	SLC	In east and south-east Australia, the species mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts; usually with a dense shrubby understorey often including ferns.	**Unlikely –** This species has been previously recorded in the south portion of the Ecology Study Area; however, there is no suitable riparian habitat within the Project Sites.
Wetlands Species					
common sandpiper	*Actitis hypoleucos*	M	SLC	The species utilises a wide range of coastal wetlands and some inland wetlands with varying levels of salinity. The species is mostly found around muddy margins or rocky shores and rarely on mudflats. It has been recorded in estuaries and deltas of streams, as well as on banks further upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties.	**Unlikely** – The species is not known from the search extent and suitable wetland habitat does not occur within the Project Sites.

Scientific Name	Common Name	EPBC Act Status[1]	NC Act Status[1]	Preferred Habitat	Likelihood of Occurrence
sharp-tailed sandpiper	*Calidris acuminata*	M	SLC	The species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. They also occur in salt works and sewage farms.	**Unlikely** – The species is not known from the search extent and suitable wetland habitat does not occur within the Project Sites.
pectoral sandpiper	*Calidris melanotos*	M	SLC	The species prefers shallow fresh to saline wetlands. It is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	**Unlikely** – The species is not known from the search extent and suitable wetland habitat does not occur within the Project Sites.
Latham's snipe	*Gallinago hardwickii*	M	SLC	In Australia, the species occurs in permanent and ephemeral wetlands up to 2000 m asl. They usually inhabit open, freshwater wetlands with low, dense vegetation such as swamps, flooded grasslands or heathlands, around bogs and other water bodies.	**Unlikely** – The species is not known from the search extent and suitable wetland habitat does not occur within the Project Sites.
osprey	*Pandion haliaetus*	M	SLC	In east and south-east Australia, the species mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts; usually with a dense shrubby understorey often including ferns.	**Unlikely** – The species is not known from the search extent and suitable wetland habitat does not occur within the Project Sites.
common greenshank	*Tringa nebularia*	M	SLC	The species is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons.	**Unlikely** – The species is not known from the search extent and suitable wetland habitat does not occur within the Project Sites.

[1]**Abbreviations:**

NT – Near Threatened V – Vulnerable E – Endangered CE – Critically Endangered M – Migratory SLC – Special Least Concern



APPENDIX D

Significant Residual Impact Assessment

D. Protected Wildlife Habitat

With regards to fauna, protected wildlife habitat prescribed in the *Environmental Offsets Regulation 2014* includes:

- an area of essential habitat on the essential habitat map for an animal or plant that is endangered or vulnerable wildlife
- an area of habitat (e.g., foraging, roosting, nesting or breeding habitat) for an animal that is endangered, vulnerable or a special least concern animal.

One threatened species is known to occur in the immediate vicinity of the Project Sites (specifically, MM2), while three threatened/special least concern species are considered as having a moderate likelihood of occurring in the Project Sites. The area of potential habitat in the Project Sites for each species is provided in the table below, noting the non-remnant status of the vegetation.

Common Name	Scientific Name	Likelihood of Occurrence	Area (ha)		
			MM1	MM2	Total
Threatened Species					
squatter pigeon (southern)	*Geophaps scripta scripta*	Known	3.1	3.1	6.2
white-throated needletail	*Hirundapus caudacutus*	Moderate	3.1	3.1	6.2
Special Least Concern Species					
fork-tailed swift	*Apus pacificus*	Moderate	3.1	3.1	6.2

A significant residual impact test was performed for each of these species in accordance with the *Queensland Environmental Offsets Policy Significant Residual Impact Guideline* (DEHP 2014) and is presented in the following sections.

D.1 Threatened Species

D.1.1 Squatter Pigeon (Southern) (*Geophaps scripta scripta*)

Evaluation Criteria	Response
Lead to a long-term decrease in the size of local population	**No.** The species has been observed during field surveys from within highly disturbed, non-remnant portions of the Ecology Study Area, including one record within 100 m of MM2. Habitat in which the species has been observed to date is equivalent to habitat occurring within the Project Sites. The species is likely to utilise these previously disturbed areas regardless of the Project. The collision with the meteorological masts guy wires causing injury or mortality is considered unlikely or a very infrequent occurrence. It is therefore considered unlikely that the Project will lead to a long-term decrease in the population.
Reduce the extent of occurrence of the species	**No.** The species has been observed during field surveys from within highly disturbed, non-remnant portions of the Ecology Study Area. The species is likely to utilise these previously disturbed areas regardless of the Project, which itself occurs in a disturbed, non-remnant area. Given the small area of habitat represented within the Project Sites comparative to the amount of suitable habitat in the surrounding landscape, vegetation removal associated with the temporary meteorological masts are unlikely to lead to a material change to the availability or quality of habitat for the species to the point where the species' extent of occurrence would be reduced.
Fragment an existing population	**No.** Given the high mobility of the species and its presence in previously disturbed/fragmented areas of the Ecology Study Area as well as the localised extent of disturbance, the Project is unlikely to fragment an existing population.
Result in genetically distinct populations forming as a result of habitat isolation	**No.** Given the high mobility of the species and its presence in previously disturbed/fragmented areas of the Ecology Study Area as well as the localised extent of disturbance, the Project is unlikely to isolate habitat to the extent where genetically distinct populations would form.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**No.** Invasive species, particularly weeds, were recorded throughout the Ecology Study Area. Given the current status of weeds and pests within the landscape, and that best practice weed hygiene measures to control weeds will be implemented for the Project, it is unlikely that the proposed works will result in further introductions or exacerbation of introduced species.
Introduce disease that may cause the population to decline	**No.** There are no known diseases affecting the species. The Project follows best practice construction and operational methods, and therefore introduction of a disease is unlikely.
Interfere with the recovery of the species	**No.** There is no recovery plan currently in place for the species. A key threat to the recovery of the species is habitat loss/degradation. The species has been observed during field surveys from within highly disturbed, non-remnant portions of the Ecology Study Area. The species is likely to utilise these previously disturbed areas regardless of the Project, which itself occurs in a disturbed, non-remnant area.

Evaluation Criteria	Response
	Given the small area of habitat represented within the Project Sites comparative to the amount of suitable habitat in the surrounding landscape, it is unlikely the Project will interfere with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	**No.** The species has been observed during field surveys from within highly disturbed, non-remnant portions of the Ecology Study Area. The species is likely to utilise these previously disturbed areas regardless of the Project, which itself occurs in a disturbed, non-remnant area. Given the small area of habitat represented within the Project Sites comparative to the amount of suitable habitat in the surrounding landscape, as well as the disturbed, non-remnant status of vegetation within the Project Sites, the Project is unlikely to disrupt ecologically significant locations.

D.1.2 White-throated Needletail (*Hirundapus caudacutus*)

Evaluation Criteria	Response
Lead to a long-term decrease in the size of local population	**No.** The species is an international migrant that has been recorded from the Ecology Study Area. It exists within the Ecology Study Area and surrounding region as transient populations, often influenced by prevailing weather conditions. Given the aerial nature of the species, localised extent of disturbance and availability of similar non-remnant habitat nearby, a long-term decrease in the size of a local population of this species is unlikely to result from habitat loss. There is a possibility that meteorological mast guy wires may occasionally result in collisions causing injury or mortality, although considered infrequent. Due to the expected low frequency of such occurrences, collisions are considered unlikely to lead to a long-term decrease in the size of a local population of this species.
Reduce the extent of occurrence of the species	**No.** Given the species' aerial nature, very high mobility and broad habitat requirements in addition to the localised extent of disturbance and availability of similar non-remnant habitat in the broader region, the temporary meteorological masts are unlikely to reduce the occurrence of the species.
Fragment an existing population	**No.** Given the species' aerial nature and very high mobility, as well as the localised extent of disturbance and availability of similar non-remnant habitat in the broader region, the temporary meteorological masts are unlikely to present significant barriers to a population to the extent where it would become fragmented.
Result in genetically distinct populations forming as a result of habitat isolation	**No.** Given the species' aerial nature and very high mobility, as well as the localised extent of disturbance and availability of similar non-remnant habitat in the broader region, the temporary meteorological masts are unlikely to isolate habitat to the extent where genetically distinct populations would form.
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**No.** Invasive species, particularly weeds, were recorded throughout the Ecology Study Area. Given the current status of weeds and pests within the landscape, and that best practice weed hygiene measures to control weeds will be implemented for the Project, it is unlikely that the proposed works will result in further introductions or exacerbation of introduced species.

Evaluation Criteria	Response
Introduce disease that may cause the population to decline	**No.** There are no known diseases affecting the species. The Project follows best practice construction and operational methods, and therefore introduction of a disease is unlikely.
Interfere with the recovery of the species	**No.** The recovery objectives of the species are mostly centred around the primary objective of protection of breeding habitat in East Asia. Another primary objective is the protection of important habitat in Australia which includes roosting locations, of which none were identified within the Project Sites. Wind farms are recognised as potential threat to the species, and the improvement of knowledge surrounding the species and wind farms is a recovery objective. Given the above objectives, it is unlikely that the temporary meteorological masts will interfere with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	**No.** Ecologically significant locations within Australia may include foraging habitat and recognised migration pathways. Given the broad habitat requirements of the species and presence of vast areas of suitable habitat beyond the Project, in addition to the localised extent of disturbance and non-remnant status of the vegetation in the Project Sites, the Project is unlikely to disrupt these activities.

D.2 Special Least Concern Species

D.2.1 Fork-tailed Swift (*Apus pacificus*)

Evaluation Criteria	Response
Lead to a long-term decrease in the size of local population	**No.** The species is an international migrant that has been recorded from the Ecology Study Area. It exists within the Ecology Study Area and surrounding region as transient populations, often influenced by prevailing weather conditions. Given the aerial nature of the species, localised extent of disturbance and availability of similar non-remnant habitat nearby, a long-term decrease in the size of a local population of this species is unlikely to result from habitat loss. There is a possibility that meteorological mast guy wires may occasionally result in collisions causing injury or mortality, although infrequent. Due to the expected low frequency of such occurrences, collisions are considered unlikely to lead to a long-term decrease in the size of a local population of this species.
Reduce the extent of occurrence of the species	**No.** Given the species' aerial nature, very high mobility and wide-ranging distribution, as well as the localised extent of disturbance and availability of similar non-remnant habitat in the broader region, the temporary meteorological masts are unlikely to reduce the occurrence of the species.
Fragment an existing population	**No.** Given the species' aerial nature and very high mobility, as well as the localised extent of disturbance and availability of similar non-remnant habitat in the broader region, the temporary meteorological masts are unlikely to present significant barriers to a population to the extent where it would become fragmented.
Result in genetically distinct populations forming as a result of habitat isolation	**No.** Given the species' aerial nature and very high mobility, as well as the localised extent of disturbance and availability of similar non-remnant habitat in the broader region, the temporary meteorological masts are unlikely to isolate habitat to the extent where genetically distinct populations would form.

Evaluation Criteria	Response
Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat	**No.** Invasive species, particularly weeds, were recorded throughout the Ecology Study Area. Given the current status of weeds and pests within the landscape, and that best practice weed hygiene measures to control weeds will be implemented for the Project, it is unlikely that the proposed works will result in further introductions or exacerbation of introduced species.
Introduce disease that may cause the population to decline	**No.** There are no known diseases affecting the species. The Project follows best practice construction and operational methods, and therefore introduction of a disease is unlikely.
Interfere with the recovery of the species	**No.** There are no recognised significant threats to the species in Australia, and no identified recovery plan and the temporary meteorological masts are unlikely to lead to long-term declines in the population of the species. For these reasons, the temporary meteorological masts are unlikely to interfere with the recovery of the species.
Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species	**No.** Ecologically significant locations within Australia may include foraging habitat and recognised migration pathways. Given the wide-ranging distribution of the species and presence of vast areas of suitable habitat beyond the Project Sites, in addition to the localised extent of disturbance and non-remnant status of the vegetation in the Project Sites, the Project is unlikely to disrupt foraging/migration activities.

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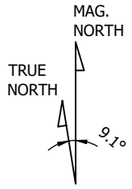

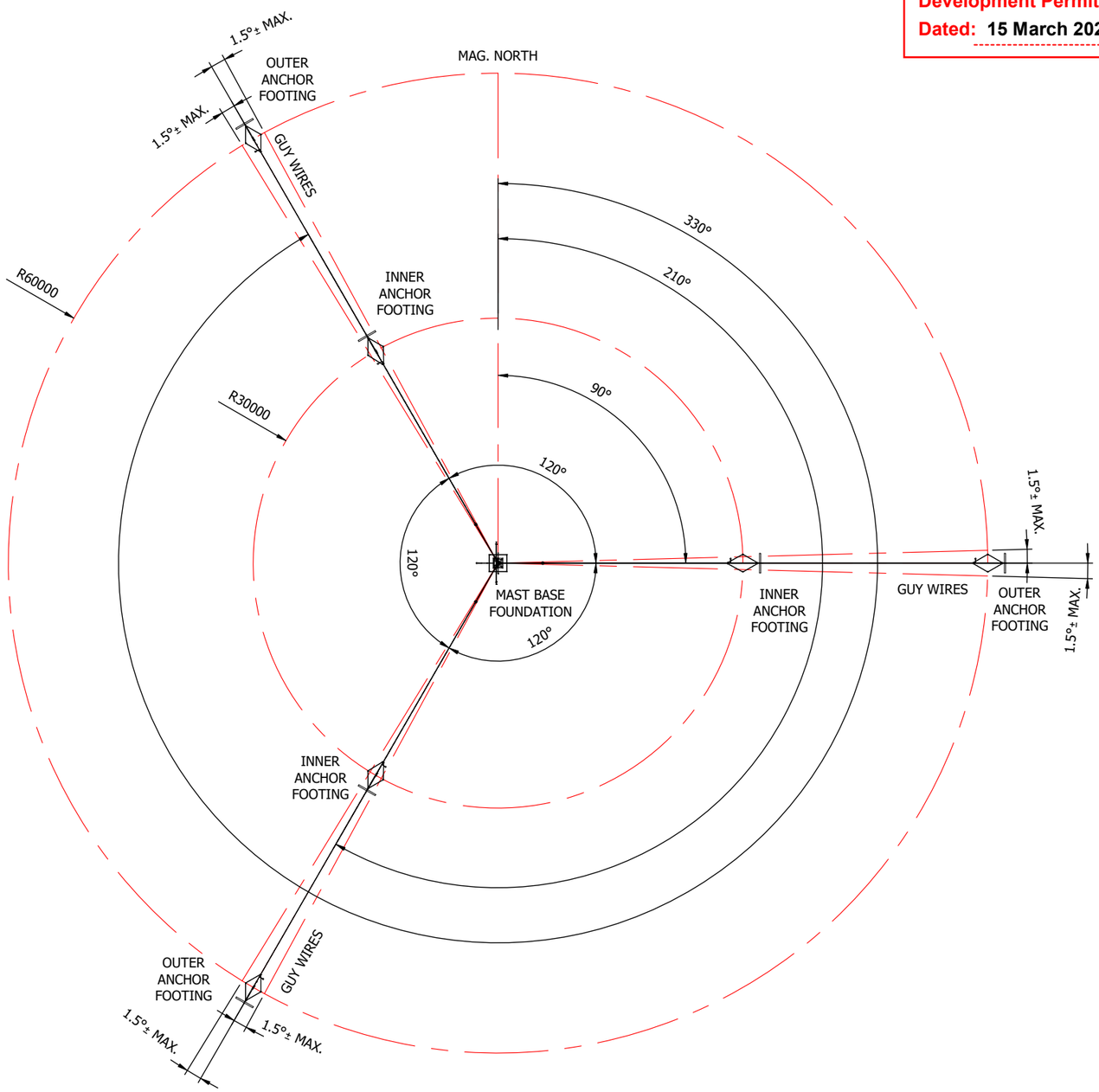

1 / S-03 PLAN VIEW
MAST ARRANGEMENT

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/152-2021

Dated: 15 March 2022

NOTES

REV	DESCRIPTION	DATE
A	ISSUED FOR APPROVAL	10/12/21

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PROJECT
RES GROUP
MOAH CREEK, QLD
MM1 - PIERCE 80M(NOM.) PERMANENT
GL55-36 GUYED LATTICE

SHEET TITLE
MAST PLAN

STATUS
FOR APPROVAL

SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION
1:600	

DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	HY	SR	SR

DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0001	3 / 9	A

NOTE:

1. REFER TO GENERAL NOTES (SHEET 2) FOR MAST SPECIFICATIONS AND ART PROPRIETARY PRODUCT DISCLOSURE.
2. REFER TO MAST ANCILLARY DETAILS (SHEET 5) FOR ANCILLARY DETAILS AND INFORMATION.
3. REFER TO MAST FOOTING DETAILS (SHEET 6) FOR FOOTING DETAILS AND INFORMATION.

GUY WIRE SCHEDULE

MARK	DESCRIPTION	HEIGHT	LENGTH	RADIUS	SIZE	PRE-TENSION
GW-1	GUY WIRE 1 - Ø8.25 (7/2.75) G1320	11820	35000	30000	Ø8.25	3.5kN
GW-2	GUY WIRE 2 - Ø8.25 (7/2.75) G1320	23340	40000			
GW-3	GUY WIRE 3 - Ø8.25 (7/2.75) G1320	34860	50000			
GW-4	GUY WIRE 4 - Ø8.25 (7/2.75) G1320	46380	60000			
GW-5	GUY WIRE 5 - Ø10.00 (19/2.00) G1320	57900	85000	60000	Ø10	5kN
GW-6	GUY WIRE 6 - Ø10.00 (19/2.00) G1320	66540	90000			
GW-7	GUY WIRE 7 - Ø10.00 (19/2.00) G1320	75180	100000			

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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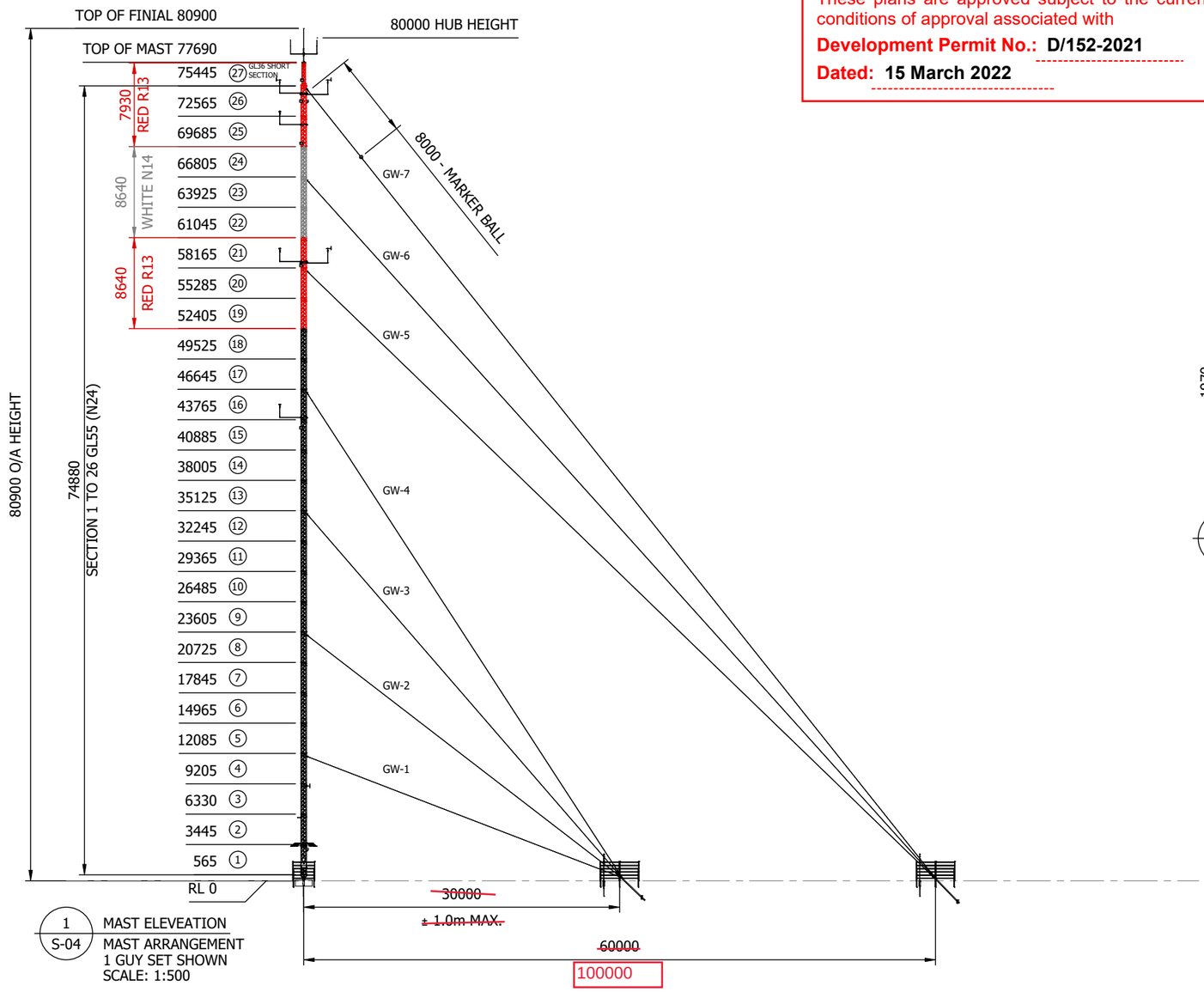
Dated: 15 March 2022



1 / S-04 MAST ELEVEATION
MAST ARRANGEMENT
1 GUY SET SHOWN
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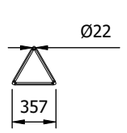

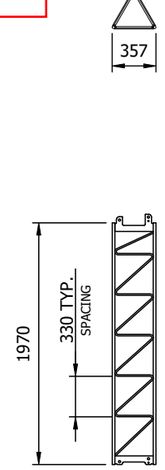

2 / S-04 GLCP-0044
GL36 SHORT SECTION
Ø22 1970L
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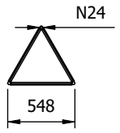

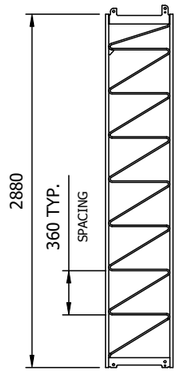

3 / S-04 GLCP-0029
GL55 SECTION
N24 2880L
SCALE: 1:50

NOTES

REV	DESCRIPTION	DATE
A	ISSUED FOR APPROVAL	10/12/21

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RES GROUP
MOAH CREEK, QLD
MM1 - PIERCE 80M(NOM.) PERMANENT
GL55-36 GUYED LATTICE

SHEET TITLE
MAST ELEVATION

STATUS
FOR APPROVAL

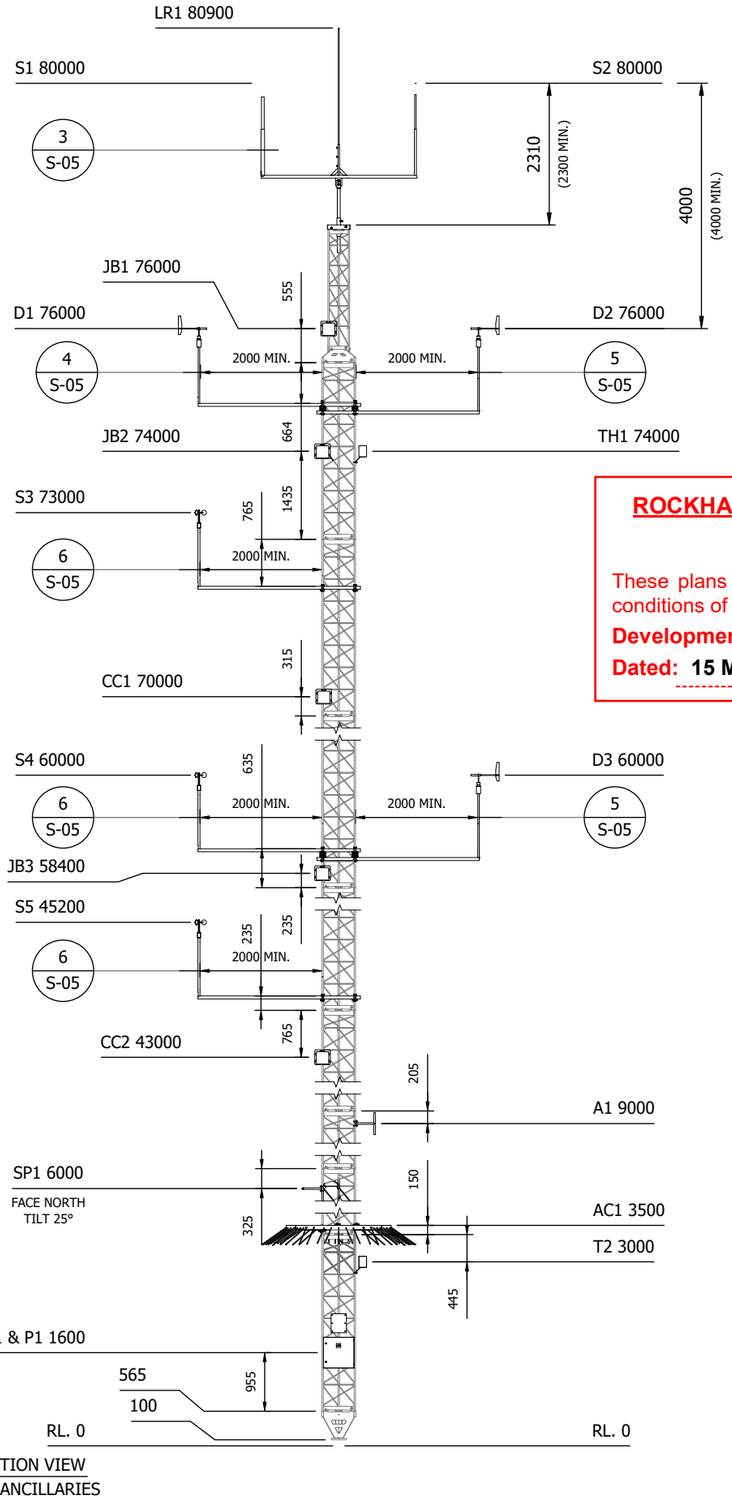
SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION		
1:500			
DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	HY	SR	SR

DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0001	4 / 9	A

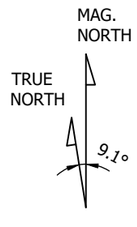
PRIMARY (A)
TRUE NORTH: TBC°
MAG. NORTH: TBC°

MAGNETIC DECLINATION:
9.1°

SECONDARY (B)
TRUE NORTH: TBC°
MAG. NORTH: TBC°



1 S-05 ELEVATION VIEW MAST ANCILLARIES



2 S-05 PLAN VIEW BOOM ARM ORIENTATION

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/152-2021

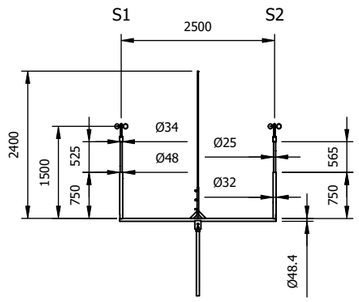
Dated: 15 March 2022

MAST ANCILLARY LOADING

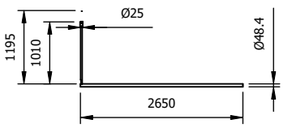
MARK	DESCRIPTION	HEIGHT	SECTION	ESA m²
LR1	LIGHTNING ROD	80900	TOP	0.56
S1	ANEMOMETER THIES FCA2	80000		
S2	ANEMOMETER VECTOR A100			
D1	WIND VANE VECTOR W200P	76000	26	0.35
D2	WIND VANE VECTOR W200P			0.35
JB1	JUNCTION BOX		27	0.06
TH1	TEMP. & HUMIDITY GALTEC MELA KPC	74000	26	0.02
JB2	JUNCTION BOX			0.06
S3	ANEMOMETER THIES FCA2	73000	25	0.2
CC1	CABLE CONNECT	70000	26	0.06
S4	ANEMOMETER THIES FCA2	60000	21	0.2
D3	WIND VANE VECTOR W200P			0.35
JB3	JUNCTION BOX	58400		0.06
S5	ANEMOMETER THIES FCA2	45200	16	0.2
CC2	CABLE CONNECT	43000	15	0.06
A1	ANTENNA OMNI COL7195	9000	3	0.02
SP1	SOLAR PANEL SOLARWAT 50w	6000	2	0.9
AC1	ANTI CLIMB	3500		0.27
T2	TEMP. CAMPBELL SCIENTIFIC 109	3000	1	0.02
P1	PRESURE SENSOR AMMONIT AB60 (INSIDE LB1)	1600		0.06
LB1	CAMPBELL SCIENTIFIC DATA LOGGER CR1000X			0.27
			TOTAL ESA m²	4.07

NOTES:

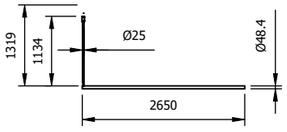
1. STRUCTURAL ALLOWANCE FOR BUNDLED CABLES DOWN MAST LEG(S).
2. ESA VALUES INCLUDE BOOM ARMS, BRACKETS AND INSTRUMENTS.



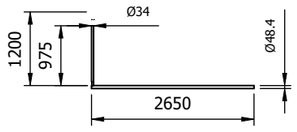
3 S-05 BA-085 TOP GOAL-POST THIES FCA2 A 100LK ANEMOMETER



4 S-05 BA-046 BOOM ARM WIND VANE VECTOR W200P



5 S-05 BA-071 BOOM ARM WIND VANE VECTOR W200P



6 S-05 BA-040 BOOM ARM ANEMOMETER THIES FCA2

NOTES

REV	DESCRIPTION	DATE
A	ISSUED FOR APPROVAL	10/12/21

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MOAH CREEK, QLD
MM1 - PIERCE 80M(NOM.) PERMANENT
GL55-36 GUYED LATTICE

SHEET TITLE
MAST ANCILLARY DETAILS

STATUS
FOR APPROVAL

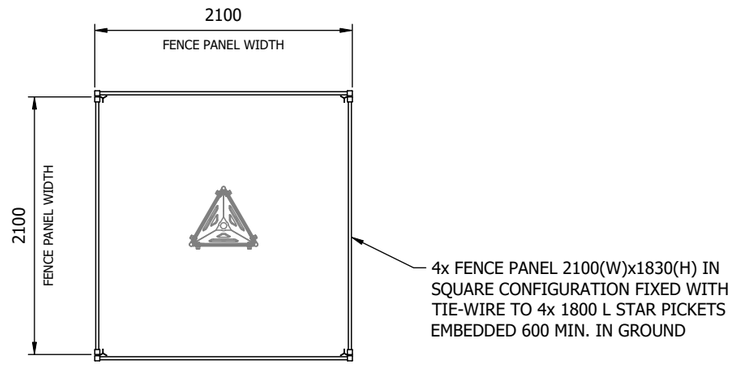
SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION
1:100	

DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	PFB	SR	SR

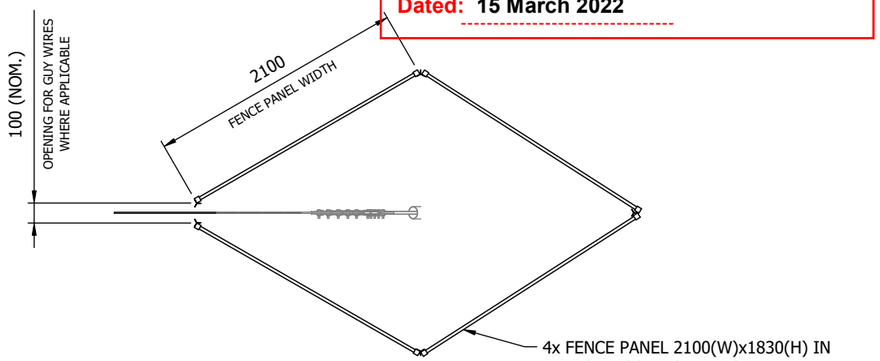
DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0001	5 / 9	A

NOTES:

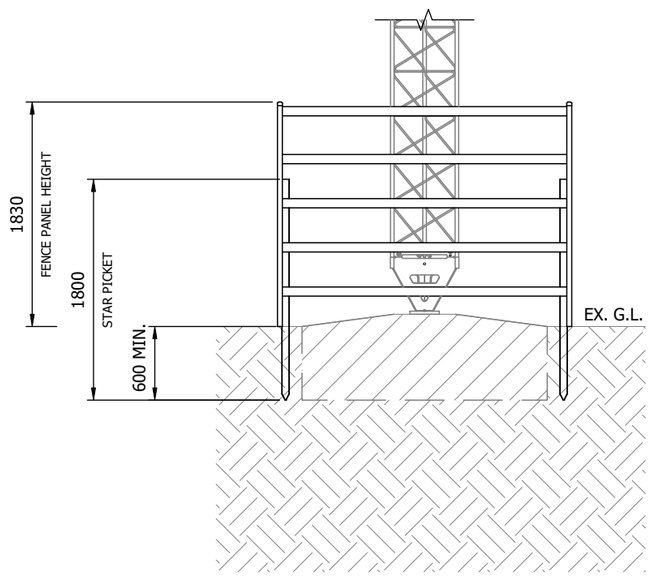
1. POSITION STAR PICKETS BEHIND FENCE PANELS.
2. NO SHARP EDGES ON THE OUTSIDE OF FENCE PANELS.
3. INNER ANCHOR - 4 PANELS & 5 STAR PICKETS.
4. OUTER ANCHOR - 4 PANELS & 4 STAR PICKETS.
5. FOOTINGS SHOWN FOR INDICATIVE PURPOSE ONLY REFER TO MAST FOOTING AND FOUNDATION DETAILS (SHEET 6).



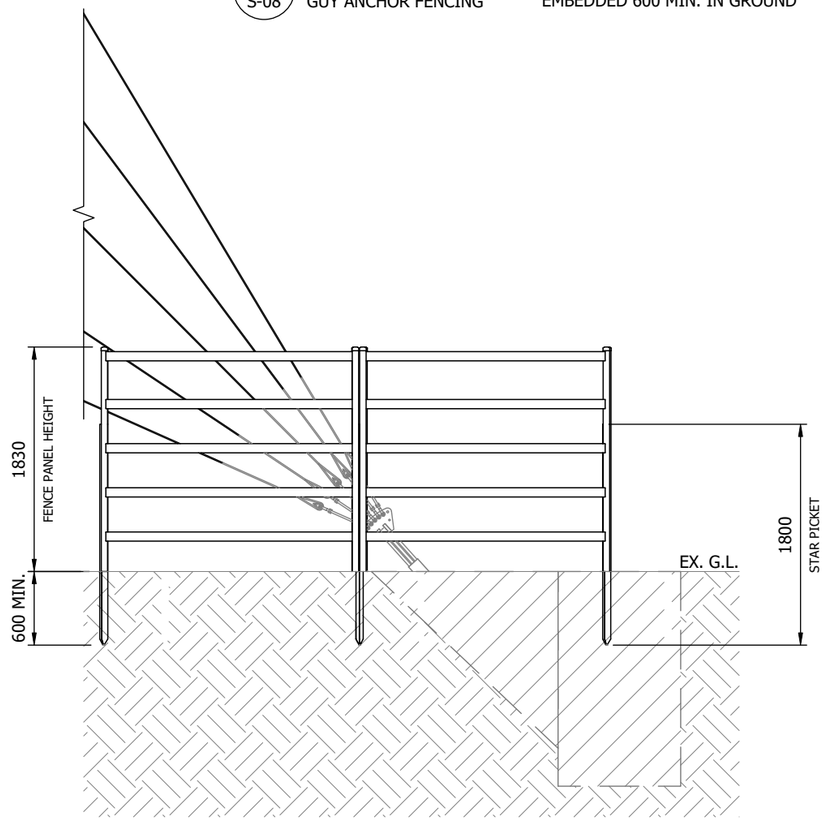
1 / S-08 PLAN VIEW MAST BASE FENCING



3 / S-08 PLAN VIEW GUY ANCHOR FENCING



2 / S-08 SECTION VIEW MAST BASE FENCING



4 / S-08 SECTION VIEW GUY ANCHOR FENCING

ROCKHAMPTON REGIONAL COUNCIL

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Dated: 15 March 2022

NOTES

REV	DESCRIPTION	DATE
A	ISSUED FOR APPROVAL	10/12/21

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PROJECT
RES GROUP
MOAH CREEK, QLD
MM1 - PIERCE 80M(NOM.) PERMANENT
GL55-36 GUYED LATTICE

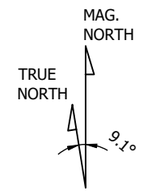
SHEET TITLE
FENCING DETAILS

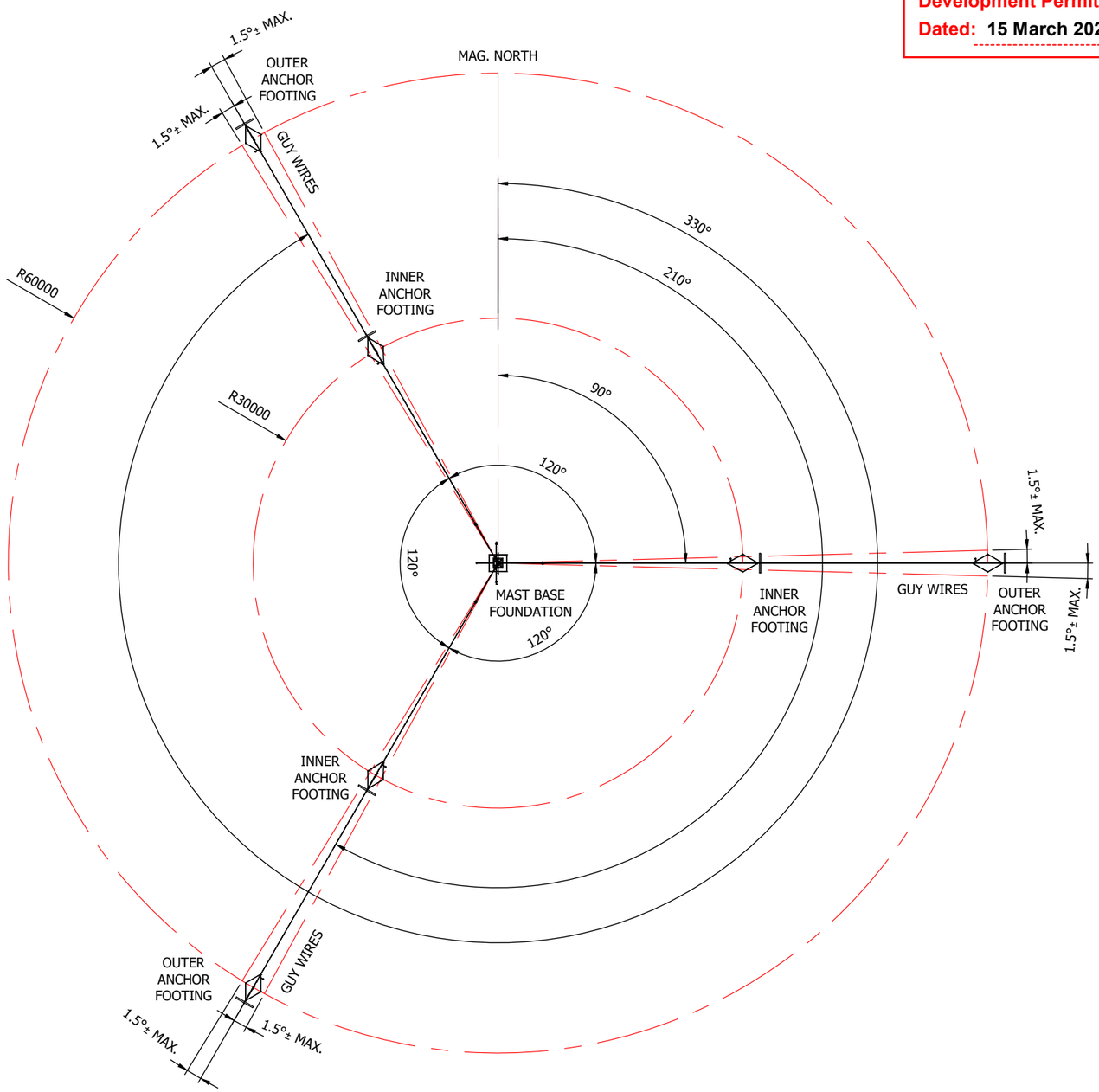
STATUS
FOR APPROVAL

SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION
N.T.S.	

DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	SR	SR	SR

DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0001	8 / 9	A





1 / S-03 PLAN VIEW
MAST ARRANGEMENT

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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RES GROUP
MOAH CREEK, QLD
MM2 - HANRAHAN 80M(NOM.) PERMANENT
GL55-36 GUYED LATTICE

SHEET TITLE
MAST PLAN

STATUS
FOR APPROVAL

SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION
1:600	

DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	HY	SR	SR

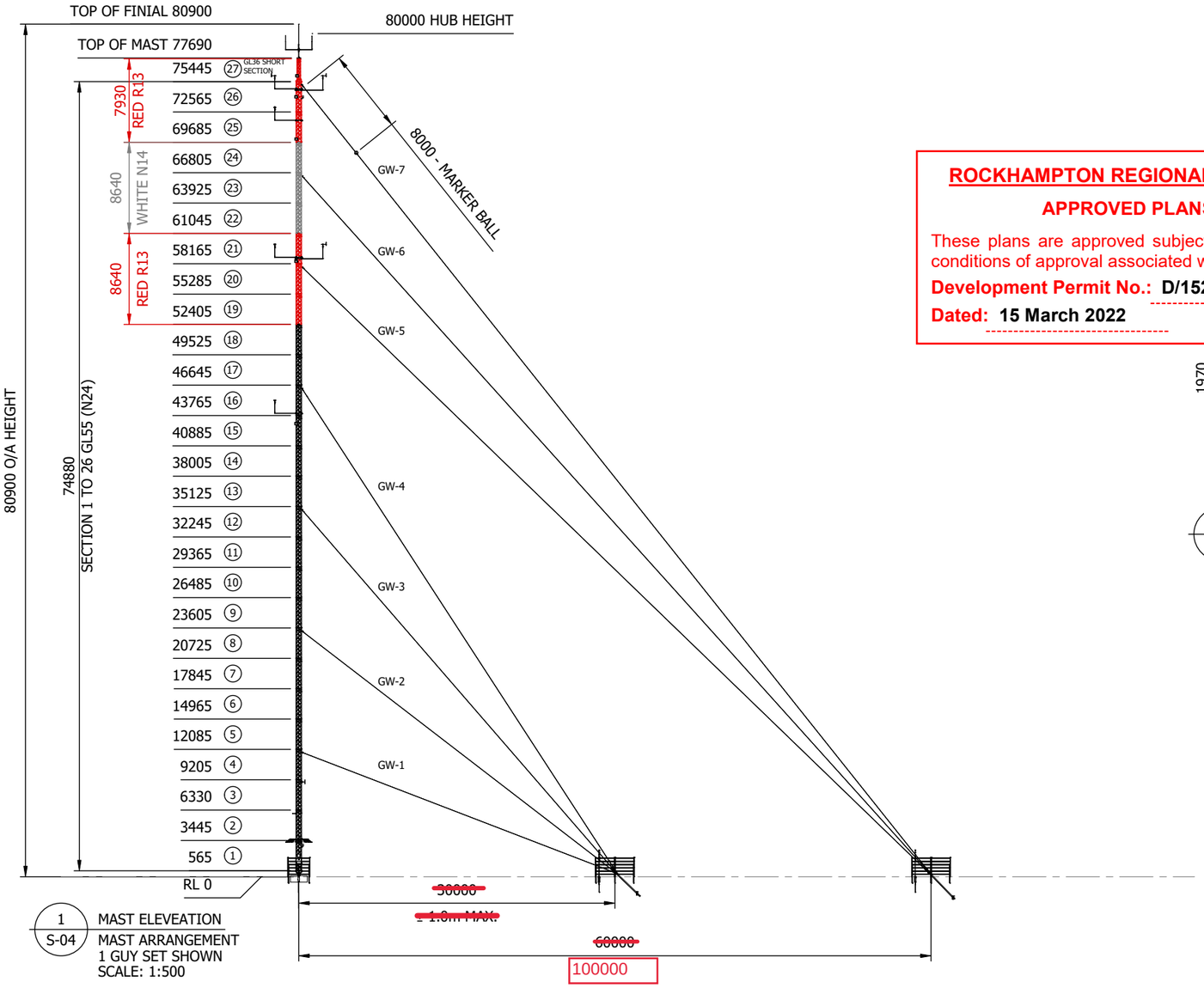
DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0002	3 / 9	A

NOTE:

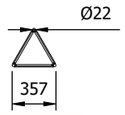
1. REFER TO GENERAL NOTES (SHEET 2) FOR MAST SPECIFICATIONS AND ART PROPRIETARY PRODUCT DISCLOSURE.
2. REFER TO MAST ANCILLARY DETAILS (SHEET 5) FOR ANCILLARY DETAILS AND INFORMATION.
3. REFER TO MAST FOOTING DETAILS (SHEET 6) FOR FOOTING DETAILS AND INFORMATION.

GUY WIRE SCHEDULE

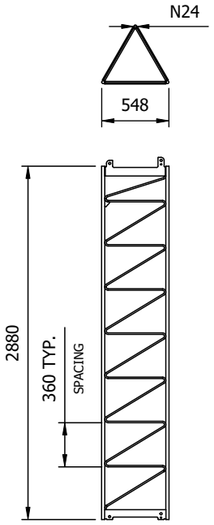
MARK	DESCRIPTION	HEIGHT	LENGTH	RADIUS	SIZE	PRE-TENSION
GW-1	GUY WIRE 1 - Ø8.25 (7/2.75) G1320	11820	35000	30000	Ø8.25	3.5kN
GW-2	GUY WIRE 2 - Ø8.25 (7/2.75) G1320	23340	40000			
GW-3	GUY WIRE 3 - Ø8.25 (7/2.75) G1320	34860	50000			
GW-4	GUY WIRE 4 - Ø8.25 (7/2.75) G1320	46380	60000			
GW-5	GUY WIRE 5 - Ø10.00 (19/2.00) G1320	57900	85000	60000	Ø10	5kN
GW-6	GUY WIRE 6 - Ø10.00 (19/2.00) G1320	66540	90000			
GW-7	GUY WIRE 7 - Ø10.00 (19/2.00) G1320	75180	100000			



1 / S-04 MAST ELEVEATION
MAST ARRANGEMENT
1 GUY SET SHOWN
SCALE: 1:500



2 / S-04 GLCP-0044
GL36 SHORT SECTION
Ø22 1970L
SCALE: 1:50



3 / S-04 GLCP-0029
GL55 SECTION
N24 2880L
SCALE: 1:50

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RES GROUP
MOAH CREEK, QLD
MM2 - HANRAHAN 80M(NOM.) PERMANENT
GL55-36 GUYED LATTICE

SHEET TITLE
MAST ELEVATION

STATUS
FOR APPROVAL

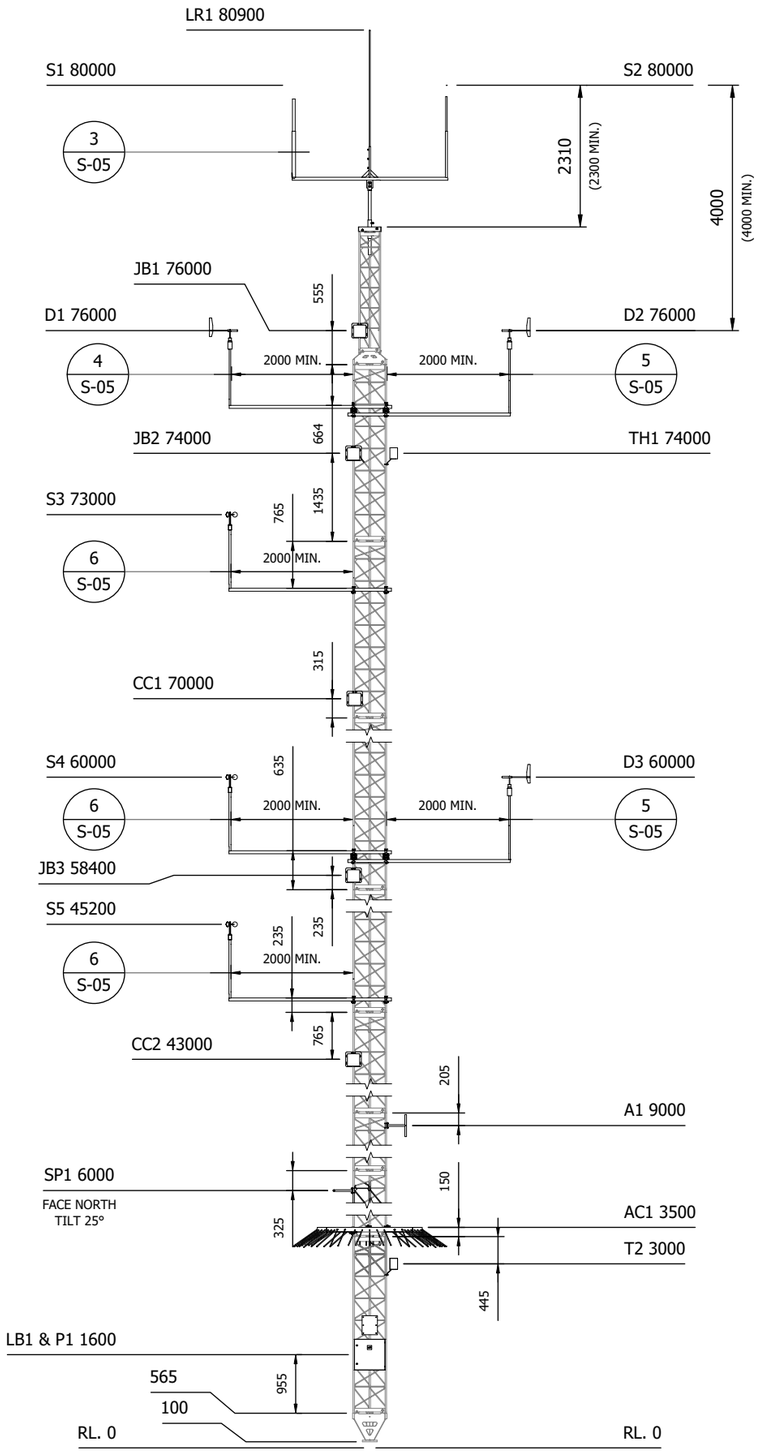
SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION		
1:500			
DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	HY	SR	SR

DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0002	4 / 9	A

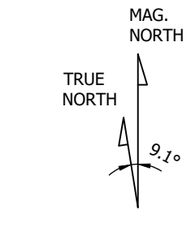
PRIMARY (A)
TRUE NORTH: TBC°
MAG. NORTH: TBC°

MAGNETIC DECLINATION:
9.1°

SECONDARY (B)
TRUE NORTH: TBC°
MAG. NORTH: TBC°



1 / S-05 ELEVATION VIEW
MAST ANCILLARIES

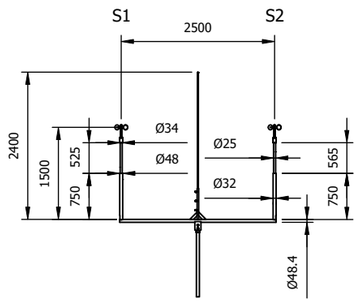


2 / S-05 PLAN VIEW
BOOM ARM ORIENTATION

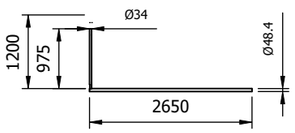
MAST ANCILLARY LOADING

MARK	DESCRIPTION	HEIGHT	SECTION	ESA m²
LR1	LIGHTNING ROD	80900	TOP	0.56
S1	ANEMOMETER THIES FCA2	80000		
S2	ANEMOMETER VECTOR A100			
D1	WIND VANE VECTOR W200P	76000	26	0.35
D2	WIND VANE VECTOR W200P			0.35
JB1	JUNCTION BOX		27	0.06
TH1	TEMP. & HUMIDITY GALTEC MELA KPC	74000	26	0.02
JB2	JUNCTION BOX			0.06
S3	ANEMOMETER THIES FCA2	73000	25	0.2
CC1	CABLE CONNECT	70000	26	0.06
S4	ANEMOMETER THIES FCA2	60000	21	0.2
D3	WIND VANE VECTOR W200P			0.35
JB3	JUNCTION BOX	58400		0.06
S5	ANEMOMETER THIES FCA2	45200	16	0.2
CC2	CABLE CONNECT	43000	15	0.06
A1	ANTENNA OMNI COL7195	9000	3	0.02
SP1	SOLAR PANEL SOLARWAT 50w	6000	2	0.9
AC1	ANTI CLIMB	3500		0.27
TH2	TEMP. CAMPBELL SCIENTIFIC 109	3000	1	0.02
P1	PRESURE SENSOR AMMONIT AB60 (INSIDE LB1)	1600		0.06
LB1	CAMPBELL SCIENTIFIC DATA LOGGER CR1000X			0.27
			TOTAL ESA m²	4.07

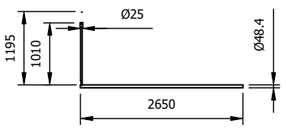
NOTES:
1. STRUCTURAL ALLOWANCE FOR BUNDLED CABLES DOWN MAST LEG(S).
2. ESA VALUES INCLUDE BOOM ARMS, BRACKETS AND INSTRUMENTS.



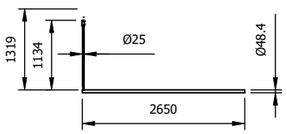
3 / S-05 BA-085
TOP GOAL-POST
THIES FCA2
A 100LK ANEMOMETER



6 / S-05 BA-040
BOOM ARM
ANEMOMETER
THIES FCA2



4 / S-05 BA-046
BOOM ARM
WIND VANE
VECTOR W200P



5 / S-05 BA-071
BOOM ARM
WIND VANE
VECTOR W200P

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GL55-36 GUYED LATTICE

SHEET TITLE
MAST ANCILLARY DETAILS

STATUS
FOR APPROVAL

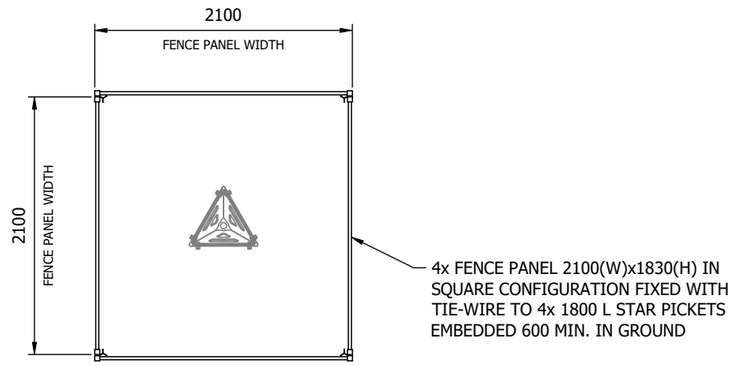
SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION
1:100	

DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	PFB	SR	SR

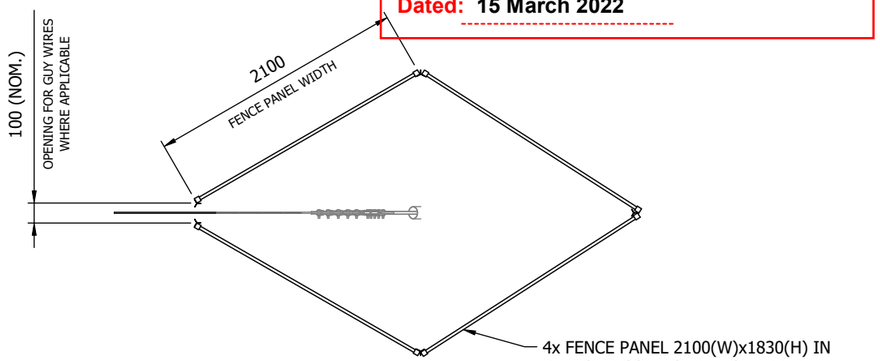
DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0002	5 / 9	A

NOTES:

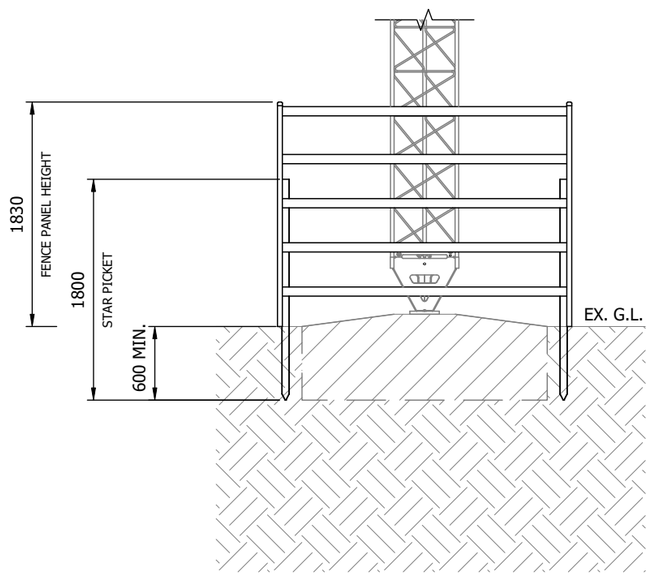
1. POSITION STAR PICKETS BEHIND FENCE PANELS.
2. NO SHARP EDGES ON THE OUTSIDE OF FENCE PANELS.
3. INNER ANCHOR - 4 PANELS & 5 STAR PICKETS.
4. OUTER ANCHOR - 4 PANELS & 4 STAR PICKETS.
5. FOOTINGS SHOWN FOR INDICATIVE PURPOSE ONLY REFER TO MAST FOOTING AND FOUNDATION DETAILS (SHEET 6).



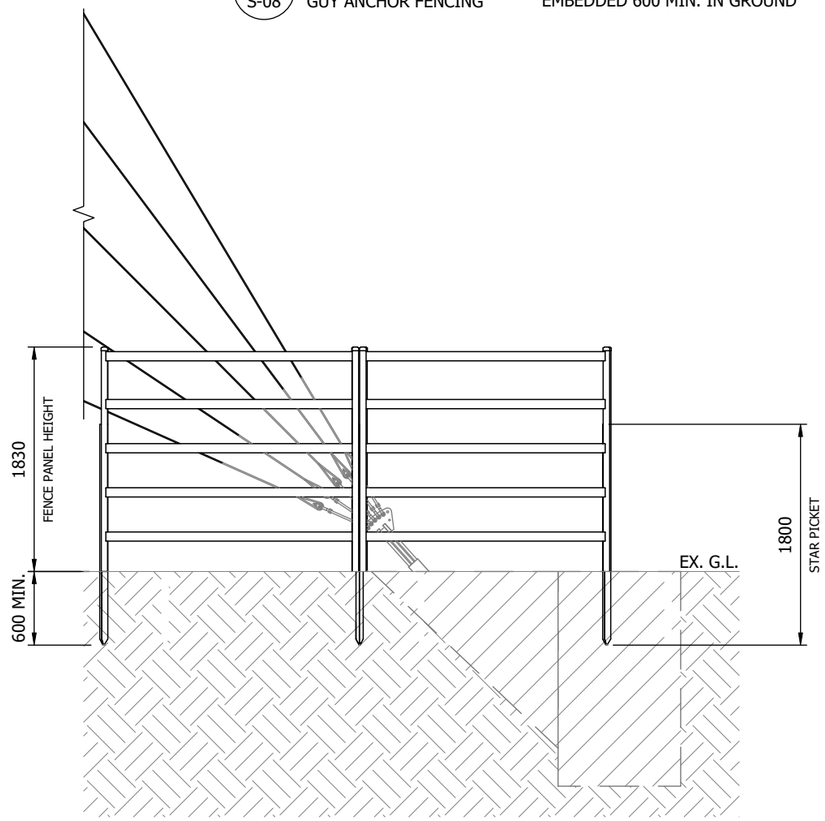
1 / S-08 PLAN VIEW MAST BASE FENCING



3 / S-08 PLAN VIEW GUY ANCHOR FENCING



2 / S-08 SECTION VIEW MAST BASE FENCING



4 / S-08 SECTION VIEW GUY ANCHOR FENCING

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GL55-36 GUYED LATTICE

SHEET TITLE
FENCING DETAILS

STATUS
FOR APPROVAL

SCALE PLOTTED AT A3	THIRD ANGLE PROJECTION
N.T.S.	

DRAWN	CHECKED	APPROVED	CO-ORDINATED
DM	SR	SR	SR

DRAWING NUMBER	SHEET	ISSUE
ART-21471-DRG-0002	8 / 9	A