Nicola J Duffy

From: Sarah J Ashworth
Sent: Tuesday, 21 September 2021 12:11 PM
To: Lena M Hobson
Subject: FW: 620.12235 -Pignata Road Intersection - Modelling Summary
Attachments: 620.12235-L05-v1.0-Pignata Intersection Analysis 2021 03 03.pdf; 28010A1-DES-000TMTA01-RPT-0001.A.IFU.pdf

Categories: Lena Action

From: N/R
Sent: Tuesday, 25 May 2021 12:55 PM
To: Sarah J Ashworth <Sarah.J.Ashworth@tmr.qld.gov.au>
Cc: N/R
Subject: 620.12235 -Pignata Road Intersection - Modelling Summary

Hi Sarah,

Sorry for the delay getting this email out – I removed

Find attached the documents that I feel may be relevant to your consideration of the traffic assessment for the Pignata intersection in response to Condition 2(ii) of the preliminary approval (your reference: SDA-0416-029516).

- *620.12235-L05-v1.0-Pignata Intersection Analysis 2021 03 03.pdf* – documents that analysis undertaken by SLR in response to the relevant condition
- *28010A1-DES-000TMTA01-RPT-0001.A.IFU.pdf (referred to as the CR2SM Report) - – documents the traffic analysis completed for the Bruce Highway Upgrade Project – Caloundra Road to Sunshine Motorway (CR2SM). This includes analysis of various intersections included in the road network using the SIDRA Intersection and VISSIM software packages, as well as Highway Capacity Manual (HCM) merge/diverge analysis along the Bruce Highway southbound between the Sunshine Motorway and Pignata Road.*

Section 9.4 of CR2SM report is particularly relevant as it considers the apparent impact of development on traffic demands. I don't necessarily agree with the authors assertion through the reporting that the impacts are "attributable" to development (noting that much of the traffic will be associated with existing mature catchments which become accessible as a result of the road network delivered by the development) but ultimately the question of the impacts being "attributable" or not is a moot point as this is ultimately a requirement of the current approval conditions.

General commentary as follows:.

- The relevant condition requires that:
  - *Provide a district collector street standard in Area A to connect the development to the Bruce Highway Western Service Road (via Pignata Road and the Bruce Highway/Pignata Road underpass). This work is to include an upgrade of the Bruce Highway/Pignata Road underpass (eastern intersection) from priority to traffic signal control, generally in accordance with DTMR Plan "Palmview Development – Pignata Rd Connection Intersection Layout (eastern side of Underpass)" dated 15/09/2016.*
- In turn the referenced layout has the following annotation:
  - *Signalisation of eastern intersection at Pignata Underpass with additional turn pockets as shown - Storage requirements to be determined with traffic analysis**

- ** Traffic analysis to be undertaken by developer aspart of detailed design development for the works*

- SLR derived our own vehicle forecasts for the subject intersection. These were based on full build-out of the area subject to the Palmview Structure Plan Area Infrastructure Agreement 2010 + transiting traffic demands (i.e. traffic demands that utilise the road network forming part of the IA but are not associated with development of the subject land – the transiting traffic demands have been extracted from relevant outputs supplied by TMR in 2018). For instance traffic that might be associated with the mature residential development to the north that transit's the IA lands to access the Pignata Road once the future bridge connection to Bellflower Road/Springhill Drive is in place.
- Key point to note is that SLR's modelling includes allowance for development of Avid's land plus the other two land holders. Essentially under the IA, Avid delivers the infrastructure and recovers a proportion of the costs from the other land holders as their lots are develop. From a traffic modelling perspective this means that we are considering the full build out of the three land holders areas not just Avid's. Technically maybe this approach (i.e. including allowance for traffic associated with the other land holders) was not applicable to the Pignata Road intersection given the way this is conditioned (i.e. in relation to Avid's development) however for simplicity we adopted this approach as we could directly utilise the forecasts from our current modelling.
- Also of note Council has a model that they have developed in parallel, in the instances where we have sighted their traffic volume forecasts from their model they are generally comparable to our traffic forecasts (i.e. volumes on the key links servicing the precinct), hence it made sense to align with the modelling that has not been disputed generally to date (there has been some disagreements on very specific aspects but in general nothing to suggest any concern with the link level traffic demands we have forecasts).
- We reviewed TMR's traffic volume forecasts documented in the CR2SM Report to benchmark our traffic volume forecasts. Whilst the CR2SM 2031 forecasts were broadly lower than our ultimate forecasts the CR2SM 2031 forecasts where a bit higher than the forecasts we had derived. It really was not clear to us the logic of this as the developable area within the catchment will be largely, if not entirely developed by 2031, so it was not clear to us why the traffic volumes would increase significantly between 2031 and 2041. We hypothesised that there may be some constraints in the higher level strategic modelling that are resulting in some possibly unintended re-routing of traffic that has the effect of possibly over-representing use of the Pignatta Road intersection.
- Notwithstanding the above residual concern that the CR2SM Report 2041 forecasts may potentially overstate traffic demands at the subject intersection we adopted these rather than the SLR derived volumes for the analysis documented in the submitted reporting. Essentially the view was that there was little utility investigating the source of the apparent discrepancy as the relevant condition is such that turn lanes need to be provided it is only the length of the lanes that can be modified down. Adopting the CR2SM Report 2041 forecasts is conservative as the traffic volumes are higher than what SLR had forecast.
- Similar to the CR2SM modelling a target LOS of C was also adopted for the analysis undertaken by SLR. It could possibly be argued that this an onerous requirement however the view again was that there was limited utility arguing this point as it would have only resulted in the shortening of a few turn lanes not their removal from the design given how the condition has been structured.

In summary, SLR derived our own traffic volume forecasts that we feel are representative (and on the conservative side) but we ultimately adopted the higher CR2SM 2041 traffic demands to minimise technical dispute. As best we can tell, the intersection form we have proposed (the CR2SM Figures are a little blurry) is a bit larger than that documented in the CR2SM report as being required at 2041 with development and with a level of service C, which seemed an intuitive outcome.

Hope this background is helpful, let me know if you require anything further.

Cheers

N/R

SLR

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Technical Discipline Manager - Transport Advisory

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DJV – Work Review Record
Independent Technical Review (ITR)

Record of Review

Package Number:	000TMTA01		**Package Name:**	**Global Traffic Report**	
Package Stage:	☐ PD ☐ DD ☒ PTU				
Package Drafter:	N/A		**Package Owner:**	N/R	
Date Issued:	26/02/2018	**Date Required:**	28/02/2018	**Allocated Hours:**	1

Supporting information, documents, references (e.g. codes, standards, project inputs and criteria), files
(add additional lines or attachments if required)

Deliverables ☐ **Refer attached**

This is to cover for every document or drawing that has been checked/to be issued. Either list/transmittal or include every document below.

Document Number	Name	Revision
28010A1-DES-000TMTA01-RPT-0001	GLOBAL - TRAFFIC REPORT	05

Review Method *(check as many as apply)*

1	☐	**Design Appropriateness Check (MANDATORY):** *The Reviewer is to review the design to determine if there is scope for cost or schedule savings. Are elements over designed or can it be done smarter?*
2	☐	**Detailed Check:** *This could be a line-by-line check of every part of calculations, a complete check of a drawing or a thorough proof read of text.* (Required prior to Detailed Design)
3	☐	**Simplified Check or Spot Check:** *This could be a random check of some parts of calculations or a check of some of the output or deliverable by another 'back of envelope' method.* (Required prior to Preliminary Design)
4	☐	**Comparison with Previous Knowledge:** *This could be a review of the output or deliverable compared to a similar one from a previous project or from the experience of the reviewer.*
5	☐	**Other:** *Alternative to the choices above. Please describe:*

DESIGN DISCIPLINE LEAD: *(Sign to confirm scope of review is correct)*

Name:	N/R	Signature:	N/R	Date	8 / 3 / 2018

DJV – Work Review Record
Independent Technical Review (ITR)

Checklist of things to look at:(Comments detailed on the *Review Comments Form*)

Reviewers Name(s):	N/R	
(Print Name and Company)		
Note: The Project Reviewer should not be the author or direct contributor to the report.	**Initial when satisfied**	**Dated**
1 Design Appropriateness. Is there is scope for cost or schedule savings? Are elements over designed or can it be done smarter?	N/R	26/02/2018
2 Is design functional and cost effective?		NA
3 Data Collection		NA
4 All design criteria considered and design allowances are correct		26/02/2018
5 Laboratory test procedures and laboratory certification		NA
6 Assumptions justifiable		26/02/2018
7 Conformity with reference documents		26/02/2018
8 Check: graphs, calculations, computer code, drawings, databases, conformity with inputs, specifications and that drawings agree		26/02/2018
9 Opinions, conclusions & recommendations are reasonable, unambiguous, & complete& minimises risks to the client & designer		26/02/2018
10 Presentation, grammar, typographical errors		26/02/2018
11 Subcontractor/Subconsultants processes and deliverables		NA

REVIEWER: (Sign to confirm review is complete and comments recorded and closed out on the *Review Comments Form*)

N/R **Date** 26 / 02 / 2018

DISCIPLINE LEAD (RPEQ): (Sign to approve checking process is adequate and issues resolved in design adequately)

N/R **Date** 8 / 3 / 2018

TECHNICAL DIRECTOR / DESIGN MANAGER: (Sign to approve checking process is complete and the *Review Comments Form* signed and attached)

N/R **Date** 8 / 3 / 2018

Fiona Gray

From: Dinesh P Thilakasiri
Sent: Monday, 20 September 2021 11:08 AM
To: N/R
Cc:
Subject: TMR21-033574 Bruce Highway Sippy Down - Information request 2 210920
Attachments: IA_Electrical drawings - C10353-1-1-PR3 - DCR2A Stage Boundary.pdf; IA_Electrical drawings - C10353-1-3-PR3 - DCR2A Stage Boundary.pdf; Harmony & District collector v0.6.1-C - Operational & Electrical (620.30257)_NRT 13.09.2021.pdf; FW: Sunshine Coast Council - Infrastructure Guidelines & Standards - Update to Traffic Signals Guidelines; Harmony sports park v0.3.2-Operations + Electrical (620.30257)_NRT 07.09.2021.pdf; M7286_IA_Pignata Underpass East v0.3.1-Operation & Electrical (620.30257)_NRT 07.06.2021.pdf

Hi N/R

I have complied the civil/signal/lighting review comments. Please update your drawings taking in to consideration our review comments or provide justification for alternative approach.
Happy to have a meeting and go through the items when you get a chance to review the below information

Please note, a review by Transport and Main Roads does not constitute TMR acceptance of a design as it is not a complete check of accuracy and/or compliance to relevant documentation. Our review is intended to add value to the design with respect to safety, appropriateness and affordability. Our review includes aims to ensure that the Development Conditions have been met. It may include commentary regarding safety issues that are apparent, or problems that are subsequently created for TMR as a result of the works.

Civil Related Comments:

1. **Design Speed**

   The Design Speed affects virtually every aspect of the design, such as horizontal and vertical curvature, superelevation, deceleration distances, taper lengths, roadside clearances, sight distances, and so on. The posted speed through this section or road is 60km/hr. In the absence of a speed survey, or operating speed model, the design speed must be assumed as 10km/hr higher than the posted speed.

2. **Geometry**

   The coordination of horizontal and vertical geometry needs to be addressed as some of the geometry combinations are poorly aligned which results in perception and safety issues. A number of horizontal curves start within or are overlapped by vertical crest curves which causes driver perception issues. Refer to AGRD Part 3, clause 6 for the fundamentals of alignment coordination.

   The vertical geometry between chainage 1150 to 1380 uses a series of compound and broken back curves. The length of the tangent between the broken back curve is less than 0.4V and should be avoided.

   The horizontal compound curve combination used between chainage 1220 and 1440 appears to use curves which will have a friction demand change greater than the acceptable limit. A full operating speed analysis for the horizontal alignment in both directions of travel must be completed once the horizontal and vertical geometry coordination issues have been resolved to show that no geometric or safety issues are created.

The orientation of the staggered pedestrian crossing is in the opposite direction than it should be. The stagger should be oriented so that pedestrians face the oncoming traffic when approaching the crossing point. Refer AGRD Part 4 clause 8.2.2 for further guidance.

3. Sight Distance

Please provide details of sight distances assessed to show compliance with standards is achieved. Refer Appendix A for further information.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant.

4. Cross Section

The use of 3.3m lane width is not adequate for a new road without constraints, see item 23 in Appendix A.

The channel of kerb and channel is included in the cycle lane width. TMR does not include the channel component in the lane widths in unconstrained locations.

Desirably, turning lane widths should be the same width as the adjacent through lane. Refer Appendix A for further information.The level of detail provided on the cross section drawings is not sufficient for checking purposes. Provide height and offset details for design strings, such as but not limited to carriageway lanes, kerb lips, subgrade and earthworks interface strings.

Ensure that median widths are wide enough to accommodate lighting posts if posts are to be provided in the medians. Minimum width of 2.0m should be adopted to house lighting posts.

It appears that in some of the cross sections that the earthworks batters extend into the property boundary. Has sufficient road corridor been provided to construct and maintain this infrastructure?

The annotations showing some measurements as typical should be removed as these cross sections are cut at known chainages. The dimension is an absolute figure, not typical in this scenario.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant / a lack of time.

5. Drainage

TMR kerb profiles should be used for all the kerb / kerb and channel specified for the project. Also, show the kerb types on the detail drawings.

Is there an alternative location for the main drainage system to be placed? The proposed design has the main system directly under the through lanes which may present an avoidable hazard and safety risk for maintenance personnel. Has safety in design been considered as part of this project and what mitigation strategies are proposed to address the safety of maintenance personnel? Alternatively, place the main system clear of the roadway if possible.

Where new drainage infrastructure is proposed to tie into an existing system, show the existing drainage infrastructure type, size and location on detail drawings.

Show contours for the existing roadway adjacent to the new works so it can be readily seen that the new works tie in smoothly with the existing roadway and so that surface water flows can be easily identified.

Provide details of surface drainage assessment for aquaplaning potential and that calculated depths are in accordance with the TMR Road Drainage Manual. Also provide calculations of surface water spread widths adjacent to kerb and channel to show that the widths achieved are compliant.

Ensure that the temporary semi-mountable kerb type used complies with the TMR approved products list. This list is available on the TMR website.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant.

6. Entrances to Private Property

This element has not been thoroughly reviewed due to a lack of information provided by the consultant

7. PUP

This element has not been thoroughly reviewed due to a lack of information provided by the consultant

8. Resumptions

Confirm that sufficient road corridor allowance has been provided to undertake future maintenance activities.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant

9. Roadside Furniture

More information required for the proposed guardrail, including the length of need calculations and hazard being protected. All new installations must also comply with the requirements of TMR's approved product list. Only systems with have been MASH tested and approved for the site specific design parameters required may be used in accordance with TMR's 'Accepted Road Safety Barrier Systems and Devices' publication.

The guardrail is placed on the 1 in 4 batter. Placement here is not expected to meet manufacturer requirements (1 in 10 max.). The shoulder should be wider or a verge designed to provide support and deflection width for the guardrail.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant.

10. Signage

Ensure that sufficient signage has been provided on approach to island noses to properly delineate these hazards.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant.

11. Pavement Marking

Ensure that the linemarking details legend is up to date with the latest version of the MUTCD/AS1742.

Ensure that all proposed line types are correctly annotated on the signage and linemarking drawings.

Ensure that green coloured surfacing is applied to cyclist conflict areas in accordance with Appendix A.

Right turn lane arrows are missing from drawing number 34-500. Ensure the number and spacing of turn arrows is in accordance with Appendix A.

Designated crossing points must comply with the Disability Discrimination Act. Please provide TGSI's and adequate supporting infrastructure in accordance with Appendix A.

Have any right turn provisions for cyclists been considers for the Pignata Road intersection. The combination of dual right turns can be particularly hazardous for cyclists wishing to turn right into Pignata Road. Have cyclists actuated or loop detected hook turns been considered?

Provide better delineation for the left turn from Pignata Road onto the Bruce Highway Connection Road to reduce the conflict area between cyclists and left turning motorists. Will cyclists also be able to turn right from the cycle lane to head south on the Bruce Highway Connection Road? Consider an alternative arrangement of the left turn lane from Pignata Road with the intent of removing conflicting movements between cyclists and motorists.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant / a lack of time.

12. Landscaping

Ensure that the proposed landscaping does not have any adverse effects on the road network. Refer Appendix A for further information.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant / a lack of time.

13. Turn Paths

Turn path details have not been provided with this submission. Turn path details should be provided with the next submission in accordance with Appendix A point 30.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant.

14. General Comments

All construction work within the state road corridor must be in accordance with the current Main Roads technical specifications and standards. Include references to the Main Roads specifications and standards on the construction drawings

15. Pavement Design

Please provide sufficient pavement design details and calculations to allow for checking.

This element has not been thoroughly reviewed due to a lack of information provided by the consultant / a lack of time.

Update to Sunshine Coast Council Traffic Signal Guidelines:

SCC recently updated their Traffic Signal Guidelines to be a *"to be a One Network (TMR & SCC) approach. The major updates include the uniform adoption of technology and safety improvement to all new and modified traffic signals, including:-*

- *Wireless communications connections to Streams*
- *Closed Circuit Television (CCTV) and*
- *Bluetooth technology"*

For further details, please see the attached email.

Network Optimisation Review:

District Collector Road & Recreation (no site ID)

1) Site ID required
2) Update the design to include all road names on the Intersection schematic
3) Are filter right turns being installed at this location?
    a. This is contrary to the TMR Road Safety Policy and must be risk assessed by the designers
4) Assuming filter right turns are being maintained
    a. Filter right turns should not be controlled by a 3 aspect secondary lantern
        i. Include appropriate through movement lanterns as a six aspect arrangement with all filtering right turn secondary lanterns
    b. Update special condition wording to include appropriate pedestrian protection

i. Right turn should be held Red for conflicting pedestrian walk time, for example, SG3 Red for PG2 Walk, else off after late start via xfs bits

5) Note potential yellow trap if moving from A to B2, and from C to either D1 or D2
6) Swap B and D phases such that bi-directional phases can overlap from the appropriate sub-phases
7) Through movements would usually only call to the bi-directional phases
8) Remove pedestrian call notation from sub-phases
9) Remove increment function from SG5 and SG6 in C Phase as these are not controlled by advanced detectors
10) Update bicycle detector numbering to be sequential with operational detectors
    a. Update subsequent detector numbering
11) Ensure all pedestrian push buttons are accessible to mobility impaired patrons
    a. Is input 21 on Station 5 in an appropriate location?
        i. Location and orientation on the design appears to be leading pedestrians towards the slip lane
12) Are pedestrian crossings suitable on the slip lanes at this location?
    a. This is contrary to the TMR safety policy
    b. Has this been risk assessed?

Bruce Highway Connection Road & Future Sports Park Road (no site ID)

13) Has the filter right turn been risk assessed?
    a. This is contrary to the TMR Road Safety Policy
    b. TMR guidance considers that SG3 is opposed by 3 lanes of traffic
14) Note potential yellow trap if moving from A Phase to C Phase
    a. Consider including operator note regarding phase order if SG3 filter is maintained
15) SG3 should be Red for PG1 walk
16) SG5 should call and extend A Phase
    a. Currently VD5 does not call any phase
17) SG6 should call to B Phase to limit impacts to westbound traffic
    a. SG6 to operate as courtesy in C Phase

Pignata Road & Pignata Connection Road (M7286)

18) Pedestrian crossing is staggered in the wrong direction
19) Signal group numbering for the pedestrian crossing is inconsistent on the Intersection schematic to the rest of the design
    a. Controller suggests only 8 signal groups available
    b. Update the Intersection schematic
20) Swap the pedestrian group associated with each signal group
    a. As per the drafting and design presentation standards manual
        i. PED1 should be SG8
        ii. PED2 should be SG7
        iii. Update associated detail (conflict, cable connections, spare cores, phasing diagrams)
21) Update Phase diagrams arrow heads for SG5 in A and B Phase, and for SG2 in C Phase
22) Consider SG6 calling to C Phase depending on dominate flow
    a. Assuming the southbound right turn is more beneficial than the westbound right turn
    b. Include special condition for B phase to cancel VD6 extend if moving to C Phase
23) SG6 can be 2 aspect signals (G-Y) as per existing arrangement
24) SG5 (VD8) should call and extend A Phase
25) Consider including new D Phase to enable pedestrians to cross Pignata Road in a single cycle if arriving in A Phase
    a. PG2 (SG7) to call D Phase
26) Show the road names on each approach on the intersection schematic
27) Is there appropriate clearance to the bicycle head-start bay to run SG5 as a courtesy movement in B Phase?
    a. Is the cycle lane left turn only?
    b. Are cyclist heading north through the intersection also to use the cycle lane on the southern approach?
28) Include note on this design to indicate that 'This drawer supersedes drawing number 727244 A'

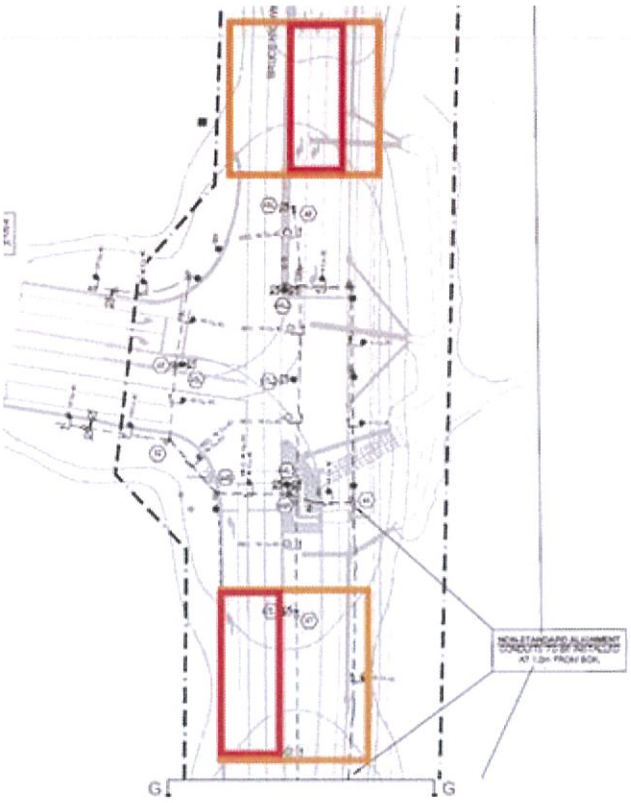
Lighting Review:
The provided drawings contain lighting designs that cover Pignata Rd intersection, "Future District Sports Park Rd", Recreation Dr intersection and lighting along Bruce Highway Connection Rd.

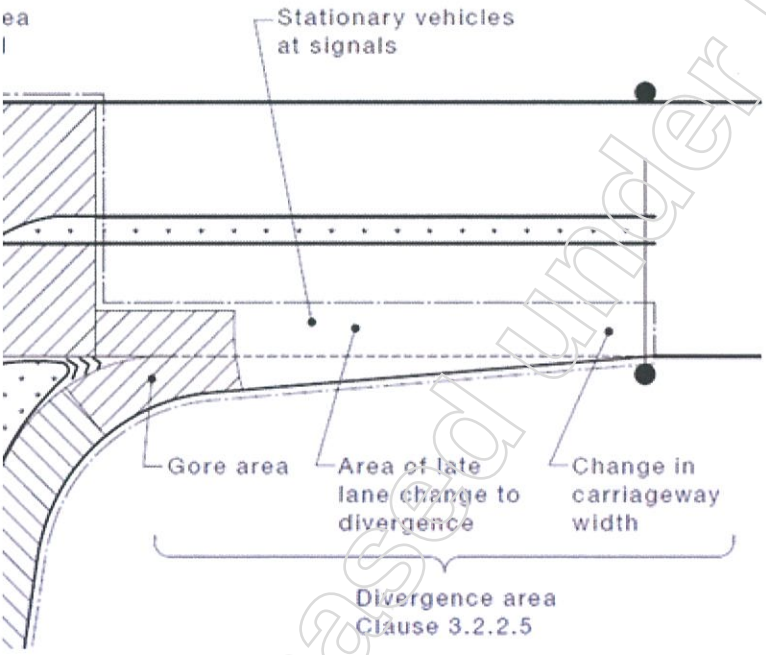
To be confirmed but from our discussions, both Recreation Dr and "Future District Sports Park Rd" intersections appear to be located outside the TMR state-controlled corridor. Whereas, the Pignata Rd intersection and the section of lighting along the Bruce Highway Connection Rd between Pignata Rd intersection and "Future District Sports Park Rd" intersection are within the TMR SCR but this is expected to become Council road corridor in the future.

As the lighting is presently within the TMR SCR, as requested, it has been assessed against TMR standards and policy.

Pignata Intersection Lighting:
The existing lighting for Pignata Rd was designed & installed as part of CR2SM and was built to TMR Rate 3 specification. The existing switchboard is labelled SCC Rate 3 and assumed that it is either council owned or to be transferred to council.

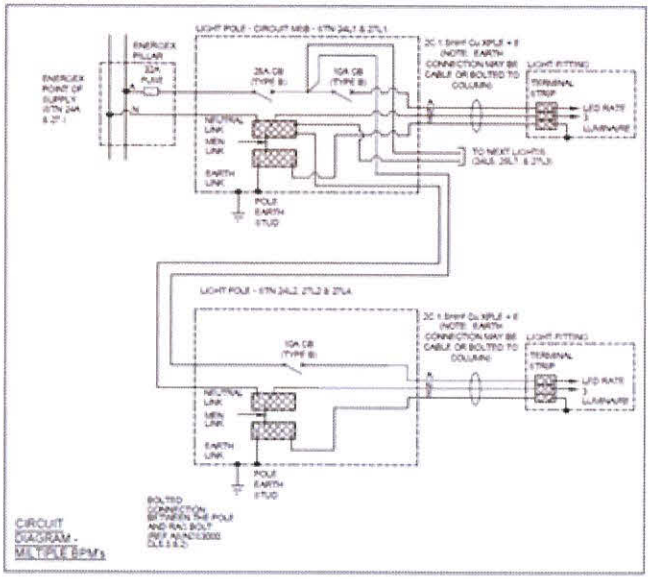
- Existing pole details are not all captured in the schedules – are there any existing BPM poles (excluding JU)?
- Intersection has been designed to Category V5, was this determined during design phase of CR2SM? Are the assumptions about traffic volumes still accurate?
- Removals of luminaires are not clearly differentiated from those to remain on the layout.
- As per RPDM Vol 6, 9.3: *"Where joint use poles are located in medians, they should be located at least 1000 mm from the median nose and not in medians less than 2000 mm wide."*
    - Designer to confirm width of northern median and distance of pole to median nose.
- Areas of reduced lighting close to intersection, particularly over turn lanes (areas shown below). Why remove STN 47?
    - Consider Figure 3.9 of AS1158.1.1 and particularly over the divergence area – stationary vehicles at signals and areas of late to divergence to be considered in defining the consolidated design area. As per Note 4 the consolidated area is to be an illuminance based design area.
    - Also consider the S/4 requirement of AS1158.1.1 Clause 3.4.3.2



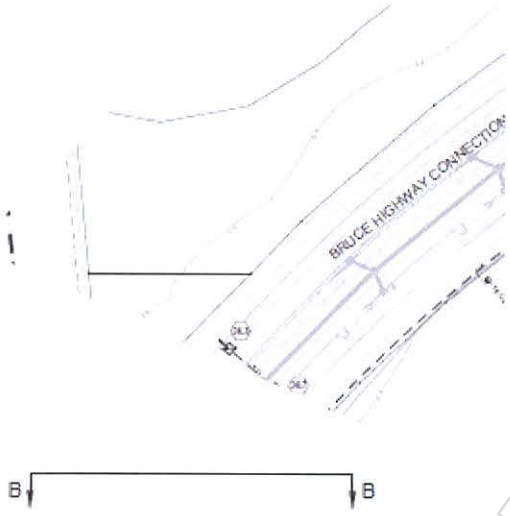


Bruce Highway Connection Rd:

- BPM poles appear to be close to road. Has a clear zone assessment been made / were SBM considered?
- Do the poles maintain required clearances to the footpath?
- Is the circuit protection within the light pole or in an underground kit? Is this a standard arrangement for SCC Rate 3?



- Minor – layout join B cuts of part of luminaire symbol:



Kind regards,

Dinesh Thilakasiri
Senior Engineer (Civil) | Corridor Management | North Coast Region | Maroochydore Office
Program Delivery And Operations | Department of Transport and Main Roads

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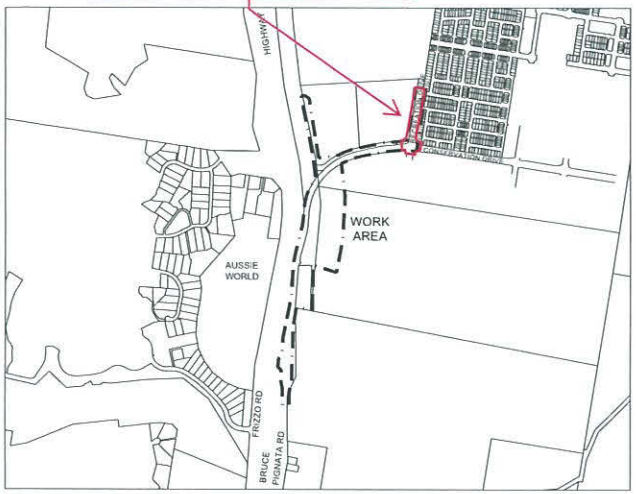
HARMONY
BRUCE HIGHWAY CONNECTION ROAD
CONSERVATION DRIVE, PALMVIEW

DCR2A Duplication Works Boundary



KEY MAP
N.T.S.

Sheet Index	
Sheet No.	Description
1	Overall Plan
2	Works Plan
3	Works Plan
4	Works Plan
5	Works Plan
6	Works Plan
7	Works Plan
8	PMT / RMU Site Detailes
9	11kV Schematic & Labels
10	LV Schematic & Labels
11	UG Schedules & Material Lists
12	OH Schedules

UNDERGROUND SERVICES IDENTIFICATION

WORK CREWS WHO WILL BE EXCAVATING AT THIS SITE ARE ADVISED TO CONTACT THE "DIAL BEFORE YOU DIG" SERVICE TO DETERMINE THE EXTENT OF EXISTING UNDERGROUND SERVICES AND THE REQUIREMENTS OF THE APPROPRIATE SERVICE PROVIDERS. IT IS THE RESPONSIBILITY OF THE WORKS CREWS TO HAVE ALL EXISTING SERVICES AFFECTED BY THESE WORKS LOCATED ON SITE TO AVOID ANY DAMAGE DURING EXCAVATION WORKS. WHILST SERVICES HAVE BEEN SHOWN ON THE PLAN, THESE LOCATIONS ARE INDICATIVE ONLY AND NO WARRANTY IS IMPLIED AS TO THEIR ACCURACY.

DIAL 1100 BEFORE YOU DIG

DIAL BEFORE YOU DIG SERVICE
PHONE - 1100
WEB - www.1100.com.au
YOUR REQUEST SHOULD BE FORWARDED 5 WORKING DAYS BEFORE PLANNED EXCAVATION DATE

LOCALITY PLAN
N.T.S.

LOCATION OF UTILITIES
THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING ALL UNDERGROUND SERVICES PRIOR TO COMMENCING WORK AT THE SITE, AND IS RESPONSIBLE FOR THE REPAIR OF DAMAGE TO UNDERGROUND OR OVERHEAD UTILITY ASSETS, ARISING FROM THESE WORKS. CONTACT DIAL BEFORE YOU DIG.

ENERGEX STANDARDS
THE CONTRACTOR IS TO READ THIS PLAN TOGETHER WITH ALL RELEVANT ENERGEX STANDARDS, TECHNICAL SPECIFICATIONS AND MANUALS. THESE DOCUMENTS INCLUDE, BUT ARE NOT LIMITED TO:
- UNDERGROUND DISTRIBUTION CONSTRUCTION MANUAL
- OVERHEAD CONSTRUCTION MANUAL
- OVERHEAD DESIGN MANUAL
- NETWORK LABELLING AND SIGNAGE MANUAL
- QLD PUBLIC LIGHTING CONSTRUCTION MANUAL

CONSUMERS INSTALLATIONS SHALL COMPLY WITH AS/NZS 3000:2018 - SAA WIRING RULES.

FOR DETAILS OF TRENCH CROSS-SECTIONS, REFER TO ENERGEX UNDERGROUND DISTRIBUTION CONSTRUCTION MANUAL.

GENERAL NOTES
1. NO OTHER SERVICES TO ENCROACH INTO THE STANDARD UNDERGROUND ELECTRICITY CORRIDOR OF 0mm - 900mm FROM RP BOUNDARY.
2. ALL CABLES TO BE INSTALLED IN CONDUIT WITHIN THE STANDARD ELECTRICITY ALIGNMENT ALLOCATED BY THE LOCAL COUNCIL. WHERE CONDUITS VARY FROM THIS AND AT ROAD CROSSINGS, PROTECTIVE STRIP IS TO BE INSTALLED. WHERE PRACTICAL ELECTRICITY CABLES SHALL NOT BE CLOSER THAN 250mm TO THE REAL PROPERTY BOUNDARY.
3. A, B OR C WHERE SHOWN BESIDE LV PILLARS DENOTES SERVICE PHASING.
4. THE CONTRACTOR SHALL MEASURE ACTUAL CABLE LENGTHS REQUIRED ON SITE AFTER INSTALLATION OF CONDUITS THEN NOTIFY ENERGEX/SUPPLIER WHEN CONFIRMING CABLE ORDER.
5. ALL BENDS INSTALLED ON 100mm AND 125mm RETICULATION CONDUITS MUST BE 1830mm RADIUS UNLESS OTHERWISE SPECIFIED.
6. CONTRACTOR TO SUPPLY ALL LABELS AND SITE ID NUMBERS TO ENERGEX SPECIFICATION.
7. WHEN CROSS ROAD CONDUIT FINISHES OPPOSITE A TRUNCATION PEG, PROPERTY SIDE OF TRENCH TO BE 300mm ALIGNMENT FROM RP.
8. CIVIL CONTRACTOR TO INSTALL ALL ROAD CROSSING CONDUITS.
9. ELECTRICAL CONTRACTOR TO INSTALL FOOTPATH CONDUITS.
10. CO-ORDINATE CONDUIT INSTALLATION WITH NBN CONTRACTORS.
11. ELECTRICITY PILLARS TO HAVE 600mm EXCLUSION ZONE FROM ALL OTHER SERVICES.
12. CIVIL CONTRACTOR TO INSTALL CONSUMER LEAD IN CONDUITS FOR ELECTRICAL AND NBN/ COMMS PRIOR TO CONSTRUCTION OF RETAINING WALLS INTO ROAD RESERVE IN ACCORDANCE WITH AS/NZS 3000:2018 AND OTHER AUTHORITY REQUIREMENTS.
13. ALL ELECTRICAL AND TELECOMMUNICATION INFRASTRUCTURE ADJACENT TO ZERO LOT BOUNDARIES ARE TO BE ALIGNED OR OFFSET FROM BOUNDARY LINE. IF THE PILLAR IS WITHIN 1M OF DRIVEWAY PROTECTIVE BOLLARDS ARE TO BE INSTALLED. STREETLIGHTS TO BE OFFSET 1M FROM BOUNDARY LINE CLEAR OF FUTURE DRIVEWAYS.
14. ENERGEX SUPPLY AGREEMENT AND AUTHORITY TO CONSTRUCT TO BE IN PLACE PRIOR TO STARTING WORKS ON ENERGEX NETWORK.

PROPOSED COMMISSIONING PLAN
TENTATIVE ONLY - SUBJECT TO AMENDMENT BY ENERGEX OUTAGE CO-ORDINATOR

LIVE LINE HV & LV x 1
CABLE ID & SPIKE x 1
GENERATOR x 3 - QC506, SG710937 & SP550191

11KV
- OPEN X2204223 IS102 - Velvet Way
- CHECK OPEN X147088 - Off Pignata Road
- LIVE LINE to Break Bridges at SP734543
- Perform 11kV Works as required.
- EMERGEX to Reverse Switching
- LIVE LINE to re-Make Bridges at SP734543
- CHECK OPEN X847088 - Off Pignata Road
- CLOSE X2204223 IS102 - Velvet Way
- CLOSE X2236056 IS21, IS22, SF23 & IS24 - Bruce Highway Connection Road.
- CLOSE SC2236057 IS25, IS26 & SF27 - Bruce Highway Connection Road.
- Commission SC2236057 - Bruce Highway Connection Road.

LV - SC2178174
- OPEN LP2178212 - Kelman Street
- Perform LV Works as Required.
- CLOSE LP2178212 - Kelman Street

LV - SC2236057
- CLOSE SC2236057 FS1 & FS2 - Bruce Highway Connection Road

STREETLIGHTING NOTE
THIS PLAN COMPRISES OF ELECTRICAL RETICULATION
SEE PLAN C10353-1-3 FOR RATE 3 STREETLIGHTING.

CIVIL CONTRACTOR NOTE
CIVIL CONTRACTOR TO ENSURE ALL CONDUITS ARE INSTALLED PRIOR TO CONSTRUCTION OF FOOTPATHS, DRIVEWAYS AND RETAINING WALLS (WHERE REQUIRED).

Related Projects		
Consultant	Consultant Reference/ Drawing Number	Energex Reference Number
CV Services	C10359	S4900270

Source Drawings		
File Name	Drawing Owner	Date Received
X-15 000256 34 BASE	Calibre	31/05/2021

LEGEND

LINES
- Boundary of Works
- Electrical Overhead - Exist
- Electrical Overhead - New
- Electrical Overhead - Recover / Future
- Electrical Underground - Exist
- Electrical Underground - New
- Electrical Underground - Recover / Future
- Consumers Overhead - New
- Consumers Underground - New
- RP Boundary
- Easement Boundary
- Kerbline
- Railway
- Retaining Wall
- Sewer Main
- Sewer Rising Main
- Water Main
- Stormwater
- Rainwater
- Open Drain / Swale
- Gas
- Telecommunications
- Fence
- Zero-lot Boundary

SYMBOLS
- Electrical Pillar
- Link Pillar
- Commercial / Industrial Pillar
- Electrical Pit
- Underground Joint
- Pole - LV Only
- Pole - HV Only
- Pole - HV & LV
- Pole - HV, Future LV
- Pole - LV, Future HV
- Pole Transformer
- Pole Termination - LV Only
- Pole Termination - HV Only
- Pole Termination - HV & LV
- Earth Electrode
- Pole Stay - Ground / Sidewalk
- Pole Stay - Aerial
- Padmount Transformer
- Ring Main Unit
- Conduit - 40mm
- Conduit - 100mm
- Conduit - 125mm
- Conduit - Energex Communications
- Street Light - LED
- Street Light - High Pressure Sodium 70W
- Street Light - High Pressure Sodium 100W
- Street Light - High Pressure Sodium 150W
- Street Light - High Pressure Sodium 250W
- Street Light - High Pressure Sodium 400W
- Street Light - Mercury Vapour 50W
- Street Light - Mercury Vapour 80W
- Street Light with Aeroscreen
- LV Disconnection Links - Open
- LV Disconnection Links - Closed
- HV Switch - Open
- HV Switch - Closed
- Drop Out Fuses - Open
- Drop Out Fuses - Closed
- Station Number
- Remove
- Phasing
- 'E' Kerb Marker
- Driveway
- Fire Hydrant
- Cable Warning Post

N/R

Digitally signed by Justin Knad
DN: cn=Justin Knad,o=Justin Knad (HAL) Australia (HAL) Australia, ou=Consult (A Strategic Engineering Services Pty Ltd, email=jknad@consultr.com.au, c=AU
Reason: I certify this document as a Registered Professional Engineer of Queensland (RPEQ 7727)
Location:
Date: 2021-06-04 09:57:41 +10:00

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
Signature N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	25/02/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
PR3	03/06/2021	ADDITIONAL WORKS ADDED. CIVIL BASE UPDATED.			

CV SERVICES GROUP
delivering the edge

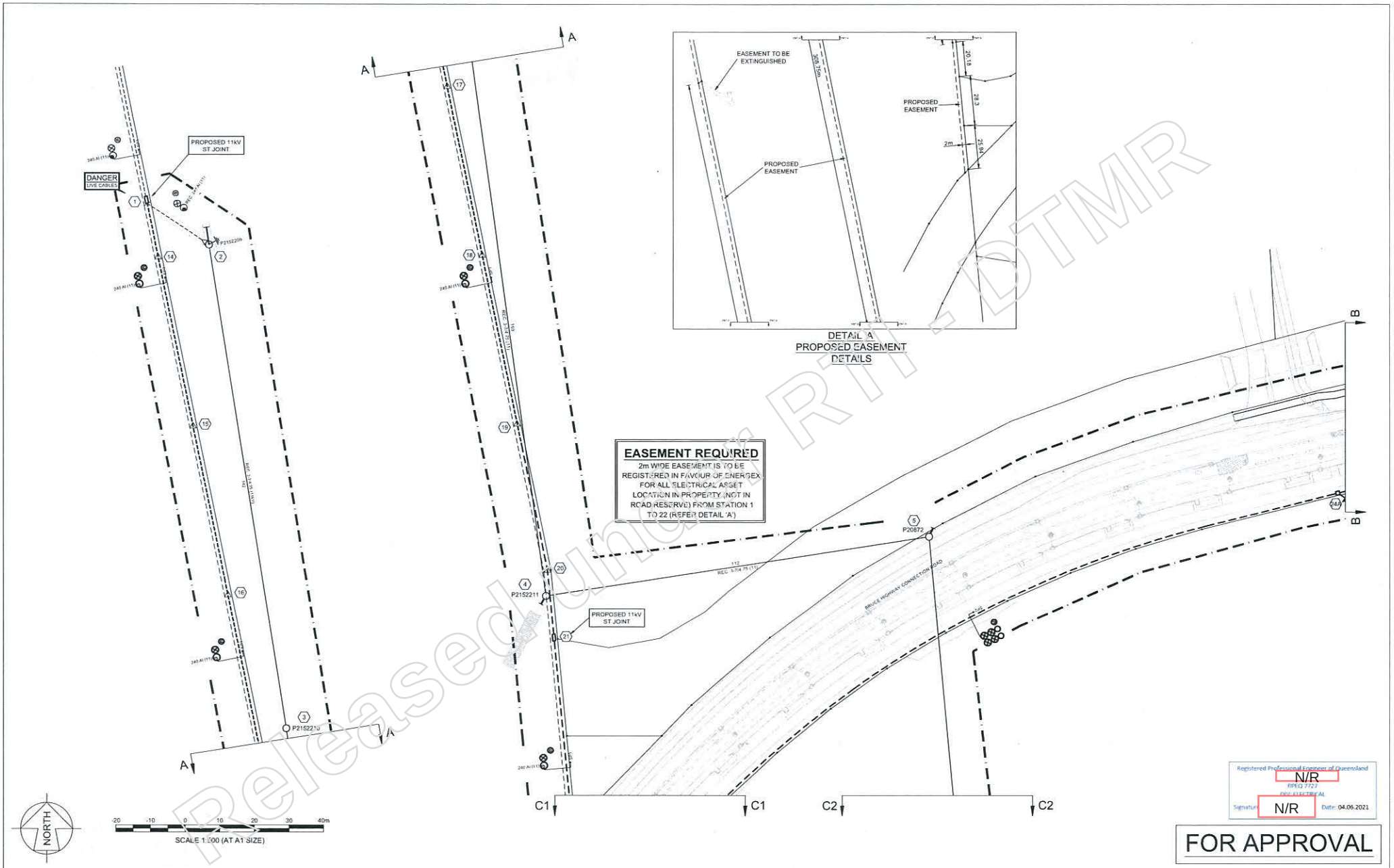
SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No	—
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ 7727

N/R

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
OVERALL PLAN

SCALE : N/A @ A1
10353-1-1
S4900292 PR3
Sheet 1 of 12



Registered Professional Engineer of Queensland
N/R
RPEQ 7727
REC ELECTRICAL
Signature N/R Date: 04.06.2021

FOR APPROVAL

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SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
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		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD		
		GAS	DBYD	CANCELLING LOTS:	N/A
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	---
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

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ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

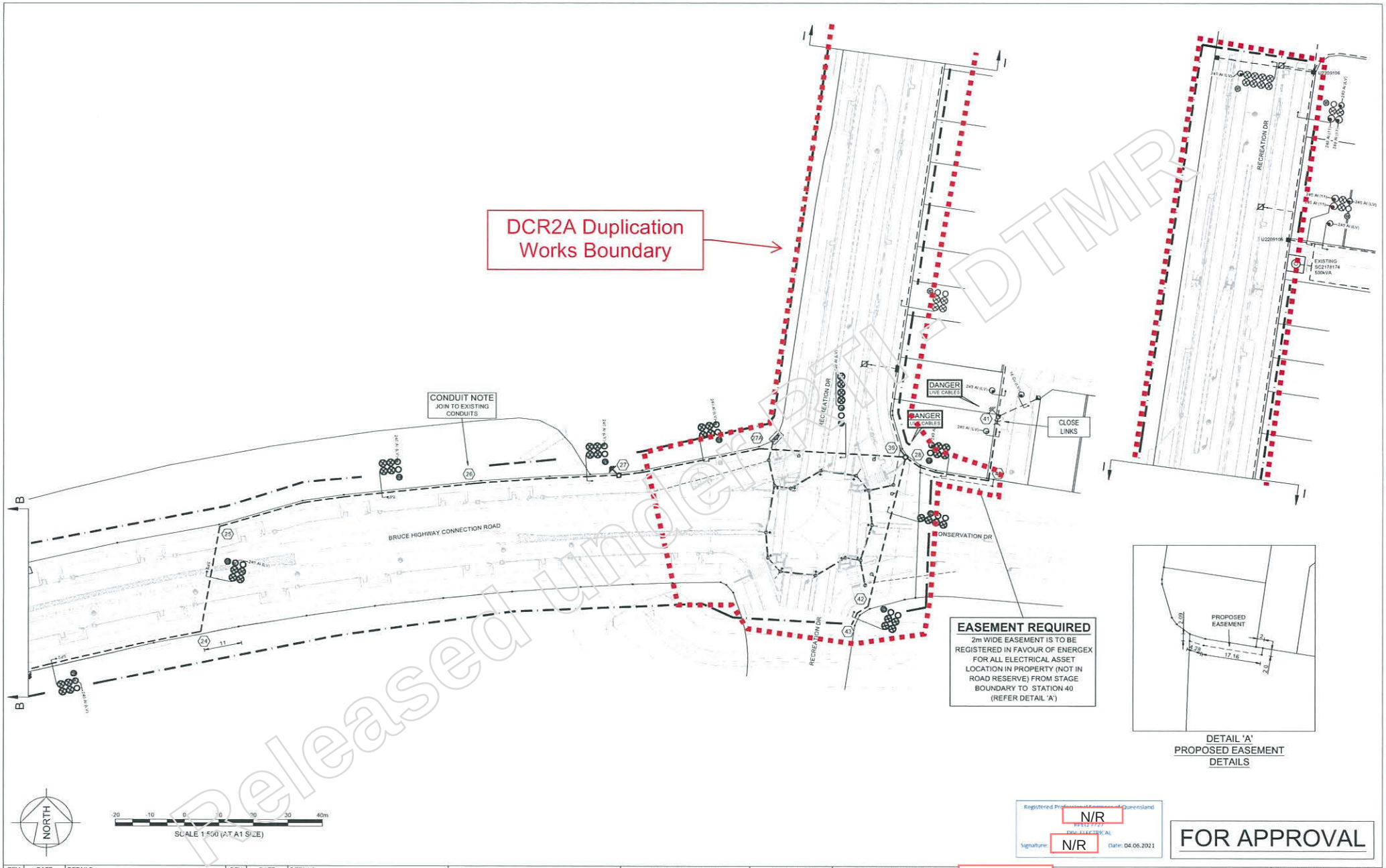
WORKS PLAN

SCALE : 1:500 @ A1

10353-1-1

S4900292 PR3

Sheet 2 of 12



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SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION
NAME		ENERGEX OH	3.0	NUMBER OF LOTS: 0
		ENERGEX UG	0.9	PROPOSED LOTS: N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS: N/A
		GAS	DBYD	
PHONE		HP GAS	DBYD	LOCAL AUTHORITY: SUNC
MOBILE		WATER	DBYD	APPROVAL No: ----
FAX		STORMWATER	DBYD	
EMAIL		SEWERAGE	DBYD	
		OTHER	DBYD	J. READ RPEQ: 7727

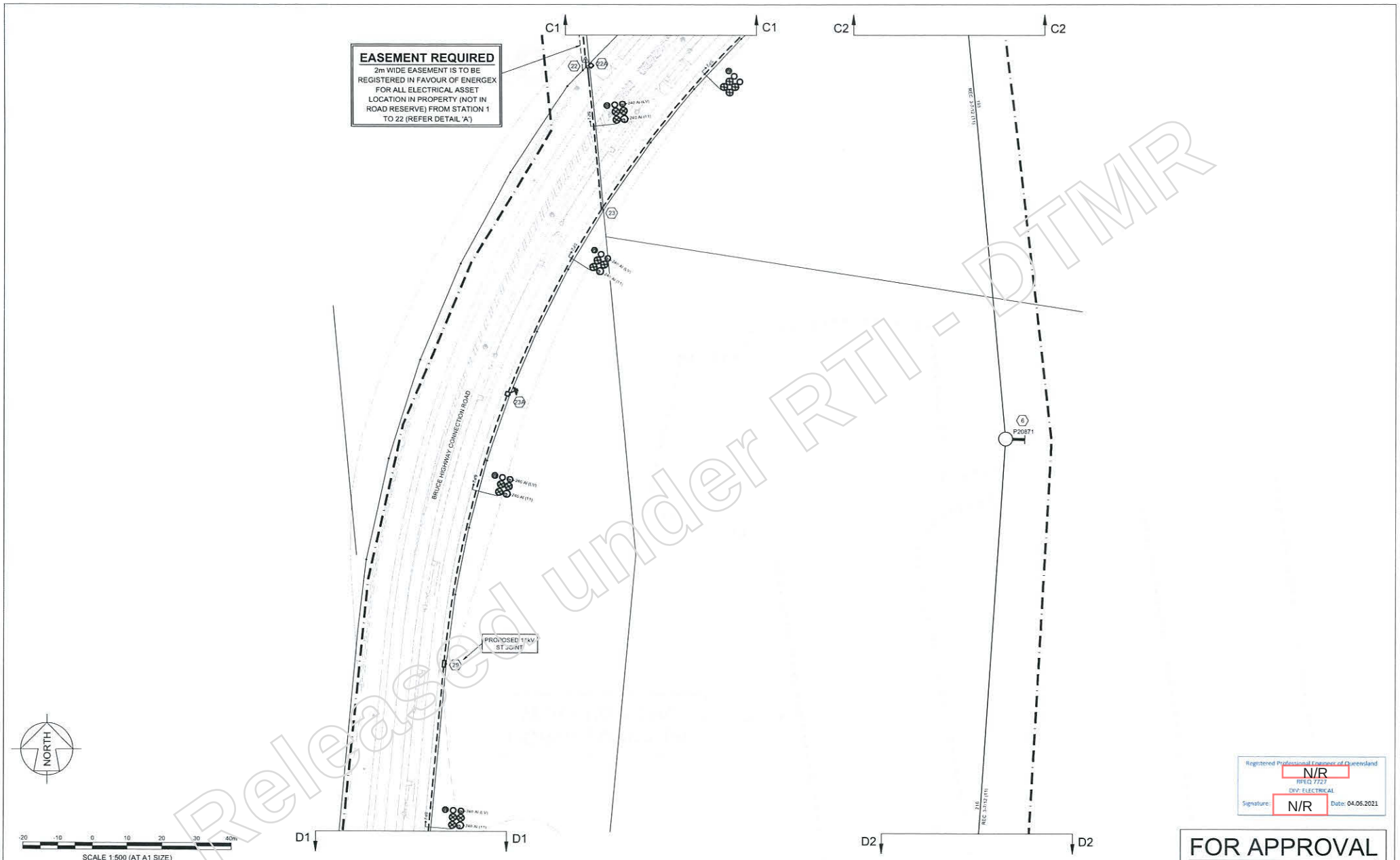
Registered Professional Engineer of Queensland
RPEQ 7727
DISCIPLINE: ALL
N/R
Signature: N/R Date: 04.06.2021

N/R

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
WORKS PLAN

SCALE : 1:500 @ A1
10353-1-1
S4900292 PR3
Sheet 3 of 12



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		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
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		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	----
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

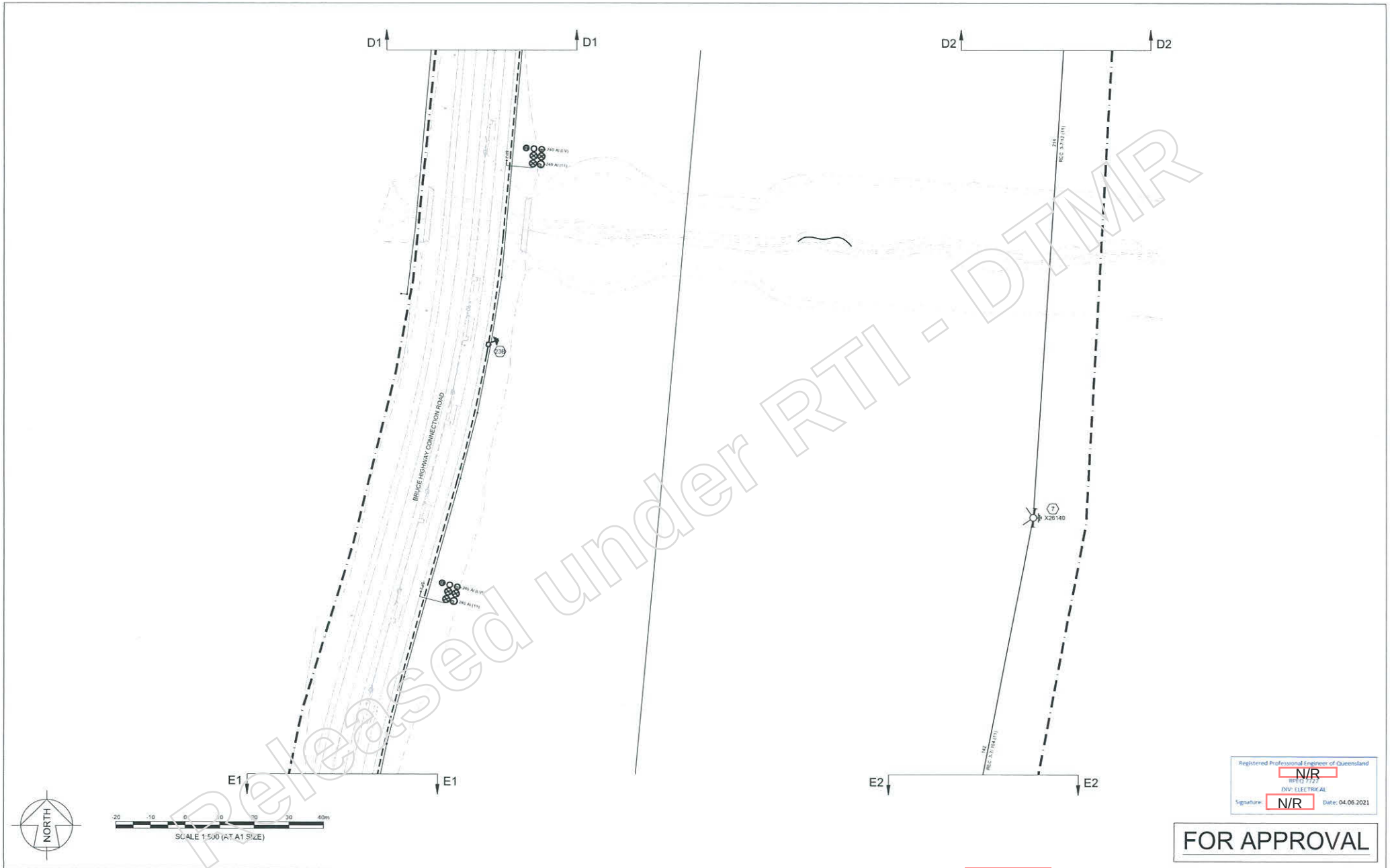
N/R

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R Date: 04.06.2021

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
WORKS PLAN

SCALE : 1:500 @ A1
10353-1-1
S4900292 PR3
Sheet 4 of 12



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		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
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		GAS	DBYD		
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MOBILE		WATER	DBYD	APPROVAL No	----
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

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ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

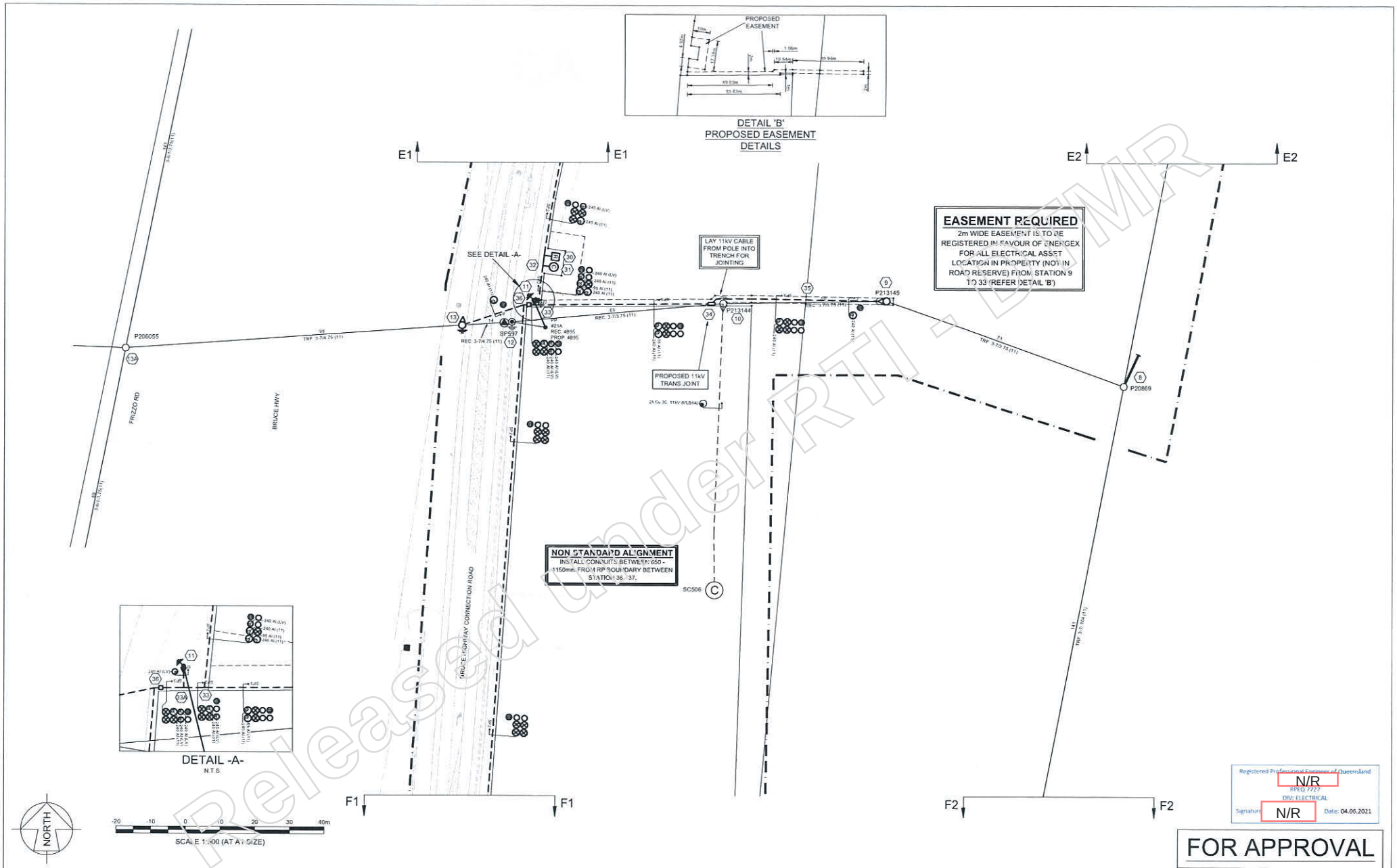
WORKS PLAN

SCALE : 1:500 @ A1

10353-1-1

S4900292 PR3

Sheet 5 of 12



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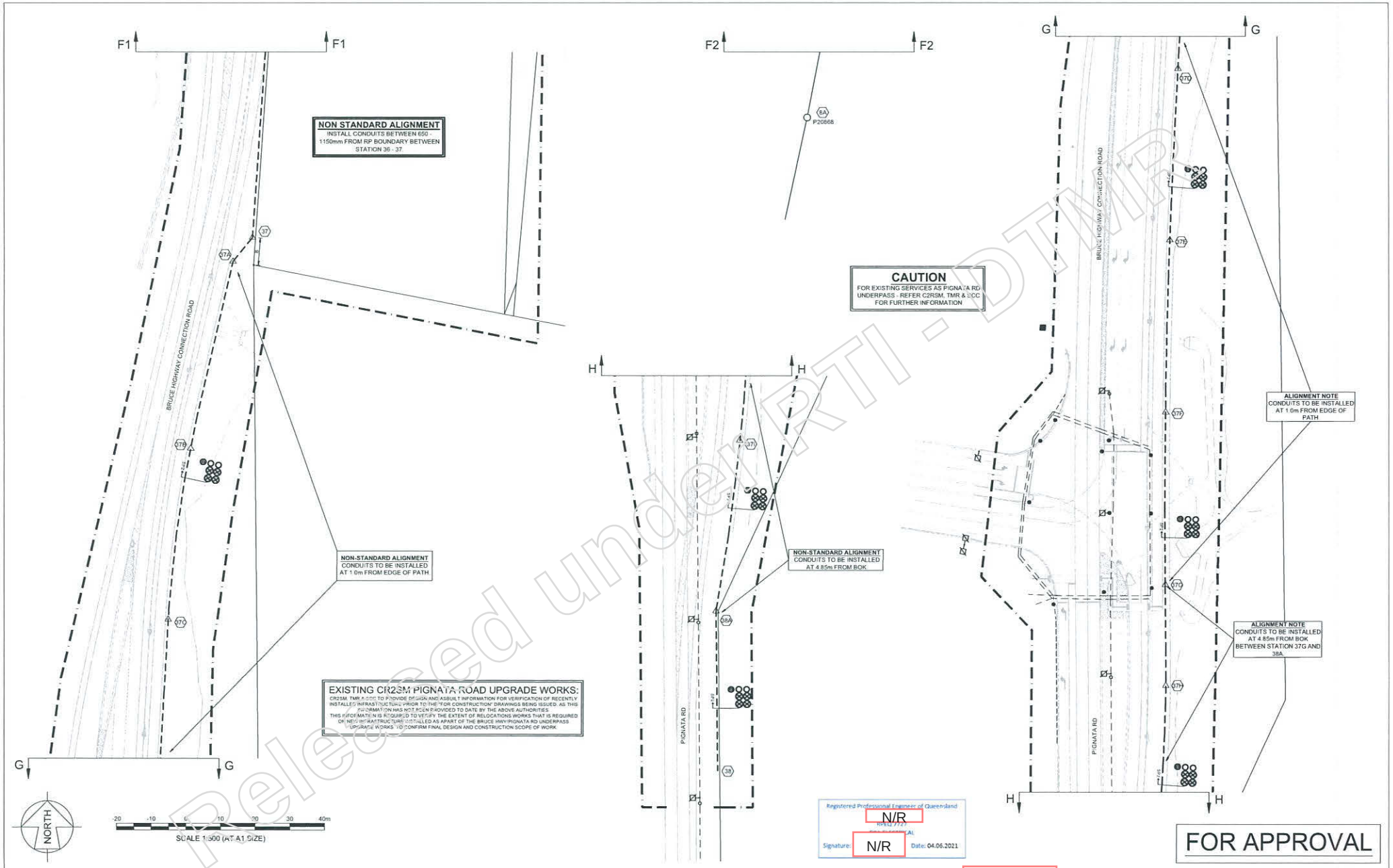
		GAS	DBYD	
PHONE		HP GAS	DBYD	LOCAL AUTHORITY: SUNC
MOBILE		WATER	DBYD	APPROVAL No: ----
FAX		STORMWATER	DBYD	
EMAIL		SEWERAGE	DBYD	
		OTHER	DBYD	J. READ RPEQ: 7727

N/R
ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
WORKS PLAN

SCALE : AS SHOWN @ A1
10353-1-1
S4900292 PR3
Sheet 6 of 12



FOR APPROVAL

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SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
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		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
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		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	----
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

N/R

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

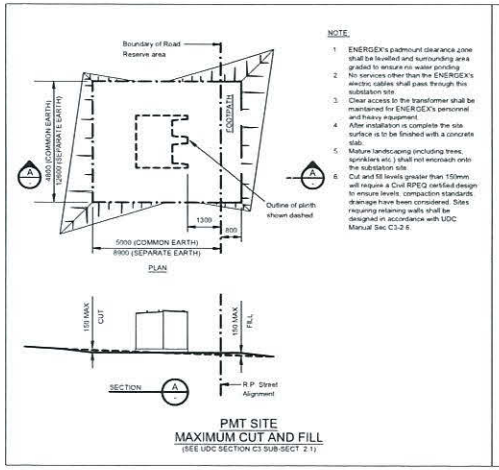
WORKS PLAN

SCALE : 1:500 @ A1

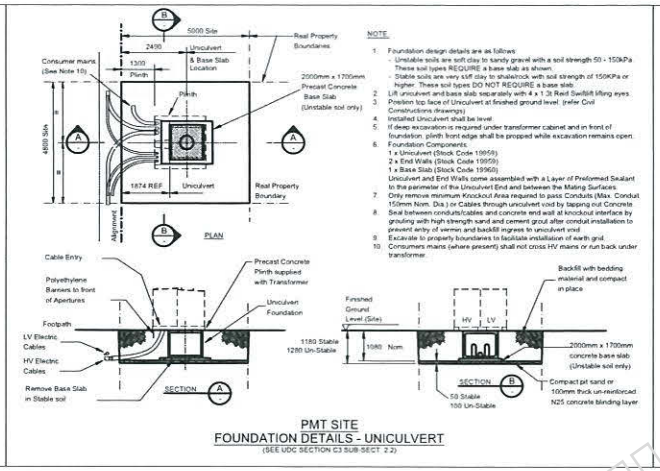
10353-1-1

S4900292 PR3

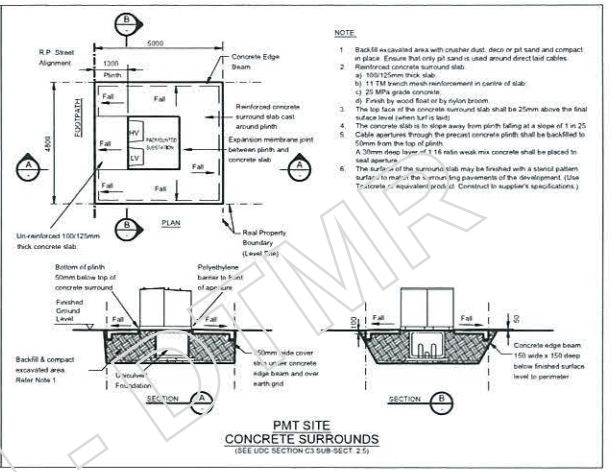
Sheet 7 of 12



PMT SITE
MAXIMUM CUT AND FILL
(SEE UDC SECTION C3 SUB-SECT. 2.1)

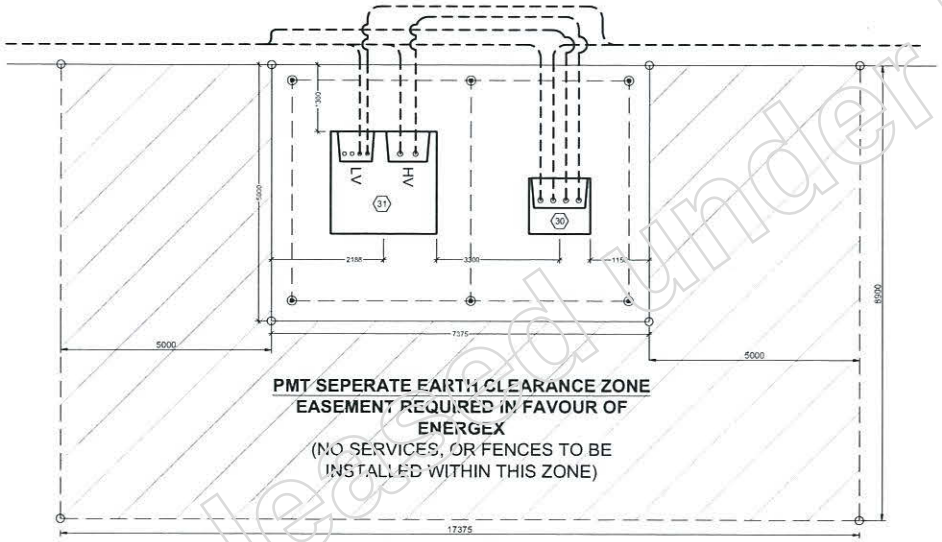


PMT SITE
FOUNDATION DETAILS - UNICULVERT
(SEE UDC SECTION C3 SUB-SECT. 2.2)



PMT SITE
CONCRETE SURROUNDS
(SEE UDC SECTION C3 SUB-SECT. 2.5)

BRUCE HIGHWAY CONNECTION ROAD
VERGE/ FOOTPATH
FRONT OF SITE



PROPOSED PADMOUNT TRANSFORMER
SITE DETAIL
SCALE 1:50

PADMOUNT TRANSFORMER SITE NOTES.

- Padmount sites are to be constructed to Energex requirements as set out in Energex Standard Drawings - UDCM C3 - Padmount Transformer Site
- Retaining walls shall be installed where a change in ground level of 300mm or more occurs within 2000mm of the substation clearance zone. Fences shall be installed for:
  - Residential areas (Typically 1200mm high)
  - Sloping sites (either front to back or left-right).
- Fences and Retaining walls shall be constructed to ENERGEX standards to satisfy minimum clearance zones of SEPERATE earth configurations. Refer to section C3-1 for retaining wall construction notes. Alternative designs to those provided in this manual will require a Civil Engineer's Certification.
- Safety fences shall comply with the requirements of the Workplace Health and Safety Act, AS1657 and AS1926 and all amendments.
- Metal retaining wall fences shall be used in CMEN areas. (Refer UDCM C3.1 Sheet 6)
- All retaining walls and safety fencing on private property shall be maintained by the owner at no cost to Energex.
- All fencing materials shall be galvanised or finished in an equally durable manner.
- All chainwire and support wires shall be PVC coated and coloured black or green.
- All elevated areas shall be provided with toe boards and infill type fencing.
- Building Exclusion Zone - maintain 4m minimum from edge of permissible residential dwelling construction area (building envelope) to edge of padmount transformer enclosure - as per UDCM C3.1 Requirements.
- Site access to padmount site - 4m wide x 5.0m high. To suit Franna T25 crane or flatbed truck. Access track to support crane with axle loads up to 10 tonne.

NORTH

Registered Professional Engineer of Queensland
N/R
DIV: ELECTRICAL
Signature N/R Date: 04.05.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	25/02/2021	PRELIMINARY DESIGN.			
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CV SERVICES GROUP
delivering the edge

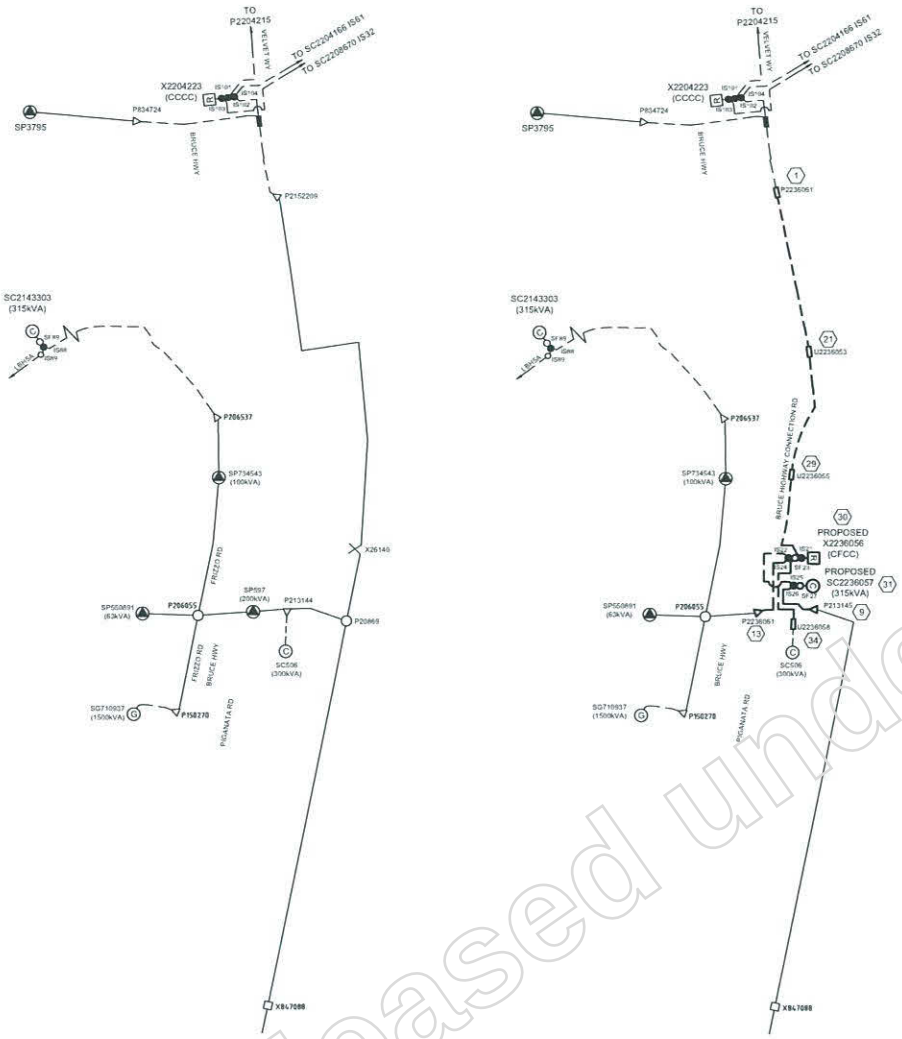
SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	---
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ 7727

N/R

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
PMT / RMU SITE DETAILS

SCALE : N/A @ A1
10353-1-1
S4900292 PR3
Sheet 8 of 12



EXISTING 11kV SCHEMATIC

SCALE 1:5000 @ A1

FEEDER: MLB6A

PROPOSED 11kV SCHEMATIC

SCALE 1:5000 @ A1

FEEDER: MLB6A

Site ID: X2204223 Location: VELVET WAY Stn No: -

LABEL SIZE	LABEL COLOUR	LETTER SIZE	RMU LABEL				LABEL LOCATION	LABEL DESCRIPTION
100x40	WB	15	IS102	IS101	IS103	IS104	NEAR ISOLATOR	ISOLATOR IDENTIFICATION
150x50	BW	10	TEE BRUCE HWY P834724 / BRUCE HIGHWAY CONNECTION RD X2236056 IS21				CABLE BOX	CABLE DESTINATION
150x50	BW	10	TEE BRUCE HWY P834724 / BRUCE HIGHWAY CONNECTION RD X2236056 IS21				INSIDE SIDE WALL	CABLE DESTINATION
			NEW	EXISTING	EXISTING	EXISTING		

Site ID: X2236056 Location: BRUCE HIGHWAY CONNECTION RD Stn No: 30

LABEL SIZE	LABEL COLOUR	LETTER SIZE	RMU LABEL				LABEL LOCATION	LABEL DESCRIPTION
100x40	WB	15	IS22	SF23	IS21	IS24	NEAR ISOLATOR	ISOLATOR IDENTIFICATION
150x50	BW	10	TO BRUCE HIGHWAY CONNECTION RD SC2236057 IS25	TO BRUCE HIGHWAY CONNECTION RD SC506	TEE VELVET WAY X2204223 IS102 / BRUCE HWY P834724	TO BRUCE HIGHWAY CONNECTION RD P2236061	CABLE BOX	CABLE DESTINATION
150x50	BW	10	TO BRUCE HIGHWAY CONNECTION RD SC2236057 IS25	TO BRUCE HIGHWAY CONNECTION RD SC506	TEE VELVET WAY X2204223 IS102 / BRUCE HWY P834724	TO BRUCE HIGHWAY CONNECTION RD P2236061	INSIDE SIDE WALL	CABLE DESTINATION
			NEW	NEW	NEW	NEW		

Site ID: SC2236057 Location: BRUCE HIGHWAY CONNECTION RD Stn No: 31

LABEL SIZE	LABEL COLOUR	LETTER SIZE	RMU LABEL			LABEL LOCATION	LABEL DESCRIPTION
100x40	WB	15	IS25	IS26	SF27	NEAR ISOLATOR	ISOLATOR IDENTIFICATION
150x50	BW	10	TO BRUCE HIGHWAY CONNECTION RD X2236056 IS22	TO BRUCE HIGHWAY CONNECTION RD P213145	TO TRANSFORMER	CABLE BOX	CABLE DESTINATION
150x50	BW	10	TO BRUCE HIGHWAY CONNECTION RD X2236056 IS22	TO BRUCE HIGHWAY CONNECTION RD P213145	TO TRANSFORMER	INSIDE SIDE WALL	CABLE DESTINATION
			NEW	NEW	NEW		

Site ID: SC506 Location: BRUCE HIGHWAY CONNECTION ROAD Stn No: -

LABEL SIZE	LABEL COLOUR	LETTER SIZE	TERM LABEL	LABEL LOCATION	LABEL DESCRIPTION
150x50	BW	10	TO BRUCE HIGHWAY CONNECTION RD X2236056 SF23	CABLE TERM	CABLE DESTINATION
			NEW		

Location: BRUCE HIGHWAY Stn No: -

LABEL SIZE	SITE LOCATION FOR ATTACHING OF LABEL	POLE LABEL	
300x100	Pole No: P834724	11kV CABLE - TEE VELVET WAY X2204223 IS102 / BRUCE HIGHWAY CONNECTION RD X2236056 IS21	NEW

Location: BRUCE HIGHWAY CONNECTION RD Stn No: 9

LABEL SIZE	SITE LOCATION FOR ATTACHING OF LABEL	POLE LABEL	
300x100	Pole No: P213145	11kV CABLE -TO BRUCE HIGHWAY CONNECTION RD SC2236057 IS26	NEW

Location: BRUCE HIGHWAY CONNECTION RD Stn No: 13

LABEL SIZE	SITE LOCATION FOR ATTACHING OF LABEL	POLE LABEL	
300x100	Pole No: P2236061	11kV CABLE - TO BRUCE HIGHWAY CONNECTION RD X2236056 IS24	NEW

NORTH

Registered Professional Engineer of Queensland
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R Date: 04.06.2021

N/R

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	25/02/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
PR3	03/06/2021	ADDITIONAL WORKS ADDED. CIVIL BASE UPDATED.			

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SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION
NAME		ENERGEX OH	3.0	NUMBER OF LOTS: 0
		ENERGEX UG	0.9	PROPOSED LOTS: N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS N/A
		GAS	DBYD	
PHONE		HP GAS	DBYD	LOCAL AUTHORITY: SUNC
MOBILE		WATER	DBYD	APPROVAL No: ---
FAX		STORMWATER	DBYD	
EMAIL		SEWERAGE	DBYD	
		OTHER	DBYD	J. READ RPEQ 7727

N/R

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

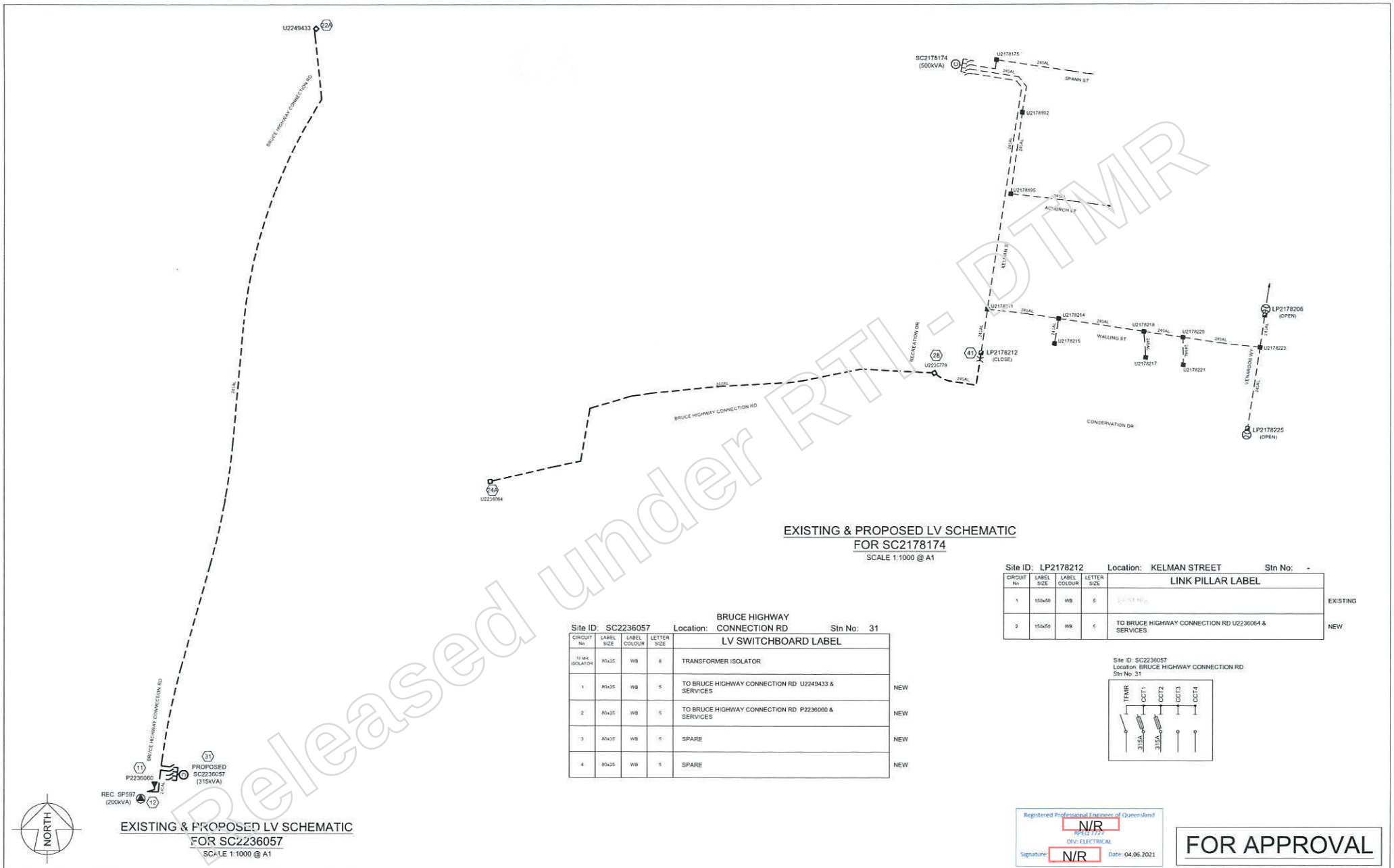
11kV SCHEMATIC & LABELS

SCALE : 1:5000 @ A1

10353-1-1

S4900292 PR3

Sheet 9 of 12



EXISTING & PROPOSED LV SCHEMATIC
FOR SC2236057
SCALE 1:1000 @ A1

EXISTING & PROPOSED LV SCHEMATIC
FOR SC2178174
SCALE 1:1000 @ A1

BRUCE HIGHWAY

Site ID: SC2236057 Location: CONNECTION RD Stn No: 31

CIRCUIT No.	LABEL SIZE	LABEL COLOUR	LETTER SIZE	LV SWITCHBOARD LABEL	
TF MH ISOLATOR	80x35	WB	6	TRANSFORMER ISOLATOR	
1	80x35	WB	5	TO BRUCE HIGHWAY CONNECTION RD U2249433 & SERVICES	NEW
2	80x35	WB	5	TO BRUCE HIGHWAY CONNECTION RD P2236060 & SERVICES	NEW
3	80x35	WB	5	SPARE	NEW
4	80x35	WB	5	SPARE	NEW

Site ID: LP2178212 Location: KELMAN STREET Stn No: -

CIRCUIT No.	LABEL SIZE	LABEL COLOUR	LETTER SIZE	LINK PILLAR LABEL	
1	150x50	WB	5	[illegible]	EXISTING
2	150x50	WB	5	TO BRUCE HIGHWAY CONNECTION RD U2236064 & SERVICES	NEW

Site ID: SC2236057
Location: BRUCE HIGHWAY CONNECTION RD
Stn No: 31

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	25/02/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
PR3	03/06/2021	ADDITIONAL WORKS ADDED. CIVIL BASE UPDATED.			

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SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	---
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

N/R

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
LV SCHEMATICS & LABELS

SCALE : 1:1000 @ A1
10353-1-1
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EQUIPMENT SCHEDULE

LOCATION	STN No.	ENERGEX SITE I.D	EX	REC	IN	MODEL DESCRIPTION	IIN	COMP I.D	PLANT No.	MODEL I.D/ C.U LISTING	QTY	REMARKS
VARIOUS LOCATIONS						32A HRC FUSE LINK CARTRIDGE FOR SL				ASSY801-1	5	
Off Bruce Highway Connection Road	1	U 2236052			X	11KV S/J 95-240 TO 95-240MM TRIPLEX		CJ1		11ST24/24X	1	
					X	CONCRETE JOINT PROTECTION SLAB				CNJTPROT	1	
	14				X	WARNING SIGN POST TYPE 1				WSP1	1	
	15				X	WARNING SIGN POST TYPE 1				WSP1	1	
	16				X	WARNING SIGN POST TYPE 1				WSP1	1	
	17				X	WARNING SIGN POST TYPE 1				WSP1	1	
	18				X	WARNING SIGN POST TYPE 1				WSP1	1	
	19				X	WARNING SIGN POST TYPE 1				WSP1	1	
	20				X	WARNING SIGN POST TYPE 1				WSP1	1	
	21	U 2236053			X	11KV S/J 95-240 TO 95-240MM TRIPLEX		CJ1		11ST24/24X	1	
					X	CONCRETE JOINT PROTECTION SLAB				CNJTPROT	1	
	22				X	WARNING SIGN POST TYPE 1				WSP1	1	
Bruce Highway Connection Road	22A	U 2249433			X	ELECT PILLAR (4C) 1WAY240,6X100A+SL		PI1		LVSP2-6SL	1	
					X	MEN EARTHS URD EXTENTIONS(NORMAL POINT)				LV4CMEN	1	
	23A	U 2249434			X	ELECT PILLAR 4C 2 WAY 240, NO FUSE PANEL		PI1		LVSP4-6NF	1	
					X	MEN EARTHS URD EXTENTIONS(NORMAL POINT)				LV4CMEN	1	
	23B	U 2249435			X	ELECT PILLAR 4C 2 WAY 240, NO FUSE PANEL		PI1		LVSP4-6NF	1	
					X	MEN EARTHS URD EXTENTIONS(NORMAL POINT)		EA1		LV4CMEN	1	
	24A	U 2236064			X	ELECT PILLAR (4C) 1WAY240,6X100A+SL		PI1		LVSP2-6SL	1	
					X	MEN EARTHS URD EXTENTIONS(NORMAL POINT)		EA1		LV4CMEN	1	
	27	U 2236054			X	ELECT PILLAR 4C 2WAY 240, 6X100A+SL		PI1		LVSP4-6SL	1	
					X	MEN EARTHS URD EXTENTIONS(NORMAL POINT)		EA1		LV4CMEN	1	
	28	U 2235779			X	ELECT PILLAR 4C 2WAY 240, 6X100A+SL		PI1		LVSP4-6SL	1	
	29	U 2236055			X	11KV S/J 95-240 TO 95-240MM TRIPLEX		CJ1		11ST24/24X	1	
					X	CONCRETE JOINT PROTECTION SLAB				CNJTPROT	1	
	30	X 2236056			X	SAFELINK 2 CFCC OD RMU		RM1		SC0034140	1	
					X	HV FUSE SAFELINK315KVA PMT TFMR AIR/TEMP				DSHMF3SLK	1	
					X	11KV TERM O/D 95/240 A OR C TRIPLEX				11SGTO240T	4	
					X	MATERIALS FOR RMU EARTH TAILS				DSRMEGT	1	
					X	RMU SUPPORT CHANNEL OVER BOX CULVERT				SC0018434	3	
					X	CULVERT BOX UNIT				SC0019566	1	
					X	CONCRETE,PRECAST FOUNDATION;1700MMLG				SC0019960	1	
	31	SC 2236057			X	PMT SQ 315KVA 11KV/433V 7TAP SIEMENS		PM1		S25117	1	
					X	HV FUSE SAFELINK315KVA PMT TFMR AIR/TEMP				DSHMF3SLK	1	
					X	11KV ELBOW TERM 185-240 TRIPLEX				2DBSTA24D	2	
					X	LV PMT TERM/CIRC 240SQMM 4C XLPE CABLE				LVPT4C240	1	
					X	LV FUSE LINK 315A FOR ABB LV BD				DSLVF31	1	
					X	SFP EARTH GRID (PMT)				DSPMSEGS	1	
					X	CULVERT BOX				SC0019959	1	
					X	CONCRETE,PRECAST FOUNDATION;1700MMLG				SC0019960	1	
	34	U 2236058			X	11KV T/J 95 AL TRIPLEX TO 25/70MM PLY		CJ1		11XT95A/25CP	1	
					X	CONCRETE JOINT PROTECTION SLAB				CNJTPROT	1	
	36	U 2236059			X	ELECT PILLAR 4C 3 WAY 3X240, 6 X 100 +SL		PI1		LVSP9-6SL	1	Future 3-Way
					X	ADDITIONAL FUSE HOLDER				1043-1	1	
	37				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37A				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37B				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37C				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37D				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37E				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37F				X	WARNING SIGN POST TYPE 1				WSP1	1	
Pignata Road	37G				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37H				X	WARNING SIGN POST TYPE 1				WSP1	1	
	37I				X	WARNING SIGN POST TYPE 1				WSP1	1	
	38A				X	WARNING SIGN POST TYPE 1				WSP1	1	
Kelman Street	41	LP 2178212	X			LV LINK PILLAR 2 WAY 240 240 AL		PI1			1	
					X	CFS UNIT PHASE CONNECTION 240 SQMM				1036-3	3	
					X	CFS UNIT NEUTRAL CONNECTION 240 SQMM				1035-3	1	
			X			MEN LINK PILLAR EARTHING		EA1			1	

URD CIVIL WORKS SCHEDULE - ROAD CROSSINGS

LOCATION	STATIONS FROM - TO	CONDUIT LENGTH 40mm (HD) ORANGE	No.	100MM (LD) ORANGE	No.	100mm (COMMS) WHITE	No.	125mm (LD) ORANGE	No.	BENDS ∠° / No. 40mm ∠°	No.	100mm ∠°	No.	COMS ∠°	No.	125mm ∠°	No.	X-SECTION (m) EXCAV TAPE (m)	TRENCH DETAIL	PVC COVERSTRIP 150mm	200mm	300mm	DRAW WIRE (m)	KERB MARKERS	REMARKS
ROAD CROSSINGS - TRENCHING AND MATERIAL SUPPLIED BY CIVIL CONTRACTOR (BENDS SUPPLIED BY ELECTRICAL CONTRACTOR)																									
Bruce Highway Connection Road	22 - 23			42	2	42	1	42	4									42	SP2			84	154	2	LV Conduit Via Stn 22A
	24 - 25			31	2	31	1	31	4									31	SP2			62	121	2	
	27A - 28			43	2	43	1	43	4			45	1					43	SP4			172	157	2	
	28 - 42			45	2	45	1	45	4									45	SP5			135	183	2	
	36 - 13					19	1	19	1					45	2	45	1	19	F			38	46	1	
CIVIL CONTRACTORS TOTALS				322		180		663		ALL BENDS TO BE SUPPLIED BY ELECTRICAL CONTRACTOR								180				491	641	9	

NOTE- ALL CONDUITS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE CURRENT ENERGEX "UNDERGROUND DISTRIBUTION CONSTRUCTION MANUAL"

UNDERGROUND CABLE SCHEDULE

LOCATION	STATIONS FROM - TO	VOLTS	EX	TRF	REC	IN	CABLE SIZE/ TYPE	MODEL I.D/ C.U LISTING	ROUTE LENGTH (m)	CABLE LENGTH (m) NEW	CABLE LENGTH (m) REC	LCC	REMARKS
Off Bruce Highway Connection Road	1 - 2	11kV	X		X		240mm² Al 3C TRIPLEX (m)	11AT240XSH	22		32		Cut Cable at Stn 1 and Recover.
	1 - 30	11kV				X	240mm² Al 3C TRIPLEX (m)	11AT240XSH	827	835			Insall Via Joints at Stns 21 & 29
Bruce Highway Connection Road	22A - 31	LV				X	240mm² Al 4C XLPE (m)	LVA4240XPV	446	460			Via Stns 23A & 23B.
	24A - 41	LV				X	240mm² Al 4C XLPE (m)	LVA4240XPV	330	339			Via Stnd 27 & 28.
	30 - 31	11kV				X	240mm² Al 3C TRIPLEX (m)	11AT240XSH	4	7			
	30 - 34	11kV				X	95mm² Al 3C TRIPLEX (m)	11AT95XSH	68	72			Joint to Existing PLY Cable
	30 - 13	11kV				X	240mm² Al 3C TRIPLEX (m)	11AT240XSH	41	56			
	31 - 9	11kV				X	240mm² Al 3C TRIPLEX (m)	11AT240XSH	119	134			
	31 - 11	LV				X	240mm² Al 4C XLPE (m)	LVA4240XPV	20	33			Via Stn 36.

URD CIVIL WORKS SCHEDULE - FOOTPATHS

LOCATION	STATIONS FROM - TO	CONDUIT LENGTH 40mm (HD) ORANGE	No.	100MM (LD) ORANGE	No.	100mm (COMMS) WHITE	No.	125mm (LD) ORANGE	No.	BENDS ∠° / No. 40mm ∠°	No.	100mm ∠°	No.	COMS ∠°	No.	125mm ∠°	No.	X-SECTION (m) EXCAV TAPE (m)	TRENCH DETAIL	PVC COVERSTRIP 150mm	200mm	300mm	DRAW WIRE (m)	KERB MARKERS	REMARKS
FOOTPATHS - TRENCHING AND MATERIAL SUPPLIED BY ELECTRICAL CONTRACTOR																									
Off Bruce Highway Connection Road	1 - 22					385	1	385	2			30	1	30	2	385		SP1			770	1167			Installed within Easement.
Bruce Highway Connection Road	23 - 24			318	2	318	1	318	4	30	4	30	2	30	8	318		SP2				2254			
	23 - 32			400	2	400	1	400	4	45	2					400		SP2				2912			
										90	3	30	6	30	12										
	32 - 33			12	3	12	1	12	4							12		SP3				68			
	25 - 27A			160	2	160	1	160	4							160		SP2			3	553			RP Side LV Conduit Via Stn 27
	33 - 35			78	3	78	1	78	4	30	4	30	2	30	8	78		SP3				574			Installed within Easement.
	33 - 33A			2	2	2	1	2	4							2		SP2				34			
	33A - 36			2	2	2	1	2	4	45	3					2		SP3			3	38			
	33A - 11			3	1					45	1					3		D			3	7			
	36 - 38			689	2	689	1	689	4	45	4	45	2	45	8	689		SP2			888	4872			Non-Std Alignment from Stn 37 to 38A.
										30	8	30	4	30	16										
Off Bruce Highway Connection Road	35 - 9					22	1	22	1			45	2	45	2	22		F			44	52			Installed within Easement.
Bruce Highway Connection Road	39 - 40			29	2	29	1	29	4	45	4	30	2	30	8	29		SP2			3	115			
	42 - 43			8	2	8	1	8	4	30	4	30	2	30	8	8		SP2				52			Cap Conduits at Stage Boundary
ELECTRICAL CONTRACTOR TOTALS				3491		2105		7584		30° 45°	23 14	30° 45°	19 4	30° 45°	62 10	2108					1714	12698			

NOTE- ALL CONDUITS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE CURRENT ENERGEX "UNDERGROUND DISTRIBUTION CONSTRUCTION MANUAL"

Underground Developer - UGD -

Model I.D/ C.U Listing	Qty	Description
11ST24/24X	3	11KV S/J 95-240 TO 95-240MM TRIPLEX
CNJTPROT	4	CONCRETE JOINT PROTECTION SLAB
WSP1	19	WARNING SIGN POST TYPE 1
LVSP2-6SL	2	ELECT PILLAR (4C) 1WAY240,6X100A+SL
LV4CMEN	5	MEN EARTHS URD EXTENTIONS(NORMAL POINT)
LVSP4-6NF	2	ELECT PILLAR 4C 2 WAY 240, NO FUSE PANEL
LVSP4-6SL	2	ELECT PILLAR 4C 2WAY 240, 6X100A+SL
SC0034140	1	SAFELINK 2 CFCC OD RMU
DSHMF3SLK	2	HV FUSE SAFELINK315KVA PMT TFMR AIR/TEMP
11SGTO240T	4	11KV TERM O/D 95/240 A OR C TRIPLEX
DSRMEGT	1	MATERIALS FOR RMU EARTH TAILS
SC0018434	3	RMU SUPPORT CHANNEL OVER BOX CULVERT
SC0019566	1	CULVERT BOX UNIT
SC0019960	2	CONCRETE,PRECAST FOUNDATION;1700MMLG
S25117	1	PMT SQ 315KVA 11KV/433V 7TAP SIEMENS
2DBSTA24D	2	11KV ELBOW TERM 185-240 TRIPLEX
LVPT4C240	1	LV PMT TERM/CIRC 240SQMM 4C XLPE CABLE
DSLVF31	1	LV FUSE LINK 315A FOR ABB LV BD
DSPMSEGS	1	SFP EARTH GRID (PMT)
SC0019959	1	CULVERT BOX
11XT95A/25CP	1	11KV T/J 95 AL TRIPLEX TO 25/70MM PLY
LVSP9-6SL	1	ELECT PILLAR 4C 3 WAY 3X240, 6 X 100 +SL
1043-1	1	ADDITIONAL FUSE HOLDER
1036-3	3	CFS UNIT PHASE CONNECTION 240 SQMM
1035-3	1	CFS UNIT NEUTRAL CONNECTION 240 SQMM
1AT240XSH	1032	11KV CABLE AL TRIPLEX 240 TR XLPE
LVA4240XPV	832	LV CABLE AL 4C 240 XLPE PVC /M
11AT95XSH	72	11KV CABLE AL TRIPLEX 95 TRXLPE

Overhead Developer - OHD -

Model I.D/ C.U Listing	Qty	Description
MDCF	2	MDCF MAXIMUM DEPTH CONCRETE FOUNDATION
RBGF	1	RBGF ROAD BASE GRAVEL FOUNDATION
P14/20-36	1	POLE, WOOD 14 MTR 36KN LST C/W FITTINGS
P11/8-14	1	POLE, WOOD 11 MTR 14KN LST C/W FITTINGS
P15.5/20-36	1	POLE, WOOD 15.5 MTR 36KN LST C/W FITTINGS
11TC/S	3	11KV TERMINATION COMP XARM 7KN SYN INS
HVT7104CU	3	HV CONDUCTOR TERM 7/.104 (7/12) CU
SC0020279	6	CABLE,POWER,ELEC,ARIEL,120MM2,CCT BRIDGE
SC0022548	3	PG CLAMP, 50-300AL/35-240CU
SC0022547	3	PG CLAMP, 35-300AL/35-300AL
SET167-4	1	11KV POST INSULATOR TO XARM(100)
HVTMA	6	HV CONDUCTOR TERMINATION - MARS
GSW55/SAS25	1	GRND STAY,WRAP,19/2.00/SCREW ANCHOR S25
11BRAL/240XL	2	BR FROM 25-150 AL OH TO XLPE TERM
11PTTRIPXW	2	11KV WOOD POLE TERM 95-240 TRIPLEX XLPE
CGES	3	CABLE GUARD EARTH (SEPARATE)
ADF	3	ADDITIONAL EARTH
LVT4C240	1	LV UG TERM 240SQMM 4C XLPE WOOD POLE
LVBR240/ABC	1	BRIDGING, LVABC TO 240 4 CORE UG CABLE
11TC2/S	1	11KV TERMINATION COMP XARM 13KN SYN INS
HVTMO	3	HV CONDUCTOR TERMINATION - MOON
4B95	15	4 X 95 SQ MM LVABC/M
SWAS200	1	NEW,LVABC,WOOD/AL MAIN,200A

Total Trench Length (m) - 2288

Registered Professional Engineer of Queensland
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS
PR1	25/02/2021	PRELIMINARY DESIGN.
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.
PR3	03/06/2021	ADDITIONAL WORKS ADDED. CIVIL BASE UPDATED.

CV SERVICES GROUP
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SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	---
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

N/R

ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

UG SCHEDULES & MATERIAL LISTS

SCALE : N/A @ A1

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OVERHEAD WORKS SCHEDULE

LOCATION	STN No.	Site I.D (POLE No.)	POLES ∠°	EDT	SST	LST	EXISTING	RECOVER	ERECT	SINKING DEPTH (m)	FOOT	COMP ID	ALIGN	CONSTRUCTIONS EXISTING	RECOVER	ERECT	NO	KBS (mm)	ANG	REMARKS
Off Bruce Highway Connection Road	2	P 2152209					P15.5/12-22	P15.5/12-22		EX	EX	P01	EX	11TC/S 11UGT SWS HVE CGE	11TC/S 11UGT SWS HVE CGE		-1 -1 -1 -1 -1			Recover Pole & Hardware
	3	P 2152210					P14/8.14	P14/8.14		EX	EX	P01	EX	11TDN	11TDN		-1			Recover Pole & Hardware
	4	P 2152211					P14/20-36	P14/20-36		EX	EX	P01	EX	11TC/S G/STAY 11TC/S	11TC/S G/STAY 11TC/S		-1 -1 -1			Recover Pole & Hardware
Bruce Highway Connection Road	5	P 20872					P15.5/20-36	P15.5/20-36		EX	EX	P01	EX	11TC/S G/STAY 11TC/S	11TC/S G/STAY 11TC/S		-1 -1 -1			Recover Pole & Hardware
Off Bruce Highway Connection Road	6	P 20871					P15.5/12	P15.5/12		EX	EX	P01	EX	11S G/STAY	11S G/STAY		-1 -1			Recover Pole & Hardware
	7	X 26140					P15.5/12	P15.5/12		EX	EX	P01	EX	11S 11LBS G/STAY G/STAY	11S 11LBS G/STAY G/STAY		-1 -1 -1 -1			Recover Pole & Hardware
	8	P 20869	NO STAY 205 9.92 kN 14.07 kN 29.13 kN WITH STAY 115 0.07 kN 4.05 kN 14.11 kN				P14/12-22			EX	EX	P01	EX	11P 11T	11P 11T	11TC/S HVT7104CU SC0020279 SC0022546 SC0022547 SET167-4 11TC/S HVTMA GSW55/SAS25	1 3 6 3 3 1 1 3 1	150 850 100	T T 	1/12 Helical Terms DGT Bridging Clamps Clamps Bridging Insulator Install at 10m, 45°, 70Bar & 25° East
	9	P 213145	110 2.58 kN 7.15 kN 19.97 kN				P12.5 H	P12.5 H	P14/20-36	2.60	MDCF	P01	EX	11A	11A	11TC/S HVTMA 11BRAL/240XL 11PTTRIPXW CGES ADE	1 3 1 1 1 1	150 1400 	T	Replace pole 2m East
	10	P 213144					P12.5 H	P12.5 H		EX	EX	P01	EX	11A 11UGT HVE CGES	11A 11UGT HVE CGES		-1 -1 -1 -1			Recover Pole & Hardware Cable to be Laid in Trench for Jointing
Bruce Highway Connection Road	11	P 2236066							P11/8.14	2.20	RBGF	P01	2.2			LVT4C240 LVBR240/ABC CGES ADE	1 1 1 1	500		
	12	SP 597					P15.5/20-36	P15.5/20-36		EX	EX	P01	EX	11SC/S 11FDO3 11PTT200 SFA PTRM SCAP1 PTSFP	11SC/S 11FDO3 11PTT200 SFA PTRM SCAP1 PTSFP		-1 -1 -1 -1 -1 -1 -1			Recover Pole & Hardware No Longer Used
	13	P 2236061	266 4.53 kN 10.65 kN 28.49 kN					P15.5/20-36		2.70	MDCF	P01	1.0 BGR			11TC2/S HVTMO 11BRAL/240XL 11PTTRIPXW CGES ADE	1 3 1 1 1 1	150 1400 	T	Install pole 1000mm behind Guard Rail Under Existing Mains

OVERHEAD CONDUCTOR SCHEDULE

LOCATION	STATIONS FROM - TO	VOLTS	EXISTING	TRANSFER	RECOVER	ERECT	No. OF SPANS	DIST (m)	STRINGING TABLE	M.E.S	SAG SPAN FROM - TO	SAG (m) 15°C	SAG (m) 30°C	TOTAL NEW CONDUCTOR LENGTH (m)	REMARKS
Off Bruce Highway Connection Road	2 - 4	11kV	3 x MOON		3 x MOON		2	301							
	4 - 5	11kV	3 x MOON		3 x MOON		1	112							
Bruce Highway Connection Road	5 - 6	11kV	3 x 7/.104		3 x 7/.12		1	153							
Off Bruce Highway Connection Road	6 - 7	11kV	3 x 7/.104		3 x 7/.12		1	216							
	7 - 8	11kV	3 x 7/.104		3 x 7/.104		1	142							
	8 - 8A	11kV	3 x 7/.104	3 x 7/.104			1	141	T125	141	8 - 8A	2.51	2.77		Maintain Existing Tension
	8 - 9	11kV	3 x MARS	3 x MARS			1	73	T299	73	8 - 8A	1.60	1.79		Maintain Existing Tension
	9 - 12	11kV	3 x MARS		3 x MARS		2	113							
Bruce Highway Connection Road	12 - 13	11kV	3 x MOON		3 x MOON		1	74							
	13 - 13A	11kV	3 x MOON	3 x MOON			1	98	T272	98	13 - 13A	2.61	2.83		Maintain Existing Tension

LV OVERHEAD SERVICE CONDUCTOR SCHEDULE

LOCATION	STATIONS FROM - TO	HOUSE No.	EXISTING	TRANSFER	RECOVER	ERECT	No. OF SPANS	DIST (m)	SAG SPAN	SAG (m) 15°	SAG (m) 25°	TOTAL CONDUCTOR LENGTH (m)	FITTINGS MAINS BOX	P.O.A CHANGE	FUSE SIZE	Ø ABCN	SERVICE FITTING CODE OR C.U	REMARKS
Bruce Highway Connection Road	11	21A				4/95	1	10		0.3	0.32	15	N	N	200	ABCN	SWAS200	
	12	21A	4/95		4/95		1	10										

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
DIV: ELECTRICAL
Signature N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	25/02/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
PR3	03/06/2021	ADDITIONAL WORKS ADDED. CIVIL BASE UPDATED.			

CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS	
NAME	
COMPANY	
PHONE	
MOBILE	
FAX	
EMAIL	

ALIGNMENTS		PROPERTY DESCRIPTION	
ENERGEX OH	3.0	NUMBER OF LOTS:	0
ENERGEX UG	0.9	PROPOSED LOTS:	N/A
TELSTRA	DBYD	CANCELLING LOTS:	N/A
GAS	DBYD		
HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
WATER	DBYD	APPROVAL No:	----
STORMWATER	DBYD		
SEWERAGE	DBYD		
OTHER	DBYD	J. READ	RPEQ: 7727

N/R

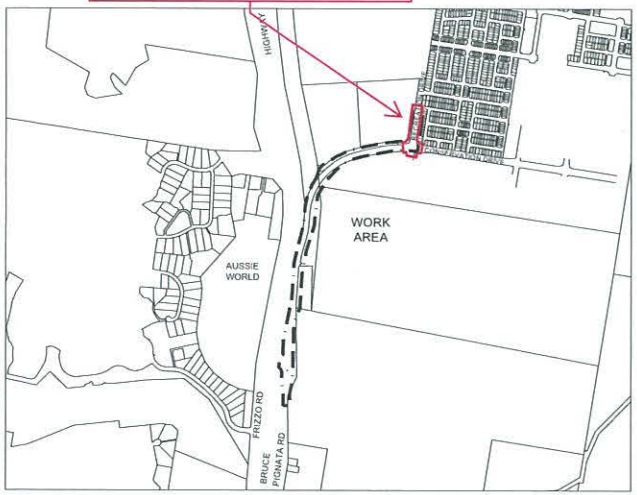
ISSUE DATE: 25/02/2021

ELECTRICAL RETICULATION
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
OH SCHEDULES

SCALE : N/A @ A1
10353-1-1
S4900292 PR3
Sheet 12 of 12

HARMONY
BRUCE HIGHWAY CONNECTION ROAD
CONSERVATION DRIVE, PALMVIEW

DCR2A Duplication Works Boundary



KEY MAP
N.T.S.

Sheet Index	
Sheet No.	Description
1	Overall Plan
2	Works Plan
3	Works Plan
4	Works Plan
5	NPL 3 Lighting Schematic
6	SUNC MSB Circuit Diagram (Pignata Rd)
7	Schedules & Material List
8	SL Schedules & Wiring Diagrams
9	Wiring Diagram & SL Certification

UNDERGROUND SERVICES IDENTIFICATION

WORK CREWS WHO WILL BE EXCAVATING AT THIS SITE ARE ADVISED TO CONTACT THE 'DIAL BEFORE YOU DIG' SERVICE TO DETERMINE THE EXTENT OF EXISTING UNDERGROUND SERVICES AND THE REQUIREMENTS OF THE APPROPRIATE SERVICE PROVIDERS. IT IS THE RESPONSIBILITY OF THE WORKS CREWS TO HAVE ALL EXISTING SERVICES AFFECTED BY THESE WORKS LOCATED ON SITE, TO AVOID ANY DAMAGE DURING EXCAVATION WORKS WHERE SERVICES HAVE BEEN SHOWN ON THE PLAN, THESE LOCATIONS ARE INDICATIVE ONLY AND NO WARRANTY IS IMPLIED AS TO THEIR ACCURACY.

DIAL 1100 BEFORE YOU DIG

DIAL BEFORE YOU DIG SERVICE
PHONE - 1100
WEB - www.1100.com.au
YOUR REQUEST SHOULD BE FORWARDED 5 WORKING DAYS BEFORE PLANNED EXCAVATION DATE

LOCATION OF UTILITIES

THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING ALL UNDERGROUND SERVICES PRIOR TO COMMENCING WORK AT THE SITE, AND IS RESPONSIBLE FOR THE REPAIR OF DAMAGE TO UNDERGROUND OR OVERHEAD UTILITY ASSETS, ARISING FROM THESE WORKS. CONTACT DIAL BEFORE YOU DIG.

Source Drawings		
File Name	Drawing Owner	Date Received
X-15-000256.34-BASE	Calibre	31/05/2021

Related Projects		
Consultant	Consultant Reference Drawing Number	Energex Reference Number
CV Services	C10359-1-3	S4900271
CV Services	C10353-1-1	S4900293
CV Services	C10353-1-1	S4900292

PROPOSED COMMISSIONING PLAN

TENTATIVE ONLY - SUBJECT TO AMENDMENT BY ENERGEX OUTAGE CO-ORDINATOR.

SL
- SIMPLE STREET LIGHTING CIRCUIT SWITCH
- TERMINATE CIRCUITS AT THE FOLLOWING POINTS OF SUPPLY
  - U2235779
  - U2236064
  - U2236054
  - U2236059

FOR PIGNATA ROAD INTERSECTION LIGHTING
- ISOLATE SL CIRCUIT SUPPLY AT SUNC MSB SSB02 - CIRCUIT 02L2.
- PERFORM REQUIRED SL WORKS
- COMMISSION SL CIRCUIT AT SUNC MSB SSB01 - CIRCUIT 02L2

FOR RECREATION DRIVE LIGHTING
- ISOLATE SL SUPPLY AT U2208041
- PERFORM REQUIRED SL WORKS
- COMMISSION SL CIRCUIT AT U2208041

- POLARITY CHECK AT EACH POINT OF SUPPLY
- TEST AND COMMISSION ALL NEW STREET LIGHTING

LOCALITY PLAN
N.T.S.

STREETLIGHTING CERTIFICATION

ROAD LIGHTING CERTIFIED TO COMPLY WITH AS/NZS 1158.1.1:2005 FOR V-CATEGORY AND AS/NZS 1158.3.1:2020 FOR P-CATEGORY.
THE LIGHTING DESIGN IS BASED UPON THE FOLLOWING MAINTENANCE SCHEDULE:

- CLEANING & INSPECTION OF LUMINAIRE AT 48 MONTH INTERVALS.
- VEGETATION TO BE KEPT CLEAR OF LUMINAIRES.
- INSPECTION PATROLS & SPOT LAMP REPLACEMENT TO MAINTAIN SERVICE AVAILABILITY AT MIN. 95%.
- LUMINAIRES AND LAMPS TO BE REPLACED WITH EXACT EQUIVALENTS.

BRUCE HIGHWAY CONNECTION RD:	CATEGORY PR3
RECREATION DRIVE	CATEGORY PR5
PIGNATA ROAD INTERSECTION:	CATEGORY V5
PIGNATA ROAD INTERSECTION NORTH/SOUTH APPROACHES:	CATEGORY V5

N/R

RPEQ No. 7727

STREETLIGHTING NOTE

THIS PLAN COMPRISES OF NPL 3 STREETLIGHTING.
SEE PLAN C10353-1-1 FOR ELECTRICAL RETICULATION.

CIVIL CONTRACTOR NOTE

CIVIL CONTRACTOR TO ENSURE ALL CONDUITS ARE INSTALLED PRIOR TO CONSTRUCTION OF FOOTPATHS, DRIVEWAYS AND RETAINING WALLS (WHERE REQUIRED).

LEGEND

LINES

- Boundary of Works
- Electrical Overhead - Exist
- Electrical Overhead - New
- Electrical Overhead - Recover / Future
- Electrical Underground - Exist
- Electrical Underground - New
- Electrical Underground - Recover / Future
- Consumers Overhead - New
- Consumers Underground - New
- RP Boundary
- Easement Boundary
- Kerbline
- Railway
- Retaining Wall
- Sewer Main
- Sewer Rising Main
- Water Main
- Stormwater
- Rainwater
- Open Drain / Swale
- Gas
- Telecommunications
- Fence
- Zero-lot Boundary

SYMBOLS

- Electrical Pillar
- Link Pillar
- Commercial / Industrial Pillar
- Electrical Pit
- Underground Joint
- Pole - LV Only
- Pole - HV Only
- Pole - HV & LV
- Pole - HV, Future LV
- Pole - LV, Future HV
- Pole Transformer
- Pole Termination - LV Only
- Pole Termination - HV Only
- Pole Termination - HV & LV
- Earth Electrode
- Pole Stay - Ground / Sidewalk
- Pole Stay - Aerial
- Padmount Transformer
- Ring Main Unit
- Conduit - 40mm
- Conduit - 100mm
- Conduit - 125mm
- Conduit - Energex Communications
- Street Light - LED
- Street Light - High Pressure Sodium 70W
- Street Light - High Pressure Sodium 100W
- Street Light - High Pressure Sodium 150W
- Street Light - High Pressure Sodium 250W
- Street Light - High Pressure Sodium 400W
- Street Light - Mercury Vapour 50W
- Street Light - Mercury Vapour 80W
- Street Light with Aeroscreen
- LV Disconnection Links - Open
- LV Disconnection Links - Closed
- HV Switch - Open
- HV Switch - Closed
- Drop Out Fuses - Open
- Drop Out Fuses - Closed
- Station Number
- Remove
- Phasing
- 'E' Kerb Marker
- Driveway
- Fire Hydrant

N/R

Digitally signed by Justin Read
DN: cn=Justin Read, o=Aurecon Australia Pty Ltd, ou=Consult, email=justin.read@aurecongroup.com, c=AU
Reason: I verify this document as a Registered Professional Engineer of Queensland (RPEQ 7727)
Location:
Date: 2021-06-04 09:10:10:00

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R
Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
PR3	03/06/2021	UPDATE DESIGN TO INCLUDE DCR2B OVERLAP			

CV SERVICES GROUP
delivering the edge

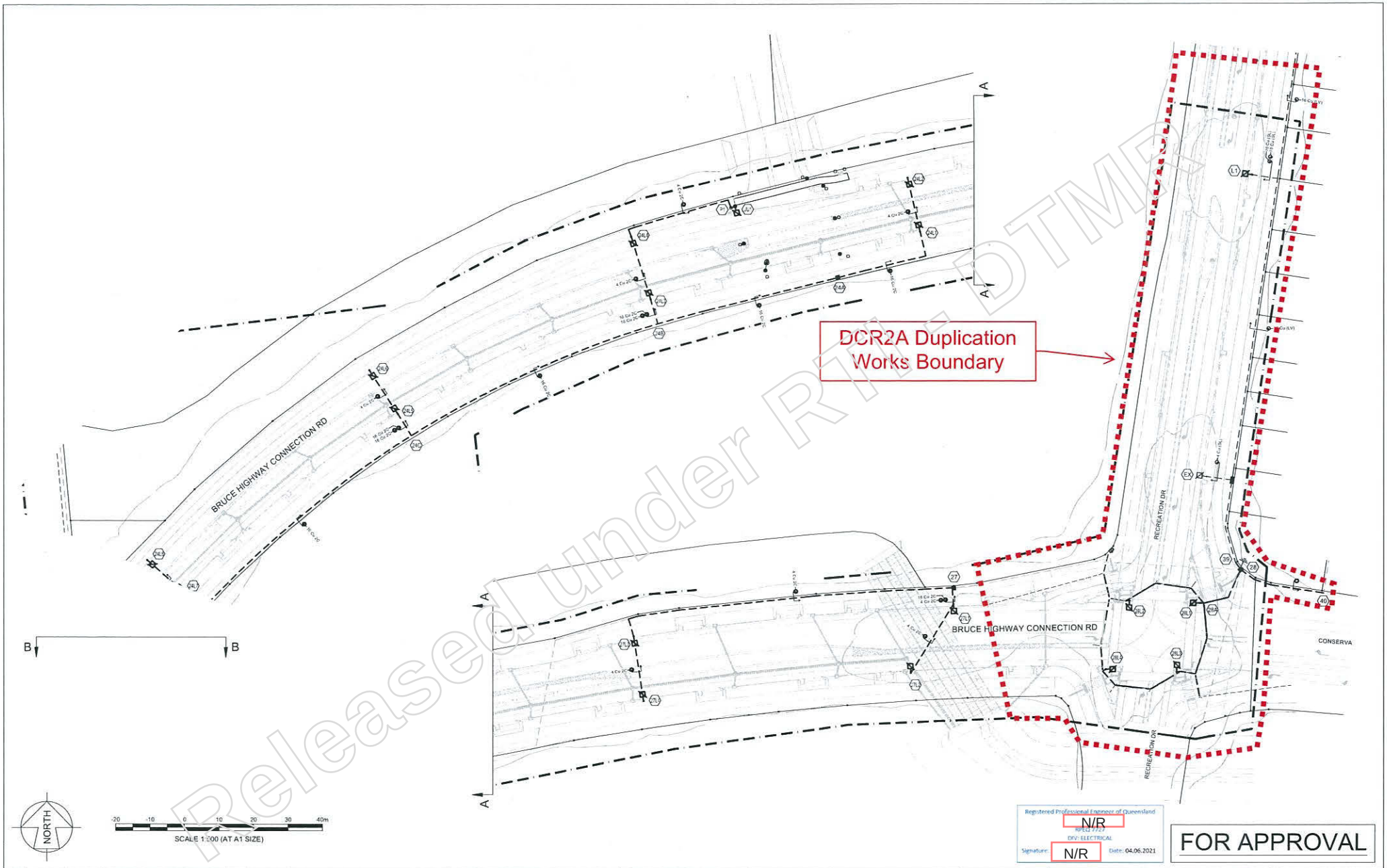
SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	----
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

N/R

ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
OVERALL PLAN

SCALE : N/A @ A1
10353-1-3
S4900293 PR3
Sheet 1 of 9



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CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	---
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

N/R

ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

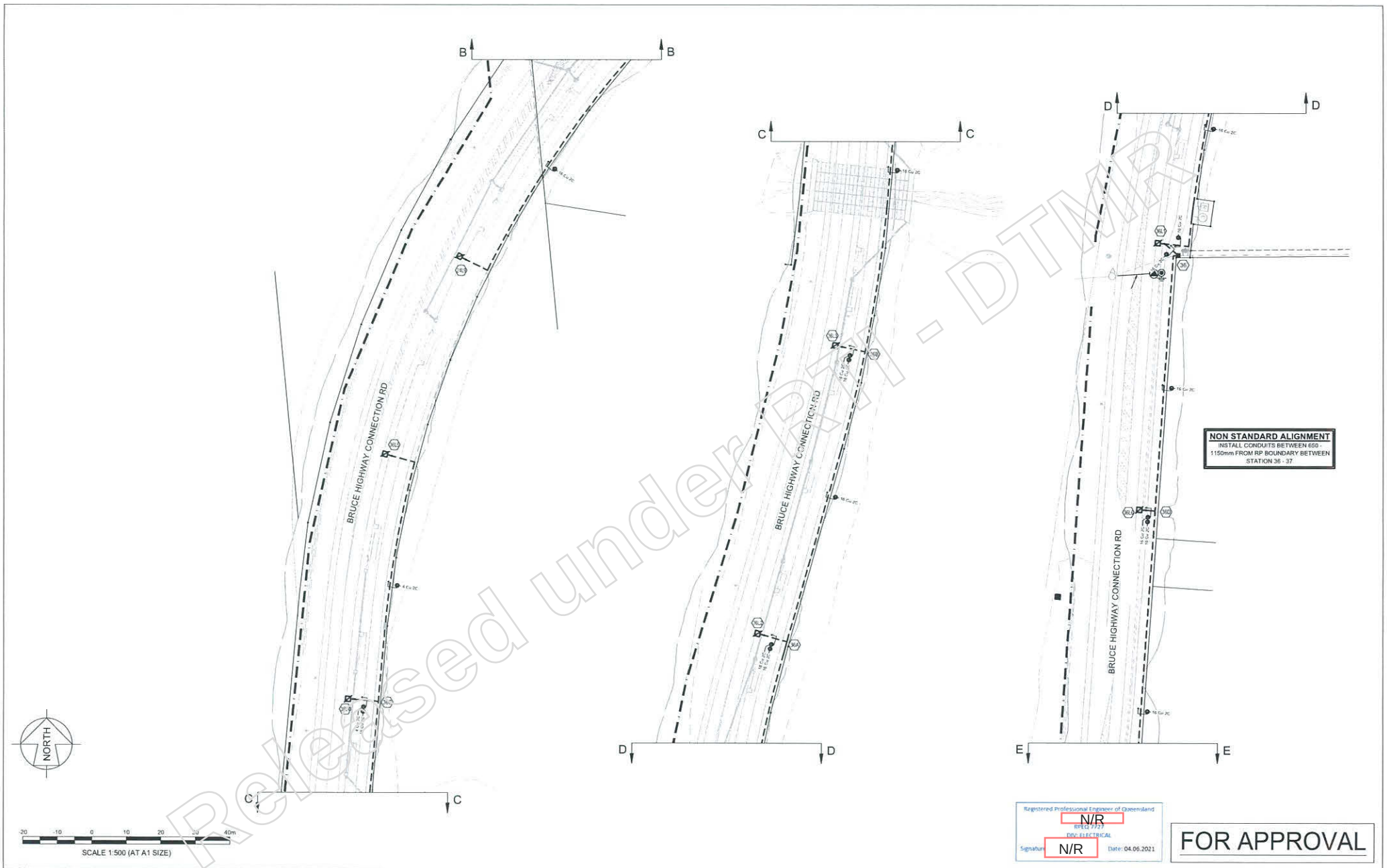
WORKS PLAN

SCALE : 1:500 @ A1

10353-1-3

S4900293 PR3

Sheet 2 of 9



Registered Professional Engineer of Queensland
RPEQ 7727
DIV: ELECTRICAL
Signature N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
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CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	----
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ 7727

N/R

ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

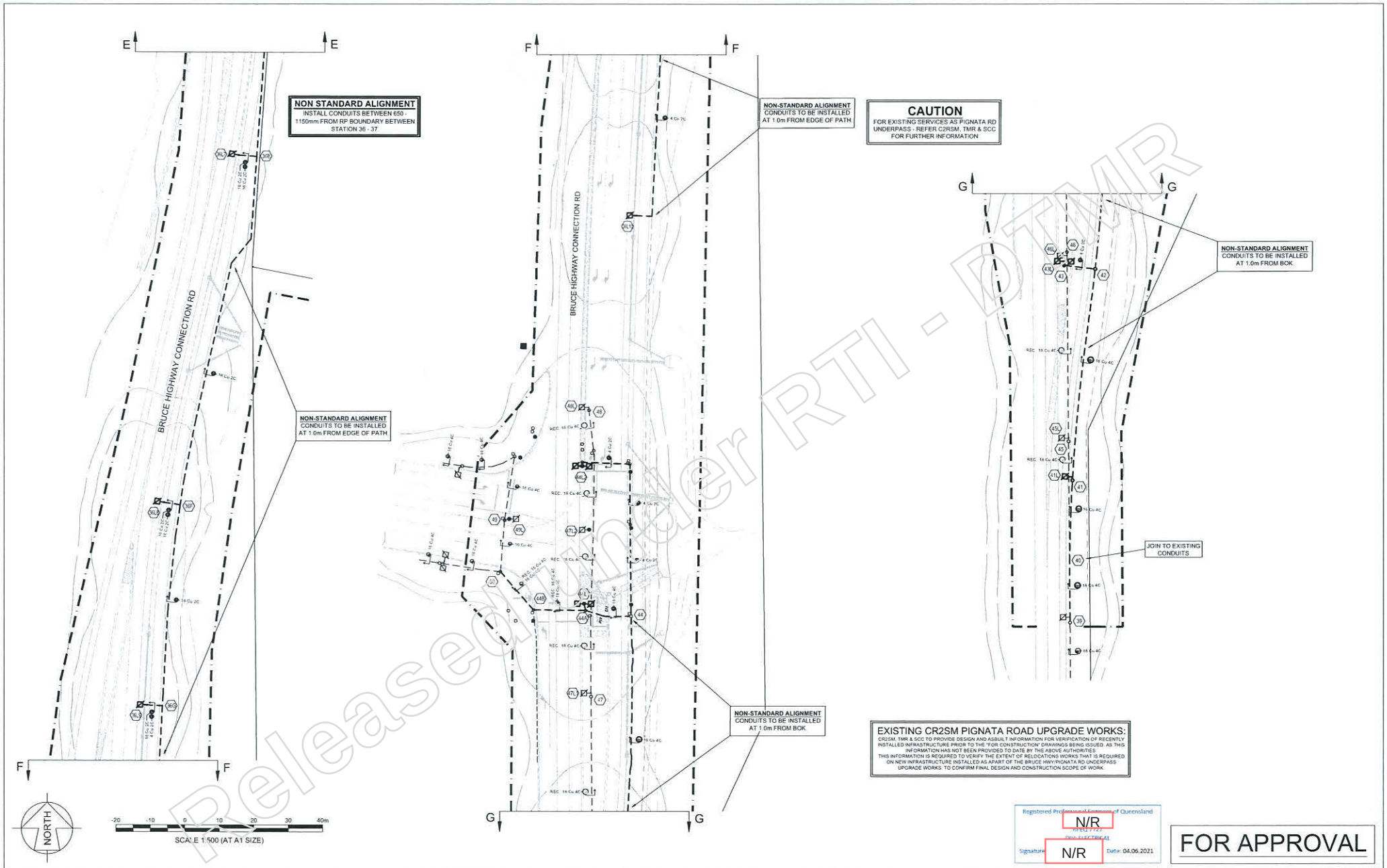
WORKS PLAN

SCALE : 1:500 @ A1

10353-1-3

S4900293 PR3

Sheet 3 of 9



REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN.			
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CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION
NAME		ENERGEX OH	3.0	NUMBER OF LOTS: 0
		ENERGEX UG	0.9	PROPOSED LOTS: N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS: N/A
		GAS	DBYD	
PHONE		HP GAS	DBYD	LOCAL AUTHORITY: SUNC
MOBILE		WATER	DBYD	APPROVAL No: ----
FAX		STORMWATER	DBYD	
EMAIL		SEWERAGE	DBYD	
		OTHER	DBYD	J. READ RPEQ: 7727

N/R

ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

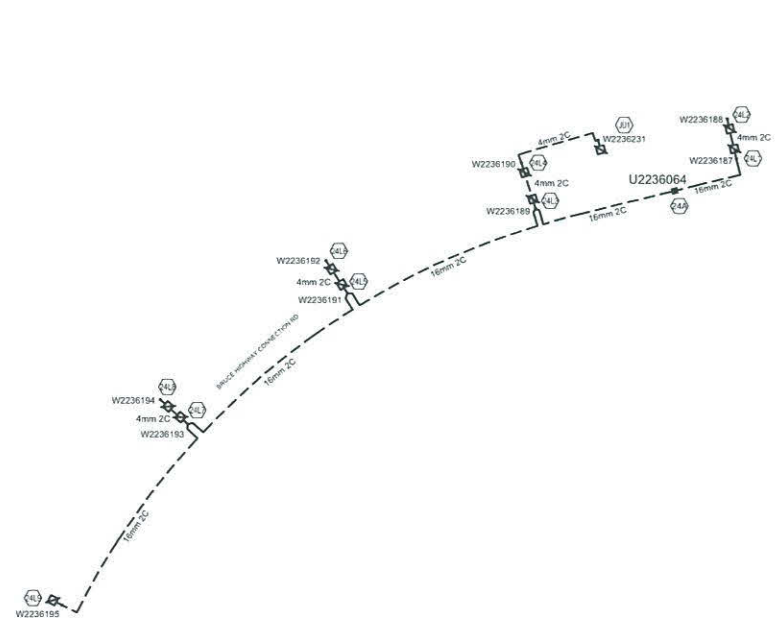
WORKS PLAN

SCALE : 1:500 @ A1

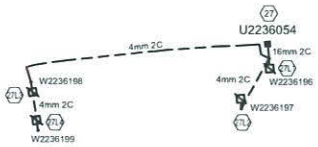
10353-1-3

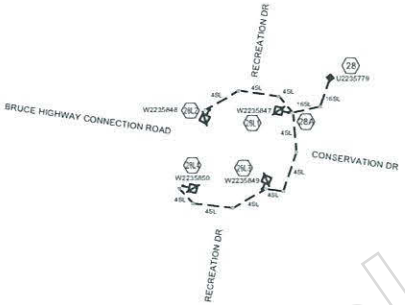
S4900293 PR3

Sheet 4 of 9



PROPOSED SL SCHEMATIC
POS: U2236064 & U2236054
SCALE 1:1000 @ A1





PROPOSED SL SCHEMATIC
POS: U2235779
SCALE 1:1000 @ A1

STREETLIGHT CALCULATIONS

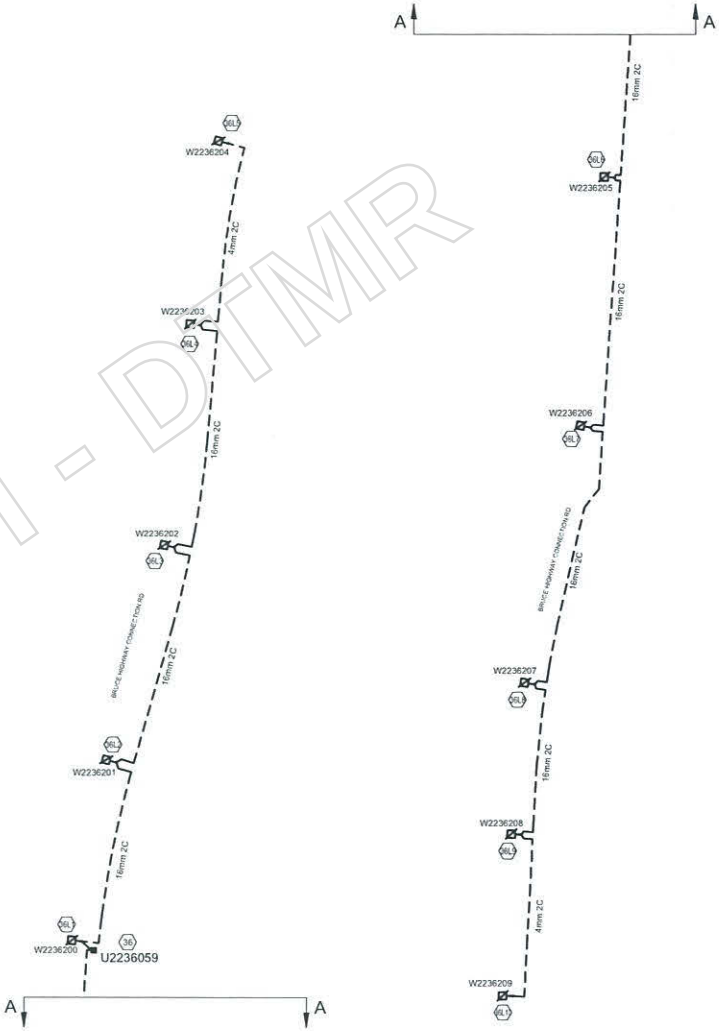
CIRCUIT FROM STN: 24A to 24L9
FL: 1.4120
MAX FL: 2.300
VD: 0.42%

CIRCUIT FROM STN: 27 to 27L4
FL: 1.7309
MAX FL: 2.300
VD: 0.41%

CIRCUIT FROM STN: 36 - 36L5
FL: 1.9415
MAX FL: 2.300
VD: 0.40%

CIRCUIT FROM STN: 36 - 36L10
FL: 1.9968
MAX FL: 2.300
VD: 1.12%

EXISTING & PROPOSED SL SCHEMATIC
POS: U2208041
SCALE 1:1000 @ A1



PROPOSED SL SCHEMATIC
POS: U2236059
SCALE 1:1000 @ A1

NORTH

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
PR3	03/06/2021	UPDATE DESIGN TO INCLUDE DCR2B OVERLAP			

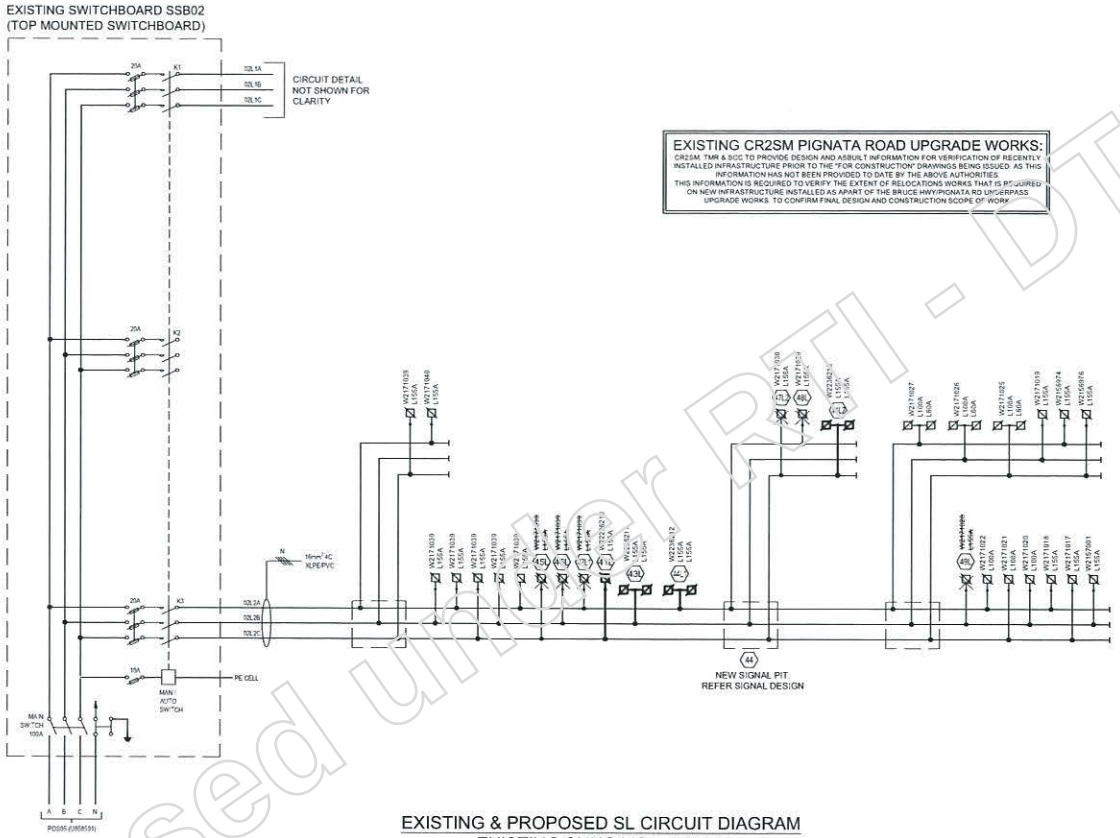
CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION
NAME		ENERGEX OH	3.0	NUMBER OF LOTS: 0
		ENERGEX UG	0.9	PROPOSED LOTS: N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS: N/A
		GAS	DBYD	
PHONE		HP GAS	DBYD	LOCAL AUTHORITY: SUNC
MOBILE		WATER	DBYD	APPROVAL No: ----
FAX		STORMWATER	DBYD	
EMAIL		SEWERAGE	DBYD	
		OTHER	DBYD	J. READ RPEQ: 7727

N/R
ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
NPL3 LIGHTING SCHEMATIC

SCALE : N/A @ A1
10353-1-3
S4900293 PR3
Sheet 5 of 9



EXISTING & PROPOSED SL CIRCUIT DIAGRAM
EXISTING SUNC MSB: SSB02

SCALE 1:1000 @ A1

NOTE: SWITCHBOARD LOCATED ADJACENT TO NEXT BRUCE HIGHWAY OFF RAMP SOUTH

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
Discipline: ELECTRICAL
Signature: N/R
Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN.			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED.			
PR3	03/06/2021	UPDATE DESIGN TO INCLUDE DCR2B OVERLAP.			

CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	----
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

N/R

ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING

BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW

SUNC MSB CIRCUIT DIAGRAM (PIGNATA RD)

SCALE : 1:1000 @ A1

10353-1-3

S4900293 PR3

Sheet 6 of 9

RATE 3 URD CIVIL WORKS SCHEDULE - FOOTPATHS (AS3000)

LOCATION	STATIONS FROM - TO	CONDUIT LENGTH 40mm (HD) ORANGE	No.	80MM (LD) ORANGE	No.	BENDS ∠° / No. 40mm ∠°	No.	80mm ∠°	No.	X-SECTION (m) EXCAV TAPE (m)	TRENCH DETAIL	PVC COVERSTRIP 150mm	200mm	300mm	DRAW WIRE (m)	KERB MARKERS	REMARKS
FOOTPATHS - TRENCHING AND MATERIAL SUPPLIED BY ELECTRICAL CONTRACTOR																	
Bruce Highway Connection Road	24A - 24L1	39	1			90	3			39		39			43		
	24A - 24L9	303	1			90	9			303		303			307		Install Bends at Stns 24B, 24C & 24D for connection to SL's.
	24L4 - P1	37	1			90	3			37		37			41		Connect into Signal Pit P1
	24B - 24L3	7	2			90	2			7		7			15		
	24C - 24L5	7	2			90	2			7		7			15		
	24D - 24L7	7	2			90	2			7		7			15		
	27 - 27L1	7	2			90	4			7		7			15		
	27 - 27L3	101	1			90	2			101		101			105		
	28 - 39	2	1			90	1			2		2			6		Connect to Existing Conduit
	28 - 40	26	1			90	2			26		26			30		Install Future Use Conduit
	36 - 36L5	335	1			90	12			335		335			339		Via Stn 36L1. Install Bends at Stns 36A, 36B & 36C for connection to SL's.
	36 - 36L10	405	1			90	13			405		405			409		
	36A - 36L2	7	2			90	2			7		7			15		
	36B - 36L3	7	2			90	2			7		7			15		
	36C - 36L4	7	2			90	2			7		7			15		
	36D - 36L6	3	2			90	2			3		3			11		
	36F - 36L7	5	2			90	2			5		5			13		
	36F - 36L8	3	2			90	2			3		3			11		
	36G - 36L9	3	2			90	2			3		3			11		
Pignata Road	40 - 44			164	1			30	4	164				164	168		Joint to Existing Conduits at Stn 40 Via
	41 - 41L			1	1	90	1			1			1		5		
	43 - 43L			1	1	90	1			1			1		5		
ELECTRICAL CONTRACTOR TOTALS		1374		166		90° 71		30° 4		1477		1311	2	164	1609		

NOTE- ALL CONDUITS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE CURRENT AS3000 WIRING RULES

NPL 3 UNDERGROUND CABLE SCHEDULE (AS3000)

LOCATION	STATIONS FROM - TO	VOLTS	EX	TRF	REC	IN	CABLE SIZE/ TYPE	MODEL I.D/ C.U LISTING	ROUTE LENGTH (m)	CABLE LENGTH (m) NEW	REC	LCC	REMARKS
Bruce Highway Connection Road	24A - 24L1	SL				X	16mm² Cu 2C PVC-PVC (m)	LVC216PVPV	33	38			
	24A - 24L9	SL				X	16mm² Cu 2C PVC-PVC (m)	LVC216PVPV	342	365			Via Stns 24L3, 24L5 & 24L7
	24L1 - 24L2	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	16	22			
	24L3 - JU1	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	56	68			Via Stn 24L4
	24L5 - 24L6	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	16	22			
	24L7 - 24L8	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	14	20			
	27 - 27L1	SL				X	16mm² Cu 2C PVC-PVC (m)	LVC216PVPV	12	17			
	27L1 - 27L2	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	23	29			
	27L1 - 27L4	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	138	150			Via Stn 27L3.
	28 - 28A	SL				X	16mm² Cu 2C PVC-PVC (m)	LVC216PVPV	16	20			
	28A - 28L1	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	2	7			
	28A - 28L2	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	28	33			
	28A - 28L4	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	55	66			Via Stn 28L3.
	36 - 36L4	SL				X	16mm² Cu 2C PVC-PVC (m)	LVC216PVPV	290	313			Via Stns 36L1, 36L2 & 36L3.
	36 - 36L9	SL				X	16mm² Cu 2C PVC-PVC (m)	LVC216PVPV	366	389			Via Stns 36L6, 36L7 & 36L8.
	36L4 - 36L5	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	64	90			
	36L9 - 36L10	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	72	78			
Pignata Road	39 - 50	LV				X	16mm² Cu 4C XLPE (m)	LVC416XPV	233	247			Via Stn 41, 42, 44, 44A & 44B.
	39 - 48L	LV	X		X		16mm² Cu 4C XLPE (m)		241		241		
	41 - 41L	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	1	6			
	42 - 43L	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	15	22			Via Stn 43.
	44A - 44L1	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	2	7			
	44 - 44L2	SL				X	4mm² Cu 2C PVC-PVC (m)	LVC24PVPV	62	67			
	44A - 50	LV	X		X		16mm² Cu 4C XLPE (m)		31		31		
	45 - 45L	SL	X		X		16mm² Cu 2C PVC-PVC (m)		1		1		
	46 - 46L	SL	X		X		16mm² Cu 2C PVC-PVC (m)		1		1		
	47 - 47L1	SL	X		X		16mm² Cu 2C PVC-PVC (m)		1		1		
	49 - 49L	SL	X		X		16mm² Cu 2C PVC-PVC (m)		1		1		

URD CIVIL WORKS SCHEDULE - ROAD CROSSINGS

LOCATION	STATIONS FROM - TO	CONDUIT LENGTH 40mm (HD) ORANGE	No.	80MM (LD) ORANGE	No.	BENDS ∠° / No. 40mm ∠°	No.	80mm ∠°	No.	X-SECTION (m) EXCAV TAPE (m)	TRENCH DETAIL	PVC COVERSTRIP 150mm	200mm	300mm	DRAW WIRE (m)	KERB MARKERS	REMARKS
ROAD CROSSINGS - TRENCHING AND MATERIAL SUPPLIED BY CIVIL CONTRACTOR (BENDS SUPPLIED BY ELECTRICAL CONTRACTOR)																	
Bruce Highway Connection Road	24L1 - 24L2	16	1			90	2			16		16			20	2	
	24L3 - 24L4	19	1							19		19			23	2	
	24L5 - 24L6	15	1							15		15			19	2	
	24L7 - 24L8	15	1							15		15			19	2	
	27L1 - 27L2	23	1							23		23			27	2	
	27L3 - 27L4	19	1							19		19			23	2	
Pignata Road	42 - 43			9	1					9			9		13	2	
CIVIL CONTRACTORS TOTALS		107		9		ALL BENDS TO BE SUPPLIED				116		107	9		144	14	

NOTE- ALL CONDUITS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE CURRENT AS3000 WIRING RULES

RATE 3 EQUIPMENT SCHEDULE (AS3000)

LOCATION	STN No.	ENERGEX SITE I.D	EX	REC	IN	MODEL DESCRIPTION	IIN	COMP I.D	PLANT No.	MODEL I.D/ C.U LISTING	QTY	REMARKS
Bruce Highway Connection Road	28A		X			TRAFFIC SIGNAL PIT					1	
					X	SUGSL/SBMJB				SUGSLSBMJB	1	
Pignata Road	41				X	CIRCULAR TMR SL PIT					1	
					X	SUGSLL/JBJUNCTIONBOXFORLVPIT				SUGSLLJB	1	
	42				X	CIRCULAR TMR SL PIT					1	
					X	SUGSLL/JBJUNCTIONBOXFORLVPIT				SUGSLLJB	1	
	43				X	CIRCULAR TMR SL PIT					1	
					X	SUGSL/SBMJB				SUGSLSBMJB	1	
	44		X			TRAFFIC SIGNAL PIT					1	By Others
					X	SUGSLL/JBJUNCTIONBOXFORLVPIT				SUGSLLJB	1	
	45		X	X		CIRCULAR TMR SL PIT					-1	Recover Pit
	46		X	X		CIRCULAR TMR SL PIT					-1	Recover Pit
	47		X	X		CIRCULAR TMR SL PIT					-1	Recover Pit
	48		X	X		CIRCULAR TMR SL PIT					-1	Recover Pit
	50		X			CIRCULAR TMR SL PIT					1	
						SUGSLL/JBJUNCTIONBOXFORLVPIT				SUGSLLJB	1	

Streetlight

Model I.D/ C.U Listing	Qty	Description
	8	BLACK ROUND TAPER POLE, 7.5m OUTREACH
SB105130UCH	1	SLBPM105/130/UGCH STREETLIGHTPOLEBPM
SB105145UCH	2	SLBPM105/145/UGCH STREETLIGHTPOLEBPM
SS105130UCH	1	SLSBM105/130/UGCH STREETLIGHTPOLESBM
SS105230UCH	1	SLSBM105/230/UGCH STREETLIGHTPOLESBM
	25	ITALO 3.7-4M 67W LED
	1	ITALO 3.7-5M 85W LED
	10	GEKKARD ROADLED L155 4K AERO
LVC216PVPV	1112	LV CABLE CU 2C 16 PVC-PVC /M
LVC416XPV	247	LV CABLE CU 4C 16 XLPE-PVC /M
SUGSLSBMJB	2	SUGSL/SBMJB
SUGSLLJB	4	SUGSLL/JBJUNCTIONBOXFORLVPIT
LVC24PVPV	687	LV CABLE CU 2C 4 SQMM PVC-PVC /M
	3	CIRCULAR TMR SL PIT
	12	BLACK ROUND TAPER POLE, 3.0m OUTREACH
	1	SINGLE 3m OUTREACH TO MATCH SIGNAL POLE
	2	DOUBLE 3m OUTREACH TO MATCH SIGNAL POLE
	4	SINGLE 1.5m OUTREACH TO MATCH SIGNAL POLE

Total Trench Length (m) - 1593

Registered Professional Engineer of Queensland
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R Date: 04.06.2021

N/R

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED			
PR3	03/06/2021	UPDATE DESIGN TO INCLUDE DCR2B OVERLAP			

CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS:	0
		ENERGEX UG	0.9	PROPOSED LOTS:	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	---
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ 7727

N/R

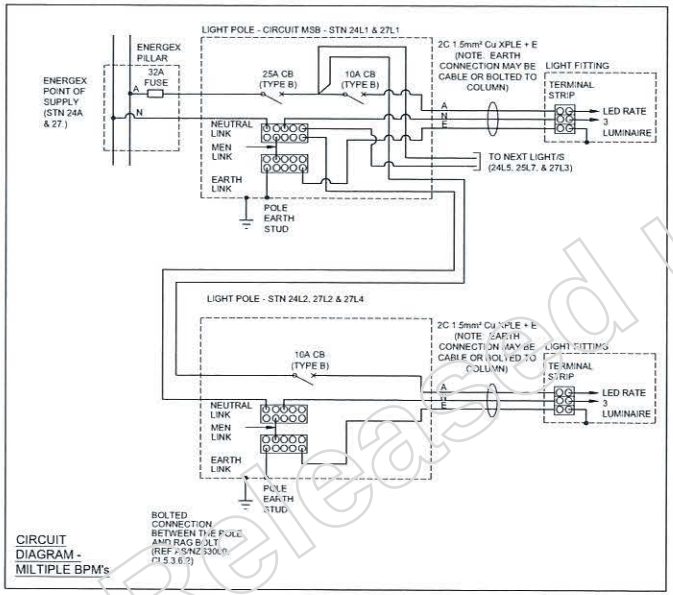
ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
SCHEDULES & MATERIAL LIST

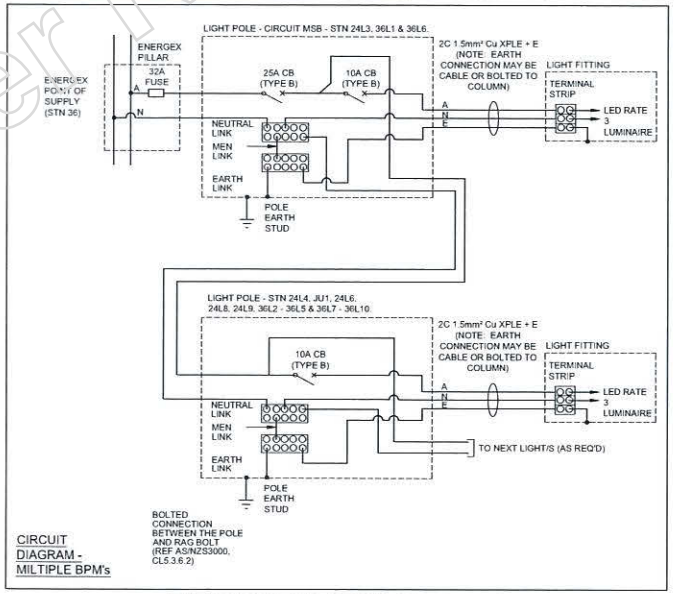
SCALE : 1:1000 @ A1
10353-1-3
S4900293 PR3
Sheet 7 of 9

NPL 3 LIGHTING SCHEDULE

LOCATION	STN No.	SITE I.D (POLE No.)	POLE or COMPONENTS						LUMINAIRE							OUTREACH BRACKET				MOUNTING HEIGHT (m)	SET OUT		REMARKS
			COMP I.D	EXIST (m)	REC (m)	ERECT (m)	C.U LISTING/ MODEL No	ALIGN. (m)	COMP I.D	EXIST	REC. LUMIN	REC. CUST	DATE DE-ENERGISED	ERECT LUMIN	ERECT CUST	DATE ENERGISED	C.U LISTING / MODEL No.	EXIST	REC.	ERECT	C.U LISTING/ MODEL No.		EAST	NORTH	
Bruce Highway Connection Road	24L1	W 2236187	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505177.55	7042044.61	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L2	W 2236188	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505173.92	7042060.29	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L3	W 2236189	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505099.37	7042024.87	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L4	W 2236190	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505093.74	7042043.00	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L5	W 2236191	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505026.03	7041991.48	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L6	W 2236192	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505017.70	7042004.26	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L7	W 2236193	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	504964.04	7041939.93	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L8	W 2236194	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	504953.24	7041949.34	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	24L9	W 2236195	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504915.09	7041868.46	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	27L1	W 2236196	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505326.90	7042084.12	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	27L2	W 2236197	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505314.55	7042064.07	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	27L3	W 2236198	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505234.09	7042074.69	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	27L4	W 2236199	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.9	505236.95	7042055.88	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	28L1	W 2235847	P01				JU POLE		SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.5			SINGLE OUTREACH TO MATCH SIGNAL POLE
	28L2	W 2235848	P01				JU POLE		SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.5			SINGLE OUTREACH TO MATCH SIGNAL POLE
	28L3	W 2235849	P01				JU POLE		SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.5			SINGLE OUTREACH TO MATCH SIGNAL POLE
	28L4	W 2235850	P01				JU POLE		SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.5			SINGLE OUTREACH TO MATCH SIGNAL POLE
Recreation Drive	L1	W 2208442	P01	8.5 BPM				EX	SL1	L67 L3	L67 L3	SUNC		L85 L3	SUNC		ITALO 3.7.5M85W	3.0				10.9			Replace Luminaire
Bruce Highway Connection Road	JU1	W 2236231	P01				JU POLE		SL1					L67 L3	SUNC		ITALO 3.7 4M67W			3.0		10.5			SINGLE OUTREACH TO MATCH SIGNAL POLE
	36L1	W 2236200	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504836.58	7041498.67	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	36L2	W 2236201	P01			10.5 BPM		0.60 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504850.20	7041568.36	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	36L3	W 2236202	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504872.72	7041622.67	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	36L4	W 2236203	P01			10.5 BPM		0.60 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504883.12	7041739.77	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	36L5	W 2236204	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504893.67	7041810.97	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	36L6	W 2236205	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504831.28	7041420.61	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	36L7	W 2236206	P01			10.5 BPM		0.55 BOK	SL1					L67 L3	SUNC		ITALO 3.7 4M67W			1.5		10.9	504821.74	7041323.05	BLACK ROUND TAPER POLE, SINGLE OUTREACH
	39L8	W 2236207	P01			8.5 BPM	SB105130UC11	0.55 BOK	SL1					L155A-L3	SUNC		ROADLED 155W 4K AERO			3.0		10.5	504600.09	7041222.37	Gerard Part No: PL99BD16L155
	39L9	W 2236208	P01			8.5 BPM	SB105145UC11	0.60 BOK	SL1					L155A-L3	SUNC		ROADLED 155W 4K AERO			4.5		10.5	504755.13	7041163.57	Gerard Part No: PL99BD16L155
	39L10	W 2236209	P01			8.5 BPM	SB105145UC11	0.60 BOK	SL1					L155A-L3	SUNC		ROADLED 155W 4K AERO			4.5		10.5	504791.64	7041100.58	Gerard Part No: PL99BD16L155
Pignata Road	41L	W 2236210	P01			8.5 SBM	SS105130UC11	1.0 EOB	SL1					L155A-L3	SUNC		ROADLED 155W 4K AERO			3.0		10.5	504780.47	7040545.58	Gerard Part No: PL99BD16L155
	43L	W 2236211	P01			8.5 SBM	SS105230UC11	1.5 BOK	SL1					L155A-L3	SUNC		ROADLED 155W 4K AERO			3.0		10.5	504778.28	7040908.04	Gerard Part No: PL99BD16L155
									SL2					L155A-L3	SUNC		ROADLED 155W 4K AERO								Gerard Part No: PL99BD16L155
	44L1	W 2236212	P01				JU POLE		SL1					L155A-L3	SUNC		ROADLED 155W 4K AERO			3.0		10.5			Gerard Part No: PL99BD16L155
									SL2					L155A-L3	SUNC		ROADLED 155W 4K AERO								Gerard Part No: PL99BD16L155
	44L2	W 2236213	P01				JU POLE		SL1					L155A-L3	SUNC		ROADLED 155W 4K AERO			3.0		10.5			Gerard Part No: PL99BD16L155
									SL2					L155A-L3	SUNC		ROADLED 155W 4K AERO								Gerard Part No: PL99BD16L155
	45L	W 2171033	P01	8.5 SBM	8.5 SBM			EX	SL1	L155A	L155A-L3	SUNC						3.0	3.0						Recover SL & Foundation
	46L	W 2171032	P01	8.5 SBM	8.5 SBM			EX	SL1	L155A	L155A-L3	SUNC						3.0	3.0						Recover SL & Foundation
	47L1	W 2171031	P01	8.5 SBM	8.5 SBM			EX	SL1	L155A	L155A-L3	SUNC						3.0	3.0						Recover SL & Foundation
	47L2	W 2171030	P01				JU POLE	EX	SL1	L155A	L155A-L3	SUNC						3.0	3.0						Recover SL & Outreach
	48L	W 2171029	P01				JU POLE	EX	SL1	L155A	L155A-L3	SUNC						3.0	3.0						Recover SL & Outreach
	49L	W 2171028	P01				JU POLE	EX	SL1	L155A	L155A-L3	SUNC						3.0	3.0						Recover SL & Outreach



RATE 3 LIGHTING WIRING SCHEMATIC
FOR MULTIPLE LIGHT CIRCUITS
(P-CAT ROAD)
N.T.S.



RATE 3 LIGHTING WIRING SCHEMATIC
FOR MULTIPLE LIGHT CIRCUITS
(P-CAT ROAD)
N.T.S.

Registered Professional Engineer of Queensland
N/R
RPEQ 7727
DIV: ELECTRICAL
Signature N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED			
PR3	03/06/2021	UPDATE DESIGN TO INCLUDE DCR2B OVERLAP			

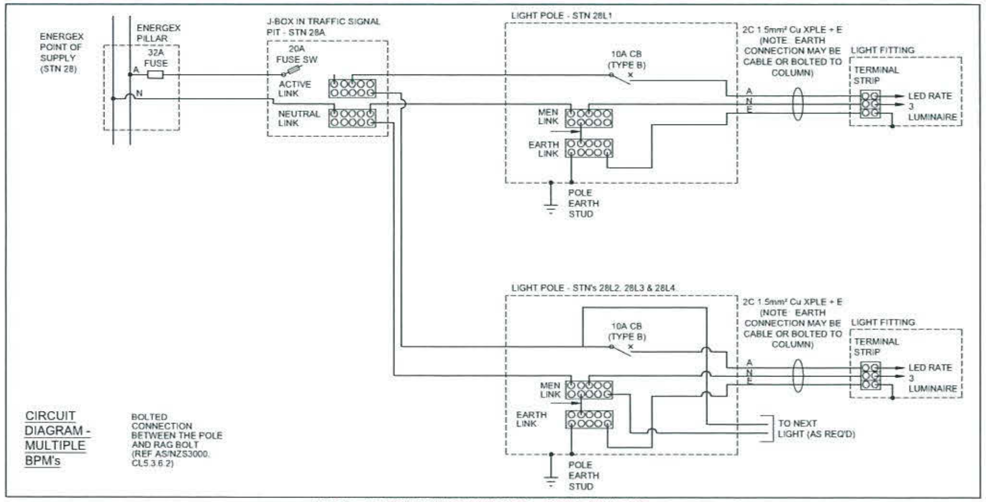
CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS		ALIGNMENTS		PROPERTY DESCRIPTION	
NAME		ENERGEX OH	3.0	NUMBER OF LOTS	0
		ENERGEX UG	0.9	PROPOSED LOTS	N/A
COMPANY		TELSTRA	DBYD	CANCELLING LOTS:	N/A
		GAS	DBYD		
PHONE		HP GAS	DBYD	LOCAL AUTHORITY:	SUNC
MOBILE		WATER	DBYD	APPROVAL No:	----
FAX		STORMWATER	DBYD		
EMAIL		SEWERAGE	DBYD		
		OTHER	DBYD	J. READ	RPEQ: 7727

N/R

ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING	SCALE : N/A	@ A1
BRUCE HIGHWAY CONNECTION RD CONSERVATION DRIVE, PALMVIEW	10353-1-3	
SL SCHEDULE & WIRING DIAGRAMS	S4900293	PR3
	Sheet 8 of 9	



RATE 3 LIGHTING WIRING SCHEMATIC
FOR SINGLE LIGHTING CIRCUIT (JU SIGNAL POLE)
SUPPLIED FROM ENERGEX PILLAR
N.T.S.

CERTIFICATE OF COMPLIANCE

DESIGN DOCUMENTATION IN ACCORDANCE WITH THE REQUIREMENTS OF AS/NZS 1158.1.1:2005 APPENDIX D

LOCATIONS & CATEGORY
PIGNATA ROAD INTERSECTION & NORTH / SOUTH APPROACHES — CATEGORY V5

INSTALLATION ARRANGEMENT/GEOMETRY
MOUNTING HEIGHT: 10.5m
OUTREACH: 3.0m / 4.5m
LIGHTING ARRANGEMENT: SEE PLAN
UPCAST ANGLE: 0°

LUMINAIRE/LAMP DETAILS

LUMINAIRE ID	GERARD ROADLED L155A 4K IP66	GERARD ROADLED L100A 4K IP66
LAMP TYPE	LED 155W AERO	LED 100W AERO
LAMP INITIAL FLUX	19.403klm	13.008klm
I-TABLE No	216207	18072
LIGHTING TARIFF	NPL 3	NPL 3
MAINTENANCE FACTOR	0.80	0.80

PHOTOMETRIC DATA DETAILS
ORIGIN OF NATA CERTIFIED PHOTOMETRIC DATA: GERARD LIGHTING

LIGHT TECHNICAL PARAMETERS
STRAIGHT ROAD
DESIGN METHOD: LUMINANCE BASED COMPUTER CALCULATIONS

INTERSECTIONS, JUNCTIONS AND OTHER SPECIFIED LOCATIONS
DESIGN METHOD: ILLUMINANCE BASED COMPUTER CALCULATIONS

LIMITING VALUES OF LIGHT TECHNICAL PARAMETERS

LIGHTING CATEGORY	$\bar{L}$ (cd/m²)	U_o	U_L	TI	E_S	E_{h} (lx)	$U_{?}$	UWLR
V5	0.35	0.33	0.5	20%	50%	3.5	8	3%

ROAD SURFACE REFLECTION CHARACTERISTIC
ROAD SURFACE REFLECTION CHARACTERISTIC: R3

COMPUTER PROGRAM USED TO CALCULATE TECHNICAL PARAMETERS
AGi32
V 19.15 (13/03/2019)

ROAD LIGHTING CERTIFIED TO COMPLY WITH AS/NZS 1158.1.1:2005 FOR V-CATEGORY FOR P-CATEGORY

J. READ — RPEQ No. 7727

CERTIFICATE OF COMPLIANCE

DESIGN DOCUMENTATION IN ACCORDANCE WITH THE REQUIREMENTS OF AS/NZS 1158.3.1:2020 APPENDIX C

LOCATIONS & CATEGORY
BRUCE HIGHWAY CONNECTION ROAD — CATEGORY PR3
RECREATION DRIVE — CATEGORY PR5

INSTALLATION ARRANGEMENT/GEOMETRY
MOUNTING HEIGHT: 10.9m / 10.5m
OUTREACH: 1.5m / 3.0m
LIGHTING ARRANGEMENT: REFER PLAN
UPCAST ANGLE: 0°

LUMINAIRE/LAMP DETAILS

LUMINAIRE ID	ITALO 1 OF2 STA 3.7-4M 67W 3K IP66	ITALO 1 OF2 STA 3.7-5M 85W 3K IP66
LAMP TYPE	LED 67W	LED 85W
LAMP INITIAL FLUX	7040lm	9520lm
I-TABLE No	ITALO 1 OF2 STA 3.7-4M.IES	ITALO 1 OF2 STA 3.7-5M.IES
LIGHTING TARIFF	NPL 3	NPL 3
MAINTENANCE FACTOR	0.80	0.80

PHOTOMETRIC DATA DETAILS
ORIGIN OF NATA CERTIFIED PHOTOMETRIC DATA: AEC LIGHTING

LIGHT TECHNICAL PARAMETERS
DESIGN METHOD: ILLUMINANCE BASED COMPUTER CALCULATIONS & DESIGN RULES

ROAD NAME	CATEGORY	ROAD WIDTH	LUMINAIRE	ARRANGEMENT	SPACING
Bruce Hwy Connection Rd	PR3	30m	L67	Opposite	111.4m
Bruce Hwy Connection Rd	PR3	27.8m	L67	Single Sided	82.9m
Recreation Drive	PR5	31m	L67	Single Sided	95.1m
Recreation Drive	PR5	31m	L85	Single Sided	105.9m

LIMITING VALUES OF LIGHT TECHNICAL PARAMETERS

LIGHTING CATEGORY	$\bar{E}_h$	E_{Ph}	U_{E2}	E_{Pv}
PR3	1.75	0.3	8	N/A
PR5	0.85	0.14	10	N/A

COMPUTER PROGRAM USED TO CALCULATE TECHNICAL PARAMETERS
PERFECT LITE
V 5.09 (10/04/2013)

ROAD LIGHTING CERTIFIED TO COMPLY WITH AS/NZS 1158.1.1:2005 FOR V-CATEGORY AND AS/NZS 1158.3.1:2020 FOR P-CATEGORY

N/R

No. 7727

Registered Professional Engineer of Queensland
MR JUSTIN READ
RPEQ 7727
DIV: ELECTRICAL
Signature: N/R Date: 04.06.2021

FOR APPROVAL

REV	DATE	DETAILS	REV	DATE	DETAILS
PR1	01/03/2021	PRELIMINARY DESIGN			
PR2	03/03/2021	ROAD NAME UPDATED. BASE UPDATED			
PR3	03/06/2021	UPDATE DESIGN TO INCLUDE DCR2B OVERLAP			

CV SERVICES GROUP
delivering the edge

SITE CONTACT DETAILS	
NAME	
COMPANY	
PHONE	
MOBILE	
FAX	
EMAIL	

ALIGNMENTS	
ENERGEX OH	3.0
ENERGEX UG	0.9
TELSTRA	DBYD
GAS	DBYD
HP GAS	DBYD
WATER	DBYD
STORMWATER	DBYD
SEWERAGE	DBYD
OTHER	DBYD

PROPERTY DESCRIPTION	
NUMBER OF LOTS	0
PROPOSED LOTS	N/A
CANCELLING LOTS	N/A
LOCAL AUTHORITY	SUNC
APPROVAL No	—

J. READ RPEQ 7727

N/R

ISSUE DATE: 01/03/2021

NPL 3 STREETLIGHTING
BRUCE HIGHWAY CONNECTION RD
CONSERVATION DRIVE, PALMVIEW
WIRING DIAGRAM & SL CERTIFICATION

SCALE : N/A @ A1
10353-1-3
S4900293 PR3
Sheet 9 of 9

From: Dez G Hehir
To: NCR_ITS_Admin
Subject: FW: Sunshine Coast Council - Infrastructure Guidelines & Standards - Update to Traffic Signals Guidelines
Date: Friday, 10 September 2021 2:59:54 PM
Attachments: image001.png
image006.jpg
image007.jpg

FYI

Kind regards,

Dez Hehir
Senior Project Officer (Traffic Management Systems) | North Coast Region
Program Delivery and Operations Branch | Infrastructure Management and Delivery Division | Department of Transport and Main Roads

Floor 2 | 21 Carnaby Street | Maroochydore Qld 4558
PO Box 1600 | Maroochydore Qld 4558
P: (07) 5475 2881 | M: N/R
dez.g.hehir@tmr.qld.gov.au
www.tmr.qld.gov.au
1585631465774

From: Internet Mailbox Traffic and Transport <TrafficandTransport@sunshinecoast.qld.gov.au>
Sent: Friday, 10 September 2021 1:54 PM
Cc: Internet Mailbox Traffic and Transport <TrafficandTransport@sunshinecoast.qld.gov.au>
Subject: Sunshine Coast Council - Infrastructure Guidelines & Standards - Update to Traffic Signals Guidelines

Sunshine Coast Council (SCC) have updated the Traffic Signals Guidelines and the updated requirements are now available on the SCC website:-

https://www.sunshinecoast.qld.gov.au/Development/Development-Tools-and-Guidelines/Infrastructure-Guidelines-and-Standards/Public-Utility-Services/Traffic-Signal-Infrastructure

The major updates include the uniform adoption of technology and safety improvement to all new and modified traffic signals, including:-

- Wireless communications connections to Streams
- Closed Circuit Television (CCTV) and
- Bluetooth technology

SCC have clarified the requirements for SCC traffic signals to be a One Network (TMR & SCC) approach across traffic signals throughout the SCC local government area to a similar standard to The Department of Transport and Main Roads (TMR).

The implementation of CCTV and Bluetooth technology across the SCC LGA is a Road Safety initiative to improve both road safety and network efficiency and operation, to reduce risk and improve network impacts (congestion) on the SCC road network.

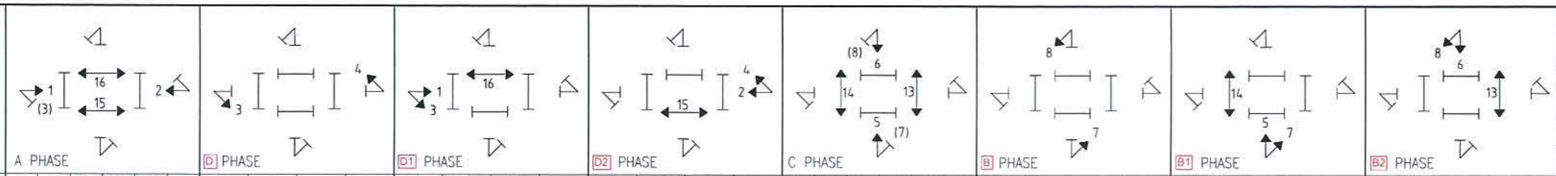
- Footage from CCTV cameras will be closely monitored by our TMR trained traffic management centre (TMC) operators to adjust traffic signal operations and reduce delays where possible.
- Bluetooth monitoring will collect data including traffic presence, density, average speed and flow, and will be used for traffic analysis to inform future planning and infrastructure optimisation.

More information

If you would like more information, please contact council Ph 07 5475 7272 - refer the Traffic and Transportation Unit or email trafficandtransport@sunshinecoast.qld.gov.au

1585631465774

PHASE DIAGRAMS



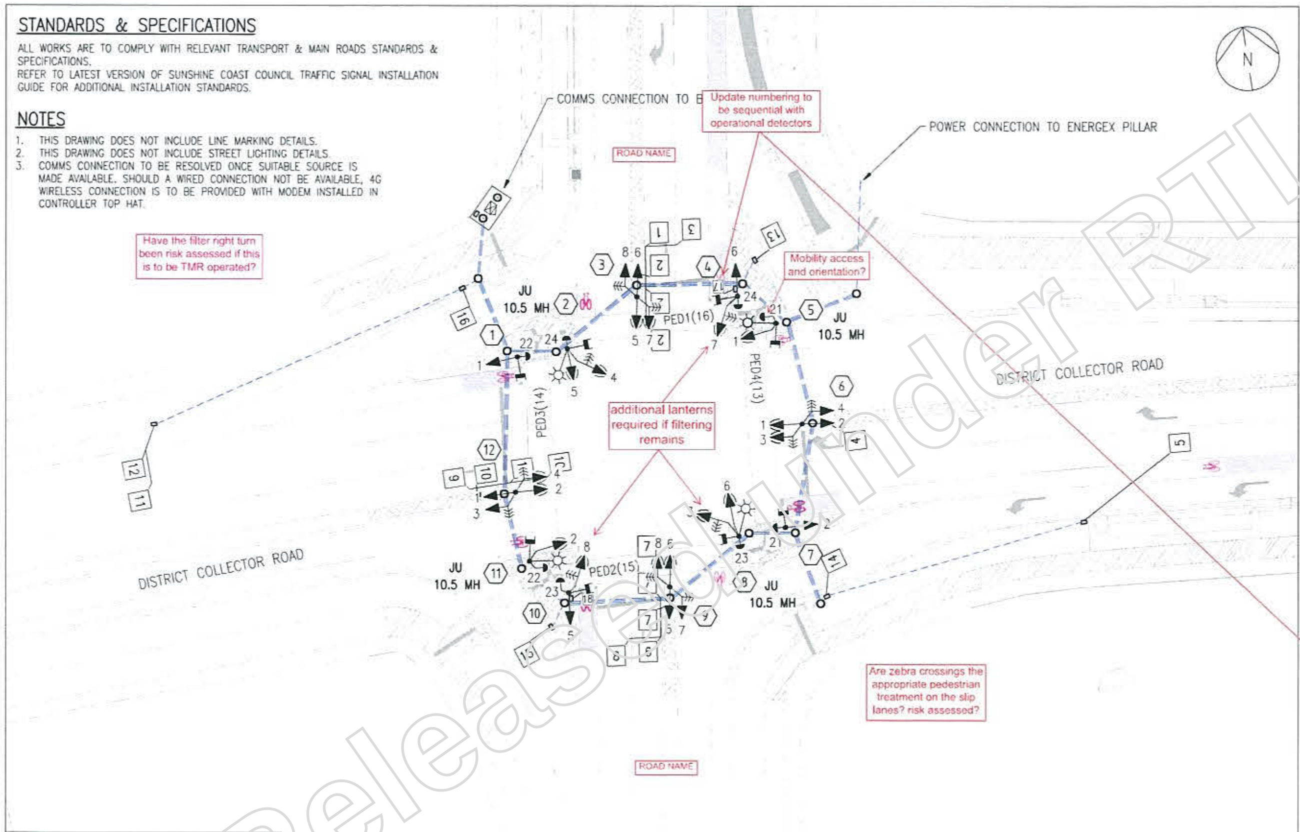
	A PHASE						D PHASE				D1 PHASE				D2 PHASE				C PHASE						B PHASE				B1 PHASE				B2 PHASE			
SIGNAL GROUPS	1	2	3	16	15		3	4			1	3	16		2	4	15		5	6	7	8	14	13	7	8			5	7	14		6	8	13	
VEHICLE/PED	VG1	VG2	VG3	PG1	PG2		VG3	VG4			VG1	VG3	PG1		VG2	VG4	PG2		VG5	VG6	VG7	VG8	PG3	PG4	VG7	VG8			VG5	VG7	PG3		VG6	VG8	PG4	
LOGICAL INPUT	11,12	5	9,10	24	23		9,10	4			11,12	9,10	24		5	4	23		8,18	3,17	6,7	1,2	22	21	6,7	1,2			8,18	6,7	22		3,17	1,2	21	
CALL	X	X		PED1	PED2		X	X			~~X~~	X	~~PED1~~		~~X~~	X	~~PED2~~		X	X			PED3	PED4	X	X			~~X~~	X	~~PED3~~		~~X~~	X	~~PED4~~	
EXTEND	X	X					X	X			~~X~~	X			~~X~~	X			X	X					X	X			~~X~~	X			~~X~~	X		
INCREMENT	X	X																	~~X~~	~~X~~																
SPECIAL CONDITIONS	SG3 RED OFF AFTER LATE START PG2 PED PROTECTION																		SG7 & SG8 RED OFF AFTER LATE START PG3 PED PROTECTION PG4 PED PROTECTION																	

STANDARDS & SPECIFICATIONS

ALL WORKS ARE TO COMPLY WITH RELEVANT TRANSPORT & MAIN ROADS STANDARDS & SPECIFICATIONS.
REFER TO LATEST VERSION OF SUNSHINE COAST COUNCIL TRAFFIC SIGNAL INSTALLATION GUIDE FOR ADDITIONAL INSTALLATION STANDARDS.

NOTES

1. THIS DRAWING DOES NOT INCLUDE LINE MARKING DETAILS.
2. THIS DRAWING DOES NOT INCLUDE STREET LIGHTING DETAILS.
3. COMMS CONNECTION TO BE RESOLVED ONCE SUITABLE SOURCE IS MADE AVAILABLE. SHOULD A WIRED CONNECTION NOT BE AVAILABLE, 4G WIRELESS CONNECTION IS TO BE PROVIDED WITH MODEM INSTALLED IN CONTROLLER TOP HAT.



SLR PROJECT NO: 620.30257
DRAWING NO: 620.30257-102

CONFLICT TABLE (X INDICATES CONFLICT)

		VEHICLE GROUPS 1	2	3	4	5	6	7	8	9	10	11	12	PED GROUPS 1	2	3	4
VEHICLE GROUPS	1	\			X	X	X	X	X							X	X
	2		\	X		X	X	X	X							X	X
	3		X	\		X	X	X	X						X	X	
	4	X			\	X	X	X	X					X			X
	5	X	X	X	X	\			X					X	X		
	6	X	X	X	X		\	X						X	X		
	7	X	X	X	X		X	\							X		X
	8	X	X	X	X	X			\					X		X	
	9									\							
	10										\						
	11											\					
	12												\				
PED GROUPS	1				X	X	X		X								
	2			X		X	X	X									
	3	X	X	X					X								
	4	X	X		X			X									

DETECTOR TABLE

PHYSICAL LABEL	CONTROLLER TERMINAL	LOGICAL INPUT	LOOP/PB CONFIGURATION	DIST TO STOP LINE
LOOP 1	P1	1	STOP LINE	4m
LOOP 2	P2	2	PRESENCE	—
LOOP 3	P3	3	STOP LINE	4m
LOOP 4	P4	4	STOP LINE	4m
LOOP 5	P5	5	ADVANCE	35m
LOOP 6	P6	6	STOP LINE	4m
LOOP 7	P7	7	PRESENCE	—
LOOP 8	P8	8	STOP LINE	4m
LOOP 9	Q9	9	STOP LINE	4m
LOOP 10	Q10	10	PRESENCE	—
LOOP 11	Q11	11	ADVANCE	35m
LOOP 12	Q12	12	ADVANCE	35m
LOOP 13	Q13	13	COUNT	—
LOOP 14	Q14	14	COUNT	—
LOOP 15	Q15	15	COUNT	—
LOOP 16	Q16	16	COUNT	—
LOOP 17	R17	17	BICYCLE	0.3m
LOOP 18	R18	18	BICYCLE	0.3m
		19		
		20		
EXT4	E8	21	Pb4-AUDIO	
EXT3	E7	22	Pb3-AUDIO	
EXT2	E6	23	Pb2-AUDIO	
EXT1	E5	24	Pb1-AUDIO	
		25		
		26		
		27		
		28		
		29		
		30		
		31		
		32		

SIGNAL GROUPS	FUNCTION	CONTROLLER TERMINALS	RUN 1 FINIAL TERMINALS	RUN 1 CONNECTS / CORES USED (1; 2, 3; 4)	RUN 2 FINIAL TERMINALS	RUN 2 CONNECTS / CORES USED (5; 6, 7; 9)	RUN 3 FINIAL TERMINALS	RUN 3 CONNECTS / CORES USED (12; 11, 10; 8)
1	RED	A5	1	1	1	1	1	1
	YELLOW	A4	2	2	2	2	2	2
	GREEN	A3	3	3	3	3	3	3
2	RED	A8			4	4	4	4
	YELLOW	A7			5	5	5	5
	GREEN	A6			6	6	6	6
3	RED	A11			7	7	7	7
	YELLOW	A10			8	8	8	8
	GREEN	A9			9	9	9	9
4	RED	A14	4	4	10	10	10	10
	YELLOW	A13	5	5	11	11	11	11
	GREEN	A12	6	6	12	12	12	12
5	RED	B5	7	7	13	13	13	13
	YELLOW	B4	8	8	14	14	14	14
	GREEN	B3	9	9	15	15	15	15
6	RED	B8	10	10	16	16	16	16
	YELLOW	B7	11	11	17	17	17	17
	GREEN	B6	12	12	18	18	18	18
7	RED	B11	13	13	19	19		
	YELLOW	B10	14	14	20	20		
	GREEN	B9	15	15	21	21		
8	RED	B14	16	16	22	22	19	19
	YELLOW	B13	17	17	23	23	20	20
	GREEN	B12	18	18	24	24	21	21
9								
10								
11								
12								
13	RED DW	D5			25	25		
	PED4							
	GREEN W	D3			26	26		
14	RED DW	D8	19	19			22	22
	PED3							
	GREEN W	D6	20	20			23	23
15	RED DW	D11					24	24
	PED2							
	GREEN W	D9					25	25
16	RED DW	D14	21	21				
	PED1							
	GREEN W	D12	22	22				
	EXT4 DET 21	E8			P4	P4		
	EXT3 DET 22	E7	P3	P3			P3	P3
	EXT2 DET 23	E6					P2	P2
	EXT1 DET 24	E5	P1	P1				
	230V	A2	A	RD	A	RD	A	RD
	DET COMMON	E3	PR	GY	PR	GY	PR	GY
	NEUTRAL	A1,B1 C1,D1	NL	BK	NL	BK	NL	BK
	SPARE CORES TO EARTH			23-27 P2,P4 OR		27 P1-P3 OR		26-27 P1,P4 OR
	CABLE SIZE			36		36		36

CONTROLLER TYPE: ATC ATSC4

Rev	Revisions/Descriptions	Drawn	Checked	Certification	Date	M'filed
G						
F						
E						
D						
C						
B	Updates To Phasing.					
A	Issued For Review.					

Associated Job Nos | Survey Data | Datum
Auxiliary Drg Nos | Horiz. Grid | Height Origin | Survey Books

Scales: 0 2 4 6 8 10m

Dimensions shown in metres except where shown otherwise

SUNSHINE COAST COUNCIL
PALMVIEW, HARMONY
DISTRICT COLLECTOR ROAD, INTERSECTION C

Reference Points: Preceding RP | Dist. to start of job (km) | From start to end of job | From end to Following RP | Following RP

Through Chainage from

TRAFFIC SIGNAL INSTALLATION
OPERATIONS & ELECTRICAL

Site Number: X

Sunshine Coast COUNCIL

Drawn: DM | Designed: DM

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
CIVIL	N/R		7628	22/02/21

Job No.: Request
Contract. No.: –
Drawing No.: Request | B
Series Number: 2 of 2

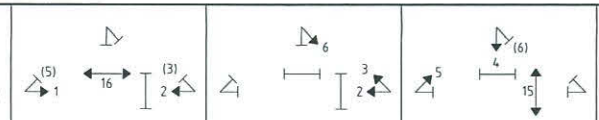
MRT_Detail (02/14)

CAD FILES C:\SharedData\Apps\TMRCust\ACAD\2013-2019\TempDwgLocation\AcPublish_13028\620.30257 Intersections C-F-H v0.6.1.dwg

Last Modified - Feb 23, 2021 - 1:10pm XREFS -

Department of Transport and Main Roads

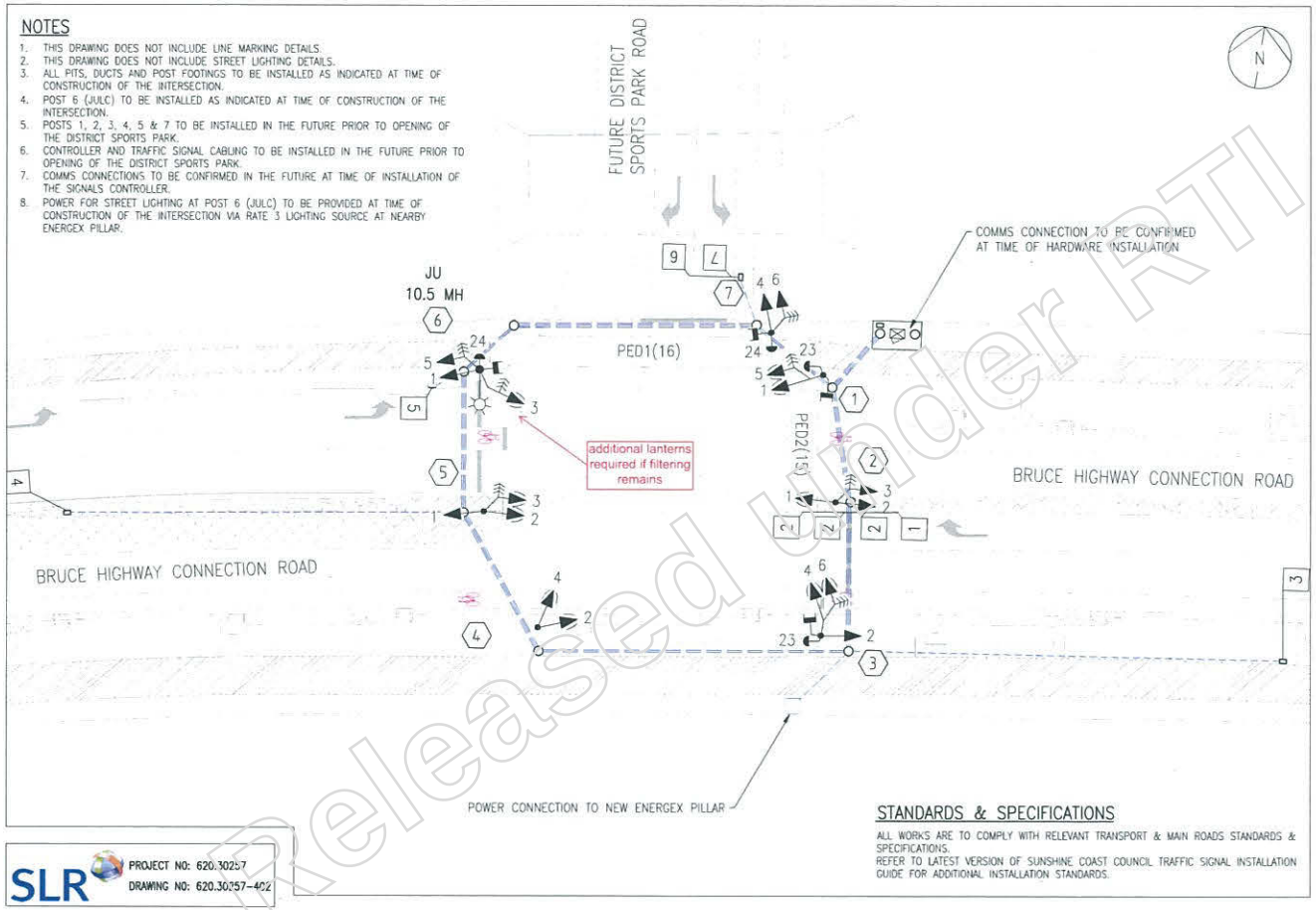
PHASE DIAGRAMS



	A PHASE					B PHASE			C PHASE			
SIGNAL GROUPS	1	2	3	5	16	2	3	6	4	5	6	15
VEHICLE/PED	VG1	VG2	VG3	VG5	PG1	VG2	VG3	VG6	VG4	VG5	VG6	PG2
LOGICAL INPUT	4	3	1,2	5	24	3	1,2	7	6	5	7	23
CALL	X	X		X	PED1		X	X	X		X	PED2
EXTEND	X	X		X			X	X	X		X	
INCREMENT	X	X										
SPECIAL CONDITIONS	SG3 PED OFF AFTER LATE START SG5 RED FOR PG1 WALK ELSE OFF Include PG1 pedestrian protection from SG3					SG6 extend cancelled if moving to C Phase			SG6 RED FOR PG2 WALK ELSE OFF			

NOTES

1. THIS DRAWING DOES NOT INCLUDE LINE MARKING DETAILS.
2. THIS DRAWING DOES NOT INCLUDE STREET LIGHTING DETAILS.
3. ALL PITS, DUCTS AND POST FOOTINGS TO BE INSTALLED AS INDICATED AT TIME OF CONSTRUCTION OF THE INTERSECTION.
4. POST 6 (JULC) TO BE INSTALLED AS INDICATED AT TIME OF CONSTRUCTION OF THE INTERSECTION.
5. POSTS 1, 2, 3, 4, 5 & 7 TO BE INSTALLED IN THE FUTURE PRIOR TO OPENING OF THE DISTRICT SPORTS PARK.
6. CONTROLLER AND TRAFFIC SIGNAL CABLING TO BE INSTALLED IN THE FUTURE PRIOR TO OPENING OF THE DISTRICT SPORTS PARK.
7. COMMS CONNECTIONS TO BE CONFIRMED IN THE FUTURE AT TIME OF INSTALLATION OF THE SIGNALS CONTROLLER.
8. POWER FOR STREET LIGHTING AT POST 6 (JULC) TO BE PROVIDED AT TIME OF CONSTRUCTION OF THE INTERSECTION VIA RATE 3 LIGHTING SOURCE AT NEARBY ENERGEX PILLAR.



STANDARDS & SPECIFICATIONS

ALL WORKS ARE TO COMPLY WITH RELEVANT TRANSPORT & MAIN ROADS STANDARDS & SPECIFICATIONS.
REFER TO LATEST VERSION OF SUNSHINE COAST COUNCIL TRAFFIC SIGNAL INSTALLATION GUIDE FOR ADDITIONAL INSTALLATION STANDARDS.

SLR PROJECT NO: 620.30257
DRAWING NO: 620.30257-402

CONFLICT TABLE (X INDICATES CONFLICT)

VEHICLE GROUPS	1	2	3	4	5	6	7	8	9	10	11	12	PED GROUPS 1	2	3	4
1			X	X		X								X		
2				X										X		
3	X				X	X								X	X	
4	X	X	X											X		
5			X											X		
6	X													X	X	
7																
8																
9																
10																
11																
12																
PED 1			X	X	X	X										
PED 2	X	X	X			X										
PED 3																
PED 4																

DETECTOR TABLE

PHYSICAL LABEL	CONTROLLER TERMINAL	LOGICAL INPUT	LOOP/PB CONFIGURATION	DIST TO STOP LINE
LOOP 1	P1	1	STOP LINE	4m
LOOP 2	P2	2	PRESENCE	—
LOOP 3	P3	3	ADVANCE	35m
LOOP 4	P4	4	ADVANCE	35m
LOOP 5	P5	5	STOP LINE	4m
LOOP 6	P6	6	STOP LINE	4m
LOOP 7	P7	7	STOP LINE	4m
		8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		
		16		
		17		
		18		
		19		
		20		
		21		
		22		
EXT2	E6	23	Pb2–AUDIO	
EXT1	E5	24	Pb1–AUDIO	
		25		
		26		
		27		
		28		
		29		
		30		
		31		
		32		

SIGNAL GROUPS	FUNCTION	CONTROLLER TERMINALS	RUN 1 FINAL TERMINALS	RUN 1 CONNECTS	RUN 1 CORES USED	RUN 2 FINAL TERMINALS	RUN 2 CONNECTS	RUN 2 CORES USED	RUN 3 FINAL TERMINALS	RUN 3 CONNECTS	RUN 3 CORES USED
1	RED	A5	1	1		1	1				
	YELLOW	A4	2	2		2	2				
	GREEN	A3	3	3		3	3				
2	RED	A8	4	4		4	4				
	YELLOW	A7	5	5		5	5				
	GREEN	A6	6	6		6	6				
3	RED	A11	7	7		7	7				
	YELLOW	A10	8	8		8	8				
	GREEN	A9	9	9		9	9				
4	RED	A14	10	10		10	10				
	YELLOW	A13	11	11		11	11				
	GREEN	A12	12	12		12	12				
5	RED	B5	13	13		13	13				
	YELLOW	B4	14	14		14	14				
	GREEN	B3	15	15		15	15				
6	RED	B8	16	16		16	16				
	YELLOW	B7	17	17		17	17				
	GREEN	B6	18	18		18	18				
7											
8											
9											
10											
11											
12											
13											
14											
15	RED DW	D11	13	13							
	PED2										
	GREEN W	D9	14	14							
16	RED DW	D14				13	13				
	PED1										
	GREEN W	D12				14	14				
	EXT2 DET 23	E6	P2	P2							
	EXT1 DET 24	E5				P1	P1				
	230V	A2	A	RD		A	RD				
	DET COMMON	E3	PR	GY		PR	GY				
	NEUTRAL	A1,B1 C1,D1	NL	BK		NL	BK				
	SPARE CORES TO EARTH			19–27 P1,P3 P4 OR			19–27 P2–P4 OR				
	CABLE SIZE			36			36				

CONTROLLER TYPE ATC ATSC4

G						
F						
E						
D						
C						
B						
A	Issued For Construction					
	Revisions/Descriptions	Drawn	Checked	Certification	Date	M'filed

Associated Job Nos | Survey Data: Datum, Horiz. Grid, Height Origin, Survey Books
Auxiliary Drg Nos

Scales: 1:200 0 2 4 6 8m
Dimensions shown in metres except where shown otherwise

SUNSHINE COAST COUNCIL
PALMVIEW, HARMONY
BRUCE HWY CONNECTION ROAD, DISTRICT SPORTS PARK

Reference Points: Preceding RP | Dist. to start of job (km) | From start to end of job | From end to Following RP | Following RP
Through Chainage from

TRAFFIC SIGNAL INSTALLATION
OPERATIONS & ELECTRICAL

Site Number X

Drawn DM
Designed DM

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
CIVIL	N/R		7628	3/03/21

Sunshine Coast Council

Job No.	Request
Contract. No.	—
Drawing No.	Request A
Series Number	2 of 2

MRT_Detail (02/14)

CAD FILES: H:\BNE\Projects-SLR\620-BNE\620.30257.00000 Palmview Harmony Western District Sports\06 SLR Data\01 CADGIS\Pignata Underpass and DSP\620.30257 WCR DSP v0.3.2.dwg

Last Modified :- Mar 03, 2021 - 4:28pm XREFS :-

PHASE DIAGRAMS	A PHASE				B PHASE				C PHASE				D PHASE			
SIGNAL GROUPS	1	2	5		4	5	6	7	3	2	6	8	2	3	6	7
VEHICLE/PED	VG1	VG2	VG5		VG4	VG5	VG6	PG2	VG3	VG2	VG6	PG1	SG2	SG3	SG6	PG2
LOGICAL INPUT	6,7	5	8		1	8	2	23	3,4	5	2	24				23
CALL	X	X	X		X		~~X~~	PED2	X		X	PED1				PED2
EXTEND	X	X	X		X		X		X		X					
INCREMENT	X	X														
SPECIAL CONDITIONS	SG5 ALL OFF FOR A PHASE				SG5 RED IF PG1 CALLED ELSE GREEN VD6 extend cancelled if moving to C Phase				SG2 RED IF PG2 CALLED ELSE GREEN							

SIGNAL GROUPS	FUNCTION	CONTROLLER TERMINALS	RUN 1 FINIAL TERMINALS	RUN 1 CORES USED			RUN 2 FINIAL TERMINALS	RUN 2 CORES USED			RUN 3 FINIAL TERMINALS	RUN 3 CORES USED
				CONNECTS 1, 2, 3, 4, 5, 6	1, 1L	4, 4L		CONNECTS 11, 10, 9, 8, 7	7, 7L			
1	RED	A5	1	1	1		1	1				
	YELLOW	A4	2	2	2		2	2				
	GREEN	A3	3	3	3		3	3				
2	RED	A8	4	4			4	4	1			
	YELLOW	A7	5	5			5	5	2			
	GREEN	A6	6	6			6	6	3			
3	RED	A11	7	7			7	7	4			
	YELLOW	A10	8	8			8	8	5			
	GREEN	A9	9	9			9	9	6			
4	RED	A14	10	10		1	10	10				
	YELLOW	A13	11	11		2	11	11				
	GREEN	A12	12	12		3	12	12				
5	RED	B5	13	13								
	YELLOW	B4	14	14								
	GREEN	B3	15	15								
6	RED	B8	16	16		4	13	13				
	YELLOW	B7	17	17		5	14	14				
	GREEN	B6	18	18		6	15	15				
7	RED DW	B11	19	19			16	16				
	PED2											
	GREEN W	B9	20	20			17	17				
8	RED DW	B14					18	18				
	PED1											
	GREEN W	B12					19	19				
9												
10												
11												
12												
13												
14												
15												
16												
	EXT1 DET 23	E6	P2	P2			P2	P2				
	EXT1 DET 24	E5	~~P1~~	~~P1~~			P1	P1				
	230V	A2	A	RD			A	RD				
	DET COMMON	E3	PR	GY			PR	GY				
	NEUTRAL	A1,B1 C1,D1	NL	BK			NL	BK				
	SPARE CORES TO EARTH			21–27 P1, P3, P4 OR				20–27 P3,P4 OR				
	CABLE SIZE			36	19	19		36	19			

CONTROLLER TYPE TYCO ECLIPSE EC1-62-8

CONFLICT TABLE (X INDICATES CONFLICT)

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	P1	P2	P3	P4
Vehicle 1	\		X	X		X							~~X~~	X		
Vehicle 2		\		X									X	~~X~~		
Vehicle 3	X		\	X	X											
Vehicle 4	X	X	X	\									X	~~X~~		
Vehicle 5			X		\								~~X~~	X		
Vehicle 6	X					\										
Vehicle 7							\									
Vehicle 8								\								
Vehicle 9									\							
Vehicle 10										\						
Vehicle 11											\					
Vehicle 12												\				
Ped 1	~~X~~	X		X	~~X~~											
Ped 2	X	~~X~~		~~X~~	X											
Ped 3																
Ped 4																

DETECTOR TABLE

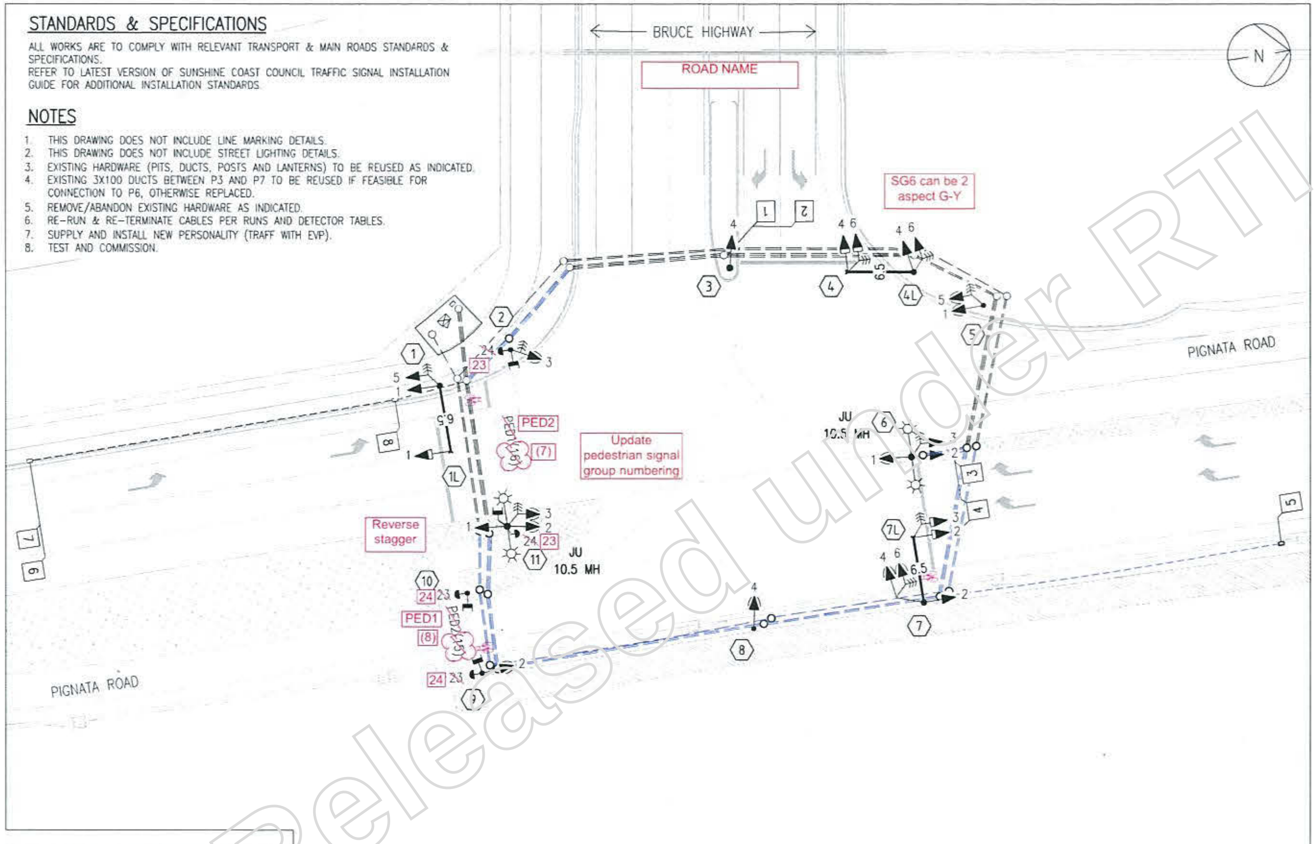
PHYSICAL LABEL	CONTROLLER TERMINAL	LOGICAL INPUT	LOOP/PB CONFIGURATION	DIST TO STOP LINE
LOOP 1	P1	1	STOP LINE	4m
LOOP 2	P2	2	STOP LINE	4m
LOOP 3	P3	3	STOP LINE	4m
LOOP 4	P4	4	STOP LINE	4m
LOOP 5	P5	5	ADVANCE	35m
LOOP 6	P6	6	ADVANCE	35m
LOOP 7	P7	7	ADVANCE	35m
LOOP 8	P8	8	STOP LINE	4m
		9		
		10		
		11		
		12		
		13		
		14		
		15		
		16		
		17		
		18		
		19		
		20		
		21		
		22		
EX2	E6	23	Pb2-AUDIO	
EXT1	E5	24	Pb1-AUDIO	
		25		
		26		
		27		
		28		
		29		
		30		
		31		
		32		

STANDARDS & SPECIFICATIONS

ALL WORKS ARE TO COMPLY WITH RELEVANT TRANSPORT & MAIN ROADS STANDARDS & SPECIFICATIONS.
REFER TO LATEST VERSION OF SUNSHINE COAST COUNCIL TRAFFIC SIGNAL INSTALLATION GUIDE FOR ADDITIONAL INSTALLATION STANDARDS.

NOTES

1. THIS DRAWING DOES NOT INCLUDE LINE MARKING DETAILS.
2. THIS DRAWING DOES NOT INCLUDE STREET LIGHTING DETAILS.
3. EXISTING HARDWARE (PITS, DUCTS, POSTS AND LANTERNS) TO BE REUSED AS INDICATED.
4. EXISTING 3X100 DUCTS BETWEEN P3 AND P7 TO BE REUSED IF FEASIBLE FOR CONNECTION TO P6, OTHERWISE REPLACED.
5. REMOVE/ABANDON EXISTING HARDWARE AS INDICATED.
6. RE-RUN & RE-TERMINATE CABLES PER RUNS AND DETECTOR TABLES.
7. SUPPLY AND INSTALL NEW PERSONALITY (TRAFF WITH EVP).
8. TEST AND COMMISSION.



SLR PROJECT NO: 620.30257
DRAWING NO: 620.30257-502

	Revisions/Descriptions	Drawn	Checked	Certification	Date	M'filed
G						
F						
E						
D						
C						
B						
A	Issued For Construction Supersedes Drawing 727244A					

CAD FILES C:\SharedData\Apps\TMRCust\ACAD\2013-2019\TempDwgLocation\AcPublish_15900\620.30257 Pignata Underpass East v0.3.1.dwg

Associated Job Nos — Auxiliary Drg Nos — Survey Data: Datum, Horiz. Grid, Height Origin, Survey Books

Scales 1:250 0 2 4 6 8 10m
Dimensions shown in metres except where shown otherwise

SUNSHINE COAST COUNCIL
BRUCE HIGHWAY (BRISBANE – GYMPIE)
CTRL CHAINAGE 58250 – 67200

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP
13	9.02	8.92	5.6	21A

Through Chainage from 10A – Ch. 58.38 to 67.20km

TRAFFIC SIGNAL INSTALLATION
OPERATIONS & ELECTRICAL

Site Number 7286

Sunshine Coast COUNCIL

Drawn DM — Designed DM

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE
CIVIL	N/R		7628	3/03/21

Job No. Request
Contract. No. –
Drawing No. Request A
Series Number 2 of 2
MRT_Detail (02/14)

Last Modified :- Mar 03, 2021 - 3:51pm KREFS -

Nicola J Duffy

From: Dinesh P Thilakasiri
Sent: Thursday, 2 September 2021 3:46 PM
To: N/R
Subject: FW: TMR21-033574 Bruce Highway Sippy Downs
Attachments: Guideline-Path-users-and-driveways1111.pdf

Hi N/R

Please find below our Civil comments. We will send the lighting and the Traffic signal comments soon.

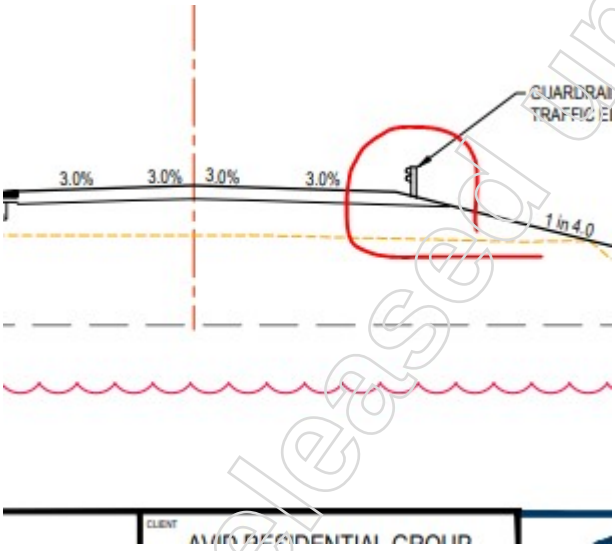
1.) Cross Sections

A) Provide lane widths on cross sections. For example chainage 80 lane widths are not provided however chainage 60 lane width are provided. It is noted chainage 80 is without a kerb and chainage 60 is with a kerb. Where the cross section profile differs provide lane widths on cross sections

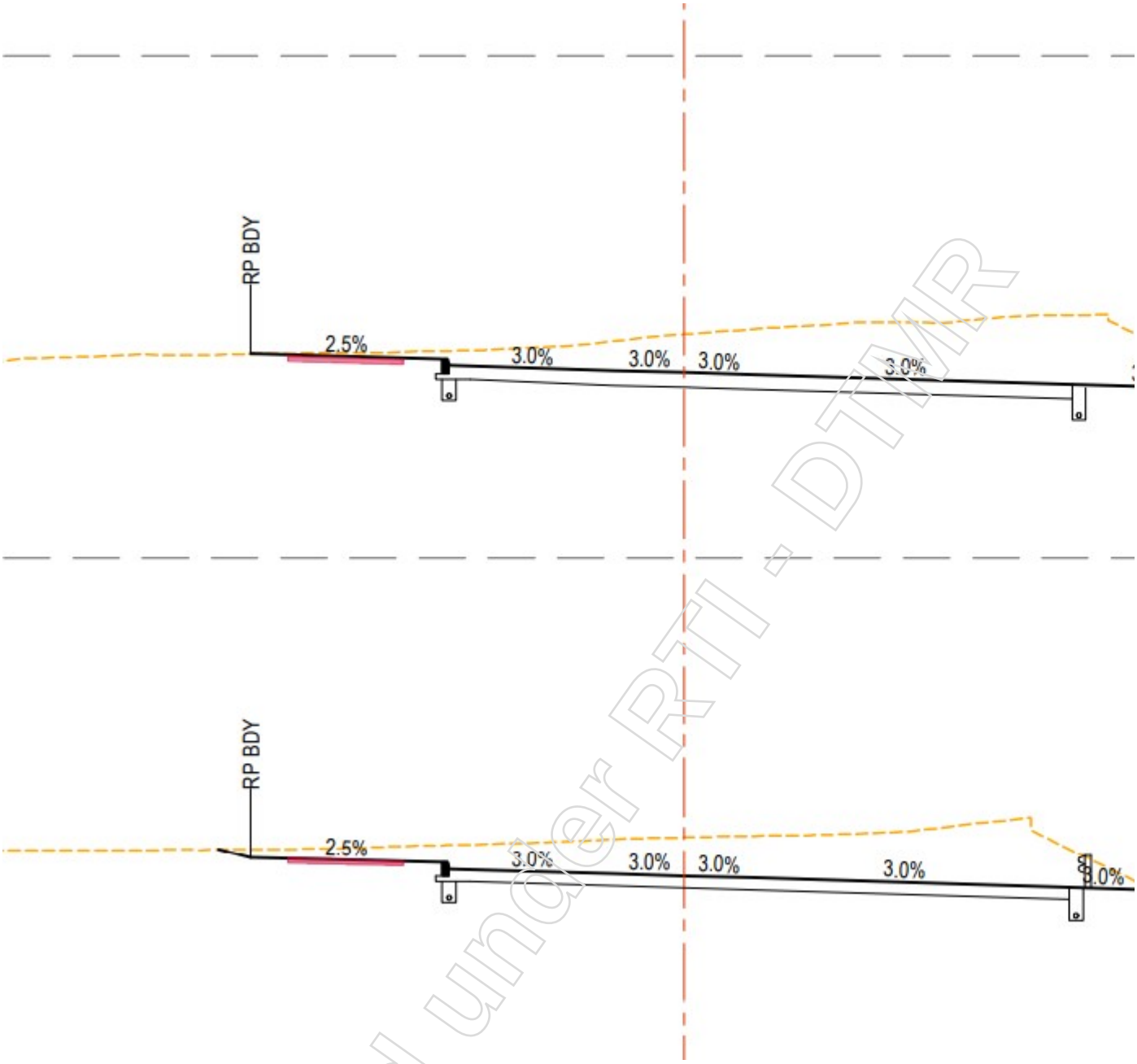
B) At cross section marked with particular chainage provide the correct value rather than a typical value. For example Ch60 typical verge width is marked when exact verge width could be shown.

2) Guard Rail

A) Why guard rails are located on the batter. Recommended it is location on a flatter section.



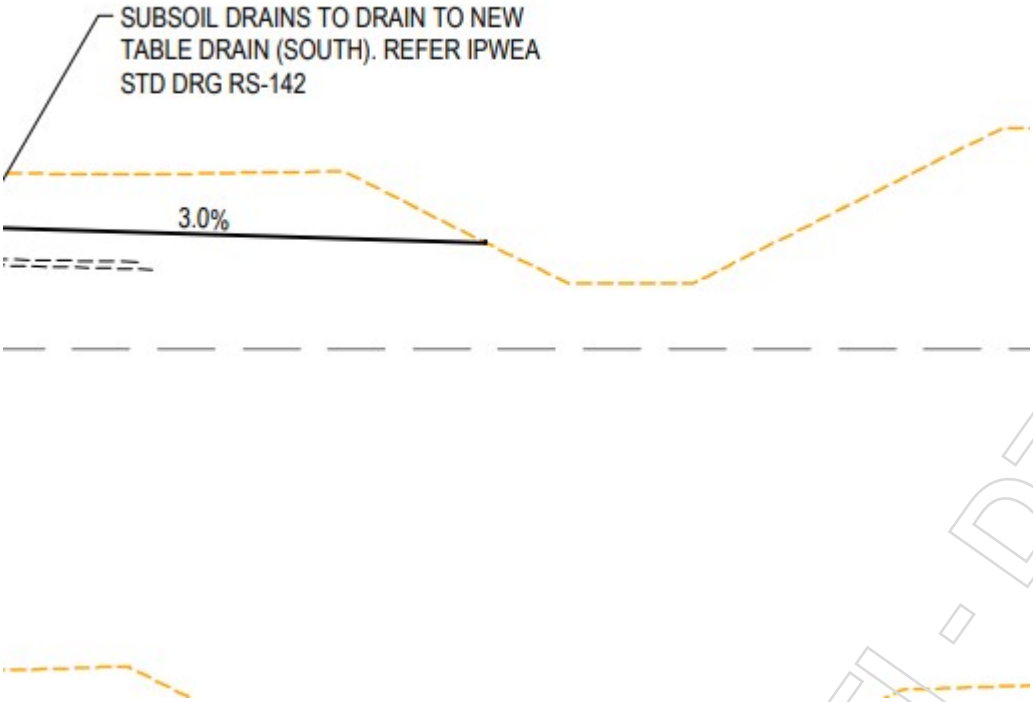
B) Please clarify why there are guard rails in some sections but not in other sections with similar drop off. Where non recoverable slope with drop off please provide hazard protection



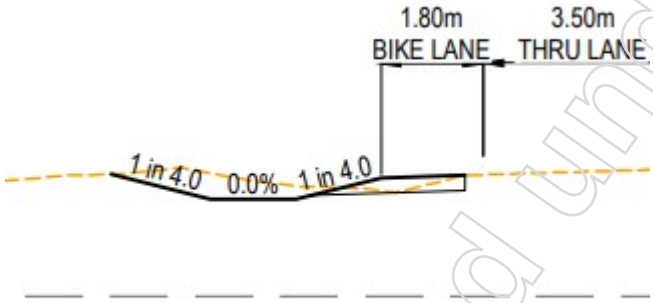
C) Provide details of the guard rail and how the required length was calculated. Please mark chainage on the line marking plan

3) Storm Water

A) Please mark the water levels at the Cross sections. Do they over top the road.



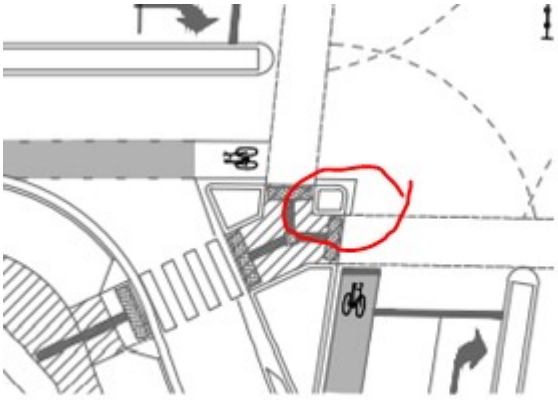
B) Subsoil drains to be 300mm below subgrade level



C) What are the reasons for choosing BIO POD is this part of a council requirement.
D) Is the table drains proposed to be turfed.

4) Splitter Islands

A) Small concrete Island sections can get easily dislodged with a vehicle hitting it. Please advise how this will be secured from getting dislodged.



B) Provide dimensions for the splitter islands.

5) Pavement Design

Please provide a pavement design with in accordance with Austroad Guide to Pavement Design

6) Vehicle Path

Please provide vehicle path for turn movements at the intersection

7) Median refuge CH480

Please demonstrate median refuge is the suitable crossing option. You may consider using Austroad Ped crossing selection tool.

Has TGSI, holding rail has been considered. Provide reason for the exclusion of Holding rails and TGSI

8) Landscaping

Has a Risk assessment including clear zone assessment is carried out for any trees planted within the clear zone. Please provide details.

9) Cost Estimation

Please provide a detail cost estimation for the project

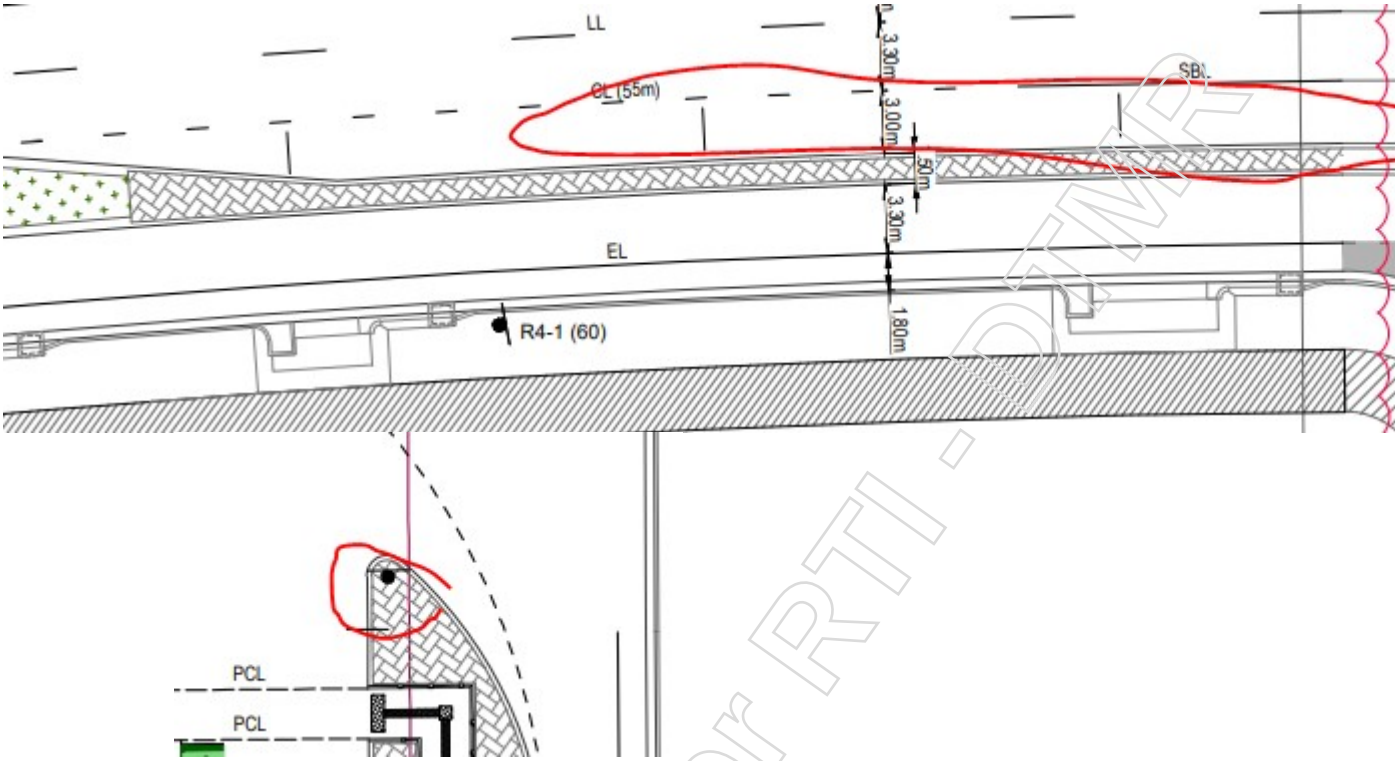
10) Traffic Report

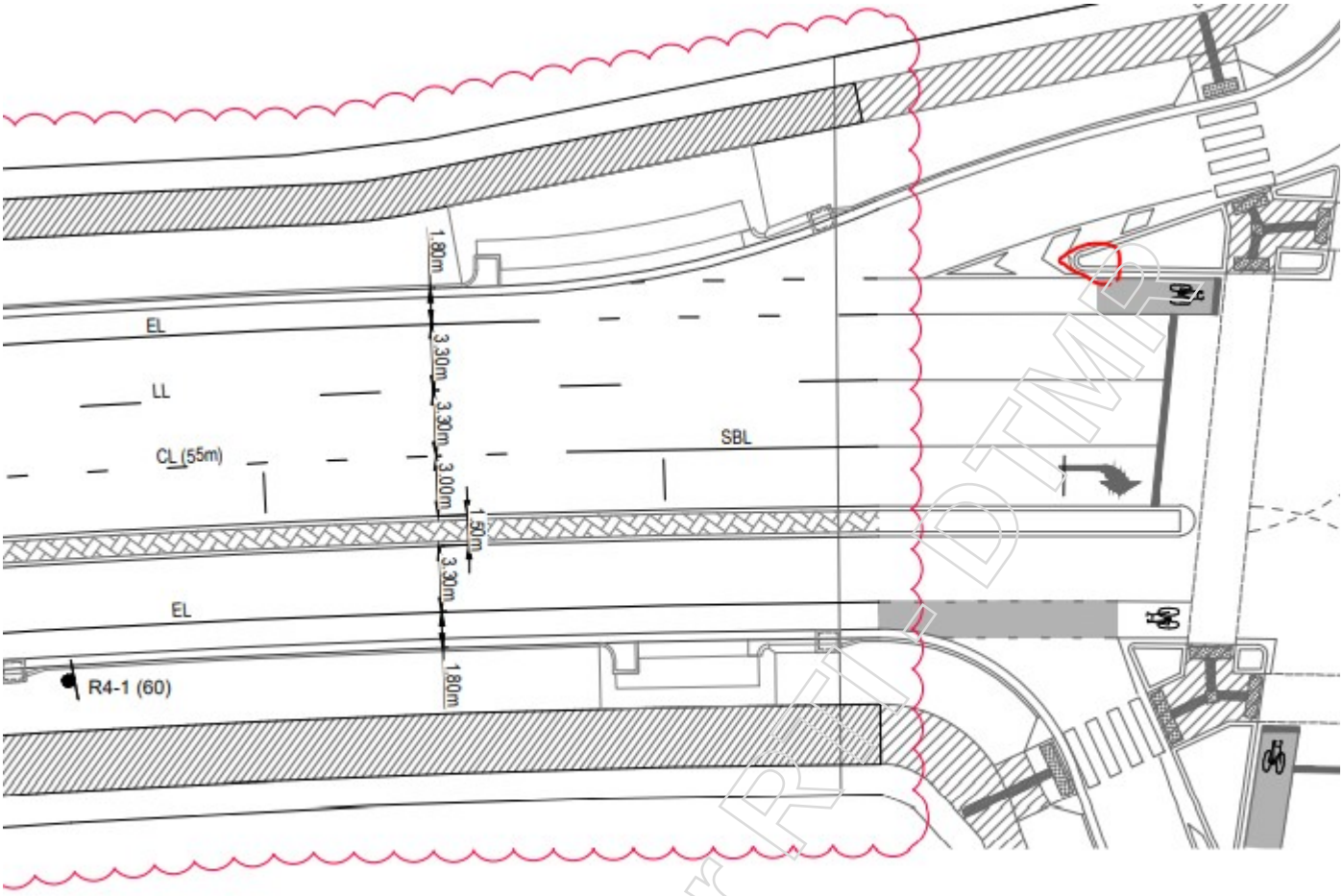
Please provide a detail traffic report demonstrating the design is suitable for the intended future traffic.

11) Please provide correspondence from council that there is no objection to this detail design

12) Sign and Line marking

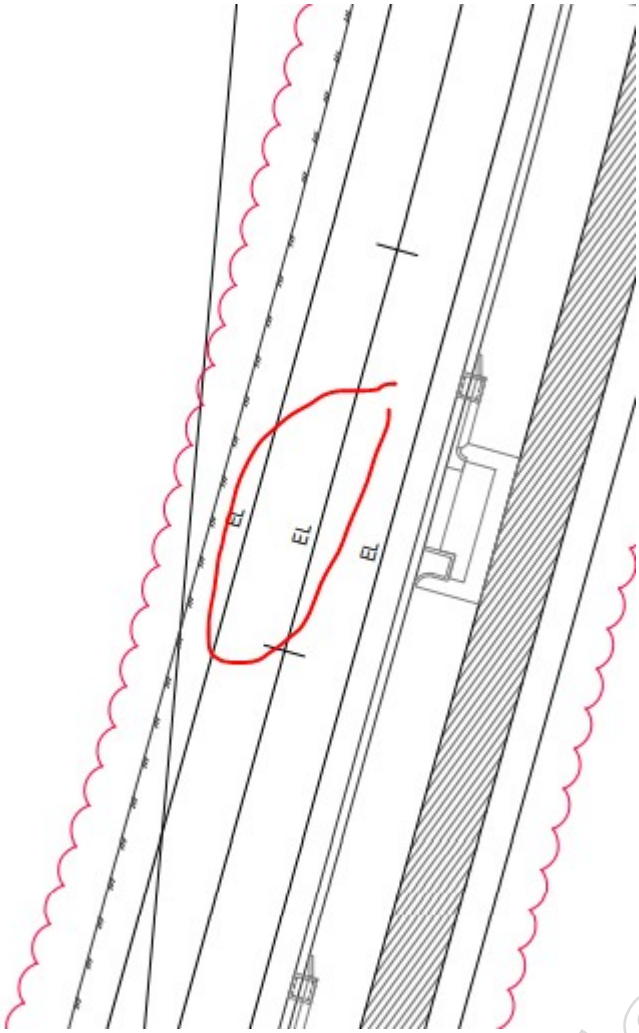
A) Please ensure all signs are provided in accordance with the Traffic and Road Use Management Manual/MUTCD.
For Right turn arrows are not sufficient for the right turn pocket, keep left signs appears to be missing, bi directional signs appears to be missing.





LINEMARKING DETAILS

B) Please advise why edge line is chosen for the centre line.



C) Where green paint has been used for cyclist please provide calculation that this is warranted.

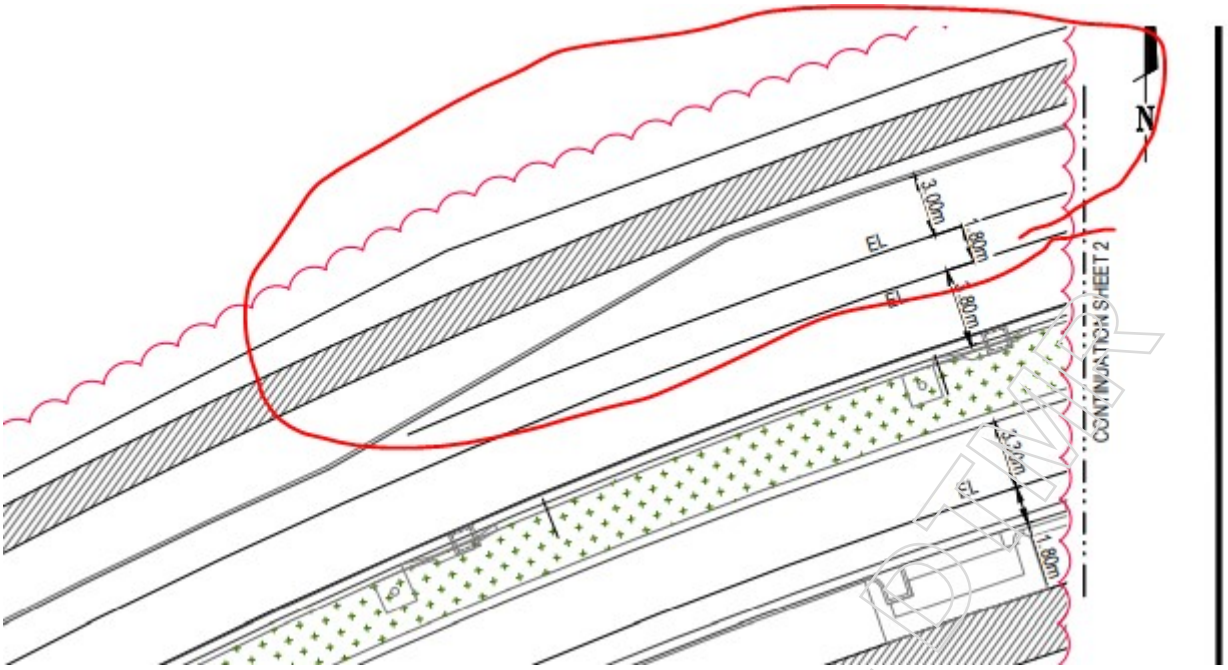
13) Unsignalized slip lanes

use of unsignalized slip lanes are not supported with TMR policy due to safety reasons. Drawing 34-500. Please justify why it is considered a suitable solution.

It appears there is no deceleration lane for the left turn High entry angle slip lane. What will be queuing distance on this high entry angle slip lane. Will it spill to the through lanes.

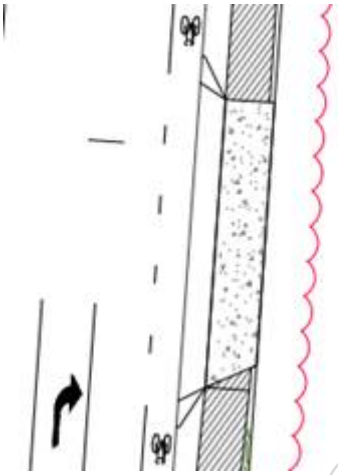
14) Future Left Turn Pockets

What is the purpose of the Bay at the below location. If it is for future left turn pocket what storage and deceleration lengths used in the design. If it is for future left turn lane is there a reason why it is not marked with a continuity lane at the taper.



15) Vehicular crossing

A) If a fence is build in future at the property boundary how a visibility to the cyclist could be achieved at the below driveway location. Refer Guideline Path users and driveways (attached). Provide vehicle paths that vehicle can enter and exit staying with in the lane



16) Curve Widening

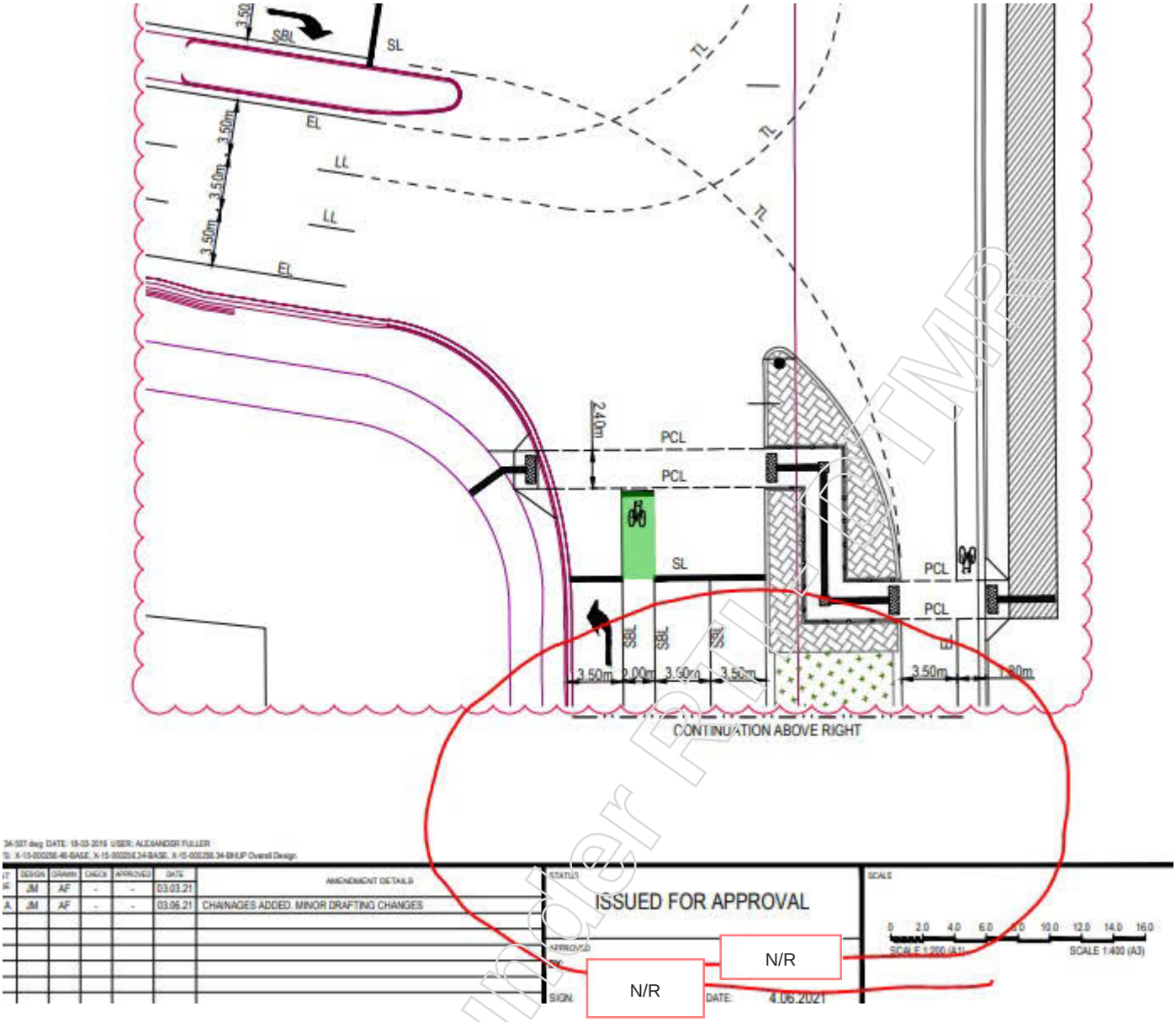
Has curve widening considered in the design

17) There appears to be a sharp lateral shift occurring at chainage 1540 Please confirm this is below the maximum rate.

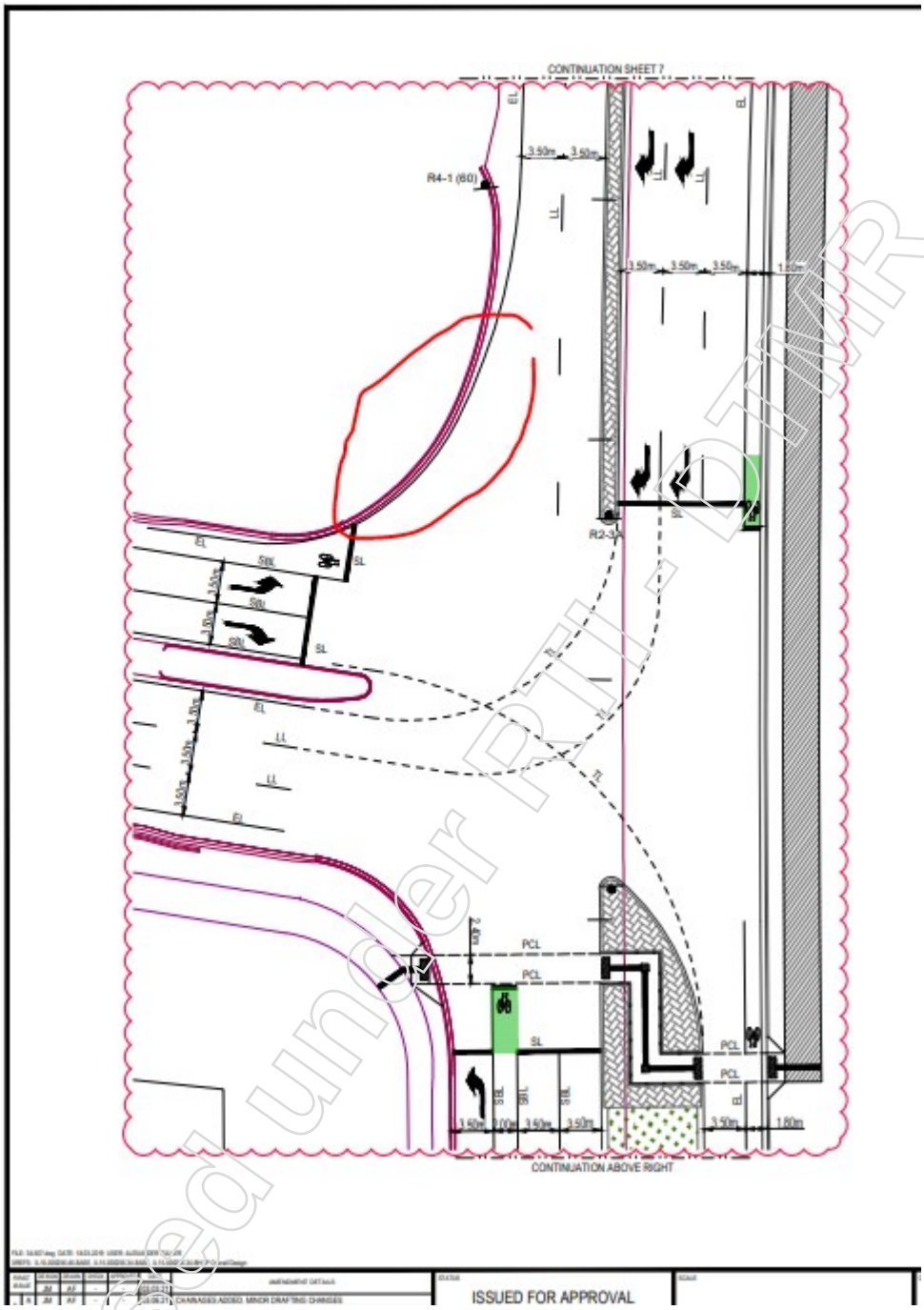
18) Pedestrian Paths

TMR policy is provide pedestrian path across all legs. Please provide justification at locations where pedestrian paths has not been provided.

19) Page 34-507 section is missing from the signage and line marking drawing



20) Please advise why no shoulder is provided for the left turning cyclists



Environmental Scoping Report

Palmview/Sippy Downs Integrated Link Strategy: SSMW

Project No: 60487984

Template Version 7, March 2015

PROJECT DETAILS			
TMR District	North Coast		
Project Name / Description	Palmview/Sippy Downs Integrated Link Strategy		
Project Number	60487984		
Project Location	SSMW upgrade		
Local Government Area	Sunshine Coast	**DMS Reference**	

REPORT PREPARATION			
On behalf of TMR, I have prepared this report based on the best information available at the time. I have taken into account, to the fullest extent possible, all actual and potential environmental impacts of the project in accordance with current legislation.			
Name	N/R	**Signature**	
Position	Graduate Environmental Scientist (AECOM)	**Date**	
REPORT REVIEW			
Name	N/R	**Signature**	
Position	Principal Environmental Scientist (AECOM)	**Date**	

VERSION HISTORY			
Version No.	**Date**	**Changed by**	**Nature of Amendment**
0	10/02/2017		
1	29/03/2017	N/R	Updated in response to comments made by N/R
2	05/05/2017		Updated in response to comments from N/R

PROJECT MANAGER ACCEPTANCE			
I agree that this report has been prepared based on the project scope at the time, and accept responsibility for ensuring any future changes to the scope are appropriately assessed.			
Name		**Signature**	
Position		**Date**	

***Note**: This Environmental Scoping Report shall remain current for 12 months. A review will be required after this time should further subsequent assessment or management actions not be undertaken.*

Table of Contents

EXECUTUVE SUMMARY

Overall the project has been assessed as having an environment and cultural heritage risk of MEDIUM.

☒ Medium Risk Projects

Further assessment is required for this project. A field assessment and/or survey of specific environment or heritage issue/s will be required during the pre-construction phase of the project. This document will form part of the Environmental Assessment Report. Appendix A – Future Actions & Cost details the further assessments and studies recommended as part of the project's environmental assessment and management.

Recommendations:

The potential environmental issues associated with this project and recommendations to mitigate (including need for further studies) are summarised below.

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
Water	Disturbance to the Mooloolah River	Two watercourses are 'yet to be determined' under the *Water Act 2000*. At the detailed planning stage, it will be necessary to review the current legislative framework to determine if these exemptions still apply and/or the value of seeking a determination from the relevant government department responsible for administering the provisions under the *Water Act 2000*. A site specific Erosion and Sediment Control Plan will be required in order to minimise impacts on the Mooloolah River, adjacent tributaries and large drainage areas. Investigation will be needed to, where possible, utilise the local supplies of water and/or recycled water to minimise the environmental impacts during construction.	NIL
Fish habitat	Potential disturbance to fish movement along	Design and construction of culvert and drainage works to minimise	If upgrade/maintenance or new culverts are required as part of the

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
	waterways	impacts to fish passage.	works, these should be designed in line with the self-assessable code WWBW01.
Wetlands	Direct impacts to the Mooloolah River National Park, which is also declared a nationally important wetland and a wetland of high ecological significance	Works to minimise impacts to wetlands.	NIL
Soil	Erosion and sediment control	Develop concept Erosion and Sediment Control Plan during detailed design.	NIL
Contaminated land	Potential disturbance of contaminated land	A search of the EMR and CLR to be completed for all freehold land parcels to be resumed.	Land listed on the EMR or CLR will require a Material Change of Use (MCU) approval for contaminated land management and disposal permit for removal of soil from site.
Acid Sulfate Soil (ASS)	Disturbance of Potential and Actual Acid Sulfate Soil	Detailed and site specific investigations will be required in high risk areas (below 5 m AHD) to determine locations of ASS and PASS.	An appropriate Acid Sulfate Soils Management Plan will be required in order to manage and treat any ASS identified.
Biodiversity (flora)	Likely clearing of native vegetation, including protected plants	Design to limit the extent of vegetation removal required to the greatest extent possible. Take all reasonable efforts to avoid impact; and, where avoidance is not possible, apply reasonable mitigation measures to minimise impacts. The Mooloolah River National Park has not been previously	A referral to the federal DoEE will be required where a self-assessment finds that the proposed project will have a significant impact on MNES. Should there be a requirement to clear threatened flora, a permit will be required from

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
		cleared and is vegetation that meets remnant status under the VM Act; therefore a protected plants survey will be necessary outside of the road reserve to determine whether threatened flora is required to be cleared.	DEHP and offsets for any significant residual impacts may be required under the *Environmental Offsets Act 2014*.
Biodiversity (fauna)	Potential clearing of fauna habitat	Design to limit the extent of vegetation removal required to the greatest extent possible. Comply with koala Memorandum of Agreement (MoA). Comply with Species Management Program for tampering with animal breeding places (low risk of impacts) 2016. Pre-clearance survey. Fauna spotter catcher required for clearing/construction.	If tampering with any animal breeding places or removal is required during the construction phase, it is the Contractor's responsibility to ensure activities are undertaken in accordance with either a Species Management Program for tampering with animal breeding places (low risk of impacts) or Species Management Program for tampering with animal breeding places (high risk of impacts) for threatened flora or fauna habitat. A referral to the federal DoEE will be required where a self-assessment finds that the proposed project will have a significant impact on MNES. If the criteria for exemption from payment of an offset as defined in section 5.3 of MoA cannot be met, make offset payment to DEHP for removal of koala

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
			habitat trees.
Biodiversity (pests)	Work in a weed affected area	Develop and implement Pest Management Plan.	NIL
Public amenity/ Health	Minimal air quality, noise quality and vibration impacts to sensitive receptors	It is recommended that future assessment stages consider whether there is a requirement to undertake a noise and vibration assessment in accordance with Volume 1 and Volume 2 of the Transport Noise Management Code of Practice. Develop and implement Noise and Vibration Management Plan.	NIL
Bushfire	Medium-high potential bushfire risk	A Bushfire Management Plan may need to be developed for the project.	NIL
Resource use and management	Waste management	Design to minimise construction and demolition waste, using principles of avoid, reduce, reuse and recycle.	NIL
Chemicals, dangerous goods and explosives	Some chemical storage is anticipated during construction	Disposal must be in accordance with local government advice.	A licence is required if conducting an 'environmentally relevant activity'. The construction of the network may include the environmentally relevant activity 8: Chemical storage.
Special areas and land tenures – State Forest	Direct impacts to the Mooloolah River National Park and the Mountain Creek Conservation Area	Design to limit the extent of vegetation removal required to the greatest extent possible.	These impacts will require consultation with the Department of Agriculture and Fisheries (DAF), Department of Natural Resources and Mines (DNRM) and the Department of National Parks, Sport and Racing (DNPSR). A Revocation

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
			Permit may be required. This has a potentially lengthy approval process (18-24 months) and should be initiated as soon as possible.

1 INTRODUCTION

1.1 Environmental Scoping Report Purpose

The purpose of the Environmental Scoping Report (ESR) is to make an early assessment of potential environmental impacts and opportunities associated with the proposed project. The intended outcome of the Scoping Report is to determine an overall environmental risk rating for the project and identify whether further environmental assessments are warranted as part of the pre-construction process. This information is used to inform the business case and subsequent detailed planning for the project. It is common for a period of time to pass between the Strategic Assessment for Service Requirement, Preliminary Evaluation and more detailed planning for the Business Case. Changes to legislation are frequent and therefore any subsequent detailed planning should consider the currency of the recommendations made within this scoping report. It may be necessary to conduct a follow up scoping assessment and environmental risk rating if the event substantial time has lapsed.

The overall environmental risk rating for the project is based on:

- existing environmental values,
- the scope of works and potential impacts from the works, and
- Legislative triggers likely associated with the works based on the legislation current at the time writing.

Further details of the risk rating process and classification are provided in the Environmental Processes Manual.

1.2 Project Purpose and Status

Significant growth in development and traffic are forecast for the Southern Sunshine Coast area with first stage completion of the Sunshine Coast Public University Hospital to be completed in April 2017 (and additional development planned between now and 2021). Additional development of the Kawana Town Centre, as well as Caloundra South development of 20,000 jobs and 50,000 residents further south over the next twenty years, will also impact development and traffic.

The existing road network is inadequate to support this growth and investment decisions need to be made to provide a balance of new links and existing network upgrades. With this forecast growth it is vital that these areas are connected via safe, efficient and sustainable transport links. In doing so this will support existing strategic networks to ensure adequate planning is conducted to identify appropriate future link upgrades and associated corridor preservation to meet future demand.

AECOM was commissioned by the Department of Transport and Main Roads (TMR) in late January 2016 to carry out the Palmview / Sippy Downs Integrated Link Strategy and Preliminary Options Analysis project. The purpose of the project is to undertake strategic transport planning to develop appropriate corridor link strategies and associated preliminary options analysis to:

- Identify and prioritise investment needs;
- Outline roles, functions, demand drivers, performance visions and priority needs for the link(s);
- Make recommendations for further investigations;
- Environmental Project Classification; and
- A breakdown of future environmental actions and costs.

1.3 Project Scope

Deliberation

The outputs from this ESR are:

- A summary of the environmental and heritage constraints;
- List of potential environmental and planning permits and approvals required; and
- Identification of any further environmental studies or fieldwork required (to be undertaken in future stages).

1.4 Project Location

The project location is shown in Appendix D, Figure 1.

1.5 Scoping Assessment Purpose and Methodology

The scoping environmental assessment was completed between January and May 2017. The scoping environmental assessment involved desktop environmental assessment and a field ecology survey of the project area.

A list of desktop databases searches and mapping layers assessed is provided in Appendix B – Assessment References. The scoping assessment involved the following elements and activities:

- Identify, describe and assess environmental advantages and disadvantages, and other constraints within the proposed area of works at reference design stage of Option 10.
- Undertake desktop assessment of environmental values, hazards and risks.

- Will provide, based on the identified risks associated with the project, a component classification.
- Preliminary identification of potential environmental and planning permits and approvals.
- Identify the need for and propose scope for additional environmental studies and investigations (to be undertaken in future stages).
- Provide relevant information to allow objective consideration of any adverse or beneficial impacts of the project and preliminary costing of environmental design features.
- Undertake an initial cultural heritage risk assessment based on desktop information.
- Undertake an ecological site assessment.
- Cover sufficient area to allow for potential road corridor including auxiliary road infrastructure (e.g. noise barriers, water quality detention basin), construction infrastructure (e.g. side-tracks, compounds, stockpile sites) and public utility plant (PUP) requirements.
- Completed by suitably qualified and experienced environmental personnel.
- Reporting will be undertaken in accordance with TMR's Environmental Process Manual 2013.

An ecological field assessment was undertaken on the 07 February 2017 and involved surveying vegetation and habitat along both sides of the SSMW, and providing observations and descriptions of the vegetation. Specifically, the ecological assessment has been undertaken to determine:

- Presence of fauna habitat and specifically, koala habitat;
- Presence of unmapped remnant vegetation; and
- Confirm the vegetation status and mapped regional ecosystems.

A targeted protected plants survey in accordance within the Department of Environment and Heritage Protection (DEHP) *Flora Survey Guidelines – Protected Plants* (DEHP, 2014) was not undertaken at this stage, due to the possibility of the impact area changing as the design progresses.

SCOPING ENVIRONMENTAL ASSESSMENT

WATER
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*
☒ Freshwater (Water Quality, Drainage, Groundwater, Sourcing Water, Interfering with Water) ☒ Marine and Coastal (Coastal, marine environment and waters and all non-freshwater)

Drainage Features and Yet to be Mapped

There are two watercourses on the northern side of the SSMW that may be impacted by the proposed works. One waterway runs parallel along the northern side of the SSMW (currently approximately 100 metres (m) to the road edge), and the other is located at the western side of the project (near the interchange at Dixon Road) and is currently crossed by the SSMW on-ramp. These are not currently mapped as either a watercourse or drainage feature under the *Water Act 2000* (Water Act). Determination as to whether these are watercourses, drainage lines, lakes or spring will need to be sought from the Department of Natural Resources and Mines (DNRM).

In addition to the Water Act, compliance must be also achieved with the *Fisheries Act 1994* (Fisheries Act). Both watercourses are classified as green 'low impact' waterways for waterway barrier works under the Fisheries Act (Appendix D, Figure 2).

Coastal

State Planning Policy (SPP) mapping indicates that the project is not within a Coastal Management District (CMD) or a storm tide inundation area (Appendix E).

Water Quality

The proposed SSMW upgrade project area falls within the Mooloolah River Catchment and Estuary, which covers 221 square kilometres (km^2). The Mooloolah Catchment waterways are considered to be in good health, based on the following indicators: the riparian vegetation in the upper reaches of the catchment is largely in good condition, there is no impact from sewage in the lower estuary, and the water looks clear in most sections of the estuary (Healthy Waterways, 2017). The Mooloolah River flows for about 70 kilometres (km) east to north-east, from the eastern slopes of the Blackall Range and discharges to the sea between Mooloolaba and Point Cartwright. Tributaries include Addington Creek, (dammed by the Ewen Maddock Dam), Sippy Creek, and Mountain Creek (Healthy Waterways, 2017).

Environmental values (EVs) and water quality objectives (WQOs) for these watercourses is established in the *Mooloolah River environmental values and water quality objectives*, under the provisions of the *Environmental Protection (Water) Policy 2009*, which is subordinate legislation under the *Environmental Protection Act 1994* (EP Act).

Groundwater

The nearest registered DNRM groundwater monitoring bore is RN127975, located approximately 500 m north of the interchange at Dixon Road (Appendix D, Figure 2).

Flooding

The project area consists of relatively simple landform patterns; and by and large it is dominated by a very low lying, flat flood plain. The project area is not susceptible to episodes of rapid flooding, as the Average Recurrence Interval (ARI) over 10 years is predicted at 0.001-0.2 m (Appendix D, Figure 4).

Impacts, Opportunities and Mitigation Measures

Water Quality

Overall, the SSMW upgrade project should be designed to minimise impacts to the Mooloolah River and stormwater drainage, including design and construction of culvert and drainage works. The Mooloolah River and its tributaries will not be directly impacted by the proposed work; however stormwater runoff from earthworks has the potential to create turbidity in receiving watercourses. There is also potential for spilled contaminants (e.g. blasting residue, paint, concrete, hydrocarbons, etc.) to discharge into the waterway via stormwater drainage systems. Urban development can lead to significant changes in catchment hydrology, with the most obvious effect being the increase in the magnitude of stormwater flow events in urban creeks and the consequential impact on flooding and public safety.

During construction, the emphasis should be on minimising impacts to water quality in surrounding watercourses. An appropriate and site specific Erosion and Sediment Control Plan (ESCP) will be required to minimise amounts of sediment-laden runoff entering surrounding watercourses.

Fish passage

The SSMW interchange at Dixon Road currently crosses a green 'low impact' waterway under the *Queensland Waterways for Waterway Barrier Works* mapping. The project will need to ensure the code for self-assessable development, *Minor waterway barrier works Part 3: culvert crossings* (WWBW01), is followed if an upgrade or replacement culvert is required at this crossing. If this code cannot be followed, a Development Approval for operational works under the *Sustainable Planning Act 2009* (SP Act) and Fisheries Act will be required.

Temporary waterway barrier works are likely to include construction and operation of a side track, sediment and erosion control and any bunding required. Compliance with the Fisheries Queensland code for self-assessable development WWBW02: Temporary waterway barrier works would be required.

Groundwater

If groundwater is encountered during earthworks, the excavation may have to be temporarily reinforced with shoring boxes or similar, to prevent void collapse. Additionally, excavations with infiltrating groundwater would have to be dewatered.

If required, extracted groundwater must not be discharge directly into adjacent watercourses. Instead an approach involving capture, testing and discharge or disposal will need to be adopted.

Flooding

There are no design requirements for the proposed works as the area is not susceptible to flooding.

Relevant Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	*Environmental Protection (Water) Policy 2009* *Environmental Protection Act 1994* *Fisheries Act 1994*

	Sustainable Planning Act 2009 *Water Act 2000* *Water Regulation 2016*
☒ Identified permits, codes or other requirements	Two watercourses located on the northern side of the SSMW are defined as 'yet to be mapped' under the Water Act; it is recommended a determination of the status of these watercourses is obtained by DNRM. Under State requirements, any proposed works that block or impede fish passage, whether temporarily or permanently, may require a Waterway Barrier Works Development Approval. The Development Approval is processed through the Integrated Development Assessment Provisions of the SP Act. Exemptions apply for works that can meet the requirements of waterway barrier works self-assessable codes. Taking of water is exempt for a construction authority if in line with the *Exemption requirements for constructing authorities for the taking of water without a water entitlement* under the *Water Regulation 2016.* In accordance with Main Roads Specification (MRS) 51 and Main Roads Technical Specification (MRTS) 51, best practice erosion and control strategies will need to be considered as part of an ESCP. No approvals are required under the EP Act. However, TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an environmentally relevant activity (ERA) and require associated approvals. A Construction Environmental Management Plan (EMP (C)) should be developed to guide the construction to demonstrate compliance with the general environmental duty.

SOIL / LAND MANAGEMENT	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*	
☒ Contaminated Land	☒ Soil
☒ Erosion and Sediment Control	☐ Landscape Architecture

Geology

Geology in the project area is summarised in the regional ecosystem (RE) mapping by DNRM. This mapping delineates one land zone within the project area: land zone 3. In geological terms, land zone 3 relates to 'Quaternary alluvial systems, including floodplains, alluvial plains, alluvial fans, terraces, levees, swamps, channels, closed depressions and fine textured palaeo-estuarine deposits' (Sattler & Williams, 1999).

Soils

The CSIRO's Atlas of Australian Soils shows one dominant soil unit in the project area – Cb36, which is a

podosol.

The dominant Principal Profile Form (PPF) within map unit Cb36 is Uc2.35. This is an acidic, uniformly coarse and deep soil type with high permeability and low nutrient content.

Contaminated land

Searches of the Queensland Government Contaminated Land Register (CLR) and the Environmental Management Register (EMR) have not been undertaken at this stage. Further assessment will be required to establish whether contaminated land is present within the project area, to assist in management and disposal of excavated soil.

Erosion

Erosion prone areas are parts of the coast considered at risk from coastal erosion or permanent inundation by the sea over a defined planning period. SPP mapping indicates that the project is not within an erosion prone area (Appendix E).

Acid sulfate soil

The Australian Soil Resource Information System (ASRIS) indicates that the project area has a rating of 'no known occurrence' of the incidence of acid sulfate soils (ASS) (Appendix D, Figure 3). Golder Associates (2008) confirmed the presence of Potential Acid Sulfate Soils (PASS) approximately 2 km south-east of the project site, generally below RL 0 to RL 0.5 m Australian Height Datum (AHD) or depths below existing ground level of 1 to 2 m.

Impacts, Opportunities and Mitigation Measures

Planning and Design

At the preliminary design stage, the following will be required:

- Detailed geotechnical assessment.
- Assessment of site conditions for dispersion and erosion. Management practices will need to be defined and implement based on the review of data collected.
- Development of a Concept ESCP.
- Stage 1 preliminary site investigation for contamination.
- Develop an acid sulfate soils management plan, should ASS be found.

Construction

During construction, the following must be addressed:

- Develop and implement the ESCP.
- Compliance with TMR Standards for Erosion and Sediment Control (MRTS52).
- If search results from the CLR and EMR are returned positive for contaminated land, where excavated soil will be required to be disposed of off-site it should be stockpiled and tested to determine whether it contains contaminated material. Any off-site disposal of contaminated soil should be avoided. Offsite removal of material will require a Contaminated Soil Disposal Permit.
- Should any land parcel be reconfigured as part of the approvals process and it is found to contain contaminated land, a Compliance Permit will be required under the SP Act.

Acid sulfate soils

Excavation and exposure of ASS within the project area could result in their oxidation and subsequent release of contaminants (sulphuric acid, iron and aluminium) which could harm the receiving environment. Detailed and site specific investigations will be required in high risk areas (below 5 m AHD) to determine locations of ASS and PASS. These investigations should be carried out as per the current Queensland Acid Sulfate Soils Investigation Team guidelines (Guidelines for the sampling and analysis of lowland acid sulphate soils in Queensland – October 1998). An appropriate and site specific ASS Management Plan should be developed to manage and treat any ASS appropriately.

Legislation – *identify any applicable permits, codes or other regulatory requirements*	
☒ Applicable legislation	*Environmental Protection Act 1994* Guidelines for the sampling and analysis of lowland acid sulphate soils in Queensland – October 1998 *Sustainable Planning Act 2009*
☒ Identified permits, codes or other requirements	ASS/PASS is managed in Queensland in accordance with the following best-practice guidelines: · Queensland acid sulfate soils technical manual: legislation and policy guide · Queensland acid sulfate soils technical manual: laboratory methods guidelines · Queensland acid sulfate soils technical manual: soil management guidelines · Guidelines for sampling and analysis of lowland acid sulfate soils Under the SP Act, a compliance permit is required for development requiring compliance assessment. A disposal permit is required to remove contaminated soil for treatment or disposal from land listed on the EMR or CLR. Soil disposal permits are issued for a specified duration and volume of soil. The permit may include conditions relating to the soil removal, transport and treatment and/or disposal process. Soil disposal permits cannot be amended. Therefore if the soil volume changes post approval, a new soil disposal permit is required. No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals.

BIODIVERSITY (Fauna, flora, ecosystems, wetlands, habitat and pests)	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*	
☒ Protected fauna	☒ Ecosystems and Habitats
☒ Protected flora	☒ Pest flora and fauna

Matter of National Environmental Significance

To identify Matters of National Environmental Significance (MNES) with potential to occur within or surrounding the project area, a desktop search was conducted using the Department of Environment and Energy (DoEE) Protected Matters Search Tool (PMST). The results of this search are presented in Appendix G. MNES are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and include the following:

- World heritage properties: none
- National heritage places: none
- Wetlands of international importance (Ramsar): 1
- Great Barrier Reef Marine Park: none
- Commonwealth marine areas: none
- Listed threatened ecological communities: 1
- Listed threatened species: 38
- Listed migratory species: 12

Other matters protected by the EPBC Act:

- Commonwealth land: none
- Commonwealth heritage places: none
- Listed marine species: 20
- Whales and other cetaceans: none
- Critical habitats: none
- Commonwealth reserves terrestrial: none
- Commonwealth reserves marine: none

Other factors that may be affected by the works:

- State and Territory reserves: 2
- Regional forest agreements: none
- Invasive species: 29
- Nationally important wetlands: 1
- Key Ecological Features (Marine): none

MNES that may be affected by the proposed SSMW upgrade project:

Wetlands of international importance (Ramsar)

The Moreton Bay Ramsar Wetland is approximately 10 km south of the project area. The site supports more than 50,000 migratory waders during their non-breeding season. At least 43 species of wading birds use the intertidal habitats, including 30 migratory species listed on international conservation agreements (DoEE, 2016). Provided that appropriate erosion and sediment control measures are in place during construction, this Ramsar site is unlikely to be impacted upon by the proposed works.

Listed threatened species

Fauna

The PMST search identified 10 listed bird species, 2 frog species, 7 mammal species and 3 reptile species that are known to or are likely to occur within 3 km of the project area.

A likelihood assessment (Appendix F) has determined that it is 'possible' that three of these species may exist within the project area:

- Koala (*Phascolarctos cinereus*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*);
- Water mouse (*Xeromys myoides).*

The likelihood assessment also determined that two of these species are 'known' to exist in the project area:

- Wallum Sedge Frog (*Litoria olongburensis*); and
- Giant Barred Frog (*Mixophyes iterates*).

Flora

The PMST search identified 16 flora species that are known to or are likely to occur within 3 km of the project area.

A likelihood assessment (Appendix F) has determined that it is 'possible' that three of these species may exist within the project area:

- Swamp Stringybark (*Eucalyptus conglomerate*);
- Lesser Swamp-orchid (*Phaius australis*); and
- Wallum Leek-orchid (*Prasophyllum wallum*).

The likelihood assessment also determined that two of these species are 'known' to exist in the project area:

- *Acacia attenuata*; and
- Emu Mountain Sheoak (*Allocasuarina emuina*).

Listed threatened ecological communities

The EPBC Act PMST search identified one listed threatened ecological community (TEC) as likely to occur within 3 km of the project area (Appendix D, Figure 5):

- *Lowland Rainforest of Subtropical Australia*

The regional ecosystems (REs) that represent the TEC *Lowland Rainforest of Subtropical Australia* are: 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, 12.12.16. None of these REs are identified on the *Vegetation Management Act 1999* (VM Act) mapping throughout the project area, and the

results of the field survey confirmed that there are no TECs within the project area.

Listed migratory species

Twelve listed migratory species were returned from the PMST report with potential to occur within a 3 km radius of the project area: one migratory marine bird, six migratory terrestrial species and five migratory wetland species.

A likelihood assessment (Appendix F) has determined that five of these species are 'known' to exist in the project area:

- White-throated Needletail (*Hirundapus caudacutus*);
- Black-faced Monarch (*Monarcha melanopsis*);
- Spectacled Monarch (*Monarcha trivirgatus*);
- Rufous Fantail (*Rhipidura rufifrons*); and
- Latham's Snipe (*Gallinago hardwickii*).

Other information:

Wetlands

A significant proportion of the project area is located within the Mooloolah River Wetlands, which are recognised as nationally important under the Directory of Important Wetlands in Australia database, and as a wetland of high ecological significance under the *Environment Protection Regulation 2008* (EP Regulation) (Appendix D, Figure 7). These designations include the Mooloolah River, Sippy Creek and the Mooloolah River National Park (adjacent to both the north and south side of the SSMW). The wetlands are tributaries, floodplain, coastal swamps and inlets and estuaries. Flows from these wetlands combine in very large flood events to form an expanse of eastward flowing water.

High impact earthworks can damage wetlands and the habitats around them by:

- changing the hydrological regime by altering water levels and environmental flows;
- removing vegetation and fauna habitat, and reducing ecological integrity;
- facilitating the introduction of pest animals and plants;
- introducing pollutants; and
- accelerating soil erosion and sediment run-off.

State and Territory reserves

Two Conservation Parks are located within 3 km of the project area, including the Mountain Creek Conservation Area, located directly adjacent to the Mooloolah River National Park on the northern side of the SSMW. The Mooloolah River National Park (located adjacent to both sides of the SSMW: Appendix D, Figure 7) is a nationally protected area and is managed by the Queensland Parks and Wildlife Service (QPWS) under the *Nature Conservation Act 1992* (NC Act).

The Mooloolah River National Park Management Plan recognises that the national park contains 'one of the few substantial areas of mainland heath remaining between Noosa and the Queensland/New South Wales border' (QPWS, 1999).

Pest species

The EPBC Act PMST identified 19 invasive fauna species and 10 invasive flora species that are considered likely to occur within the project area. Of these, 8 are considered feral animals and all invasive flora species are Weeds of National Significance (WoNS).

Whole of the environment: This section discusses the existing flora and fauna values as they relate to State-listed flora and fauna species and vegetation communities.

Matters of State Environmental Significance

Matters of State Environmental Significance (MSES) within and surrounding the project area are:

- The Mooloolah River National Park and the Mountain Creek Conservation Area are classed as 'protected areas', 'wildlife habitat', 'regulated vegetation' and 'high ecological significance wetlands';
- The vegetation along the waterways that run on the northern side of the SSMW are classed as 'regulated vegetation intersecting a watercourse';
- 'Of concern' RE 12.3.14a; and
- Essential habitat.

Threatened fauna

In addition to the MNES listed threatened fauna species, results from the Wildlife Online (results presented in Appendix G) and Atlas of Living Australia (ALA) searches have indicated that six fauna species listed under the NC Act have been sighted and recorded within 3 km of the project area:

- Glossy black-cockatoo (eastern) (*Calyptorhynchus lathami lathami*);
- Rainbow bee-eater (*Merops ornatus*);
- Eastern osprey (*Pandion cristatus*);
- Ground parrot (*Pezoporus wallicus wallicus*); and
- Wallum froglet (*Crinia tinnula*).

Three endangered, vulnerable or near threatened (EVNT) frog species have been identified on previous assessments of the wider project area (WorleyParsons, 2010). These include the Wallum Froglet (*Crinia tinnula*), Wallum Rocketfrog (*Litoria freycineti*) and the Wallum Sedgefrog (*Litoria olongburensis*). These species were not directly observed during the field assessments; however suitable habitat was observed.

Koala

The koala is listed as 'Vulnerable' under the EPBC Act and the NC Act. There are three recorded Koala sightings (within 3 km) of the alignment since 1980. The area is mapped as a combination of 'low and medium value bushland' habitat and 'low value rehabilitation' habitat for koala and is within the South East Queensland Koala Protection Area (SEQKPA) (Appendix D, Figure 8). It is possible that koala might occur in this area, given the historical sightings. Non-juvenile koala habitat trees were identified in the project area during the field survey. Historically, populations of koala were known to move between the Mooloolah River / Palmview floodplain, the Mooloolah River National Park and north into the Buderim escarpment (Eco 9 Pty Ltd, 2011).

Threatened flora

In addition to the MNES listed threatened flora species, results from the Wildlife Online (results presented in Appendix G) and ALA searches have indicated that five flora species listed under the NC Act have been

sighted and recorded within 3 km of the project area:

- Tiny wattle (*Acacia baueri* subsp. *Bauera*);
- Christmas bells (*Blandfordia grandiflora*);
- Wide Bay boronia (*Boronia rivularis*);
- *Caustis blakei*; and
- *Parsonsia largiflorens.*

The north and south of the project area are dominated by the Mooloolah River National Park (Appendix D, Figure 7).

The project area is mapped as a 'high risk' area on the NC Act protected plants flora survey trigger map (Appendix D, Figure 6). No threatened flora species were recorded during the course of the ecological field survey. However, a targeted protected plants survey in accordance within the *Flora Survey Guidelines – Protected Plants* (DEHP, 2014) was not undertaken at this stage (due to limited access to the site and the possibility of the extent of impact area to change as the design progresses). Prior to clearing, this survey must be undertaken to determine the presence/absence of threatened flora species, confirm fauna habitat values and inform mitigation and management requirements (if required).

Remnant vegetation and essential habitat

The entire Mooloolah River National Park (both north and south side) is classified as Category B: remnant vegetation on the regulated vegetation management map.

Essential habitat, for protected wildlife, means a Category A area, a Category B area or Category C area shown on the regulated vegetation management map:

- that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or
- in which the protected wildlife, at any stage of its life cycle, is located.

The section of the Mooloolah River National Park that lies adjacent to both the northern and southern side of the SSMW contains essential habitat under the NC Act for the Wallum Rocketfrog (V), Wallum Froglet (V), Wallum Sedgefrog (V), and the Ground Parrot (V) (Appendix D, Figure 5).

Vegetation communities

Mapped remnant vegetation types within the Mooloolah River National Park (Appendix D, Figure 5) include:

- 12.3.5: *Melaleuca quinquenervia* open forest on coastal alluvium (least concern);
- 12.3.13: Closed heathland on seasonally waterlogged alluvial plains usually near coast (least concern); and
- 12.3.14a: *Eucalyptus racemosa* woodland to open-forest (of concern).

The ecological field survey confirmed that the regulated remnant vegetation mapping for the most part corresponds to the on-ground vegetation observed. A small area of what appears to be remnant vegetation of the RE 12.3.14a occurs on the northern side of the SSMW (between the SSMW and the cleared dirt road adjacent to the Mooloolah River National Park), which is not currently mapped. In addition, a patch of mapped RE 12.3.5 on the south western edge of the site is incorrectly mapped and is in fact RE 11.3.14a.

The existing road reserve is highly modified and disturbed comprising previously cleared native vegetation and landscape vegetation. However, the remnant vegetation on both sides of the SSMW is in excellent condition and could potentially provide habitat for a wide range of flora and fauna species, some being threatened species. Such species include wallum dependent frogs (i.e. acid frogs), priority flora (*Acacia baueri* subsp. *Bauera*, *Blandfordia grandiflora, Boronia rivularis, Caustis blakei, Parsonsia largiflorens*), Glossy black cockatoo, Koala etc. Kangaroos, black swans and migratory birds including cattle egrets have also been observed across the wider project area in previous ecological assessments (ARUP, 2011). The RE 12.3.14a contains many large mature eucalypt species including *Eucalyptus racemosa* and *Corymbia intermedia* which contain hollows and could provide animal breeding places. The significance of the wetlands as habitat for EPBC Act listed species such as the wallum sedge frog (*Litoria olongburensis*) would require further investigation.

Impacts, Opportunities and Mitigation Measures

Impacts on MNES

The EPBC Act is a federally administered act which provides protection to MNES. Self-assessment using the DoEE *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* needs to be undertaken for the project at the Business Case phase, to establish the likelihood of the project significantly impacting on MNES. Anyone wanting to undertake an action that may have a significant impact on a MNES is required to submit a referral to the federal DoEE. DoEE then makes a decision as to whether the project is deemed a 'controlled' or 'non-controlled' action. Where a project is deemed to be a 'controlled action', further assessment and approval under the EPBC Act is required.

Further site investigations should be undertaken to determine the presence or absence of flora and fauna species protected under the EPBC Act considered likely to be present within the project area. The results of the field survey confirmed that there are no TECs within the project area. It is not known at this stage whether an EPBC referral is likely. Offset requirements under the EPBC Act are detailed below: Possible Environmental Offsets, and in Section 2.1.

Impacts on MSES

The current concept design footprint indicates that the edge of the Mooloolah River National Park would need to be cleared as part of the project, as well as part of the 'of concern' RE 12.3.14a, the 'least concern' RE 12.3.5, essential habitat and wetlands of high ecological significance under the EP Regulation. Under the SP Act, operational works that is high impact earthworks in a wetland protection area is self-assessable and does not required approval.

The Department of State Development, Infrastructure and Planning (DSIP) Significant Residual Impact Guideline should be used to assist in determining whether or not a prescribed activity (assessable under SP Act) will, or is likely to have a significant residual impact on a MSES.

An environmental offset condition may be imposed under various State assessment frameworks (such as the SP Act and EP Act for an activity prescribed under the *Environmental Offsets Act 2014* (EO Act)), if the activity will, or is likely to have a significant residual impact on a prescribed environmental matter that is a MSES.

Impacts on Animal breeding places protected under the NC Act

For any proposed activity that will impact on breeding places of protected animals (Endangered, Vulnerable, Near Threatened, special least concern, colonial breeder or least concern), a species management program

will be required. The process for determining when an approved species management program is required is to:

1. Undertake desktop assessment to determine what species of fauna may be on site.
2. Undertake field fauna survey to determine animal breeding places.
3. Dependent on the field survey results, the proponent may be required to prepare either:

- Species Management Program for tampering with animal breeding places (low risk of impacts); or
- Species Management Program for tampering with animal breeding places (high risk of impacts); or
- The person removing or tampering with the breeding place holds a damage mitigation permit for the species identified and the permit authorises the removal or tampering.

It is anticipated that a Species Management Program for tampering with animal breeding places (high risk of impacts) will be required for, as a minimum, the Wallum Froglet, Wallum Rocketfrog and Wallum Sedgefrog. Further Species Management Programs may be required to manage impacts on animal breeding places for least concern fauna. Adequate resources should be set aside to support the detailed ecological survey and preparation of Species Management Plan(s) (SMPs). Specific survey requirements apply approval for the SMPs must be obtained from DEHP.

Impacts to protected plants under the NC Act

The TMR DEHP approved Compliance Management Plan (CMP) (03 December 2016) allows clearing where there is evidence vegetation was previously cleared using the Protected Plant Exemption issued under section 89 of the NC Act and section 41 (1) (a) (ii) of the Nature Conservation (Protected Plants) Conservation Plan issued by DEHP in May 2013 (note: this exemption applies to the taking of protected plants up until, and including, 31 March 2018). As works will extend into remnant vegetation that may not have been previously cleared and the Protected Plant Exemption cannot be applied, a targeted protected plants survey must be undertaken to determine the presence/absence of EVNT flora species, confirm fauna habitat values and inform mitigation and management requirements (if required). The flora survey and reporting must be undertaken in accordance with the NC Act flora survey guidelines.

Koala

Impacts on koala and koala habitat must be assessed under both Commonwealth and Queensland statutory provisions, therefore the EPBC Act impact assessment process as previously described will apply to koala. Further under the State Government Supported Community Infrastructure koala Conservation Policy (July 2014), the planning of this project must undertake a self-assessment and ensure the planning, design and construction of the community infrastructure in the SEQKPA is carried out in a way that reduces adverse impacts on koala. This is achieved through compliance with the Community Infrastructure Assessment Criteria.

The Community Infrastructure Assessment Criteria apply to any koala habitat value type within the SEQKPA as shown on the SPP koala habitat maps. The alignment occurs in areas mapped as a combination of 'low and medium value bushland' habitat and 'low value rehabilitation' habitat for koala (Appendix D, Figure 8), and therefore the project must comply with the following design and construction criteria:

<u>Design</u>

- Site design must avoid clearing non-juvenile koala habitat trees in the identified areas of bushland habitat. Impacts to low-value rehabilitation habitat do not trigger mandatory mitigation; however TMR

may consider including these areas in impact mitigation strategies.

- Any unavoidable clearing in the areas of bushland habitat must be minimised and offset. The size and other characteristics of the offset must be as required by the *Environmental Offset Policy 2016*.
- Site design must provide safe koala-movement opportunities, including koala movement infrastructure, as appropriate to the development type and habitat connectivity values to the site.
- Landscape activities must provide food, shelter and movement opportunities for koalas consistent with the site design.

Additional Investigation

- It will be necessary to survey and provide evidence for the number of non-juvenile koala habitat trees that will be cleared for the project, as part of determining the offset requirement. Record keeping and reporting will need to be a mandatory requirement of the construction contract to comply with the community infrastructure koala policy and may be subject to audit by DEHP.

Construction

- Native vegetation clearing must be undertaken as sequential clearing and under the guidance of a koala spotter where the native vegetation is non-juvenile koala trees.
- During construction, measures must be taken in construction practices not to increase the risk of death or injury to koala, and native vegetation that is cleared, or intended to be retained for koala movement opportunities is progressively restored and rehabilitated.

Vegetation communities

Future works associated with the project may necessitate removal of some native vegetation. Removal of mapped RE should be minimised where possible. The current design footprint indicates that 450 m of the 'of concern' RE 12.3.14a and 570 m of the 'least concern' RE 12.3.5 would need to be cleared as part of the proposed works. Where removal of REs cannot be avoided, TMR is exempt from requiring permits and offsets as the project is considered 'community infrastructure' (under Schedule 2 of the *Sustainable Planning Regulation 2009* (SP Regulation)) which is made exempt from assessment under Schedule 24, Section 16 of the SP Regulation.

The biodiversity planning assessments map indicates that the project site is outside the State and local ecological corridor (Appendix D, Figure 9).

Pest species

Construction and operation of the upgraded SSMW has the potential to introduce biosecurity risks. Under the *Biosecurity Act 2014,* individuals and organisations have a general biosecurity obligation to manage biosecurity risks, by taking all reasonable and practical steps to prevent or minimise each biosecurity risk. During detailed planning, it will be necessary to conduct a biosecurity risk assessment on likely activities, potential for harm and identify reasonable management methods to control each risk. This should include arrangements for treating pests, diseases, contaminants and carriers, restrictions on moving material into / outside a biosecurity zone and a mandatory code of practice for reducing the risk.

Legislation – *identify any applicable permits, codes or other regulatory requirements*	
☒ Applicable legislation	2/10 Koala Conservation State Planning Policy (SPP) *Biosecurity Act 2014*

	DEHP Flora Survey Guidelines – Protected Plants DoEE *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* DSIP Significant Residual Impact Guideline *Environment Protection and Biodiversity Conservation Act 1999* *Environment Protection Regulation 2008* *Environmental Offset Act 2014* *Environmental Offset Policy 2016* *Environmental Protection Act 1994* *Nature Conservation Act 1992* *Nature Conservation (Wildlife Management) Regulation 2006* SEQ Koala Conservation State Planning Regulatory Provisions (SPRP) *State Government Supported Community Infrastructure – Koala Conservation Policy July 2014* *State Planning Policy* *Sustainable Planning Act 2009* *Sustainable Planning Regulation 2009* *Transport Infrastructure Act 1994* *Vegetation Management Act 1999* *Water Act 2000*
☒ Identified permits, codes or other requirements	A referral to the federal DoEE will be required where a self-assessment finds that the proposed project will have a significant impact on MNES. Self-assessment should be carried out as the project enters the Business Case phase. The *Environmental Offsets Policy 2016* applies where there will be significant residual impacts on MSES. Under the State Government Supported Community Infrastructure Koala Conservation Policy, compliance must be achieved with Table 1, Column 2 of the Community Infrastructure Assessment Criteria. Dependent on the field survey results, the proponent may be required to prepare either: · Species Management Program for tampering with animal breeding places (low risk of impacts); or · Species Management Program for tampering with animal breeding places (high risk of impacts); or · The person removing or tampering with the breeding place holds a

	damage mitigation permit for the species identified and the permit authorises the removal or tampering. TMR's Compliance Management Plan (CMP) for clearing of previously cleared areas for transport infrastructure, dated 03 December 2016 (expiring 04 December 2018); states that exempt clearing does not require surveys for clearing in high-risk areas or clearing permits to take protected plants under the NC Act within a Protected Plant Exemption. A targeted protected plants survey of the clearing impact area must be undertaken prior to any potential clearing within remnant areas outside of the road reserve. Should there be a requirement to clear threatened flora, a clearing permit will be required from DEHP and offsets for any significant residual impacts may be required under the EO Act. No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals. TMR are able to operate under the following exemptions: · Schedule 24, Part 1, Section 16 of the SP Regulation provides exemption for the Clearing of Vegetation for Community Infrastructure; and · TMR Compliance Management Plan (CMP) for clearing of previously cleared areas for transport infrastructure.

CULTURAL HERITAGE	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*	
☒ Indigenous heritage	☒ Natural Heritage
☒ Historical heritage	

Indigenous heritage

There is one DATSIP site – Scarred Tree (KC:B75) – within or directly adjacent to the western most extent of the works. However, an inspection of this tree suggests that the marks are unlikely to be the result of Aboriginal cultural practice.

Much of the project area has been previously cleared, causing significant ground disturbance. However, there are two sections of road that appear to be outside of the current SSMW footprint. Works in these areas have been assessed as activities that pose the highest risk of harming Aboriginal Cultural Heritage (Category 5) under the Duty of Care Guidelines.

The remainder of the alignment is previously cleared and has been assessed as activities in an area subject to significant ground disturbance (Category 3 and 4) under the Duty of Care Guidelines (Appendix H: Cultural Heritage Risk Assessment).

Native Title

Native Title: Aboriginal and Torres Strait Islander owned land and identified interests (including areas in which a claim under the *Native Title Act* has been registered by the National Native Title Tribunal). Legislation provides Native Title claimants an opportunity to comment on construction over waterways and Trustee Reserves. Generally, Native Title is extinguished over freehold land; however the TMR Project Manager should investigate the process to determine native title requirements, if any.

QLD heritage

There are no QLD heritage places within or near the project area.

World heritage

There are no World heritage places within or near the project area.

Impacts, Opportunities and Mitigation Measures

Indigenous heritage

Category 5 activities should not proceed without further Cultural Heritage Assessment and consultation with the Aboriginal Party/ies. Further detail is provided in Appendix H: Cultural Heritage Risk Assessment.

Native title

The proposed works will, for the most part, be confined to the existing road reserve. TMR will manage any provisions under the *Native Title (Queensland) Act 1993* internally.

Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984* *Aboriginal Cultural Heritage Act 2003* *Native Title (Queensland) Act 1993* *Native Title Act 1993* *Queensland Heritage Act 1992*
☒ Identified permits, codes or other requirements	Management requirements under the ACHA 2003 Duty of Care Guidelines will be determined in consultation with the Aboriginal Party/ies. Under the Queensland Government native title work procedures, TMR must complete a native title assessment, prior to the commencement of all of its land / resource dealings. A native title assessment will need to be undertaken prior to construction to determine if native title interests impact waterway crossings under USL tenure. Native title notification requirements under section 24KA of the NT Act may apply.

PUBLIC AMENITY / HEALTH	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint or associated with the project*	
☒ Air	☒ Vibration
☒ Noise	☐ Fire and Burning
Air, noise and vibration Land use adjacent to the project is National Park; therefore no sensitive receptors are expected to be impacted by the works. Minimal air quality, noise and vibration impacts are likely to result from construction activities (clearing vegetation, ground disturbance and vehicle movements) and operation of the road corridor. **Bushfire** The Mooloolah River National Park (both north and south of the SSMW) and the Mountain Creek Conservation Area are mapped as having 'medium, high and very high potential bushfire intensity' on the SPP mapping tool (Appendix D, Figure 10).	
Impacts, Opportunities and Mitigation Measures	
Air, noise, vibration Construction activities such as excavation, earthmoving and heavy vehicle movements are expected to generate noise and vibration during construction. Control of noise and vibration from construction of transport projects can be effectively managed through implementation of a Noise and Vibration Management Plan, including early community consultation, incident response and corrective actions processes. It is recommended that future assessment consider whether a noise and vibration assessment is required in accordance with Volume 1 and Volume 2 of the Transport Noise Management Code of Practice. **Bushfire** Given that the project is located in areas identified as at potential risk from bushfire hazards, this will be a consideration for construction and operation of the project. A Bushfire Management Plan may need to be developed for the project, specifying appropriate clearance distances, and emergency service access requirements during construction. Construction activities do have the potential to temporarily increase the risk of bushfires; however this is considered a low risk. No burning off of cleared vegetation would be permitted as part of construction activities.	
Legislation – *identify any applicable permits, codes or other regulatory requirements*	
☒ Applicable legislation	*Environmental Protection (Air) Policy 2008* *Environmental Protection (Noise) Policy 2008* *Environmental Protection Act 1994* *Local Government Act 2009*
☒ Identified permits, codes or other requirements	Transport Noise Management Code of Practice Volume 1: Road Traffic Noise. Transport Noise Management Code of Practice Volume 2: Construction Noise

	and Vibration. No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals.

RESOURCE USE AND MANAGEMENT
Resources Identification – *Resources potentially used or impacted upon by the project*
☒ Waste ☐ Material Extraction and Use ☒ Chemicals, Dangerous Goods and Explosives
Waste Project waste streams likely to be generated include general solid waste from construction workforce and packaging materials, greenwaste, construction and demolition (inert) materials such as pavement, reinforcing and pipe. Energy (fuel) and water supplies will be consumed during construction activities. **Chemicals, Dangerous Goods and Explosives** Some minor chemical storage is anticipated during construction. UXO Unexploded ordnance (UXO) is ammunition such as artillery shells, mortar bombs and grenades that did not explode when used. UXO is a potential safety risk because it may detonate if disturbed. It may also release chemicals that pose a risk to human health and the environment. Most of the project area is in an area that the Department of Defence (Defence) has assessed as "having no potential for residual UXO" (Appendix D, Figure 10). However, lot plan 1/SP149815 (located at the fork between the SSMW and Kawana Way) is mapped as "having 'other' potential for residual UXO" (Appendix D, Figure 10). Areas categorised as 'other' are those where Defence records confirm that the area was used for military training but do not confirm that the site was used for live firing. UXO or explosive ordnance fragments / components have not been recovered from the site. Defence opinion is that it would be inappropriate to assess as either slight or substantial.
Impacts, Opportunities and Mitigation Measures
Waste The project should be designed to minimise construction and demolition waste using principles of avoid, reduce, reuse and recycle. A Waste Management Plan will need to be submitted as part of the EMP (C). Site design should provide for waste segregation and storage for appropriate recycling, treatment or disposal. The requirements of the Waste Management Plan will be implemented for the duration of construction works. Where possible, consideration should be given to using energy efficient equipment, renewable resources and other recycling initiatives to minimise the environmental impacts during construction activities. These should be investigated during later phases of the project management and implemented through detailed design,

contract documents and through an appropriate Environmental Management Plan.

Chemicals, Dangerous Goods and Explosives

Measures must be in place to ensure prevention of spill of oils or other chemicals entering the waterway. In the event that the spill occurs in the waterway, contain and clean up the spills in accordance with the EMP (C).

Schedule 1 of EP Regulation lists all ERAs, their aggregate environmental score and thresholds. The construction of the network may include the ERA 8: Chemical storage. The construction contractor is required to obtain a licence if conducting an ERA and will be the responsibility of the Construction contractor.

UXO

It is unlikely that UXO will be encountered during the works. If any UXO are encountered, Defence should be informed and the UXO removed by specialist personnel.

Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	*AS 1940-2004 The storage and handling of flammable and combustible liquids* *Dangerous Goods Safety Management Act 2001* *Environmental Protection Act 1994* *Environmental Protection Regulation 2008* *Sustainable Planning Act 2009* *Waste Reduction and Recycling Act 2011*
☒ Identified permits, codes or other requirements	No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals.

SPECIAL AREAS AND LAND TENURES

Resources Identification – *Special areas and land tenures potentially impacted upon by the project*

☐ Indigenous Land Tenures ☒ Forestry Land

☐ Commonwealth Land

Commonwealth Land

There is no Commonwealth Land within or adjacent to the project area.

Forestry Land

Although the Mooloolah River National Park is declared a 'national park', this park is protected under the NC Act.

The Mountain Creek Conservation Area is a State Forest and is location adjacent to the Mooloolah River National Park, on the north side of the SSMW.

Impacts, Opportunities and Mitigation Measures	
Forestry Land Direct impacts to the Mountain Creek Conservation Area and the Mooloolah River National Park should be minimised.	
Legislation – *identify any applicable permits, codes or other regulatory requirements*	
☒ Applicable legislation	*Forestry Act 1959* *Nature Conservation Act 1992*
☒ Identified permits, codes or other requirements	The ability to revoke part of the Mooloolah River National Park must be approved by the Governor in Council (under Section 32 of the NC Act). As the revocation has to be undertaken in parliament, there is no mandated timeframes for approval/refusal. Converting the tenure of land within the Mountain Creek Conservation Area for the project will require the revocation of the State Forest declarations under the section 26 of the *Forestry Act 1959* (Forestry Act). In the event that project works are to be undertaken within the State forests land prior to the transfer of tenure to a State-controlled road corridor, an authority would be required under section 39 of the Forestry Act for interference with forest products within a State forest. Under the Queensland Government's administrative arrangements, the Forestry Act is jointly administered in part by the Department of National Parks, Recreation, Sport and Racing (DNPRSR) and the Department of Agriculture and Fisheries (DAF). Revocations of State Forest by the above state agencies may be considered where it can be demonstrated that there are no feasible alternatives, that it is in the public interest and that there will be no net loss for nature conservation. TMR will need to commence negotiations with DNPRSR (Queensland Parks and Wildlife Service Operations Manager and/or the Regional Manager) and DAF. Issues which will need to be negotiated and resolved as part of the revocation process include: · Written agreement to an offset package as compensation for loss of land from the state forest; · Written confirmation that Native Title issues in relation to the area/s to be revoked have been, or are in the process of being, addressed and resolved; · Provision of an initial accurate sketch of the area sought for revocation, and the compensatory land, for inclusion with the request for Ministerial approval in principle; and · Written agreement that TMR will bear all costs in the matter (i.e. survey, native title negotiations).

	Once these issues have been resolved, and in principle support has been gained from the Minister, Cabinet approval to table the proposal in the Legislative Assembly must be obtained. The proposal for revocation will then need to be debated by the Minister, and if successful, amended subordinate legislation will need to be drafted and the gazettal of the revocation will need to be finalised. The revocation process can take up to 12 months to reach gazettal.

OTHER ACTIVITY REQUIREMENTS	
Factors Identification – *Other legislative relevant activities potentially associated with the project*	
☐ Other activity requirements[1]	
NIL	
Impacts, Opportunities and Mitigation Measures	
NIL	
Legislation – *identify any applicable permits, codes or other regulatory requirements*	
☐ Applicable legislation	None identified
☐ Identified permits, codes or other requirements	None identified

[1] Identify what other activities the project may be involved in, that trigger permit or compliance requirements.

POSSIBLE ENVIRONMENTAL OFFSETS

Commonwealth Environmental Offsets

☒ There are EPBC Protected Matter/s potentially or likely to be impacted – koala habitat, threatened species

Could there be a significant impact on the matter? ☐ Unlikely ☒ Possible ☐ Likely

In its current form, the project is not expected to result in a significant impact on the vulnerable koala as the koala habitat is not considered critical to the survival of the koala and will not introduce or exacerbate key threats to the species. As there is known koala habitat within the project site, a significant impact assessment in accordance with the EPBC Act referral guidelines for the vulnerable koala may be required. Should there be loss of critical koala habitat that constitutes a significant impact, referral may be required. If deemed a controlled action offsets may be required for residual impacts.

A self-assessment using the DoEE *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* will be required at the Business Case phase, to determine whether the project will have a significant impact on MNES. Anyone wanting to undertake an action that may have a significant impact on a MNES is required to submit a referral to the federal DoEE (for a cost of $6,577). DoEE then makes a decision as to whether the project is deemed a 'controlled' or 'non-controlled' action.

Impacts on listed threatened species are considered the greatest risk of triggering an environmental assessment under the EPBC Act. As noted above in the Scoping Assessment, results of the field survey confirmed that there are no threatened ecological communities within the project area.

If significant impacts are considered likely, and the action is deemed to be a controlled action, then the referral will proceed to the next stages of the process - environmental assessment and approval. If the project is declared to be a controlled action, offsets may be required for any residual impacts on MNES that cannot be avoided or mitigated. Residual impacts area those that remain after avoidance and mitigation measures have been implemented.

Offsets may be in the form of direct offsets or other compensatory measures, however direct offsets must make up 90% of the total offset package. Direct offsets must result in a net biodiversity gain for the impacted MNES and may include enhancing habitat, creating new habitat, reducing threats or averting loss of an MNES or its habitat. Other compensatory measures include research, educational programs or other relevant actions that are described in an approved recovery plan for the impacted MNES.

Queensland Environmental Offsets

☐ Prescribed Activity

☒ Matter of State Environmental Significance impacted by Prescribed Activity – protected fauna, protected plants, waterway providing fish passage, regulated vegetation intersecting a watercourse

Could there be a significant residual impact on the matter? ☐ Unlikely ☒ Possible ☐ Likely

The project area is mapped as a high risk area on the flora survey trigger map (100% of the project area) and non-juvenile koala habitat trees are located in an area shown as bushland habitat or low-medium rehabilitation habitat on State koala habitat mapping.

Under the TMR Koala Memorandum of Agreement (MoA) and the *State Government Supported Community Infrastructure Koala Conservation Policy 2014*, offsets will be required where there is clearing of vegetation; extraction of material; and/or excavating and filling in koala habitat (under the SPP koala habitat values) that

exceed the nominated criteria.

A targeted protected plants survey will be required to determine whether EVNT flora species are found within areas of remnant vegetation outside of an area under a Protected Plant Exemption. Should there be a requirement to clear threatened flora in the remnant vegetation, a clearing permit will be required from DEHP and offsets for any significant residual impacts may be required under the EO Act. If the survey does not detect any EVNT plants in the clearing impact area or the impacts on EVNT plants can be avoided (i.e. clearing will not take place within 100 m of the EVNT plants), a clearing permit is not required but an exempt clearing notification must be submitted to DEHP within one year of the survey being undertaken and at least one week prior to the clearing commencing. If the flora survey report is satisfactory, DEHP will provide a receipt acknowledging submission of the exempt clearing notification and clearing can commence.

The Department of State Development, Infrastructure and Planning (DSIP) Significant Residual Impact Guideline should be used to assist in determining whether or not a prescribed activity (assessable under SP Act) will, or is likely to have a significant residual impact on a MSES.

An environmental offset condition may be imposed under various State assessment frameworks (such as the SP Act and EP Act for an activity prescribed under the EO Act), if the project will, or is likely to have a significant residual impact on a prescribed environmental matter that is a MSES.

2 SUMMARY OF LEGISLATIVE REQUIREMENTS

2.1 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* (EPBC Act) is a federally administered act which provides protection to matters of national environmental significance (MNES).

As part of the additional environmental assessment for the project at a later project stage, an initial 'self-assessment' should be undertaken to determine whether the project is likely to have a significant impact on MNES. Anyone wanting to undertake an action that may have a significant impact on a MNES is required to submit a referral to the federal Department of Environment and Energy (DoEE). DoEE then makes a decision as to whether the project is deemed a 'controlled' or 'non-controlled' action. Note that referral of the project under EPBC may have significant time and cost implications for the project, particularly if the project is deemed to be a 'controlled action'.

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The objective of the Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (ATSIHP Act) is to preserve and protect places, areas and objects that are of particular significance to Aboriginal people. Aboriginal people can request the Australian Government protect places or things of significance to Aboriginal people. These Commonwealth powers override the powers of the States and Territories. The Commonwealth would seek to exercise these powers only after the relevant Aboriginal party had exhausted all opportunities to protect the Aboriginal cultural heritage through the State or Territory legislative process.

Native Title Act 1993

The functions of the *Native Title Act 1993* (NT Act) include setting up processes through which native title can be recognised, in addition to providing protection for native title rights. Proposed activities or developments that may affect native title are classed as 'future acts' under the NT Act. The NT Act provides for the

determination of native title claims, for the treatment of future acts, and the requirement of consultation and/or notification to relevant native title claimants where future acts are involved. Under the Act, any past grants of freehold or leasehold interests that were thrown into doubt by the Mabo decision are validated.

The NT Act operates in conjunction with associated state legislation, such as the *Native Title (Queensland) Act 1993*, the *Aboriginal Land Act 1991* and the *Torres Strait Islander Act 1991*. In Queensland, all of the abovementioned acts are administered by the Department of Natural Resources and Mines (DNRM).

2.2 State legislation

State Development and Public Works Organisation Act 1971

The purpose of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) is to facilitate timely, coordinated and environmentally responsible infrastructure, planning and development to support Queensland's economic and social progress.

Section 25 of the SDPWO Act requires that proper account is taken of the environmental effects of any development. Compliance with this requirement can be achieved by following TMR's assessment process.

Under section 26 of the SDPWO Act, the Coordinator-General may declare the project to be a coordinated project for which an EIS is required. In this event, the assessment processes for an EIS under the SDPWO Act must be followed.

Environmental Protection Act 1994

The purpose of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. In general terms, the project must comply with section 319 of the EP Act (the 'General Environmental Duty') and not undertake activities that cause or are likely to cause environmental harm unless all reasonable and practical measures are taken to prevent or minimise the harm.

There are also a number of issue-specific Environmental Protection Policies (EPP's) that the project will need to comply with. These include the *Environmental Protection (Air) Policy 2008*, *Environmental Protection (Noise) Policy 2008*, and *Environmental Protection (Water) Policy 2009*.

In co-ordination with the *Sustainable Planning Act 2009*, the EP Act provides for licensing and approval of Environmentally Relevant Activities (ERA's). ERA's are activities that require specific regulation because of the likelihood that they could cause environmental harm. To carry out an ERA, an environmental authority (EA) must be obtained prior to commencing the activity. A full list of all of the prescribed ERAs can be found in schedule 2 of the *Environmental Protection Regulation 2008*.

The Act also deals with the assessment and management of contaminated land, including administration of the Environmental Management Register (EMR) and the Contaminated Land Register (CLR).

Sustainable Planning Act 2009

The purpose of the *Sustainable Planning Act* (SP Act) is to achieve ecological sustainability by managing the development process and coordinating and integrating planning at the local, regional and State levels. Under the provisions of the SP Act, a number of activities associated with the project may require development permits through the Integrated Development Assessment System (IDAS). These include material change of use approvals (such as for ERA's and permits to remove contaminated land) and operational works approvals (such as works within watercourses, waterway barrier works and vegetation clearing).

Under this Act the concept of 'development' includes one or more of the following:

- carrying out building work;
- carrying out plumbing and drainage work;
- carrying out operational work;
- reconfiguring a lot; and
- making a material change of use of premises.

Schedule 3, table 4, item 1 of the SP Regulation outlines that operational work for the clearing of native vegetation, as defined under the *Vegetation Management Act 1999* (VM Act), is assessable development unless the clearing is mentioned in schedule 24 of the SP Regulation.

The clearing of native vegetation for road works carried out on a State-controlled road or future State-controlled road is exempt development under schedule 24, part 1, item 11 of the SP Regulation. Road works is defined under the *Transport Infrastructure Act 1994* (TI Act) as "constructing roads or things associated with roads". As the project involves undertaking works for State-controlled roads, all works for the project within the State-controlled road corridor, including the removal of vegetation is exempt development. No permits for the clearing of vegetation or associated offsets will be required under the VM Act for road works within the State-controlled road corridor.

Schedule 24, part 1, item 16 of the SP Regulation also exempts clearing for community infrastructure specified in schedule 2 of the SP Regulation. State-controlled roads are defined in schedule 2 as community infrastructure. It is not clearly specified in schedule 24 or schedule 2 whether this exemption applies to clearing for ancillary activities associated with community infrastructure where these activities occur outside of the State-controlled road corridor (or future State-controlled road corridor).

Schedule 3, table 5, item 2 of the SP Regulation states that development carried out by the State does not require a development permit for any aspect of development on a Queensland heritage place, provided TMR has sought and received permission from the Minister.

Schedule 3, table 5, item 3 of the SP Regulation states that development that is mentioned in schedule 4 of the SP Regulation does not require a development permit for any aspect of development on a local heritage place. Consequently, a development permit would not be required if the works interfere with a local heritage place.

There are also a number of State Planning Policies (SPP's) under the SP Act that may be applicable to the project.

State Assessment and Referral Agency

As of 1 July 2013, the State Assessment and Referral Agency (SARA) established within the Department of State Development, Infrastructure and Planning (DSDIP) a single point of lodgement, coordination and decision making on behalf of all state agencies (not including government-owned organisations such as Energex). Under the new arrangements, SARA is the assessment manager or concurrence agency for all development applications where a state agency has a jurisdiction.

The State Development Assessment Provisions (SDAP) set out the matters of interest to the state for development assessment, where the chief executive administering the SP Act (i.e. through SARA) is responsible for assessing or deciding development applications.

The SDAP is prescribed in the SP Regulation, and contains the matters the chief executive may have regard to when assessing a development application. The chief executive may give these matters the weight he or she is satisfied is appropriate.

SDAP contains state codes that are specific to each matter of state interest.

Native Title (Queensland) Act 1993

The *Native Title (Queensland) Act 1993* was enacted to ensure Queensland's laws are consistent with the *Commonwealth Native Title Act 1993* for dealings affecting native title. The *Native Title Act* seeks to formally recognise that native title rights did, and in some cases still do, exist for the descendants of Aboriginal and Torres Strait Islander people, and that descent groups can lodge native title claims. Native title in land can be extinguished by valid government acts that are inconsistent with the continued existence of native title rights and interests, such as the grant of freehold estates.

Aboriginal Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* is intended to provide effective recognition, protection and conservation of Aboriginal cultural heritage within the state. Under this Act it is an offence to knowingly destroy or interfere with places, artefacts and landscapes of Aboriginal heritage or spiritual culture. Individuals or corporations undertaking development in Queensland are obliged to observe the Aboriginal Cultural Heritage Duty of Care Guidelines.

Queensland Heritage Act 1992

The *Queensland Heritage Act 1992* aims to provide for the conservation of Queensland's cultural heritage, including for example, the regulation of the excavation of sites that contain, or may contain, objects of significance to Queensland's heritage. The Heritage Register is the principal mechanism through which the Queensland Heritage Act operates.

Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) seeks to achieve the conservation of nature through an integrated and comprehensive strategy for the whole of Queensland. The Act provides for the conservation of nature by the declaration and management of protected areas, and also the protection of native wildlife not found in a protected area.

Under the provision of the NC Act, permits are required from the Department of Environment and Heritage Protection (DEHP) where a proposed activity involves the taking of 'endangered', 'near threatened' or 'least concern' native plants in the wild.

TMR currently has a number of legislative provisions which can be used as a mechanism to not have to obtain a permit for removal of 'least concern' plants in areas of remnant (i.e. not previously cleared) vegetation, subject to a number of conditions. In areas of previously cleared or regrowth vegetation, TMR has exemption from the requirement to obtain a permit for the clearing of 'endangered', 'near threatened' or 'least concern' species, if certain conditions are met.

Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) seeks to regulate the clearing of native vegetation to preserve remnant endangered and 'of concern' and 'endangered' regional ecosystems, vegetation in areas of high nature conservation values and areas vulnerable to land degradation.

Fisheries Act 1994

The *Fisheries Act 1994* manages and protects fish habitats, fisheries resources and aquaculture. The Act holds provisions for the following:

- tidal work or work within a coastal management district;
- removal, damage or disturbance to marine plants, including mangroves;
- works in a declared fish habitat; and
- constructing or raising waterway barrier works.

Should the proposed project works involve these activities, approval is required in the form of a Development Permit under the SP Act.

Forestry Act 1959

The *Forestry Act 1959* (Forestry Act) provides for forest reservations and their management, silvicultural treatment and protection of State forests, and the sale and disposal of forest products and quarry material, the property of the Crown on State forests, timber reserves and on other lands; and for other purposes.

A Memorandum of Understanding (MoU) between TMR and the Department of Agriculture and Fisheries (DAF) has been prepared that transfers the administrative responsibility of access to State-owned quarry material on State lands for the purpose of road works to TMR. Section 4 of the MoU, which took effect on 2 December 2011, states that where State-owned quarry material is being extracted by TMR for the purposes of road works governed under the TI Act, no quarry licence is required.

As it is intended that the land required for the project would be acquired by TMR prior to the commencement of construction, no permits for works within existing State forest land would be required for the project corridor.

Converting the tenure of land within the Mountain Creek Conservation Area for the project will require the revocation of the State Forest declarations under the section 26 of the Forestry Act. In the event that project works are to be undertaken within Mountain Creek Conservation Area land prior to the transfer of tenure to a State-controlled road corridor, an authority would be required under section 39 of the Forestry Act for interference with forest products within a State forest. As noted above, this requirement does not apply to quarry material extracted by TMR for the purposes of road works.

Under the Queensland Government's administrative arrangements, the Forestry Act is jointly administered in part by the Department of National Parks, Recreation, Sport and Racing (DNPRSR) and DAF.

Revocations of State Forest by the above state agencies may be considered where it can be demonstrated that there are no feasible alternatives, that it is in the public interest and that there will be no net loss for nature conservation.

TMR will need to commence negotiations with DNPRSR (Queensland Parks and Wildlife Service Operations Manager and/or the Regional Manager) and DAF. Issues which will need to be negotiated and resolved as part of the revocation process include:

- Written agreement to an offset package as compensation for loss of land from the state forest;
- Written confirmation that Native Title issues in relation to the area/s to be revoked have been, or are in the process of being, addressed and resolved;
- Provision of an initial accurate sketch of the area sought for revocation, and the compensatory land, for inclusion with the request for Ministerial approval in principle; and
- Written agreement that TMR will bear all costs in the matter (i.e. survey, native title negotiations).

Once these issues have been resolved, and in principle support has been gained from the Minister, Cabinet approval to table the proposal in the Legislative Assembly must be obtained. The proposal for revocation will then need to be debated by the Minister, and if successful, amended subordinate legislation will need to be drafted and the gazettal of the revocation will need to be finalised. The revocation process can take up to 12 months to reach gazettal.

Dangerous Goods Safety Management Act 2001

The *Dangerous Goods Safety Management Act 2001* covers the storage and handling of dangerous goods and combustible liquids as well as the operation of major hazard facilities. It is not likely that this Act will be required for assessment in the project during construction or in the operational phase of the development.

Land Act 1994

The *Land Act 1994* provides a framework for the allocation of state land either as leasehold, freehold or other tenure. Permits may be acquired under this Act from the DNRM for the occupation of a reserve, road or unallocated state land.

Acquisition of Land Act 1967

The *Acquisition of Land Act 1967* enables the state to acquire freehold land for public works or other public purposes. The Coordinator-General can compulsorily acquire land:

- By agreement (section 15 of the *Acquisition of Land Act 1967*) - The Coordinator-General's preference is to negotiate with the landowner to compulsorily acquire his or her land by agreement. An agreement can be struck before or after a Notice of Intention to Resume has been issued to the landowner. If the landowner agrees to the acquisition, the amount of compensation can be finalised at a later date. However, if compensation is also agreed to, this will be included in the agreement.
- Without agreement - If the landowner does not agree to the compulsory acquisition of their land, the statutory land acquisition process will run its course.

Water Act 2000

The purpose of the *Water Act* is to promote sustainable management and efficient use of water and other resources by establishing a system for the planning, allocation and use of water. Approval will be required for a number of activities, including:

- Destroying vegetation, excavation and placement of fill within watercourses (Riverine Protection Permit may be required);
- Taking or interfering with water (including interfering with flow); and
- Taking quarry material from the bed or banks of a watercourse.

A development permit is not required under the SP Act for water-related infrastructure identified as exempt in the *Sustainable Planning Regulation 2009*. Taking of water is exempt for a construction authority if in line with the Exemption requirements for the taking of water without a water entitlement under the *Water Regulation 2016*.

2.3 Planning scheme policies

This section lists the planning scheme policies that will need to be considered for the proposed works. Planning scheme policies support the Sunshine Coast Planning Scheme 2014. These policies must be considered as part of the assessment process for development of land:

- SC6.4: Planning scheme policy for the acid sulfate soils overlay code;
- SC6.6: Planning scheme policy for the biodiversity, waterways and wetlands overlay code;
- SC6.7: Planning scheme policy for the bushfire hazard overlay code;
- SC6.9: Planning scheme policy for the flood hazard overlay code;
- SC6.10: Planning scheme policy for heritage and character areas overlay code;
- SC6.14: Planning scheme policy for development works;
- SC6.18: Planning scheme policy for waste management code;
- SC6.20: Planning scheme policy for Palmview Structure Plan; and
- SC6.21: Planning scheme policy for biodiversity offsets.

3 SCOPING ASSESSMENT SUMMARY AND RECOMMENDATIONS

Based on identified risks associated with the proposed SSMW upgrade project, and taking into consideration the resulting environmental assessment requirements, the component classification is considered to be ***MEDIUM***.

This decision has been made for the following summarised reasons:

- Project works are largely along the existing road corridor; however there will be some land resumed from the Mooloolah River National Park and the Mountain Creek Conservation Area.
- The proximity of works to nationally important wetlands and National/State parks.
- The project area is mapped as 'high risk' on the NC Act flora survey trigger map.
- Non-juvenile koala habitat trees are potentially located in an area shown as bushland habitat and low rehabilitation habitat on State koala habitat mapping (SPP mapping).
- Clearing of native vegetation and potential koala habitat will be required that has the potential to impact on habitat functionality and connectivity for protected fauna known to occur in the area.
- Offsets may be required for significant residual impact to a MSES (under the EO Act), MNES (under the EPBC Act), koala habitat (under the EPBC Act and/or the EO Act) and/or the clearing of threatened plants within remnant vegetation (under the EO Act).

As a ***MEDIUM*** environmental risk project, further environmental assessment will be required for the following:

- Confirmation of the presence or absence of contaminated land is required prior to construction works.
- Survey of the full extent of properties impacted by the SSMW upgrade where vegetation meets remnant status and is within a 'high risk' area on the NC Act flora survey trigger map.
- Field surveys will be required to determine potential impacts to MNES.
- Significant impact assessments of all EPBC Act species known or likely to occur within the impact area in accordance with the *Significant Impact Guidelines 1.1* to determine whether referral is necessary under the EPBC Act.

- Self-assessment needs to be undertaken for the project to establish the likelihood of the project significantly impacting on MNES:
    - Listed threatened species: 38
    - Listed migratory species: 12
- If significant impact to MNES is likely, a referral to DoEE will be required.
- Self-assessment needs to be undertaken for the project to establish the likelihood of the project having a significant impact on MSES:
    - The Mooloolah River National Park and the Mountain Creek Conservation Area are classed as 'protected areas', 'wildlife habitat', 'regulated vegetation' and 'high ecological significance wetlands'.
    - The vegetation along the waterways that run on the northern side of the SSMW are classed as 'regulated vegetation intersecting a watercourse'.
    - Removal of 'of concern' RE 12.3.14a.
    - Removal of essential habitat.
- Offsets requirements will need to be assessed.

A breakdown of further work and actions to be completed as part of the environmental component project is included in Appendix A – Future Actions & Cost.

Appendix A also includes work items that are recommended to managed / mitigate environmental impacts identified in the ESR.

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Appendix A – Future Actions & Cost

The table below outlines the recommended actions required as part of the environmental assessment and management for the project.

OUTPUT	RECOMMENDED ACTION (P/O)	OPTIONAL ESTIMATE	
		DURATION	COST
PRE-CONSTRUCTION			
Environmental Assessment Report (Internal/External)	**P**		
Review of Environmental Factors (Internal / External)			
Environmental Management Plan (Planning) (Internal / External)	**P**		
Cultural Heritage Risk Assessment	**P**		
Environmental Management Plan (Site Investigations)	**P**		
Factor-specific assessment (Internal / External) [please specify]			
Landscape Design (Internal / External)	**P**		
Environmental Design Report	**P**		
Cultural Heritage Field Assessment	**P**		
Cultural Heritage Field Agreement			
Cultural Heritage Management Plan			
Cultural Heritage Management Agreement	**P**		
Prepare and submit applications for Licences / Permits / Agreements including notifications for relevant Self Assessable Codes [please specify]	**P**		
Develop Construction Contract (Environmental)	**P**		
Develop Administration Contract (Environmental) *[Required for when an external Contractor Administrator is employed by Principal.]*	**P**		
Other, please specify			
CONSTRUCTION			
Administer Construction Contract (Environmental)	**P**		

OUTPUT	RECOMMENDED ACTION (P/O)	OPTIONAL ESTIMATE	
		DURATION	COST
Administer Administration Contract (Environmental)	P		
Environmental Audits	P		
FINALISATION			
Surrender and finalise relevant licences / Permits / Agreements including sending post-works notifications for relevant Self Assessable Codes [please specify]	P		
Post Implementation Review / Handover Report (Environment)	P		
Other, please specify			
Total Cost Estimate		$	

Appendix B – Assessment References

AECOM reviewed existing available reports and studies from within the local area that are relevant to the project. In addition, desktop environmental and planning information and data sources were reviewed, including:

- CSIRO's Australian Soil Resource Information System (ASRIS)
- Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) Cultural Heritage Search Tool
- Department of Agriculture and Fisheries (DAF) Fish Habitat Mapping under the *Fisheries Act 1994*
- Department of Defence Unexploded Ordnance Search
- Department of the Environment (DoE) Protected Matters Search Tool
- Department of Environment and Heritage Protection (DEHP) Wildlife Online species lists
- Atlas of Living Australia species list
- DEHP Protected Plants Flora Survey Trigger Map
- DEHP Environmentally Sensitive Areas Map
- DEHP Queensland Heritage Register
- DEHP Koala Habitat Area Map
- DEHP Referable Wetlands Mapping
- DEHP Coastal Hazard Areas Map
- Department of Natural Resources and Mines (DNRM) Vegetation Maps
- Department of State Development, Infrastructure and Planning (DSDIP) SPP Mapping Tool
- Queensland Government 'Queensland Globe'
- UNESCO World Heritage List

Appendix C – Glossary

Explains technical and unfamiliar words—but not abbreviations—used in a publication.

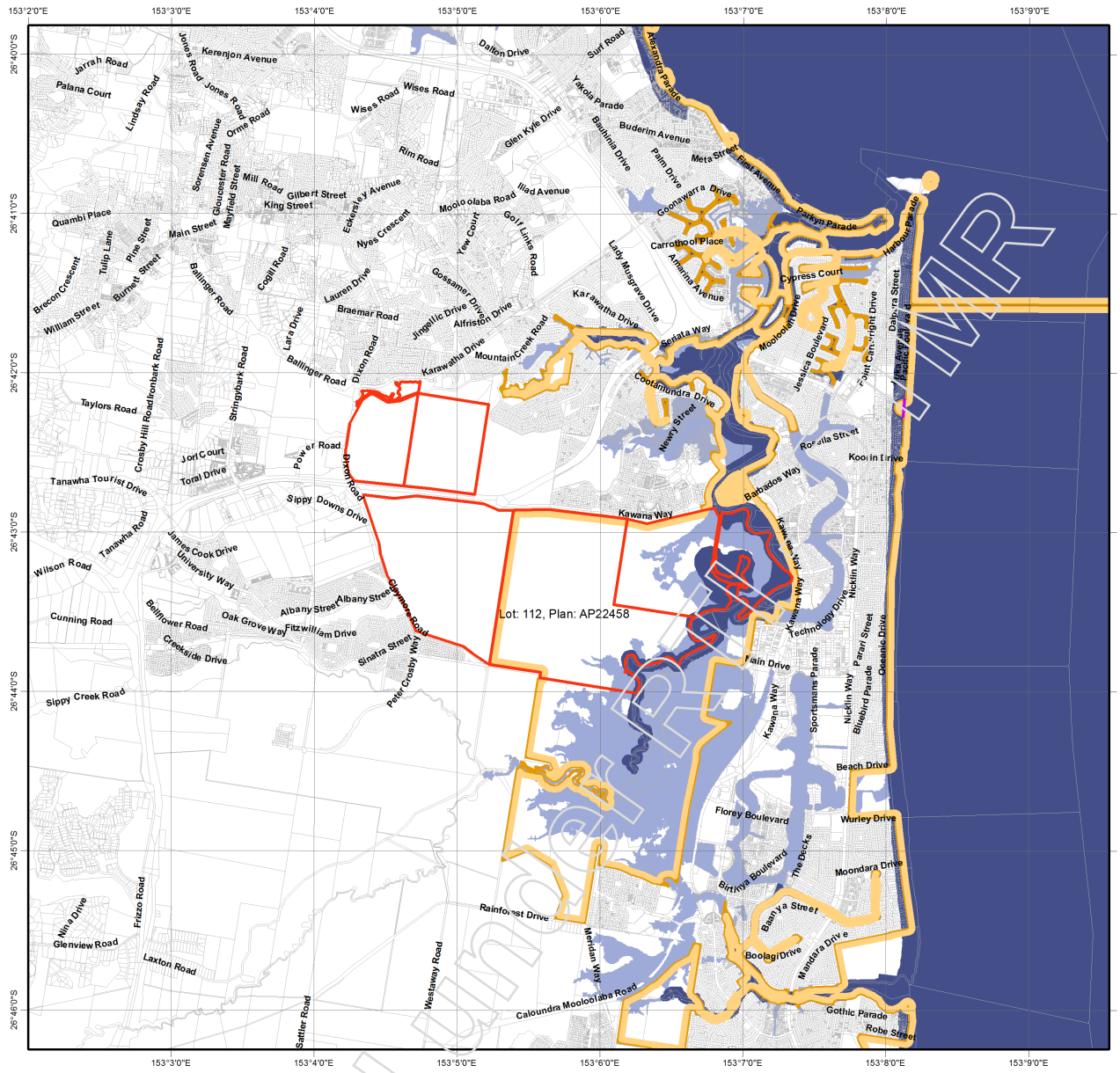
Term	Description
Negligible environmental risk	Negligible environmental risk projects are works that from the Environment and Heritage Service Request, do not require any further assessment. Furthermore, due to the negligible risk involved with the works, the environmental management requirements of MRTS51 and MRTS52 are not required as part of the Contract requirements.
Low environmental risk	Low environmental risk projects are projects where the Environmental Scoping Report does not identify a need for further environmental assessment. Site specific issues or legislative requirements needed to be managed are very few and minor in consequence. TMR's due diligence is sufficiently addressed by incorporation of MRTS 51 and MRTS52 and completed annexure within contract documentation. Low risk projects are typically minor works and programed maintenance within existing road formation.
Medium environmental risk	Medium environmental risk projects are projects that have at least one environmental factor requiring further environmental assessment identified in the Environmental Scoping Report. Medium Risk projects will generally have at least one site specific impact or legislative requirement that needs to be managed through design or contract. Medium Level projects are also typically characterised by: · being works on existing infrastructure and within existing corridor; · having disturbed or uncomplicated receiving environment · having few or uncomplicated legislative requirements · being generally managed and / or performed in-house by department staff · having some project tasks outsourced where necessary.
High environmental risk	High risk environmental risk projects are projects that involve numerous environmental factors and legislative triggers and requirements that may be associated with the project. The Environmental Scoping Report will identify that a comprehensive environmental assessment is required for the project. Projects commonly identified as high environmental risk are characterised by: · being works on new infrastructure · having longer lead time · having numerous options

Term	Description
	· having multi-faceted elements · having sensitive or complex receiving environment · having numerous or complex legislative requirements · having detailed strategic (Link Study) evaluation.

Appendix D – Figures

Pages 49 through 58 redacted for the following reasons:
- -
Deliberation

Appendix E – Coastal Zones and Storm Tide Inundation Mapping



Coastal Hazard Areas Map
Erosion Prone Area

Legend

- Lot and Plan
- Erosion due to storm impact and long term trends including sediment supply deficit and channel migration
- Erosion from permanent tidal inundation due to sea level rise
- Coastal Management District
- Coastal Building Lines

LOCALITY DIAGRAM

N

0 490 980 1,470 1,960 2,450 m

This product is projected into:
GDA 1994 MGA Zone 56

Notes

1. The areas shown on this map are indicative of the extent of erosion and permanent inundation defined by erosion prone area plans declared under the Coastal Protection and Management Act 1995. Only the declared erosion prone area plans should be used for development assessment. To determine the actual position of the erosion prone area a registered surveyor or geotechnical consultant may be required if there is any doubt.

2. Erosion prone area plans for each local government area and a comprehensive description of their determination are available from the Department of Environment and Heritage Protection website at www.ehp.qld.gov.au

Version 7 - October 2016

Disclaimer

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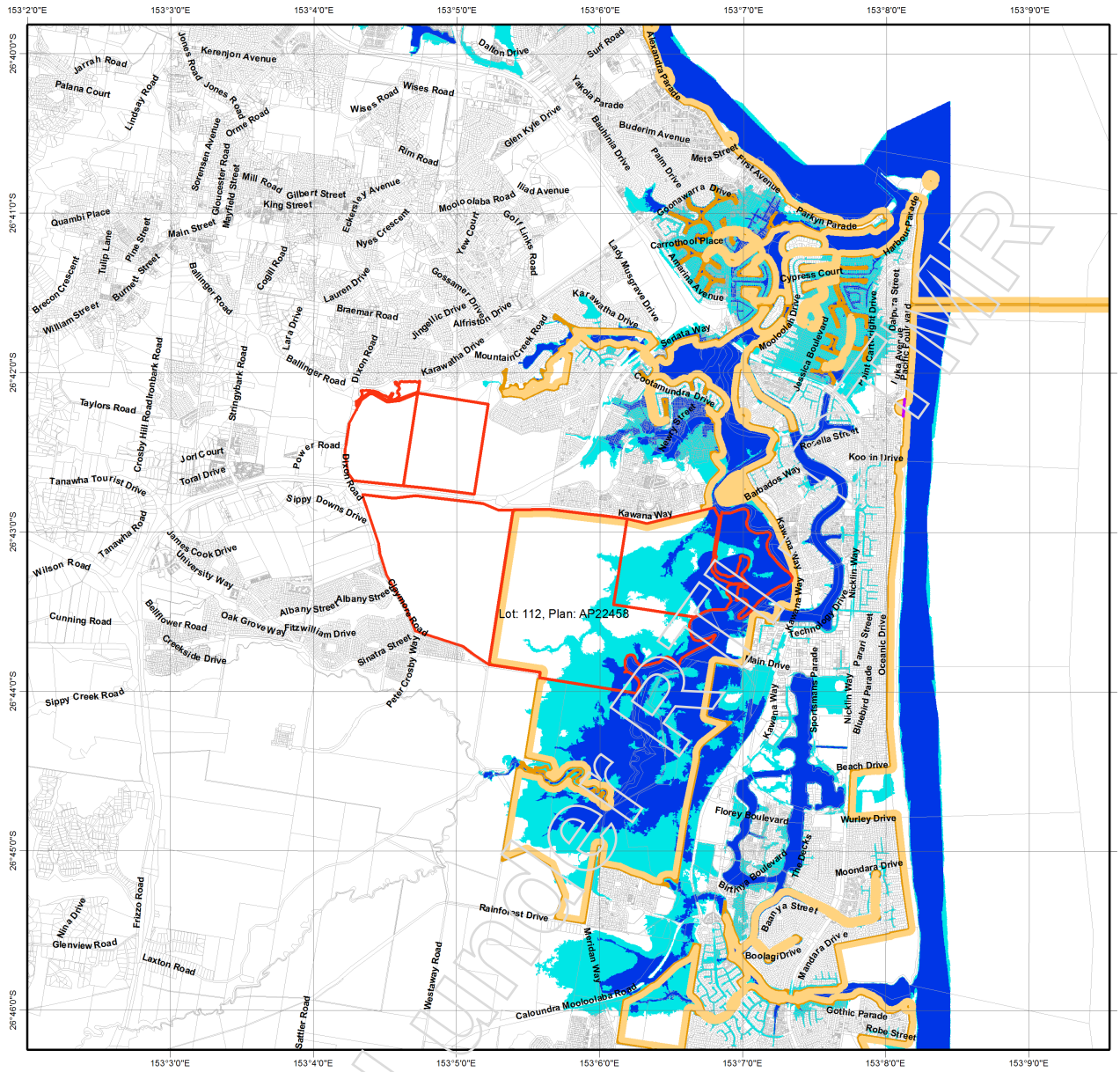

Coastal Hazard Areas Map
Storm Tide Inundation Area

Legend

- Lot and Plan
- High hazard area (greater than 1.0m water depth)
- Medium hazard area (less than 1.0m water depth)
- Coastal Management District
- Coastal hazard data not available in this area Refer to note 1 to determine
- Coastal Building Lines

* **Regional default values for a 100yr ARI inundation level including 0.8m sea level rise.**

LOCALITY DIAGRAM

N

0 490 980 1,470 1,960 2,450 m

This product is projected into:
GDA 1994 MGA Zone 56

Notes

1. A default storm tide inundation level of 1.5 m HAT in South East Queensland regional planning area and 2 m HAT for the remainder of Queensland is used where projected storm tide inundation levels have not been determined locally.

2. The high hazard area may coincide with the area of permanent inundation - refer to the Erosion Prone Area map.

3. The map should be used as a guide only. Field surveys are recommended to verify feature boundaries.

Version 4 - July 2015

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Appendix F - EVNT Species Likelihood of Occurrence

Table 1 EPBC Act threatened fauna species likelihood assessment

Species name	Common name	Status	Preferred habitat	Likelihood of occurrence within project area
Birds				
Anthochaera Phrygia	Regent honeyeater	Critically endangered	Most records are from box-ironbark eucalypt associations, and it seems the species prefers wetter, more fertile sites within these associations such as along creek flats, broad river valleys and lower slopes.	**Low** Species habitat exists in the project area but no recorded occurrences in the region.
Botaurus poiciloptilus	Australasian Bittern	Endangered	Occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands. Favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water.	**Unlikely**. No records of this species exist in the project area. Rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions.
Calidris ferruginea	Curlew Sandpiper	Critically endangered	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters.	**Unlikely**. No records of this species exist in the project area.

Erythrotriorchis radiates	Red Goshawk	Vulnerable	Occupies a range of habitats, although primarily found in extensive areas of coastal and sub-coastal open forest and woodland supporting a mosaic of vegetation types. Favoured areas contain permanent water, are relatively fertile and biologically rich with large population of birds. Rarely seen away from large areas of intact vegetation. Nests are typically within tall trees less than one kilometre from permanent water.	**Unlikely**. No records of this species exist in the project area.
Lathamus discolour	Swift Parrot	Critically endangered	Breeds in Tasmania, migrates to mainland Australia in autumn, where it is seminomadic during winter. Key habitats for the species in northern New South Wales and south-eastern Queensland are *Eucalyptus crebra*, *E. tereticornis* or *E. melliodora* forest, while on the western slopes *E. sideroxylon* and *E. microcarpa* are commonly utilized.	**Unlikely**. No records of this species exist in the project area.
Numenius madagascariensis	Eastern Curlew	Critically endangered	Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally occurs on ocean beaches, and coral reefs, rock platforms or rocky islets.	**Unlikely**. No records of this species exist in the project area.
Pachyptila turtur subantarctica	Fairy Prion (southern)	Vulnerable	The southern subspecies of the Fairy Prion is a marine bird, found mostly in temperate and subantarctic seas. The Fairy Prion sometimes forages over continental shelves and the continental slope, but it can come close inshore in rough weather. This species breeds on islands and rock stacks. It burrows in soil, or uses crevices and caves in cliffs or rock falls. The subspecies can also nest in scrub, herbland, tussock or pasture.	**Unlikely**. No records of this species exist in the project area.

Poephila cincta cincta	Southern Black-throated Finch	Endangered	Typically occurs in grassy open woodlands and forests dominated by *E. Corymbia*, *Melaleuca* and *Acacia*, often in the vicinity of water courses and occasionally in tussock grasslands or freshwater wetlands. Requires access to seeding grasses, water and trees providing suitable nesting habitat. Probably requires a mosaic of different habitat types in which to find seed during the wet season.	**Low**. No records of this species exist in the project area. Species habitat exists in the project area; however current distribution of this species does not include the Sunshine Coast region.
Rostratula australis	Australian Painted Snipe	Endangered	Inhabits shallow, well vegetated, temporary or infrequently filled wetlands, which may have associated trees, shrubs or samphire. Occasionally inhabits brackish wetlands, saltmarsh or claypans. Typical sites include those with rank emergent tussocks of grass, sedges, rushes, reeds or samphire, often with clumps of *Muehlenbeckia* or sometimes *Melaleuca*.	**Low**. No records of this species exist in the project area. Species habitat exists in the project area but has limited occurrences in the region and is migratory in nature.
Turnix melanogaster	Black-breasted Button-quail	Vulnerable	Inhabits periodically water-stressed rainforests, vine thickets and *Brachychiton* scrubs that may incorporate Brigalow and belah, low thickets or woodlands with a dense understorey but little ground cover (typically dominated by *Acacia* sp.), and vine scrubs and *Acacia* thickets in littoral situations.	**Unlikely**. No records of this species exist in the project area.
Frogs				
Litoria olongburensis	Wallum Sedge Frog	Vulnerable	Can be found along creeks and in marshy or swampy lowland habitats amongst emergent vegetation and reeds of the wallum.	**Known**. Is known to occur in the project area.
Mixophyes iterates	Giant Barred Frog	Endangered	The Giant Barred Frog occurs in rainforests and wet sclerophyll forests in upper to lower catchment areas. During surveys in the Cooroy to Curra area of south-east Queensland, Giant Barred Frogs were observed to prefer a closed forest canopy with a relatively light cover of vegetation at ground level.	**Known**. Is known to occur in the project area.

Mammals				
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	The species is most commonly recorded from dry sclerophyll forest; however there are also records from rainforest, wet sclerophyll forests and *Callitris*-dominated forest. Fertile wooded valley habitat in close proximity to sandstone cliffs appear to be particularly important to this species.	**Low**. Is known to occur in the Beerwah State Forest; however no records of this species exist in the project area.
Dasyurus hallucatus	Northern Quoll	Endangered	Northern quolls do not have highly specific habitat requirements, and occur in a variety of habitats across their range. Most quoll populations are now associated with rocky or rugged upland areas. Recent surveys throughout Queensland suggest that northern quolls are more likely to be present in areas of high relief that have shallower soils, greater boulder cover, less fire impact and that are closer to permanent water.	**Unlikely**. No records of this species exist in the project area.
Dasyurus maculatus maculatus	Spot-tailed Quoll	Endangered	Recorded in rainforest, wet and dry sclerophyll forest and woodland habitats. Has been found on the margins of farmland and its preferred habitat includes escarpments, gullies, saddles and riparian habitat as well as rocky areas where it finds den sites.	**Low**. Is known to occur in the Beerwah State Forest; however no records of this species exist in the project area.
Petauroides volans	Greater Glider	Vulnerable	Greater gliders are typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The distribution may be patchy even in suitable habitat. The Greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.	**Unlikely**. No records of this species exist in the project area.

Phascolarctos cinereus	Koala	Vulnerable	Koala habitat can be broadly defined as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. The distribution of this habitat is largely influenced by land elevation, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clay soils.	**Possible**. Suitable habitat exists within the project area. Two sighting records of this species within 3 km of the project area. Historically, populations of koalas were known to move between the Mooloolah River / Palmview floodplain, the Mooloolah River National Park and north into the Buderim escarpment.
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	The Grey-headed Flying-fox is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops and on introduced tree species in urban areas.	**Possible**. No individuals or roosts have been identified in previous field surveys of the wider project area; however as none of the vegetation communities used by the Grey-headed Flying-fox produce continuous foraging resources throughout the year, the species has adopted complex migration traits in response to ephemeral and patchy food resources.

Xeromys myoides	Water Mouse	Vulnerable	Habitat includes mangrove communities and adjacent sedgelands, grasslands and freshwater wetlands.	**Possible**. Historically, the Water Mouse was found along the Mooloolah River and has been encountered during previous works by TMR in the local area.
Reptiles				
Delma torquate	Collared Delma	Vulnerable	Found in a variety of habitats including forests and woodlands on black alluvial cracking clay and clay loams; and various spotted gum, ironbark, white cypress pine and bull-oak associations on sandstone derived soils.	**Unlikely**. No records of this species exist in the project area, and the species distribution is limited in Queensland to habitat associated with Brigalow vegetation community.
Furina dunmalli	Dunmall's Snake	Vulnerable	Dunmall's Snake has been found in a broad range of habitats, including: • Forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow (*Acacia harpophylla*), other Wattles (*A. burowii, A. deanii, A. leioclyx*), native Cypress (*Callitris* spp.) or Bull-oak (*Allocasuarina luehmannii*) • Various Blue Spotted Gum (*Corymbia citriodora*), Ironbark (*Eucalyptus crebra* and *E. melanophloia*), White Cypress Pine (*Callitris glaucophylla*) and Bulloak open forest and woodland associations on sandstone derived soils.	**Low**. Species habitat exists in the project area but no recorded occurrences in the region.

Saiphos reticulatus	Three-toed Snake-tooth Skink	Vulnerable	In Queensland, the Three-toed Snake-tooth Skink has been recorded in rainforest, closed forest, wet sclerophyll forest, tall open Blackbutt (*Eucalyptus pilularis*) forest, tall layered open eucalypt forest and closed Brush Box (*Lophostemon confertus*) forest. It has also been recorded from extensive regrowth in heavily logged areas.	**Unlikely**. No records of this species exist in the project area.

Table 2 EPBC Act threatened flora species likelihood assessment

Species name	Common name	Status	Preferred habitat	Likelihood of occurrence within project area
Acacia attenuata	No common name	Vulnerable	The species occurs in high rainfall areas of south-east Queensland and is confined to coastal lowland sand plains, where it is never more than 40 km from the coast.	**Known**. This species is known to occur in the Mooloolah National Park and surrounding areas.
Allocasuarina emuina	Emu Mountain Sheoak	Endangered	The Emu Mountain Sheoak grows in open and closed heath on fine-grained rhyolite rocky slopes (Mt Peregian) and in wallum heath on undulating coastal plain. The soils range in texture from sands, sandy loams and light to medium clays, usually with a weak acidic reaction.	**Known**. This species is known to occur in the Mooloolah River National Park and surrounding areas.
Arthraxon hispidus	Hairy-joint Grass	Vulnerable	Hairy-joint Grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland. In south-east Queensland, Hairy-joint Grass has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests.	**Unlikely**. No records of this species exist in the project area.

Bosistoa transversa	Three-leaved Bosistoa	Vulnerable	Three-leaved Bosistoa grows in lowland subtropical rainforest up to 300 m above sea level.	**Unlikely**. No records of this species exist in the project area.
Cryptocarya foetida	Stinking Cryptocarya	Vulnerable	The Stinking Cryptocarya is restricted to coastal sands, or if not, then close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m.	**Unlikely**. No records of this species exist in the project area.
Cryptostylis hunteriana	Leafless Tongue-orchid	Vulnerable	Occurs in a variety of habitats including heathlands, woodlands, sedgelands, sclerophyll forests, grasslands and rainforests containing moist sandy or peaty soils	**Unlikely**. No records of this species exist in the project area.
Eucalyptus conglomerata	Swamp Stringybark	Endangered	The Swamp Stringybark occurs on coastal flats up to 30 m above sea level. It occurs mostly in the ecotone between wet heath (wallum) and tall open forest communities. The soils are infertile, deep and sandy or peaty in texture. Drainage is poor and soils can be seasonally water-logged.	**Possible**. Two sighting records of this species within 3 km of the project area.
Graptophyllum reticulatum	Veiny Graptophyllum	Endangered	Occurs within notophyll vine forests (below 700 m AHD) along creek banks and hillsides on basalt caps.	**Low** There is a population of this species within 5 km north east of the project area (Buderim); however it has not been recorded within the project area.
Macadamia integrifolia	Macadamia Nut	Vulnerable	Occurs within remnant rainforest and closed forests patches. The species has been recorded within hill crests, slopes, gullies and terrace plains	**Unlikely**. No records of this species exist in the project area.

Macadamia ternifolia	Small-fruited Queensland Nut	Vulnerable	Occurs within lowland notophyll vine forests and Araucarian vine forests on fertile, basalt-derived soils on steep southern slopes and restricted to an area from near Pomona to near Maleny	**Unlikely**. No records of this species exist in the project area.
Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable	Rough-shelled Bush Nut is a rare species that generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of these forests and in mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well-drained sites.	**Unlikely**. No records of this species exist in the project area.
Phaius australis	Lesser Swamp-orchid	Endangered	The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark or Swamp Mahogany are found. Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest, swampy rainforest, or fringing open forest.	**Possible**. Suitable habitat for this species is mapped in the remnant vegetation throughout the project area (RE 12.3.5).
Phebalium distans	Mt Berryman Phebalium	Critically endangered	Mt Berryman Phebalium is found in semi-evergreen vine thicket on red volcanic soils, or in communities adjacent to this vegetation type. Geology of the area in which this species occurs is deeply weathered basalt with undulating to hilly terrain.	**Unlikely**. No records of this species exist in the project area.
Prasophyllum wallum	Wallum Leek-orchid	Vulnerable	Grows in wallum communities and on stabilised dunes. Associated species include *Melaleuca quinquenervia* and *Banksia robur.*	**Possible**. Suitable habitat for this species is mapped in the remnant vegetation throughout the project area (RE 12.3.5).

Samadera bidwillii	Quassia	Vulnerable	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses.	**Unlikely**. No records of this species exist in the project area.
Triunia robusta	No common name	Endangered	Mainly notophyll vine forest or tall open forest with a rainforest understorey. Mostly occur within 25 m of a watercourse, on southern facing slopes or river terraces. On well-drained soils.	**Unlikely**. No records of this species exist in the project area.

Table 3 EPBC Act threatened migratory species likelihood assessment

Species name	Common name	Status	Preferred habitat	Likelihood of occurrence within project area
Migratory marine birds				
Apus pacificus	Fork-tailed Swift	-	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh.	**Low**. Species may overfly project area.
Migratory Terrestrial Species				
Cuculus optatus	Oriental Cuckoo	-	The Oriental cuckoo mainly inhabits forests, occurring in coniferous, deciduous and mixed forest.	**Low**. Species may overfly project area.

Hirundapus caudacutus	White-throated Needletail	-	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.	**Known**. Species has been recorded in the project area.
Monarcha melanopsis	Black-faced Monarch	-	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical rainforest, subtropical rainforest, mesophyll thicket/shrubland, warm temperate rainforest, dry rainforest and (occasionally) cool temperate rainforest.	**Known**. Species has been recorded in the project area.
Monarcha trivirgatus	Spectacled Monarch	-	The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	**Known**. Species has been recorded in the project area.
Myiagra cyanoleuca	Satin Flycatcher	-	Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest.	**Low**. Species may overfly project area.
Rhipidura rufifrons	Rufous Fantail	-	Rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps, riverside vegetation.	**Known**. Species has been recorded in the project area.
Migratory wetland species				
Gallinago hardwickii	Latham's Snipe	-	The Latham's Snipe usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies).	**Known**. Species has been recorded in the project area.

Pandion haliaetus	Osprey	-	The Osprey inhabits the areas around shallow waters, being sufficiently tolerant of human settlement to persist in suburban and sometimes urban environments.	**Low**. Species may overfly project area.
Tringa nebularia	Common Greenshank	-	The Common Greenshank 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 and are recorded less often in round tidal pools, rock-flats and rock platforms.	**Low**. Species may overfly project area.

Appendix G – Desktop Assessment Results

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

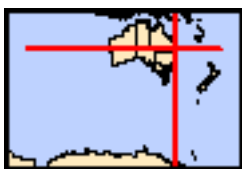
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 17/01/17 10:13:19

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	38
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	29
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Moreton bay	Within 10km of Ramsar

Listed Threatened Ecological Communities	[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Frogs		
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat may occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll, Digul [331]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area
Plants		
Acacia attenuata [10690]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina emuina Emu Mountain Sheoak, Mt Emu She-oak [21926]	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Eucalyptus conglomerata Swamp Stringybark [3160]	Endangered	Species or species habitat likely to occur within area
Graptophyllum reticulatum Veiny Graptophyllum [55459]	Endangered	Species or species habitat likely to occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-	Vulnerable	Species or species

Name	Status	Type of Presence
shelled Macadamia, Bush Nut, Nut Oak [7326]		habitat likely to occur within area
Macadamia ternifolia		
Small-fruited Queensland Nut, Gympie Nut [7214]	Vulnerable	Species or species habitat likely to occur within area
Macadamia tetraphylla		
Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Phaius australis		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Phebalium distans		
Mt Berryman Phebalium [81869]	Critically Endangered	Species or species habitat may occur within area
Prasophyllum wallum		
Wallum Leek-orchid [55148]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii		
Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Triunia robusta		
[14747]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Delma torquata		
Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli		
Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus		
Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata		
Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Cuculus saturatus		
Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Mooloolah River	QLD
Mountain Creek Conservation Area	QLD

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		

Name	Status	Type of Presence
Asparagus aethiopicus		
Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus		
Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. rotundata		
Bitou Bush [16332]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis		
Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp.		
Prickly Pears [82753]		Species or species habitat likely to occur within area
Protasparagus densiflorus		
Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Lower Mooloolah River	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-26.71115 153.07102,-26.71266 153.08954,-26.71431 153.08942,-26.7122 153.07083,-26.71115 153.07102

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
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Wildlife Online Extract

Search Criteria: Species List

Species:	All
Type:	All
Status:	All
Records:	All
Date:	Since 1980
Latitude:	-26.7126
Longitude:	153.08
Distance:	1.5
Email:	amelia.mack@aecom.com
Date submitted:	Tuesday 17 Jan 2017 09:33:02
Date extracted:	Tuesday 17 Jan 2017 09:40:31

Description of the CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the Nature Conservation Act 1992.
Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the Environment Protection
Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Kingdom	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen Records
animals	Rhinella marina	cane toad	Y			6	0
animals	Limnodynastes peronii	striped marshfrog		C		1	0
animals	Pseudophryne raveni	copper backed broodfrog		C		1	0
animals	Crinia tinnula	wallum froglet		V		1	0
animals	Sericornis frontalis	white-browed scrubwren		C		10	0
animals	Gerygone mouki	brown gerygone		C		1	0
animals	Acanthiza pusilla	brown thornbill		C		19	0
animals	Gerygone olivacea	white-throated gerygone		C		15	0
animals	Pandion cristatus	eastern osprey		SL		3	0
animals	Accipiter cirrocephalus	collared sparrowhawk		C		1	0
animals	Aquila audax	wedge-tailed eagle		C		3	0

animals	Haliastur indus	brahminy kite	C	3	0
animals	Elanus axillaris	black-shouldered kite	C	7	0
animals	Circus approximans	swamp harrier	C	1	0
animals	Accipiter fasciatus	brown goshawk	C	2	0
animals	Aviceda subcristata	Pacific baza	C	1	0
animals	Haliastur sphenurus	whistling kite	C	15	0
animals	Haliaeetus leucogaster	white-bellied sea-eagle	C	1	0
animals	Hieraaetus morphnoides	little eagle	C	3	0
animals	Acrocephalus australis	Australian reed-warbler	C	2	0
animals	Ceyx azureus	azure kingfisher	C	5	0
animals	Chenonetta jubata	Australian wood duck	C	2	0
animals	Anas superciliosa	Pacific black duck	C	5	0
animals	Aythya australis	hardhead	C	1	0
animals	Cygnus atratus	black swan	C	1	0
animals	Anhinga novaehollandiae	Australasian darter	C	2	0
animals	Hirundapus caudacutus	white-throated needletail	SL	7	0
animals	Ardea pacifica	white-necked heron	C	3	0
animals	Ixobrychus flavicollis	black bittern	C	1	0
animals	Egretta novaehollandiae	white-faced heron	C	6	0
animals	Bubulcus ibis	cattle egret	C	7	0
animals	Cracticus tibicen	Australian magpie	C	39	0
animals	Cracticus torquatus	grey butcherbird	C	22	0
animals	Artamus leucorynchus	white-breasted woodswallow	C	12	0
animals	Cracticus nigrogularis	pied butcherbird	C	20	0
animals	Artamus cinereus	black-faced woodswallow	C	1	0
animals	Burhinus grallarius	bush stone-curlew	C	2	0
animals	Calyptorhynchus funereus	yellow-tailed black-cockatoo	C	6	0
animals	Calyptorhynchus lathami lathami	glossy black-cockatoo (eastern)	V	1	0
animals	Eolophus roseicapilla	galah	C	4	0
animals	Coracina novaehollandiae	black-faced cuckoo-shrike	C	32	0
animals	Coracina tenuirostris	cicadabird	C	6	0
animals	Coracina papuensis	white-bellied cuckoo-shrike	C	1	0
animals	Lalage leucomela	varied triller	C	6	0
animals	Lalage tricolor	white-winged triller	C	1	0
animals	Vanellus miles	masked lapwing	C	2	0
animals	Vanellus miles novaehollandiae	masked lapwing (southern subspecies)	C	3	0
animals	Cisticola exilis	golden-headed cisticola	C	3	0
animals	Climacteris picumnus	brown treecreeper	C	1	0

animals	Cormobates leucophaea	white-throated treecreeper	C	1	0
animals	Cormobates leucophaea metastasis	white-throated treecreeper (southern)	C	27	0
animals	Geopelia humeralis	bar-shouldered dove	C	12	0
animals	Macropygia amboinensis	brown cuckoo-dove	C	2	0
animals	Lopholaimus antarcticus	topknot pigeon	C	2	0
animals	Geopelia striata	peaceful dove	C	13	0
animals	Columba leucomela	white-headed pigeon	C	1	0
animals	Ocyphaps lophotes	crested pigeon	C	11	0
animals	Eurystomus orientalis	dollarbird	C	1	0
animals	Corvus orru	Torresian crow	C	47	0
animals	Chalcites basalis	Horsfield's bronze-cuckoo	C	4	0
animals	Cacomantis variolosus	brush cuckoo	C	6	0
animals	Chalcites lucidus	shining bronze-cuckoo	C	10	0
animals	Centropus phasianinus	pheasant coucal	C	12	0
animals	Cacomantis flabelliformis	fan-tailed cuckoo	C	14	0
animals	Chalcites minutillus barnardi	little bronze-cuckoo	C	2	0
animals	Dicrurus bracteatus	spangled drongo	C	7	0
animals	Lonchura punctulata	nutmeg mannikin	Y	1	0
animals	Lonchura castaneothorax	chestnut-breasted mannikin	C	9	0
animals	Neochmia temporalis	red-browed finch	C	20	0
animals	Taeniopygia bichenovii	double-barred finch	C	25	0
animals	Falco cenchroides	nankeen kestrel	C	8	0
animals	Falco longipennis	Australian hobby	C	4	0
animals	Falco berigora	brown falcon	C	1	0
animals	Todiramphus sanctus	sacred kingfisher	C	6	0
animals	Dacelo novaeguineae	laughing kookaburra	C	24	0
animals	Todiramphus macleayii	forest kingfisher	C	12	0
animals	Petrochelidon nigricans	tree martin	C	3	0
animals	Cheramoeca leucosterna	white-backed swallow	C	2	0
animals	Petrochelidon ariel	fairy martin	C	17	0
animals	Hirundo neoxena	welcome swallow	C	36	0
animals	Irediparra gallinacea	comb-crested jacana	C	1	0
animals	Malurus melanocephalus	red-backed fairy-wren	C	39	0
animals	Malurus lamberti	variegated fairy-wren	C	26	0
animals	Megalurus timoriensis	tawny grassbird	C	10	0
animals	Alectura lathami	Australian brush-turkey	C	1	0
animals	Myzomela obscura	dusky honeyeater	C	1	0
animals	Meliphaga lewinii	Lewin's honeyeater	C	34	0

animals	Caligavis chrysops	yellow-faced honeyeater	C	11	0
animals	Entomyzon cyanotis	blue-faced honeyeater	C	1	0
animals	Phylidonyris niger	white-cheeked honeyeater	C	47	0
animals	Lichmera indistincta	brown honeyeater	C	32	0
animals	Philemon corniculatus	noisy friarbird	C	20	0
animals	Manorina melanocephala	noisy miner	C	23	0
animals	Myzomela sanguinolenta	scarlet honeyeater	C	30	0
animals	Philemon citreogularis	little friarbird	C	5	0
animals	Anthochaera chrysoptera	little wattlebird	C	25	0
animals	Melithreptus albogularis	white-throated honeyeater	C	35	0
animals	Merops ornatus	rainbow bee-eater	C	29	0
animals	Monarcha melanopsis	black-faced monarch	SL	2	0
animals	Myiagra rubecula	leaden flycatcher	C	14	0
animals	Grallina cyanoleuca	magpie-lark	C	4	0
animals	Symposiachrus trivirgatus	spectacled monarch	SL	1	0
animals	Anthus novaeseelandiae	Australasian pipit	C	7	0
animals	Dicaeum hirundinaceum	mistletoebird	C	17	0
animals	Daphoenositta chrysoptera	varied sittella	C	12	0
animals	Sphecotheres vieilloti	Australasian figbird	C	6	0
animals	Oriolus sagittatus	olive-backed oriole	C	11	0
animals	Colluricincla megarhyncha	little shrike-thrush	C	1	0
animals	Pachycephala pectoralis	golden whistler	C	22	0
animals	Pachycephala rufiventris	rufous whistler	C	42	0
animals	Colluricincla harmonica	grey shrike-thrush	C	36	0
animals	Falcunculus frontatus	crested shrike-tit	C	1	0
animals	Pardalotus striatus	striated pardalote	C	38	0
animals	Pardalotus punctatus	spotted pardalote	C	3	0
animals	Pelecanus conspicillatus	Australian pelican	C	1	0
animals	Microeca fascinans	jacky winter	C	1	0
animals	Petroica rosea	rose robin	C	3	0
animals	Eopsaltria australis	eastern yellow robin	C	21	0
animals	Phalacrocorax varius	pied cormorant	C	1	0
animals	Microcarbo melanoleucos	little pied cormorant	C	3	0
animals	Phalacrocorax carbo	great cormorant	C	1	0
animals	Coturnix ypsilophora	brown quail	C	11	0
animals	Alisterus scapularis	Australian king-parrot	C	1	0
animals	Trichoglossus chlorolepidotus	scaly-breasted lorikeet	C	19	0
animals	Trichoglossus haematodus moluccanus	rainbow lorikeet	C	20	0

animals	Platycercus adscitus	pale-headed rosella	C	11	0
animals	Pezoporus wallicus wallicus	ground parrot	V	1	0
animals	Psophodes olivaceus	eastern whipbird	C	2	0
animals	Gallinula tenebrosa	dusky moorhen	C	1	0
animals	Fulica atra	Eurasian coot	C	1	0
animals	Tribonyx ventralis	black-tailed native-hen	C	1	0
animals	Rhipidura leucophrys	willie wagtail	C	20	0
animals	Rhipidura albiscapa	grey fantail	C	58	0
animals	Rhipidura rufifrons	rufous fantail	SL	4	0
animals	Gallinago hardwickii	Latham's snipe	SL	1	0
animals	Ninox boobook	southern boobook	C	1	0
animals	Threskiornis molucca	Australian white ibis	C	1	0
animals	Threskiornis spinicollis	straw-necked ibis	C	6	0
animals	Zosterops lateralis	silvereye	C	10	0
animals	Turnix varius	painted button-quail	C	1	0
animals	Polyura sempronius sempronius	tailed emperor		1	0
animals	Danaus plexippus plexippus	monarch		5	0
animals	Tirumala hamata hamata	blue tiger		1	0
animals	Junonia villida calybe	meadow argus		1	0
animals	Melanitis leda bankia	common evening-brown		4	0
animals	Vanessa kershawi	Australian painted lady		1	0
animals	Graphium sarpedon choredon	blue triangle		1	0
animals	Catopsilia pomona pomona	lemon migrant		2	0
animals	Belenois java teutonia	caper white		1	0
animals	Elodina angulipennis	southern pearl-white		1	0
animals	Delias nigrina	black jezebel		5	0
animals	Eurema sp.			2	0
animals	Delias sp.			1	0
animals	Delias argenthona argenthona	scarlet jezebel		3	0
animals	Bos taurus	European cattle	Y	1	0
animals	Vulpes vulpes	red fox	Y	1	0
animals	Antechinus flavipes flavipes	yellow-footed antechinus	C	1	0
animals	Felis catus	cat	Y	1	0
animals	Wallabia bicolor	swamp wallaby	C	1	0
animals	Macropus giganteus	eastern grey kangaroo	C	6	0
animals	Rattus lutreolus	swamp rat	C	1	0
animals	Melomys burtoni	grassland melomys	C	3	0
animals	Hydromys chrysogaster	water rat	C	1	0

animals	Trichosurus vulpecula	common brushtail possum	C		2	0
animals	Phascolarctos cinereus	koala	V	V	2	0
animals	Pteropus scapulatus	little red flying-fox	C		1	0
animals	Pogona barbata	bearded dragon	C		1	0
animals	Intellagama lesueurii	eastern water dragon	C		1	0
animals	Tropidonophis mairii	freshwater snake	C		1	0
animals	Lampropholis delicata	dark-flecked garden sunskink	C		3	0
animals	Concinnia tenuis	bar-sided skink	C		1	1
animals	Varanus varius	lace monitor	C		2	0
plants	Lycopodiella cernua		C		1	0
plants	Adiantum hispidulum		C		1	0
plants	Asplenium flabellifolium	necklace fern	C		1	0
plants	Blechnum cartilagineum	gristle fern	C		1	0
plants	Blechnum indicum	swamp water fern	C		1	0
plants	Pteridium esculentum	common bracken	C		1	0
plants	Hypolepis muelleri	swamp bracken	C		1	0
plants	Calochlaena dubia		C		1	0
plants	Gleichenia mendellii		C		1	0
plants	Gleichenia dicarpa	pouched coral fern	C		1	0
plants	Sticherus flabellatus var. flabellatus		C		1	0
plants	Todea barbara	king fern	C		1	0
plants	Schizaea bifida	forked comb fern	C		1	0
plants	Lygodium microphyllum	snake fern	C		1	0
plants	Christella dentata	creek fern	C		1	0
plants	Cyclosorus interruptus		C		1	0
plants	Brunoniella australis	blue trumpet	C		1	0
plants	Hygrophila angustifolia		C		1	0
plants	Platysace ericoides	heath platysace	C		1	0
plants	Centella asiatica		C		1	0
plants	Xanthosia pilosa	woolly xanthosia	C		2	1
plants	Platysace lanceolata		C		1	0
plants	Platysace linearifolia		C		2	1
plants	Tabernaemontana pandacaqui	banana bush	C		1	0
plants	Gomphocarpus physocarpus	balloon cottonbush	Y		1	0
plants	Parsonsia straminea	monkey rope	C		1	0
plants	Parsonsia ventricosa		C		1	1
plants	Parsonsia largiflorens		E		1	1
plants	Trachymene incisa subsp. incisa		C		1	0

plants	Polyscias elegans	celery wood		C	1	0
plants	Astrotricha latifolia			C	1	0
plants	Schefflera actinophylla	umbrella tree		C	1	0
plants	Erigeron canadensis		Y		1	0
plants	Crassocephalum crepidioides	thickhead	Y		1	0
plants	Ageratum houstonianum	blue billygoat weed	Y		1	0
plants	Baccharis halimifolia	groundsel bush	Y		1	0
plants	Cyanthillium cinereum			C	1	0
plants	Sigesbeckia orientalis	Indian weed		C	1	0
plants	Sphaeromorphaea australis			C	1	0
plants	Commersonia bartramia	brown kurrajong		C	1	0
plants	Lobelia quadrangularis			C	1	0
plants	Wahlenbergia gracilis	sprawling bluebell		C	1	0
plants	Lobelia purpurascens	white root		C	1	0
plants	Capparis arborea	brush caper berry		C	1	0
plants	Allocasuarina littoralis			C	3	2
plants	Allocasuarina torulosa			C	1	0
plants	Allocasuarina emuina	Mt. Emu she-oak		E E	7	7
plants	Casuarina glauca	swamp she-oak		C	1	0
plants	Hypericum gramineum			C	1	0
plants	Schizomeria ovata	white cherry		C	1	0
plants	Bauera capitata	clustered bauera		C	1	0
plants	Hibbertia scandens			C	1	0
plants	Hibbertia acicularis			C	1	0
plants	Hibbertia salicifolia			C	2	1
plants	Hibbertia aspera			C	1	0
plants	Hibbertia stricta			C	1	0
plants	Hibbertia vestita			C	2	1
plants	Hibbertia linearis			C	2	1
plants	Drosera peltata	pale sundew		C	1	0
plants	Drosera spatulata var. spatulata			C	1	1
plants	Drosera binata	forked sundew		C	2	1
plants	Drosera pygmaea			C	1	0
plants	Drosera spatulata			C	1	0
plants	Diospyros pentamera	myrtle ebony		C	1	0
plants	Elaeocarpus eumundi	Eumundi quandong		C	1	0
plants	Tetratheca thymifolia			C	1	0
plants	Elaeocarpus reticulatus	ash quandong		C	1	0

plants	Elaeocarpus obovatus	blueberry ash	C	1	0
plants	Leucopogon leptospermoides		C	2	1
plants	Sprengelia sprengelioides	sprengelia	C	2	1
plants	Leucopogon pimeleoides		C	1	0
plants	Leucopogon ericoides		C	1	0
plants	Agiortia pedicellata		C	1	0
plants	Acrotriche aggregata	red cluster heath	C	1	0
plants	Leucopogon virgatus	common beard heath	C	1	0
plants	Epacris microphylla		C	1	0
plants	Monotoca scoparia	prickly broom heath	C	1	0
plants	Epacris pulchella	wallum heath	C	1	0
plants	Epacris obtusifolia	common heath	C	2	1
plants	Mallotus philippensis	red kamala	C	1	0
plants	Excoecaria agallocha	milky mangrove	C	1	0
plants	Macaranga tanarius	macaranga	C	1	0
plants	Ricinocarpos pinifolius	wedding bush	C	2	1
plants	Aotus lanigera	pointed aotus	C	2	1
plants	Aotus ericoides	common aotus	C	2	1
plants	Hovea acutifolia		C	1	0
plants	Pultenaea retusa		C	1	0
plants	Dillwynia retorta		C	1	0
plants	Pultenaea villosa	hairy bush pea	C	1	0
plants	Desmodium intortum		Y	1	1
plants	Jacksonia scoparia		C	1	0
plants	Kennedia rubicunda	red Kennedy pea	C	1	0
plants	Oxylobium robustum	tree shaggy pea	C	1	0
plants	Pultenaea paleacea		C	1	0
plants	Desmodium uncinatum		Y	1	0
plants	Glycine clandestina		C	1	0
plants	Mirbelia rubiifolia	heathy mirbelia	C	2	1
plants	Pultenaea myrtoides		C	2	1
plants	Daviesia umbellulata		C	2	1
plants	Dillwynia floribunda		C	1	0
plants	Phyllota phylicoides	yellow peabush	C	1	0
plants	Platylobium formosum	flat pea	C	1	0
plants	Crotalaria grahamiana		Y	1	1
plants	Gompholobium pinnatum	poor mans gold	C	1	0
plants	Gompholobium virgatum		C	1	0

plants	Hardenbergia violacea			C	1	0
plants	Austrosteenisia blackii	bloodvine		C	1	0
plants	Desmodium rhytidophyllum			C	1	0
plants	Dampiera			C	1	0
plants	Goodenia stelligera			C	2	1
plants	Goodenia bellidifolia			C	1	0
plants	Goodenia rotundifolia			C	1	0
plants	Velleia spathulata	wild pansies		C	1	0
plants	Dampiera sylvestris	blue dampiera		C	1	1
plants	Gonocarpus micranthus subsp. ramosissimus			C	1	0
plants	Gonocarpus chinensis subsp. verrucosus			C	1	0
plants	Westringia tenuicaulis	tufted westringia		C	1	0
plants	Clerodendrum floribundum			C	1	0
plants	Gmelina leichhardtii	white beech		C	1	0
plants	Utricularia dichotoma	fairy aprons		C	1	0
plants	Utricularia aurea	golden bladderwort		C	1	0
plants	Mitrasacme paludosa			C	1	0
plants	Rotala rotundifolia		Y		1	1
plants	Hibiscus heterophyllus			C	1	0
plants	Sida rhombifolia		Y		1	0
plants	Melastoma candidum		Y		1	1
plants	Melastoma malabathricum subsp. malabathricum			C	1	0
plants	Synoum glandulosum			C	1	0
plants	Acacia disparrima subsp. disparrima			C	2	0
plants	Acacia longissima			C	1	0
plants	Acacia maidenii	Maiden's wattle		C	1	0
plants	Acacia attenuata			V V	2	1
plants	Acacia oshanesii			C	1	0
plants	Acacia leiocalyx subsp. leiocalyx			C	1	0
plants	Acacia baueri subsp. baueri	tiny wattle		V	3	2
plants	Acacia melanoxylon	blackwood		C	1	0
plants	Acacia hubbardiana			C	1	0
plants	Acacia ulicifolia			C	1	0
plants	Acacia suaveolens	sweet wattle		C	2	1
plants	Acacia penninervis var. penninervis			C	1	0
plants	Acacia complanata	flatstem wattle		C	1	0
plants	Acacia cincinnata			C	1	0
plants	Ficus coronata	creek sandpaper fig		C	1	0

plants	Maclura cochinchinensis	cockspur thorn	C		1	0
plants	Myrsine variabilis		C		1	0
plants	Myrsine subsessilis		C		1	0
plants	Eucalyptus racemosa subsp. racemosa	scribbly gum	C		1	0
plants	Acmena smithii	lillypilly satinash	C		1	0
plants	Melaleuca nodosa		C		1	0
plants	Syzygium oleosum	blue cherry	C		1	0
plants	Baeckea imbricata	spindly baeckea	C		1	0
plants	Melaleuca sieberi		C		1	0
plants	Syzygium australe	scrub cherry	C		1	0
plants	Baeckea frutescens		C		3	2
plants	Corymbia gummifera	red bloodwood	C		1	0
plants	Eucalyptus grandis	flooded gum	C		1	0
plants	Eucalyptus robusta	swamp mahogany	C		1	0
plants	Melaleuca salicina		C		1	0
plants	Austromyrtus dulcis	midgen berry	C		1	0
plants	Corymbia intermedia	pink bloodwood	C		1	0
plants	Leptospermum whitei		C		2	1
plants	Ochrosperma lineare		C		1	0
plants	Eucalyptus pilularis	blackbutt	C		1	0
plants	Eucalyptus propinqua	small-fruited grey gum	C		1	0
plants	Eucalyptus tindaliae	Queensland white stringybark	C		1	0
plants	Homoranthus virgatus	twiggy homoranthus	C		2	1
plants	Melaleuca thymifolia	thyme honeymyrtle	C		1	0
plants	Corymbia trachyphloia		C		1	0
plants	Eucalyptus microcorys		C		1	0
plants	Eucalyptus resinifera	red mahogany	C		1	0
plants	Lophostemon confertus	brush box	C		1	0
plants	Melaleuca pachyphylla		C		1	0
plants	Syncarpia glomulifera		C		1	0
plants	Leptospermum speciosum		C		1	0
plants	Lophostemon suaveolens	swamp box	C		1	0
plants	Rhodomyrtus psidioides	native guava	C		1	0
plants	Waterhousea floribunda	weeping lilly pilly	C		1	0
plants	Eucalyptus conglomerata	swamp stringybark	E	E	2	1
plants	Eucalyptus tereticornis		C		1	0
plants	Leptospermum trinervium	woolly tea-tree	C		1	0
plants	Melaleuca quinquenervia	swamp paperbark	C		1	0

plants	Leptospermum juniperinum	prickly tea-tree	C	1	0
plants	Leptospermum liversidgei		C	3	2
plants	Leptospermum semibaccatum	wallum tea-tree	C	3	2
plants	Pilidiostigma rhytispermum		C	1	0
plants	Leptospermum polygalifolium	tantoon	C	1	0
plants	Ochna serrulata	ochna	Y	1	0
plants	Olax retusa		C	2	1
plants	Notelaea longifolia		C	1	0
plants	Notelaea ovata	forest olive	C	1	0
plants	Ludwigia octovalvis	willow primrose	C	1	0
plants	Oxalis corniculata		Y	1	0
plants	Passiflora subpeltata	white passion flower	Y	1	0
plants	Breynia oblongifolia		C	1	0
plants	Glochidion ferdinandi		C	1	0
plants	Glochidion sumatranum	umbrella cheese tree	C	1	0
plants	Pseudanthus orientalis		C	2	1
plants	Petalostigma triloculare	forest quinine	C	1	0
plants	Pittosporum revolutum	yellow pittosporum	C	1	0
plants	Billardiera scandens		C	1	0
plants	Comesperma hispidulum		C	1	0
plants	Persicaria strigosa		C	1	0
plants	Persicaria orientalis	princes feathers	C	1	0
plants	Rumex brownii	swamp dock	C	1	0
plants	Persoonia sericea	silky geebung	C	1	0
plants	Hakea actites		C	1	0
plants	Strangea linearis	strangea	C	2	1
plants	Lomatia silaifolia	crinkle bush	C	1	0
plants	Banksia oblongifolia	dwarf banksia	C	1	0
plants	Persoonia cornifolia	broad-leaved geebung	C	1	0
plants	Petrophile canescens		C	1	0
plants	Petrophile shirleyae		C	1	0
plants	Conospermum taxifolium	devil's rice	C	2	1
plants	Banksia spinulosa var. collina		C	1	0
plants	Banksia integrifolia subsp. integrifolia		C	1	0
plants	Banksia robur	broad-leaved banksia	C	1	0
plants	Hakea florulenta	three-nerved willow hakea	C	1	0
plants	Banksia aemula	wallum banksia	C	1	0
plants	Persoonia virgata	small-leaved geebung	C	2	1

plants	Alphitonia excelsa	soap tree		C	1	0
plants	Rhaphiolepis indica	Indian hawthorn	Y		1	1
plants	Rubus moluccanus			C	1	0
plants	Gynochthodes jasminoides			C	1	0
plants	Psychotria loniceroides	hairy psychotria		C	1	0
plants	Pomax umbellata			C	1	0
plants	Melicope elleryana			C	1	0
plants	Zieria minutiflora			C	1	0
plants	Boronia rosmarinifolia	forest boronia		C	1	0
plants	Philotheca queenslandica			C	1	0
plants	Boronia falcifolia	wallum boronia		C	3	2
plants	Phebalium woombye	wallum phebalium		C	1	0
plants	Boronia rivularis	Wide Bay boronia		NT	4	3
plants	Zieria minutiflora subsp. minutiflora			C	1	1
plants	Zieria laxiflora	wallum zieria		C	2	1
plants	Zieria smithii			C	1	0
plants	Acronychia laevis	glossy acronychia		C	1	0
plants	Mischocarpus pyriformis			C	1	0
plants	Dodonaea triquetra	large-leaved hop bush		C	1	0
plants	Jagera pseudorhus			C	1	0
plants	Guioa semiglauca	guioa		C	1	0
plants	Cupaniopsis anacardioides	tuckeroo		C	1	0
plants	Solanum nigrum		Y		1	0
plants	Solanum seaforthianum	Brazilian nightshade	Y		1	0
plants	Duboisia myoporoides			C	1	0
plants	Stackhousia nuda			C	1	1
plants	Stylidium debile	frail trigger plant		C	1	0
plants	Stylidium graminifolium	grassy-leaved trigger-flower		C	2	1
plants	Stylidium schizanthum			C	1	0
plants	Stylidium ornatum			C	1	1
plants	Symplocos thwaitesii	buff hazelwood		C	1	0
plants	Wikstroemia indica	tie bush		C	1	0
plants	Pimelea linifolia			C	3	2
plants	Trema tomentosa var. aspera			C	1	0
plants	Lantana camara	lantana	Y		1	0
plants	Hybanthus stellarioides			C	1	0
plants	Cissus hypoglauca			C	1	0
plants	Avicennia marina subsp. australasica			C	1	0

plants	Eupomatia laurina	bolwarra	C	1	0
plants	Cassytha pubescens	downy devil's twine	C	1	0
plants	Cinnamomum camphora	camphor laurel	Y	1	0
plants	Cryptocarya bidwillii	yellow laurel	C	1	0
plants	Cryptocarya glaucescens		C	1	0
plants	Endiandra sieberi	hard corkwood	C	1	0
plants	Cassytha glabella		C	1	0
plants	Cryptocarya macdonaldii	McDonald's laurel	C	1	0
plants	Stephania japonica		C	1	0
plants	Hypserpa decumbens		C	1	0
plants	Nymphaea gigantea		C	1	0
plants	Piper hederaceum		C	1	0
plants	Ranunculus inundatus	river buttercup	C	1	0
plants	Crinum pedunculatum	river lily	C	1	0
plants	Gymnostachys anceps	settler's flax	C	1	0
plants	Livistona australis	cabbage tree palm	C	1	0
plants	Archontophoenix cunninghamiana	piccabeen palm	C	1	0
plants	Blandfordia grandiflora	christmas bells	E	2	1
plants	Burchardia umbellata		C	2	1
plants	Commelina diffusa	wandering jew	C	1	0
plants	Fimbristylis dichotoma	common fringe-rush	C	1	0
plants	Rhynchospora corymbosa		C	1	0
plants	Schoenus melanostachys		C	1	0
plants	Fimbristylis pauciflora		C	1	0
plants	Schoenoplectiella mucronata		C	1	0
plants	Cyperus haspan subsp. juncoides		C	1	1
plants	Schoenus calostachyus		C	2	1
plants	Lepidosperma laterale		C	1	0
plants	Schoenus brevifolius		C	2	1
plants	Rhynchospora brownii	beak rush	C	1	0
plants	Lepironia articulata		C	1	0
plants	Chorizandra cymbaria		C	1	0
plants	Cyathochaeta diandra	sheath rush	C	1	0
plants	Cyperus polystachyos		C	1	0
plants	Cyperus brevifolius	Mullumbimby couch	Y	1	0
plants	Scleria sphacelata		C	1	0
plants	Schoenus scabripes		C	3	2
plants	Gahnia aspera		C	1	0

plants	Scleria levis		C	1	0
plants	Carex appressa		C	1	0
plants	Carex maculata		C	1	0
plants	Caustis blakei		C	1	0
plants	Cyperus fulvus		C	1	0
plants	Cyperus haspan		C	1	0
plants	Gahnia clarkei	tall sawsedge	C	1	0
plants	Scleria rugosa		C	1	0
plants	Baumea muelleri		C	1	0
plants	Cyperus lucidus		C	1	0
plants	Schoenus apogon		C	1	0
plants	Baumea articulata	jointed twigrush	C	1	0
plants	Baumea rubiginosa	soft twigrush	C	1	0
plants	Carex horsfieldii		C	1	0
plants	Caustis recurvata		C	2	1
plants	Cyperus bowmannii		C	1	0
plants	Cyperus difformis	rice sedge	C	1	0
plants	Cyperus exaltatus	tall flatsedge	C	1	0
plants	Gahnia sieberiana	sword grass	C	1	0
plants	Isolepis inundata	swamp club rush	C	1	0
plants	Baumea teretifolia		C	1	0
plants	Cyperus leiocaulon		C	1	0
plants	Schoenus paludosus		C	2	1
plants	Dioscorea transversa	native yam	C	1	0
plants	Eriocaulon australe		C	2	1
plants	Flagellaria indica	whip vine	C	1	0
plants	Haemodorum tenuifolium		C	2	1
plants	Geitonoplesium cymosum	scrambling lily	C	1	0
plants	Dianella caerulea var. vannata		C	1	1
plants	Dianella caerulea		C	1	0
plants	Dianella longifolia		C	1	0
plants	Patersonia fragilis		C	2	1
plants	Patersonia sericea		C	1	0
plants	Tricoryne elatior	yellow autumn lily	C	1	0
plants	Tricoryne muricata		C	1	1
plants	Caesia parviflora var. parviflora		C	1	1
plants	Tricoryne anceps subsp. pterocaulon		C	1	0
plants	Juncus prismatocarpus	branching rush	C	1	0

plants	Juncus usitatus		C	1	0
plants	Juncus continuus		C	1	0
plants	Juncus polyanthemus		C	1	0
plants	Cycnogeton multifructus		C	1	0
plants	Lomandra laxa	broad-leaved matrush	C	1	0
plants	Cordyline rubra	red-fruited palm lily	C	1	0
plants	Lomandra hystrix		C	1	0
plants	Sowerbaea juncea	vanilla plant	C	2	1
plants	Eustrephus latifolius	wombat berry	C	1	0
plants	Laxmannia gracilis	slender wire lily	C	1	0
plants	Lomandra longifolia		C	1	0
plants	Lomandra multiflora		C	1	0
plants	Thysanotus tuberosus		C	1	0
plants	Lomandra elongata		C	1	1
plants	Cymbidium suave		C	1	0
plants	Cymbidium madidum		C	1	0
plants	Geodorum densiflorum	pink nodding orchid	C	1	0
plants	Cryptostylis erecta	bonnet orchid	C	1	0
plants	Thelymitra ixioides		C	1	0
plants	Dipodium punctatum		C	1	0
plants	Freycinetia scandens		C	1	0
plants	Philydrum lanuginosum	frogsmouth	C	1	0
plants	Leersia hexandra	swamp rice grass	C	1	0
plants	Themeda triandra	kangaroo grass	C	1	0
plants	Entolasia stricta	wiry panic	C	1	0
plants	Eriachne glabrata		C	1	0
plants	Oplismenus mollis		C	1	0
plants	Ischaemum australe		C	1	0
plants	Oplismenus aemulus	creeping shade grass	C	1	0
plants	Paspalidium gausum		C	1	0
plants	Sacciolepis indica	Indian cupscale grass	C	1	0
plants	Capillipedium parviflorum	scented top	C	1	0
plants	Digitaria didactyla	Queensland blue couch	Y	1	0
plants	Entolasia marginata	bordered panic	C	1	0
plants	Eragrostis elongata		C	1	0
plants	Imperata cylindrica	blady grass	C	1	0
plants	Paspalum conjugatum	sourgrass	Y	1	0
plants	Cymbopogon refractus	barbed-wire grass	C	1	0

plants	Digitaria parviflora		C	1	0
plants	Eragrostis pubescens		C	1	0
plants	Ottochloa gracillima	pademelon grass	C	1	0
plants	Andropogon virginicus	whiskey grass	Y	1	0
plants	Sporobolus virginicus	sand couch	C	1	0
plants	Paspalum scrobiculatum	ditch millet	C	1	0
plants	Eragrostis paniciformis		Y	1	1
plants	Panicum simile		C	1	0
plants	Briza maxima	quaking grass	Y	1	0
plants	Setaria sphacelata		Y	1	0
plants	Empodisma minus	spreading rope rush	C	2	1
plants	Baloskion pallens		C	1	0
plants	Leptocarpus tenax		C	1	0
plants	Lepyrodia scariosa		C	1	0
plants	Baloskion tetraphyllum subsp. meiostachyum		C	1	0
plants	Hypolaena fastigiata	tassel rope rush	C	1	0
plants	Eurychorda complanata		C	1	0
plants	Sporadanthus caudatus		C	1	0
plants	Sporadanthus interruptus		C	1	0
plants	Baloskion tenuiculme		C	1	0
plants	Smilax glyciphylla	sweet sarsaparilla	C	1	0
plants	Smilax australis	barbed-wire vine	C	1	0
plants	Typha orientalis	broad-leaved cumbungi	C	1	0
plants	Xanthorrhoea fulva	swamp grasstree	C	1	0
plants	Xanthorrhoea macronema		C	1	0
plants	Xanthorrhoea latifolia subsp. latifolia		C	1	0
plants	Xyris complanata	yellow-eye	C	1	0
plants	Xyris juncea	dwarf yellow-eye	C	1	0
plants	Alpinia caerulea	wild ginger	C	1	0
plants	Selaginella uliginosa	swamp selaginella	C	1	0

Appendix H – Cultural Heritage Risk Assessment

Cultural Heritage Risk Assessment	Revision Number: 2
	Effective Date: 07.12.2016

Executive Summary

This CHRA provides an analysis of the cultural heritage risks pertaining to Sippy Downs-Palmview Option 10 (the Project), including a consideration of both Historical and Indigenous heritage requirements. The CHRA finds that the Project is a high risk to cultural heritage because it requires works in previously undisturbed areas, and in previously disturbed areas with a high potential for residual cultural heritage significance. In summary, the Project has the following risk profile:

☐ No Historical or Indigenous cultural heritage issues (Low Risk)

☐ Historical heritage issues:

☒ Indigenous heritage issues: works in previously undisturbed areas, and in previously disturbed areas with a high potential for residual cultural heritage significance. Further assessment required.

Further details on management recommendations for Sippy Downs-Palmview Option 10 are provided in Table 1.

Project Details			
PDO District	North Coast		
Project name & number	Deliberation		
Project manager			
Location			
Local Government	Sunshine Coast RC	**WBS**	N/A
Road/Facility No	N/A	**DMS reference**	N/A

Project Scope				
Nature of Works:	☐ Maintenance	☒ New construction	☐ Site Investigations	
	☐ Other:			
Phase:	☒ Concept	☐ Development	☐ Construction	☐ Other:
Estimated works start date:	N/A			
Scope of works: Plans/design drawings/project drawings to be attached in Appendices section (at rear)	Upgrade of approximately 2km of the existing Sunshine Motorway, including the addition of on and off ramps and better separation of service roads. Disturbance footprint up to 150m from existing infrastructure, but generally within 50m.			

Project Scope	
Are there ancillary works? If Yes, describe briefly	Unknown, but likely.
Aboriginal Party/ies for project area: Complete this section based on results of DATSIP search (question 4 below).	Kabi Kabi First Nation Queensland South Native Title Services Limited PO Box 10832, Adelaide Street BRISBANE QLD 4000 Phone: (07) 3224 1200 Freecall: 1800 663 693 Fax (07) 3229 9880 Email: reception@qsnts.com.au
Has there been previous cultural heritage assessment/s for any or all of the project area? If yes, provide relevant details	N/A

Management Recommendations

Only complete this table when you have completed Tables 2-6 below, if applicable. **Complete this table for ALL works. Describe landscape information for entire project/works (i.e. each section and associated disturbance areas).**

This section requires an ACCURATE DESCRIPTION OF THE 'ON GROUND' SITE CONDITIONS. Ensure that supporting documents are attached in the Appendices section (n.b. the duty of care category can change throughout works sections, e.g. works near specific vegetation &/or features like watercourses etc.)

Table 1 Overall Management Recommendations

Location description: Section / Chainage / GPS Coordinates / Waterway Name	**Property:** Lot on plan	**Past use/ground disturbance description:** (summarise land use/ground disturbance – attach aerials/site photos/other information as appendix to illustrate) E.g. evidence of past mechanical disturbance	**Description of Vegetation / Features within works spans** E.g. Rivers & creeks, rock outcrops, remnant or regrowth, open woodland grassland etc.	**Category** (Low risk or High Risk Duty of Care Category)	**Management Recommendations**
Deliberation		Potentially uncleared Location of DATSIP site KC:B75	*Melaleuca quinquenervia* open forest and *Banksia aemula* low woodland on coastal alluvium, on ridge	High Risk Cat 5 (See Figure 10)	Further assessment, consultation with Aboriginal Party
		Potentially uncleared	*Eucalyptus pilularis* tall open forest on sedimentary rocks, on ridge	High Risk Cat 5 (See Figure 10)	Further assessment, consultation with Aboriginal Party
		Previous clearing and grading (1970s, 1990s, 2000s), previous road construction (1970s, 1980s)	Cleared road corridor, including areas of pavement	Low Risk Cat 4 (See Figure 10)	Low potential for residual cultural heritage significance Chance finds protocols and cultural heritage inductions

Location description: Section / Chainage / GPS Coordinates / Waterway Name	**Property:** Lot on plan	**Past use/ground disturbance description:** (summarise land use/ground disturbance – attach aerials/site photos/other information as appendix to illustrate) E.g. evidence of past mechanical disturbance	**Description of Vegetation / Features within works spans** E.g. Rivers & creeks, rock outcrops, remnant or regrowth, open woodland grassland etc.	**Category** (Low risk or High Risk Duty of Care Category)	**Management Recommendations**
Deliberation		Previous clearing (1970s), clearing and grading (1980s, 1990s, 2000s)	Vegetated road corridor on ridge	Moderate-High Risk Cat 4 (See Figure 10)	Moderate-high potential for residual cultural heritage significance Chance finds protocols and cultural heritage inductions Consider further assessment
		Previous clearing (1970s), clearing and grading (1980s, 1990s, 2000s)	Vegetated road corridor on former swamp	Low Risk Cat 4 (See Figure 10)	Low potential for residual cultural heritage significance Chance finds protocols and cultural heritage inductions
		Previous clearing (1970s), clearing and grading (1980s, 1990s, 2000s)	Partly vegetated road corridor on ridge	Moderate-High Risk Cat 4 (See Figure 10)	Moderate-high potential for residual cultural heritage significance Chance finds protocols and cultural heritage inductions Consider further assessment
		Existing road	Roadway, artificial land surface	Cat 3 (See Figure 10)	Chance finds protocols and cultural heritage inductions

Historical cultural heritage assessment

Table 2 Historical Heritage Assessment

Are there any historical cultural heritage places/values inside or within 100 metres of the proposed works area? Search the following:	Yes	No
Queensland Heritage Register ***Comment***: There are no SHR places within 2.5km of the Project.	☐	☒
Australian Heritage Database: ***Comment***: There are no CHL or NHL places within 5 km of the Project. The Project is within two RNE listed places: Mooloolah River National Park (RNE#8706) and the Mooloolah River Area (RNE# 7799) (Figure 1). However, the RNE is no longer a statutory archive, and both places are listed solely for their natural heritage values.	☐	☒
Australian National Shipwreck Database: ***Comment***: There are no shipwrecks within 5km of the Project	☐	☒
Queensland National Trust Heritage Register ***Comment***: N/A	☐	☐
Contact the relevant local government ***Comment***: There are no Local Heritage Places within 2.5km of the Project	☐	☒

Stage 1 Indigenous cultural heritage assessment

Table 3 Preliminary Risk Factors

Preliminary Risk Factors	Yes	No
Question 1: Are there any existing Cultural Heritage Management Agreement/s over any part of the project area? Are there any Cultural Heritage Network Agreements, Cultural Heritage Corridor Agreements, Service Level Agreements or any other deed or agreements with Aboriginal Party/ies over any part of the project area (inc. where ancillary works will occur)? ***Comment***: N/A	☐	☒
Question 2: Are project works proposed in the Torres Strait Islands or in/near remote mainland Aboriginal communities? ***Comment***: Works are in a developed area on the mainland.	☐	☒
Question 3: Are there any political or community issues or concerns in the area to be impacted by the project works? ***Comment***: None known.	☐	☒
Question 4: Search DATSIP's Aboriginal and Torres Strait Islander Cultural Heritage Database and Register. Did your DATSIP search identify any recorded cultural heritage sites? ***Comment***: There is one DATSIP site – Scarred Tree (KC:B75) – within or directly adjacent to the western most extent of the works (Figure 2). However, an inspection of this tree (Figure 3) suggests that the marks are unlikely to be the result of Aboriginal cultural practice. This is firstly because the species -- *Eucalyptus racemose* (Scribbly Gum) – does not provide useful bark, and is not generally associated with Aboriginal modification (NSW Department of Environment & Conservation, 2005). Secondly, the unsymmetrical scar, which is tear shaped with ragged edges, is consistent with a branch tear rather than cultural scarring. Lastly, the dry face of the scar (the exposed heart wood) has been cut numerous times with a steel blade, which is again consistent with the removal of a torn limb rather than Aboriginal scarring.	☒	☐
Question 5: Is it likely that any of the DATSIP recorded sites will be impacted by the project works? ***Comment***: There is one DATSIP site – Scarred Tree (KC:B75) – which is likely to be impacted by the works (Figure 2). As discussed in Question 4, however, this Scarred Tree is unlikely to be the result of Aboriginal modification, and thus is unlikely to have Aboriginal heritage value.	☒	☐

Table 4 Category Risk Factors

Category 1 Risk Factors	Yes	No
Question 6: Will ANY project works be undertaken OUTSIDE the footprint of an existing DTMR asset? ***Comment***: Much of the work will be located within the existing road footprint, or in the adjacent area of existing disturbance. However, there are two sections of road that appear to be outside of the current footprint: the new off-ramp to Sippy Downs Drive and the new road on the northern side of the motorway, opposite the Kawana Way interchange (see Question 10, 14).	☒	☐
Question 7: Do the project works involve Surface Disturbance? ***Comment***: The Project will require earthworks along the entirety of the current alignment, including the existing infrastructure footprint and currently undeveloped areas.	☒	☐

Stage 2 Indigenous cultural heritage assessment

Table 5 Category 2 Risk Factors

Category 2 Risk Factors	Yes	No
Question 8: Will ANY project works cause any ground disturbance that is inconsistent with previous surface disturbance? ***Comment***: Much of the work will be located within the existing road footprint, or in the adjacent area of existing disturbance. However, there are two sections of road that appear to be outside of the current footprint: the new off-ramp to Sippy Downs Drive and the new road on the northern side of the motorway, opposite the Kawana Way interchange (see Question 10, 14). Works in these areas would constitute additional disturbance.	☒	☐
Question 9: Will ANY project works impact vegetation? If so, will the works cause any additional disturbance compared to that has previously occurred (e.g. is the clearing of remnant vegetation)? ***Comment***: A 1902 Bribie Parish Map shows that the Project area was initially part of a large timber reserve (Figure 4). However, a topographic map from 1945 suggests that the Project area was uncleared at this point, consisting of a low ridge vegetated by mangroves (Figure 5). A track is shown running along the top of the ridge, providing egress through the surrounding swamp The Project area still appears uncleared in a 1958 aerial photograph, with the track along the ridgeline faintly visible on the southern side of the ridge (Figure 6). The track is very narrow and, for the most parts, skirts the tree line, suggesting that little vegetation clearance was undertaken for its construction. The first evidence of vegetation clearance in the Project area comes in the mid-1970s, when Dixon Road was built along the ridge. A 20-30m wide corridor was cleared and graded for this project, but the vegetation outside of this corridor appears to remain intact. The original track remains visible to the south of the new road Figure 7. Further clearance works were required in the early 1990s, when the first stage of the Sunshine Motorway was constructed to the south of the Dixons Road, and to the north of the original track. A corridor approximately 90m wide was cleared during construction, extending from north of Dixons Road to just south of the current road, and additional areas were cleared around Claymore Road for toll infrastructure. Much of the original track appears to have been destroyed or subsumed at this stage, but the far western section remained around Claymore Road, as did surrounding stands of vegetation (Figure 8). In the mid-2000s, the Sunshine Motorway was duplicated, with a two lane carriage way constructed to the south of the original road. The corridor cleared for this work was approximately 100m wide, extending from north of Dixons Road to the service track south of the current motorway. The original track is no longer visible at this stage, either subsumed or removed during the works. Throughout these various construction works, discrete pockets of vegetation appear to	☒	☐

Category 2 Risk Factors	Yes	No
remain uncleared in or adjacent to the Project area, including near the alignment of the proposed Sippy Downs Drive off-ramp, and the area to the north of the motorway, opposite the Kawana Way interchange. Clearing of these or any of the other uncleared areas will likely constitute additional disturbance (Figure 9).		

Table 6 Category 3 Risk Factors

Category 3 Risk Factors	Yes	No
Question 10: Will ANY project works be conducted in areas that are NOT "developed areas"? ***Comment***: Most of the works will be within the disturbance footprint of the existing road. However, the proposed Sippy Downs Drive off-ramp is located outside of this footprint, as are the proposed works on the northern side of the motorway, opposite the Kawana Way interchange.	☒	☐
Additional Risk Checklist		
Despite works being duty of care Category 2 or 3, there are other risk factors that can be considered. Some of DTMR's existing asset areas may still have residual Cultural Heritage present, which may or may not be recorded.		
Question 11: Are ANY project works in an high risk landscape or geographic area? Tip: High risk areas include feature such as: • mature and/or remnant vegetation • Rock Outcrops • Foreshores and coastal dunes • Sand hills • Some hill and mound formations • Wetlands • Permanent and semi-permanent waterholes ***Comment***: The Project works are located on a low ridge adjacent to wetlands, which are a rich resource extraction area for Aboriginal people (Brockwell, 2013; Hall, 1985). There are also stands of mature (possibly old growth) vegetation that may be impacted by the works.	☒	☐
Question 12: Are you aware of any places, items, features or objects in the proposed works area that might be of Cultural Heritage value (Indigenous and Historical) but which might not have been registered in the past? ***Comment***: There is a high potential for additional Aboriginal cultural heritage places or objects within the Project area. As noted above, the Project area occupies a low ridge surrounded by wetlands. This ridge provides an obvious point of access through the wetlands, and it is highly likely that an Aboriginal pathway existed in the Project area before tracks or roads were constructed.	☒	☐

Category 3 Risk Factors	Yes	No
The ridge also provides an good point from which Aboriginal people might access the wetlands for resource extraction, and it is possible that small, temporary camps were located in this area, with the larger living sites situated on the higher ridges to the west (approximately 2km from the Project area). Aboriginal use of this ridgeline is evidenced by the presence of eight artefact scatters along its eastern extent, adjacent to Kawana Way (500m east of the Project) (Figure 2). There is a strong likelihood that similar types and densities of Aboriginal places existed in the Project area..		
Question 13: Are ANY project works in an area that is NOT a previously disturbed area? ***Comment***: Although a good deal of road building activity has already occurred within the Project area, there are discrete pockets of vegetation that appear to have remained uncleared. This includes stands of vegetation near the alignment of the proposed Sippy Downs Drive off-ramp, and near the upgrades on the northern side of the motorway, opposite the Kawana Way interchange. Works in these or any of the other uncleared areas will likely constitute additional disturbance (Figure 9).	☒	☐

Stage 3 Indigenous cultural heritage assessment

The purpose of this section is to establish whether the project works are 'Low Risk' or 'High Risk'.

'**High Risk**' projects are:

1 **Category 4 Activities** in areas that have been subject to 'Significant Ground Disturbance' under the *ACHA 2003 Duty of Care Guidelines*, but where the following may apply:

- past ground disturbance has not been thorough or extensive across the entire works area; or
- recorded Cultural Heritage site/s within a DTMR asset; or
- works will traverse or be in the vicinity of landscapes that have higher risk of residual Cultural Heritage being present; or
- where there are known high risk bioregions/landscapes; or
- within the vicinity of commonly known Cultural Heritage places; or
- where cultural material is present within or in very close proximity to the corridor/asset.

2 **Category 5 Activities** are those that do not fit under any other category outlined in this process or the *ACHA 2003 Duty of Care Guidelines*. Category 5 works are those that pose the highest risk of harming Aboriginal Cultural Heritage and these works should not proceed without further Cultural Heritage Assessment and consultation with the Aboriginal Party/ies.

Table 7 Category 4 or 5 Risk Factors

Category 4 or 5 Risk Factors	Yes	No
Question 14: Will any of the project works cause additional surface disturbance? ***Comment***: Although a good deal of road building activity has already occurred within the Project area, there are discrete pockets of vegetation that appear to have remained uncleared. This includes stands of vegetation near the alignment of the proposed Sippy Downs Drive off-ramp, and near the upgrades on the northern side of the motorway, opposite the Kawana Way interchange. Works in these or any of the other uncleared areas will likely constitute additional disturbance (Figure 9).	☒	☐
Question 15: Will any of the project works cause direct disturbance to any high risk landscapes or features? Note: "Disturbance" is defined under question 14 above. Tip: An accurate answer to this question requires a site inspection, and also review available reports on the EMS Cultural Heritage reports library ***Comment***: As discussed, the Project area occupies a low ridge that is surrounded by wetlands. This ridge provides an obvious point of access through the wetlands, and it is highly likely that an Aboriginal pathway existed in the Project area before tracks or roads were constructed. The ridge also provides an good point from which Aboriginal people might access the wetlands for resource extraction, and it is possible that small, temporary camps were located in this area, with the larger living sites situated on the higher ridges to the west (approximately 2km from the Project area) (Brockwell, 2013; Hall, 1985; Lilley, 1984). Aboriginal use of this ridgeline is evidenced by the presence of eight artefact scatters along its eastern extent, adjacent to Kawana Way (500m east of the Project). There is a strong likelihood that similar types and densities of Aboriginal places existed in the Project area. The extent of previous road building in the Project area means that, for the most part, any Aboriginal sites that existed will have been disturbed or destroyed. However, there are some discrete areas within the Project footprint where disturbance in minimal, and where any extant remains might be preserved. There is also good potential for previously disturbed areas to retain residual cultural heritage significance, such as disturbed artefact scatters or isolated artefacts.	☒	☐

Sign-off

Name:	**Name**:
Kate Quirk	insert name
Position:	**Position**:
Senior Cultural Heritage Specialist (AECOM)	**Project Manager**
Signature:	Signature:
Date:	Date:
/ /	/ /

Note

This assessment of the project shall remain current for a period of 12 months. Commencement after that date will require revision to ensure its accuracy/currency. Should any part of the project scope (location or activities) change, this assessment must be revised. The results of the revision shall be documented.

Disclaimer

Unless informed otherwise TMR is acting in good faith that all results and information provided to the Department by relevant stakeholders and authorities is accurate and reliable information for the purposes of this risk assessment.

Appendices

Have you attached:

☐ Initial site inspection notes and/or photos

☐ DATSIP Cultural Heritage Database and Register search results

☐ Maps/plans/design drawings showing known Historical and Indigenous sites and boundary of area covered by this assessment

☐ Photos of known Historical and Indigenous sites and/or high risk landscapes/features

☐ Any other documents collected during this CHRA (e.g. historical aerial imagery, evidence of previous ground disturbance, and so on)

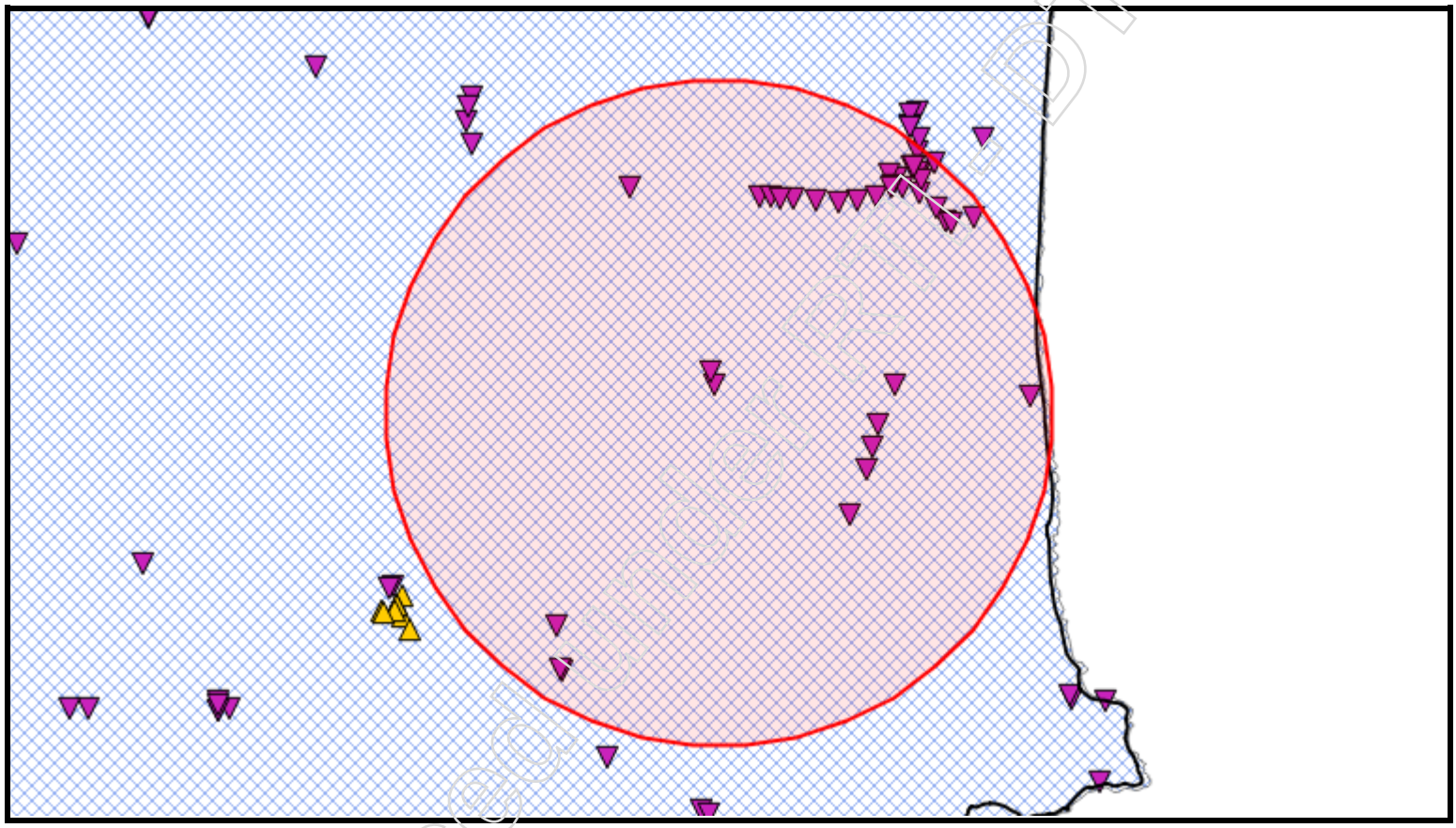
Deliberation

Deliberation

Queensland Government
Department of Aboriginal and Torres Strait Islander Partnerships

Latitude/Longitude Search

Reference Number:	14623
Latitude:	-26.746800
Longitude:	153.087000
Buffer Distance:	5000 metres



Cultural heritage site points for the area are:

Site ID	Latitude	Longitude	Record Date	Attribute	Aboriginal Party
KC:A04	-26.742516	153.086283	Jan 1, 1984	Earthern Arrangement(s)	Kabi Kabi First Nation
KC:A04	-26.742516	153.086283	Aug 1, 1994	Earthern Arrangement(s)	Kabi Kabi First Nation
KC:B75	-26.712666	153.073446	Oct 4, 1990	Scarred/Carved Tree	Kabi Kabi First Nation
KC:D29	-26.710834	153.112653	Feb 14, 1995	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Aug 1, 1994	Shell Midden(s)	Kabi Kabi First

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					Nation
KC:D30	-26.713735	153.117065	Aug 1, 1994	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Jan 29, 2002	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.713735	153.117065	Jan 29, 2002	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Jan 1, 2001	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.713735	153.117065	Jan 1, 2001	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.713735	153.117065	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:E63	-26.717189	153.125357	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:E63	-26.717189	153.125357	Apr 1, 1993	Shell Midden(s)	Kabi Kabi First Nation
KC:E64	-26.709023	153.119336	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:E65	-26.715821	153.119776	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:E66	-26.717933	153.121055	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:F83	-26.714305	153.0947	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F84	-26.714503	153.096138	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F85	-26.714628	153.098299	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F86	-26.714887	153.101607	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F87	-26.715074	153.104915	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F88	-26.714819	153.10779	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F89	-26.714185	153.110746	Jan 29, 2002	Artefact Scatter	Kabi Kabi First Nation
KC:F89	-26.714185	153.110746	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation

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KC:F90	-26.714144	153.093011	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F91	-26.740666	153.085833	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F92	-26.71281	153.114575	Jan 29, 2002	Shell Midden(s)	Kabi Kabi First Nation
KC:F92	-26.71281	153.114575	Oct 22, 2001	Shell Midden(s)	Kabi Kabi First Nation
KC:G82	-26.761977	153.106816	Sep 10, 2004	Artefact Scatter	Kabi Kabi First Nation
KC:G85	-26.778734	153.062559	Dec 12, 2005	Scarred/Carved Tree	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Aug 7, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Aug 7, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.709691	153.116106	Aug 7, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.709691	153.116106	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.709691	153.116106	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation

Latitude/Longitude Search

Cultural heritage site points for the area are:

Site ID	Latitude	Longitude	Record Date	Attribute	Aboriginal Party
KC:H02	-26.709691	153.116106	Aug 7, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Aug 7, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Aug 7, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H03	-26.709763	153.116257	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H03	-26.709708	153.116418	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H06	-26.707297	153.116817	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H07	-26.718209	153.121936	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H08	-26.711522	153.117515	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H08	-26.710891	153.117173	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H08	-26.710656	153.116841	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H09	-26.751824	153.110004	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H10	-26.742576	153.113555	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H11	-26.748474	153.111036	Apr 2, 2007	Scarred/Carved Tree	Kabi Kabi First Nation
KC:H12	-26.755229	153.109223	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H43	-26.785632	153.063338	Dec 8, 2009	Artefact Scatter	Kabi Kabi First Nation
KC:H44	-26.785434	153.062996	Dec 3, 2004	Artefact Scatter	Kabi Kabi First Nation
KC00000010	-26.744236	153.133948	Jun 13, 2014	Artefact Scatter	Kabi Kabi First Nation

There are no Aboriginal cultural heritage site polygons recorded in your specific search area.

Cultural heritage party for the area is:

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QC Ref Number	QUD Ref Number	Party Name	Contact Details
QC2013/003	QUD280/2013	Kabi Kabi First Nation	Queensland South Native Title Services Limited PO Box 10832, Adelaide Street BBRISBANE QLD 4000 Phone: (07) 3224 1200 Freecall: 1800 663 693 Fax (07) 3229 9880 Email: reception@qsnts.com.au

There is no cultural heritage body recorded in your specific search area.

Cultural Heritage Management Plans (CHMP) for the area are:

CHL Number	Sponsor	Party	Approved
CLH000140	Unknown	Unknown	No Date
CLH000436	Caloundra Maroochy Water Supply Board	Dr Eve Fesl - Gubbi Gubbi People	Jul 13, 2006
CLH000737	Sunshine Coast Regional Council	Gubbi Gubbi	Jun 9, 2009

There are no Designated Landscape Areas (DLA) recorded in your specific search area.

There are no Registered Cultural Heritage Study Areas in your specific search area.

Regional Coordinator:

Name	Position	Phone	Mobile	Email
Andrew Rutch	Cultural Heritage Coordinator Southern Region	1300 378 401	N/R	Andrew.Rutch@datsip.qld.gov.au

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Queensland Government
Department of Aboriginal and Torres Strait Islander Partnerships

Latitude/Longitude Search

I refer to your application in which you requested advice on Aboriginal cultural heritage places recorded on the above location.

I wish to advise that the search has been performed on the inventory of recorded Aboriginal sites as per your description. Attached is a list which highlights the identified Aboriginal cultural heritage sites, as recorded for the search area. However, it is not possible to conclusively guarantee the accuracy of these recordings (in particular, the longitude and latitude location description for each site) and extra diligence is required when operating in these locations.

See Attached Report

All significant Aboriginal cultural heritage in Queensland is protected under the Aboriginal Cultural Heritage Act 2003, and penalty provisions apply for any unauthorized harm. Under the legislation a person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal Cultural Heritage. This applies whether or not such places are recorded in an official register and whether or not they are located in, on or under private land.

Aboriginal cultural heritage, which may occur on the subject property, is protected under the terms of the Aboriginal Cultural Heritage Act 2003 even if the Department of Aboriginal and Torres Strait Islander Partnerships has no records relating to it.

Please refer to our website www.datsip.qld.gov.au/people-communities/aboriginal-and-torres-strait-islander-cultural-heritage for a copy of the gazetted Cultural Heritage duty of care guidelines, which set out reasonable and practical measures for meeting the duty of care. In order to meet your duty of care, any land use activity within the vicinity of the recorded cultural heritage, should not proceed without the agreement of the Aboriginal Party for the area or a Cultural Heritage Management Plan undertaken pursuant to Part 7 of the Aboriginal Cultural Heritage Act 2003.

Should you have any further queries, please do not hesitate to contact the approval officer on 1300 378 401.

Kind regards

The Director
Cultural Heritage | Community Participation | Department of Aboriginal and Torres Strait Islander Partnerships

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Deliberation

Figure 3 DATSIP Scarred Tree KC:B75

Pages 126 through 129 redacted for the following reasons:
- -
Deliberation

Environmental Scoping Report

Palmview/Sippy Downs Integrated Link Strategy: E-W Link

Project No: 60487984

To attribute this material, cite State of Queensland (Department of Transport and Main Roads) 2015, Environmental Scoping Report.

Template Version 7, March 2015

PROJECT DETAILS			
TMR District	North Coast		
Project Name / Description	Palmview/Sippy Downs Integrated Link Strategy		
Project Number	60487984		
Project Location	E-W Link Corridor Preservation		
Local Government Area	Sunshine Coast	**DMS Reference**	

REPORT PREPARATION			
On behalf of TMR, I have prepared this report based on the best information available at the time. I have taken into account, to the fullest extent possible, all actual and potential environmental impacts of the project in accordance with current legislation.			
Name	N/R	**Signature**	
Position	Graduate Environmental Scientist (AECOM)	**Date**	
REPORT REVIEW			
Name	N/R	**Signature**	
Position	Principal Environmental Scientist (AECOM)	**Date**	

VERSION HISTORY			
Version No.	**Date**	**Changed by**	**Nature of Amendment**
0	10/02/2017		
1	29/03/2017		Updated in response to comments made by N/R
2	05/03/2017	N/R	Updated in response to comments from N/R

PROJECT MANAGER ACCEPTANCE			
I agree that this report has been prepared based on the project scope at the time, and accept responsibility for ensuring any future changes to the scope and legislation are appropriately assessed.			
Name		**Signature**	
Position		**Date**	

***Note**: This Environmental Scoping Report shall remain current for 12 months. A review will be required after this time should further subsequent assessment or management actions not be undertaken.*

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EXECUTUVE SUMMARY

Overall the project has been assessed as having an environment and cultural heritage risk of HIGH.

☒ High Risk Projects

This project will potentially impact a number of environmental factors and /or will trigger a number of environmental approvals. There is a need for extensive field environmental assessments during the projects pre-construction. In addition to a field assessment, Appendix A – Future Actions & Cost details further assessments and studies recommended as part of the project's environmental assessment and management. A comprehensive Review of Environmental Factors and Environmental Management Plan (Planning) is required for this project.

Recommendations:

The potential environmental issues associated with this project and recommendations to mitigate (including need for further studies) are summarised below.

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
Water	Disturbance to the Mooloolah River	Design works to minimise impacts to the Mooloolah River. Undertake baseline water quality monitoring. The Mooloolah River is considered to be a watercourse under the *Water Act 2000*; therefore works are to be undertaken in accordance with the DNRM Riverine Protection Permit Exemption Requirements. A number of watercourses are 'yet to be determined' under the Water Act. At the detailed planning stage, it will be necessary to review the current legislative framework to determine if these exemptions still	If works cannot comply with the minimum requirements of the DNRM Riverine Protection Permit Exemption Requirements, a Riverine Protection Permit will be required.

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
		apply and/or the value of seeking a determination from the relevant government department responsible for administering the provisions under the Water Act. A site specific Erosion and Sediment Control Plan will be required in order to minimise impacts on adjacent Mooloolah River tributaries and large drainage areas. Investigation will be needed to, where possible, utilise the local supplies of water and/or recycled water to minimise the environmental impacts during construction.	
Fish habitat	Potential disturbance to fish movement along the Mooloolah River and its distributaries	Design and construction of culvert and drainage works to minimise impacts to fish passage.	Fisheries Development Approval is required for the crossing of the Mooloolah River, as waterway barrier works cannot be completed under self-assessable codes. Culverts for the other waterway crossings should be designed in line with the self-assessable code WWBW01.
Wetlands	Direct impacts to nationally important wetlands (Mooloolah River), and to wetlands of	Works to minimise impacts to wetlands.	NIL

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
	high ecological significance (Mooloolah River and Birtinya wetlands)		
Soil	Erosion and sediment control	Develop concept Erosion and Sediment Control Plan during detailed design.	Nil.
Contaminated land	Potential disturbance of contaminated land.	A search of the EMR and CLR to be completed for all freehold land parcels to be resumed.	Land listed on the EMR or CLR will require a Material Change of Use (MCU) approval for contaminated land management and disposal permit for removal of soil from site.
Acid Sulfate Soil (ASS)	Disturbance of Potential and Actual Acid Sulfate Soil	Detailed and site specific investigations will be required in high risk areas (below 5 m AHD) to determine locations of ASS and PASS.	An appropriate Acid Sulfate Soils Management Plan will be required in order to manage and treat any ASS identified.
Coastal management	Potential impacts to the project due to tidal inundation and erosion	The eastern portion of the project area is mapped within the coastal management district, erosion prone areas due to inundation and flooding areas.	DILGP has assessment manager or referral agency powers and responsibilities to assess certain development applications under the SP Act. Tidal works permits may also be required.
Biodiversity (flora)	Likely clearing of native vegetation, including protected plants	Design to limit the extent of vegetation removal required to the greatest extent possible. Take all reasonable efforts to avoid impact; and, where avoidance is	Field surveys will be required to determine potential impacts to MNES. A referral to the federal DoEE will be required where a self-assessment finds that the proposed project will

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
		not possible, apply reasonable mitigation measures to minimise impacts. Comply with TMR Compliance Management Plan (CMP) for clearing of previously cleared areas for transport infrastructure, which states that in areas of previously cleared or regrowth vegetation, TMR have exemption from the requirement to obtain a permit for the clearing of 'endangered', 'near threatened' or 'least concern' species. The riparian vegetation of the Mooloolah River and the entire Birtinya Wetlands meets remnant status under the VM Act. Therefore, a targeted protected plants survey will be necessary in these areas to determine whether threatened flora is required to be cleared.	have a significant impact on MNES. Should there be a requirement to clear threatened flora in the remnant vegetation, a permit will be required from DEHP and offsets for any significant residual impacts may be required under the *Environmental Offsets Act 2014*.
Biodiversity (fauna)	Potential clearing of fauna habitat	Design to limit the extent of vegetation removal required to the greatest extent possible. Comply with koala Memorandum of Agreement (MoA). Comply with Species Management Program for tampering with animal breeding places (low risk	If tampering with any animal breeding places or removal is required during the construction phase, it is the Contractor's responsibility to ensure activities are undertaken in accordance with either a Species Management Program for tampering with animal breeding

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
		of impacts) 2016. Pre-clearance survey. Fauna spotter catcher required for clearing/construction.	places (low risk of impacts) or Species Management Program for tampering with animal breeding places (high risk of impacts) for threatened flora or fauna habitat. A referral to the federal DoEE will be required where a self-assessment finds that the proposed project will have a significant impact on MNES. If the criteria for exemption from payment of an offset as defined in section 5.3 of MoA cannot be met, make offset payment to DEHP for removal of koala habitat trees.
Biodiversity (pests)	Work in a weed affected area	Develop and implement Pest Management Plan.	NIL
Public amenity/ Health	Minimal air quality, noise quality and vibration impacts to sensitive receptors	It is recommended that future assessment stages consider whether there is a requirement to undertake a noise and vibration assessment in accordance with Volume 1 and Volume 2 of the Transport Noise Management Code of Practice. Develop and implement Noise and Vibration Management Plan.	NIL

Environmental Factor	Potential Impact / Opportunity	Recommended Mitigation	Potential Approvals
Bushfire	High potential bushfire risk	A Bushfire Management Plan will need to be developed for the project.	NIL
Resource use and management	Waste management	Design to minimise construction and demolition waste, using principles of avoid, reduce, reuse and recycle.	NIL
Chemicals, dangerous goods and explosives	Potential UXO in the project area Some chemical storage is anticipated during construction	Clarification of the categories of UXO potential should be confirmed for each land parcel affected by the proposed project. Disposal of chemicals must be in accordance with local government advice.	A development application must be lodged with the Sunshine Coast Council if the E-W Link is on a lot defined as having 'substantial' potential for UXO. A licence is required if conducting an 'environmentally relevant activity'. The construction of the network may include the environmentally relevant activity 8: Chemical storage.

1 INTRODUCTION

1.1 Environmental Scoping Report Purpose

The purpose of the Environmental Scoping Report (ESR) is to make an early assessment of potential environmental impacts and opportunities associated with the proposed project. The intended outcome of the Scoping Report is to determine an overall environmental risk rating for the project and identify whether further environmental assessments are warranted as part of the pre-construction process. This information is used to inform the business case and subsequent detailed planning for the project. It is common for a period of time to pass between the Strategic Assessment for Service Requirement, Preliminary Evaluation and more detailed planning for the Business Case. Changes to legislation are frequent and therefore any subsequent detailed planning should consider the currency of the recommendations made within this scoping report. It may be necessary to conduct a follow up scoping assessment and environmental risk rating if the event substantial time has lapsed.

The overall environmental risk rating for the project is based on:

- existing environmental values;
- the scope of works and potential impacts from the works; and
- Legislative triggers likely associated with the works based on the legislation current at the time writing.

Further details of the risk rating process and classification are provided in the Environmental Processes Manual.

1.2 Project Purpose and Status

Significant growth in development and traffic are forecast for the Southern Sunshine Coast area with first stage completion of the Sunshine Coast Public University Hospital to be completed in April 2017 (and additional development planned between now and 2021). Additional development of the Kawana Town Centre, as well as Caloundra South development of 20,000 jobs and 50,000 residents further south over the next twenty years, will also impact development and traffic.

The existing road network is inadequate to support this growth and investment decisions need to be made to provide a balance of new links and existing network upgrades. With this forecast growth, it is vital that these areas are connected via safe, efficient and sustainable transport links. In doing so this will support existing strategic networks to ensure adequate planning is conducted to identify appropriate future link upgrades and associated corridor preservation to meet future demand.

AECOM was commissioned by the Department of Transport and Main Roads (TMR) in late January 2016 to carry out the Palmview / Sippy Downs Integrated Link Strategy and Preliminary Options Analysis project. The purpose of the project is to undertake strategic transport planning to develop appropriate corridor link strategies and associated preliminary options analysis to:

- Identify and prioritise investment needs;
- Outline roles, functions, demand drivers, performance visions and priority needs for the link;
- Make recommendations for further investigations;
- Environmental Project Classification; and
- A breakdown of future environmental actions and costs.

1.3 Project Scope

Extensive options development and a Multi-Criteria Analysis (MCA) process involving Sunshine Coast Council for a potential East-West Link (E-W Link) between Palmview and Kawana occurred as part of the Palmview/Sippy Downs Integrated Link Strategy. Following an MCA option selection workshop on 17 November 2016 with TMR North Coast and Sunshine Coast Council, an E-W Link option (option 9A) and the Sunshine Motorway upgrade (SSMW) (option 10) were confirmed as preferred, shortlisted options.

Following further discussions with TMR North Coast and Sunshine Coast Council, alternative alignments to option 9A were proposed for the E-W Link and are all discussed in this ESR. The alignment options (9A – F) are for a new road, all of which crosses the Mooloolah River early, and then follow the river on the southern side, following cleared areas as much as possible.

A new E-W Link would support the long-term network needs of the area. It would provide a potential link between the new $1.8B Sunshine Coast University Hospital (SCUH) at Birtinya and the University of the Sunshine Coast (USC). A corridor in this vicinity would also provide a more direct public transport connection between demand areas. The Sippy Downs area has a number of major planned developments as well as significant growth at the USC. Corridor protection will be required to preserve the provision of this new link.

The outputs from this ESR are:

- A summary of the environmental and heritage constraints;
- List of potential environmental and planning permits and approvals required; and
- Identification of any further environmental studies or fieldwork required (to be undertaken in future stages).

1.4 Project Location

The project location of the proposed E-W Link alignment options is shown in Appendix D, Figure 1.

1.5 Scoping Assessment Purpose and Methodology

The scoping environmental assessment was completed between January and May 2017. The scoping environmental assessment involved desktop environmental assessment of the project area.

A list of desktop databases searches and mapping layers assessed is provided in Appendix B – Assessment References. The scoping assessment involved the following elements and activities:

- Identify, describe and assess environmental advantages and disadvantages, and other constraints within the proposed area of works. Environmental considerations are similar for all options; however individual differences in the options have been discussed where needed.
- Undertake desktop assessment of environmental values, hazards and risks.
- Will provide, based on the identified risks associated with the project, a component classification.
- Preliminary identification of potential environmental and planning permits and approvals.
- Identify the need for and propose scope for additional environmental studies and investigations (to be undertaken in future stages).
- Provide relevant information to allow objective consideration of any adverse or beneficial impacts of the project and preliminary costing of environmental design features.
- Undertake an initial cultural heritage risk assessment based on desktop information.

- Cover sufficient area to allow for potential road corridor including auxiliary road infrastructure (e.g. noise barriers, water quality detention basin), construction infrastructure (e.g. side-tracks, compounds, stockpile sites) and public utility plant (PUP) requirements.
- Completed by suitably qualified and experienced environmental personnel.
- Reporting will be undertaken in accordance with TMR's Environmental Process Manual 2013.

SCOPING ENVIRONMENTAL ASSESSMENT

WATER
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*
☒ Freshwater (Water Quality, Drainage, Groundwater, Sourcing Water, Interfering with Water) ☒ Marine and Coastal (Coastal, marine environment and waters and all non-freshwater)

Watercourse Features

All proposed alignment options cross the Mooloolah River, upstream of the confluence of the Mooloolah River and Sippy Creek. This is a watercourse defined and managed under the *Water Act 2000* (Water Act) as well as classified a 'major' waterway for waterway barrier works under the *Fisheries Act 1994* (Fisheries Act). An authorisation under the Water Act is required to take water, interfere with the flow of water, take quarry material, or excavate and place fill in a watercourse, unless works meet the Riverine protection permit exemption requirements. TMR is currently afforded exemption for various activities under the Water Act through the Riverine Protection Permit Exemption. Assessment of likely permitting triggers will be required at the time of detailed planning against the legislative framework applicable at that time. It would be advised to consult with the relevant government department responsible for administering the provisions under the Water Act.

Drainage Features and Yet to be Mapped

Each alignment option has a number of additional drainage features identified under the Water Act, considered overland flow water, and may require an authorisation to take or interfere with it. In addition, there are a number of features not currently mapped as either a watercourse or drainage features. Determination as to whether these are watercourses, drainage lines, lakes or spring will need to be sought from the Department of Natural Resources and Mines (DNRM).

In addition to the Water Act, compliance must be also achieved with the Fisheries Act. Under the Fisheries Act, these drainage features and unnamed tributaries of the Mooloolah River are mapped 'waterways'. Construction or raising a barrier in a waterway will trigger a development application or compliance with a self-assessable code for waterway barrier works. Each route option will potentially have different permitting requirements and vary in planning complexity (Appendix D, Figure 2). A comparison of the waterway determination between each option is as follows:

- Option 9A: four amber 'moderate impact' waterways;
- Option 9B: at least two amber 'moderate impact' waterway crossings, additional dependent on western-end option chosen;
- Option 9C: four amber 'moderate impact' waterways, one red 'high impact' waterway crossing;
- Option 9D: four amber 'moderate impact' waterways, five red 'high impact' waterway crossings;
- Option 9E: four amber 'moderate impact' waterway crossings; and
- Option 9F: none.

Coastal and marine environment

The eastern portion of the project area is mapped within the Coastal Management District (CMD) (Appendix E). The CMD mapping considers the declared erosion prone area mapping including a projected sea level rise of 0.8 metres (m) to 2100 m from climate change. This generally includes lots where permanent inundation from tidal water or increased coastal erosion from sea level risk is expected to occur.

Coastal hazard area mapping indicates the eastern portion of the proposed E-W Link alignment, including the Birtinya Wetlands, is an erosion prone area, as well as both a medium and high storm tide inundation (Appendix E):

- High hazard area – refers to the land within the coastal hazard area that would be subject to temporary inundation during a defined storm-tide event of one metre or more; and
- Medium hazard area – refers to land within the coastal hazard area that would be subject to less than one metre of inundation during a defined storm-tide event.

The project area is not located within a declared fish habitat area or in a tidal zone. However, the Mooloolah River is mapped as tidal waterway upstream to the confluence with Sippy Creek. The proximity of this tidal influence to the alignment options will need to be investigated to confirm the potential development application triggers.

Water quality

The proposed E-W Link project area falls within the Mooloolah River Catchment and Estuary, which covers 221 square kilometres (km^2). The Mooloolah catchment waterways are considered to be in good health, based on the following indicators: the riparian vegetation in the upper reaches of the catchment is largely in good condition, there is no impact from sewage in the lower estuary, and the water looks clear in most sections of the estuary (Healthy Waterways, 2017). The Mooloolah River flows for about 70 kilometres (km) east to north-east, from the eastern slopes of the Blackall Range and discharges to the sea between Mooloolaba and Point Cartwright. Tributaries include Addington Creek, (dammed by the Ewen Maddock Dam), Sippy Creek, and Mountain Creek (Healthy Waterways, 2017). The junction of Sippy Creek and the Mooloolah River marks the tidal limit.

Environmental values (EVs) and water quality objectives (WQOs) for these watercourses are established in the *Mooloolah River environmental values and water quality objectives*, under the provisions of the *Environmental Protection (Water) Policy 2009*, which is subordinate legislation under the *Environmental Protection Act 1994* (EP Act).

Groundwater

Groundwater gradients are likely to be shallow across the majority of the site, and in an easterly direction towards the coastline or locally towards the Mooloolah River (Golders, 2006).

The nearest existing registered DNRM groundwater monitoring bores are RN159476, RN156179 and RN159478 (Appendix D, Figure 2).

Flooding

The project area consists of relatively simple landform patterns; and by and large it is dominated by a very low lying, flat flood plain. There is very little overall elevation throughout the project area and water tends to lie in the melon-holes and channels across the plain; these areas support aquatic and wetland vegetation.

The majority of the project area is susceptible to episodes of rapid flooding, particularly in areas around the Mooloolah River and the eastern portion of the project area, bounded by Kawana Way (Appendix D, Figure 4). Significant flood events were reported in 1972, 1989, 1992 and January 2011 (BoM, 2017). Parts of the

project area are also susceptible to both riverine flooding and potential inundation during high tide and storm surge events, as identified in the Coastal Hazard Areas Mapping Storm Tide Inundation (Appendix E).

Impacts, Opportunities and Mitigation Measures

Water Quality

Overall, the future proposed E-W Link should be designed to minimise impacts to the Mooloolah River and stormwater drainage, including design and construction of culvert and drainage works. Stormwater runoff from earthworks has the potential to create turbidity in receiving watercourses. There is also potential for spilled contaminants (e.g. blasting residue, paint, concrete, hydrocarbons, etc.) to discharge into the waterway via stormwater drainage systems. Urban development can lead to significant changes in catchment hydrology, with the most obvious effect being the increase in the magnitude of stormwater flow events in urban creeks and the consequential impact on flooding and public safety.

The proposed E-W Link has the potential to impact on the environmental values of downstream aquatic environments within the Mooloolah River and ultimately the sea. Further and more detailed assessment of both potential impacts to surrounding water bodies and appropriate mitigation measures to address these impacts should therefore be developed as the project progresses. Prior to and during construction, water quality monitoring should be undertaken to establish existing water quality levels and to ensure the parameters are kept within the objectives defined in the *Mooloolah River environmental values and water quality objectives*. During construction, the emphasis should be on minimising impacts to water quality in surrounding watercourses. An appropriate and site specific Erosion and Sediment Control Plan (ESCP) will be required to minimise amounts of sediment-laden runoff entering surrounding watercourses.

Fish passage

Where waterway barrier works are required (some bridge works may not constitute waterway barrier works) over creeks identified under the waterway barrier mapping, fish passage must be provided for. The Code for self-assessable development, *Minor waterway barrier works Part 3: culvert crossings* (WWBW01), applies to waterway barrier works for the construction of a new, or replacement of an existing culvert crossing on a low (green), moderate (amber) or high (red) impact waterway as marked on the spatial data layer *Queensland Waterways for Waterway Barrier Works*. This code does not apply if the new or replacement works are on an assessable (purple) waterway or within a tidal zone as marked on the data layer, such as the crossing of the Mooloolah River. For these works, a Development Approval must be lodged under the *Sustainable Planning Act 2009* (SP Act).

Temporary waterway barrier works are likely to be required for the construction of the bridge crossing. Temporary works are likely to include construction and operation of a side track, sediment and erosion control and any bunding required. Compliance with the Fisheries Queensland code for self-assessable development WWBW02: Temporary waterway barrier works would be required.

Coastal

Operational works within a CMD have the potential to trigger various development applications, typically tidal works and/or impacts to marine plants and/or interfering with quarry material for road construction, which would be assessed under the SP Act. Further investigation will need to be sought through ecological site survey and detailed permitting and approvals assessment at the time of detailed planning and against the legislative framework applicable at that time. The lead time for such approvals are an important consideration in project planning, and will need to be confirmed early in the detailed planning phase to ensure timely

delivery of the project.

Groundwater

If groundwater is encountered during earthworks, the excavation may have to be temporarily reinforced with shoring boxes or similar, to prevent void collapse. Additionally, excavations with infiltrating groundwater would have to be dewatered.

If required, extracted groundwater must not be discharged directly into adjacent watercourses. Instead an approach involving capture, testing and discharge or disposal will need to be adopted. Dewatering in areas of potential acid sulfate soils may subject the soil to sufficient oxidation to generate actual acid sulfate soils. In this case, extracted groundwater may need to be pre-treated in accordance with the Queensland Acid Sulfate Soil Technical Manual (Dear, et al., 2014) prior to discharge or disposal.

Flooding

Design of the proposed E-W Link would require extensive bridges and structures to maintain desired flood immunity, deliver infrastructure resilience and not adversely affect flooding upstream (i.e. create afflux).

Relevant Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	*Coastal Protection and Management Act 1995* *Coastal Protection and Management Regulation 2003* *Environmental Protection (Water) Policy 2009* *Environmental Protection Act 1994* *Fisheries Act 1994* *Sustainable Planning Act 2009* *Water Act 2000* *Water Regulation 2016*
☒ Identified permits, codes or other requirements	TMR is currently afforded exemption for various activities under the Water Act through the *Riverine Protection Permit Exemption* and *Exemption requirements for constructing authorities for the taking of water without a water entitlement under the Water Regulation 2016*. Assessment of likely permitting triggers will be required at the time of detailed planning against the legislative framework applicable at that time. It would be advised to consult with the relevant government department responsible for administering the provisions under the Water Act, and to seek determination of 'yet to be defined' water features. Construction or raising a barrier in a waterway will trigger a development application or compliance with a self-assessable code for waterway barrier works. Each route option will potentially have different permitting requirements and vary in planning complexity. The alignments transect 'major', 'high' and 'moderate' waterways providing for fish passage. In accordance with Main Roads Specification (MRS) 51 and Main Roads Technical Specification (MRTS) 51, best practice erosion and control

	strategies will need to be considered as part of an ESCP. No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an environmentally relevant activity (ERA) and require associated approvals. A Construction Environmental Management Plan (EMP (C)) will need to be developed to guide the construction to demonstrate compliance with the general environmental duty.

SOIL / LAND MANAGEMENT	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*	
☒ Contaminated Land	☒ Soil
☒ Erosion and Sediment Control	☐ Landscape Architecture

Topography

The project area is characterised by gently undulating topography which reflects its location within and on the margins of the coastal plain. In general the topography falls towards the Mooloolah River and eastwards towards the coast.

Geology

Geology in the project area is summarised in the regional ecosystem (RE) mapping by DNRM. This mapping delineates one land zone within the project area: land zone 3. In geological terms, land zone 3 relates to 'Quaternary alluvial systems, including floodplains, alluvial plains, alluvial fans, terraces, levees, swamps, channels, closed depressions and fine textured palaeo-estuarine deposits' (Sattler & Williams, 1999).

Soils

The CSIRO's Atlas of Australian Soils shows two soil units dominating the project area – Cb36, which is a podosol, and MF4, which is a hydrosol. Cb36 is mapped as the dominant soil unit at the Palmview and Birtinya ends of the project area. Map unit MF4 extends across the centre of the project area, roughly aligned with the flow path of the Maroochy River and its tributaries.

The dominant Principal Profile Form (PPF) within map unit Cb36 is Uc2.35. This is an acidic, uniformly coarse and deep soil type with high permeability and low nutrient content.

The PPF within map unit MF4 is Gn3.04. This is an acidic, moderately deep soil with a gradational texture profile. It has low permeability and low nutrient content.

Contaminated land

Searches of the Queensland Government Contaminated Land Register (CLR) and the Environmental Management Register (EMR) have not been undertaken at this stage. Further assessment will be required to establish whether contaminated land is present within the project area, to assist in management and disposal of excavated soil.

Erosion

Erosion prone areas are parts of the coast considered at risk from coastal erosion or permanent inundation by the sea over a defined planning period. SPP mapping indicates that the eastern portion of the E-W Link, including the Birtinya Wetlands, is in an erosion prone area (Appendix E). Statutory erosion prone areas are declared under section 70 of the Coastal Act by reference to an erosion prone area plan.

Acid sulfate soil

The Australian Soil Resource Information System (ASRIS) indicates that the majority of the project area has a high probability of the incidence of acid sulfate soils (ASS), with some areas having a low probability (Appendix D, Figure 3). Golder Associates (2008) confirmed the presence of Potential Acid Sulfate Soils (PASS) approximately 1 km north of the project site, generally below RL 0 to RL 0.5 m Australian Height Datum (AHD) or depths below existing ground level of 1 to 2 m.

Impacts, Opportunities and Mitigation Measures

Planning and Design

At the preliminary design stage, the following will be required:

- Detailed geotechnical assessment.
- Assessment of site conditions for dispersion and erosion. Management practices will need to be defined and implement based on the review of data collected.
- Development of a Concept ESCP.
- Stage 1 preliminary site investigation for contamination.
- Develop an Acid Sulfate Soil Management Plan.

Construction

During construction, the following must be addressed:

- Develop and implement the Erosion and Sediment Control plan
- Compliance with TMR Standards for Erosion and Sediment Control (MRTS52).
- If search results from the CLR and EMR are returned positive for contaminated land, where excavated soil will be required to be disposed of off-site it should be stockpiled and tested to determine whether it contains contaminated material. Any off-site disposal of contaminated soil should be avoided. Offsite removal of material will require a Contaminated Soil Disposal Permit.
- Should any land parcel be reconfigured as part of the approvals process and it is found to contain contaminated land, a Compliance Permit will be required under the SP Act.

Soils

Given the likely significant thickness of soft and compressible soils underlying the site, any earthworks necessary to elevate the proposed E-W Link above acceptable flood levels could trigger consolidation of the soils, leading to short and long term settlement. Ground surface movement could be significant if the soft soils are thick and/or embankments are relatively high.

Superficial soils are unlikely to be of adequate strength to support structure foundations, and deep piled foundations should be assumed for all but the lighter and least sensitive structures.

Acid sulfate soils

Excavation and exposure of ASS within the project area could result in their oxidation and subsequent release of contaminants (sulphuric acid, iron and aluminium) which could harm the receiving environment. Detailed and site specific investigations will be required in high risk areas (below 5 m AHD) to determine locations of ASS and PASS. These investigations should be carried out as per the current Queensland Acid Sulfate Soils Investigation Team guidelines (Guidelines for the sampling and analysis of lowland acid sulphate soils in Queensland – October 1998). An appropriate and site specific ASS Management Plan should be developed to manage and treat any ASS appropriately.

Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	*Environmental Protection Act 1994* Guidelines for the sampling and analysis of lowland acid sulphate soils in Queensland – October 1998 *Sustainable Planning Act 2009*
☒ Identified permits, codes or other requirements	ASS/PASS is managed in Queensland in accordance with the following best-practice guidelines: · Queensland acid sulfate soils technical manual: legislation and policy guide · Queensland acid sulfate soils technical manual: laboratory methods guidelines · Queensland acid sulfate soils technical manual: soil management guidelines · Guidelines for sampling and analysis of lowland acid sulfate soils Under the SP Act, a compliance permit is required for development requiring compliance assessment. A disposal permit is required to remove contaminated soil for treatment or disposal from land listed on the EMR or CLR. Soil disposal permits are issued for a specified duration and volume of soil. The permit may include conditions relating to the soil removal, transport and treatment and/or disposal process. Soil disposal permits cannot be amended. Therefore if the soil volume changes post approval, a new soil disposal permit is required. No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals.

BIODIVERSITY (Fauna, flora, ecosystems, wetlands, habitat and pests)	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*	
☒ Protected fauna	☒ Ecosystems and Habitats
☒ Protected flora	☒ Pest flora and fauna

Matters of National Environmental Significance

To identify Matters of National Environmental Significance (MNES) with potential to occur within or surrounding the project area, a desktop search was conducted using the Department of Environment and Energy (DoEE) Protected Matters Search Tool (PMST). The results of this search are presented in Appendix H. MNES are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and include the following:

- World heritage properties: none
- National heritage places: none
- Wetlands of international importance (Ramsar): 1
- Great Barrier Reef Marine Park: none
- Commonwealth marine areas: none
- Listed threatened ecological communities: 2
- Listed threatened species: 41
- Listed migratory species: 16

Other matters protected by the EPBC Act:

- Commonwealth land: none
- Commonwealth heritage places: none
- Listed marine species: 24
- Whales and other cetaceans: none
- Critical habitats: none
- Commonwealth reserves terrestrial: none
- Commonwealth reserves marine: none

Other factors that may be affected by the works:

- State and Territory reserves: 3
- Regional forest agreements: none
- Invasive species: 33
- Nationally important wetlands: 1
- Key Ecological Features (Marine): none

MNES that may be affected by the proposed E-W Link:

Wetlands of international importance (Ramsar)

The Moreton Bay Ramsar Wetland is approximately 10 km south of the project area. The site supports more than 50,000 migratory waders during their non-breeding season. At least 43 species of wading birds use the intertidal habitats, including 30 migratory species listed on international conservation agreements. Provided that appropriate erosion and sediment control measures are in place during construction, this Ramsar site is unlikely to be impacted upon by the proposed works.

Listed threatened species

Fauna

The PMST search identified 14 listed bird species, 2 frog species, 7 mammal species and 2 reptile species that are known to or are likely to occur within 3 km of the project area.

A likelihood assessment (Appendix G) has determined that it is 'possible' that five of these species may exist within the project area:

- Bar-tailed Godwit (*Limosa lapponica bauera*);
- Eastern Curlew (*Numenius madagascariensis*);
- Koala (*Phascolarctos cinereus*);
- Grey-headed Flying-fox (*Pteropus poliocephalus*); and
- Water mouse (*Xeromys myoides).*

The likelihood assessment also determined that two of these species are 'known' to exist in the project area:

- Wallum Sedge Frog (*Litoria olongburensis*); and
- Giant Barred Frog (*Mixophyes iterates*).

Flora

The PMST search identified 15 flora species that are known to or are likely to occur within 3 km of the project area.

A likelihood assessment (Appendix G) has determined that it is 'possible' that six of these species may exist within the project area:

- Hairy Joint Grass (*Arthraxon hispidus*);
- Swamp Stringybark (*Eucalyptus conglomerate*);
- Macadamia Nut (*Macadamia integrifolia*);
- Small-fruited Queensland Nut (*Macadamia ternifolia*);
- Lesser Swamp Orchid (*Phaius australis*); and
- Wallum Leek-orchid (*Prasophyllum wallum*).

The likelihood assessment also determined that two of these species are 'known' to exist in the project area:

- *Acacia attenuata*; and
- Emu Mountain Sheoak (*Allocasuarina emuina*).

Listed threatened ecological communities

The EPBC Act PMST search identified two listed threatened ecological communities (TECs) as likely to occur within 3 km of the project area (Appendix D, Figure 5):

- *Lowland Rainforest of Subtropical Australia*
- *Subtropical and Temperate Coastal Saltmarsh*

The regional ecosystems (REs) that represent the TEC *Lowland Rainforest of Subtropical Australia* are: 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, 12.12.16. Of these, the endangered RE 12.3.1 is identified on the *Vegetation Management Act 1999* (VM Act) mapping throughout the project area. A detailed site inspection by qualified ecologists is required to determine the presence of this TEC; however previous surveys undertaken within the eastern and western corridors of the Mooloolah River revealed the vegetation to be consistent with RE 12.3.1 (RPS, 2015). Most of the areas surveyed were in good condition, have good connectivity and contained vegetation which would qualify as TEC. Many of these areas were fenced, hence avoiding impacts from livestock, or alternatively had active rehabilitation programs to improve the rainforest community (RPS, 2015).

The RE that is known to represent the TEC *Subtropical and Temperate Coastal Saltmarsh* (RE 12.1.2) is not identified on the VM Act mapping in the project area and as such, it is unlikely that this TEC is present.

Listed migratory species

Sixteen listed migratory species were returned from the PMST report with potential to occur within a 3 km radius of the project area: four migratory marine birds, six migratory terrestrial species and six migratory wetland species.

A likelihood assessment (Appendix G) has determined that it is 'possible' that two of these species may exist within the project area:

- Oriental Cuckoo (*Cuculus optatus*); and
- Satin Flycatcher (*Myiagra cyanoleuca*).

The likelihood assessment also determined that six of these species are 'known' to exist in the project area:

- Fork-tailed Swift (*Apus pacificus*);
- White-throated Needletail (*Hirundapus caudacutus*);
- Black-faced Monarch (*Monarcha melanopsis*);
- Spectacled Monarch (*Monarcha trivirgatus*);
- Rufous Fantail (*Rhipidura rufifrons*); and
- Latham's Snipe (*Gallinago hardwickii*).

<u>Other information:</u>

Wetlands

A significant proportion of the project area is located within the Mooloolah River Wetlands, which are recognised as nationally important under the Directory of Important Wetlands in Australia database, and as a wetland of high ecological significance under the *Environment Protection Regulation 2008* (EP Regulation) (Appendix D, Figure 7). These designations include the Mooloolah River, Sippy Creek and the Mooloolah River National Park. The wetlands are tributaries, floodplain, coastal swamps and inlets and estuaries. Flows from these wetlands combine in very large flood events to form an expanse of eastward flowing water.

The Birtinya Wetlands are mapped as a mixture of palustrine and riverine wetlands, and are also recognised as a wetland of high ecological significance.

High impact earthworks can damage wetlands and the habitats around them by:

- changing the hydrological regime by altering water levels and environmental flows;
- removing vegetation and fauna habitat, and reducing ecological integrity;
- facilitating the introduction of pest animals and plants;
- introducing pollutants; and
- accelerating soil erosion and sediment run-off.

State and Territory reserves

Three Conservation Parks are located within 3 km of the project area, including the Palmview Regional Park to the south west, Meridan Plains Regional Park to the south of Rainforest Drive, and the Lower Mooloolah River Environmental Reserve between the Mooloolah River National Park and the Mooloolah River (Appendix D, Figure 7). The Mooloolah River National Park (located to the north of the project area, Appendix D, Figure 7) is a nationally protected area and is managed by the Queensland Parks and Wildlife Service (QPWS) under the *Nature Conservation Act 1992* (NC Act).

The Mooloolah River National Park Management Plan recognises that the national park contains 'one of the few substantial areas of mainland heath remaining between Noosa and the Queensland/New South Wales border' (QPWS, 1999). The Lower Mooloolah River Environmental Reserve provides important habitat linkages east to wetlands at Birtinya, south and west to Palmview Conservation Park, and north to Mooloolah River National Park.

Pest species

The EPBC Act PMST identified 19 invasive fauna species and 14 invasive flora species that are considered likely to occur within the project area. Of these, seven are considered feral animals and all invasive flora species are Weeds of National Significance (WoNS).

Whole of the environment: This section discusses the existing flora and fauna values as they relate to State-listed flora and fauna species and vegetation communities.

Matters of State Environmental Significance

Matters of State Environmental Significance (MSES) within and surrounding the project area are:

- The Mooloolah River National park, the Mooloolah River, Sippy Creek and the Birtinya Wetlands are classed as 'wildlife habitat', 'regulated vegetation' and 'high ecological significance wetlands';
- The vegetation along all waterways that intersects the E-W Link are classed as 'regulated vegetation intersecting a watercourse';
- 'Endangered' RE 12.3.1; and
- Essential habitat.

Threatened fauna

In addition to the MNES listed threatened fauna species, results from the Wildlife Online (results presented in Appendix H) and Atlas of Living Australia (ALA) searches have indicated that 18 fauna species listed under

the NC Act have been sighted and recorded within 3 km of the project area:

- Cattle egret (*Ardea ibis*);
- Glossy black-cockatoo (eastern) (*Calyptorhynchus lathami lathami*);
- White-winged black tern (*Chlidonias leucopterus*);
- Cicadabird (*Coracina tenuirostris*);
- Beach stone-curlew (*Esacus magnirostris*);
- Gull-billed tern (*Gelochelidon nilotica*);
- Rainbow bee-eater (*Merops ornatus*);
- Little curlew (*Numenius minutus*);
- Whimbrel (*Numenius phaeopus*);
- Ground parrot (*Pezoporus wallicus wallicus*);
- Common tern (*Sterna hirundo*);
- Southern emu-wren (*Stipiturus malachurus*);
- Crested tern (*Thalasseus bergii*);
- Terek sandpiper (*Xenus cinereus*);
- Tusked frog (*Adelotus brevis*);
- Wallum froglet (*Crinia tinnula*);
- Wallum rocketfrog (*Litoria freycineti*); and
- Short-beaked echidna (*Tachyglossus aculeatus*).

Three endangered, vulnerable or near threatened (EVNT) frog species have been identified on previous assessments of the wider project area (WorleyParsons, 2010). These include the Wallum Froglet (*Crinia tinnula*), Wallum Rocketfrog (*Litoria freycineti*) and the Wallum Sedgefrog (*Litoria olongburensis*).

Qualified ecologists have not yet conducted a site inspection to ground-truth search results and determine the presence and absence of threatened species/ecosystems. It is anticipated the three above listed species will be encountered during ground trothing.

Both State and local ecological corridors traverse the project area, particularly following the Mooloolah River (Appendix D, Figure 9).

Koala

The koala is listed as 'Vulnerable' under the EPBC Act and the NC Act. There are three recorded Koala sightings (within 3 km) of the alignment since 1980. The area is mapped as a combination of 'low value bushland' habitat and 'low value rehabilitation' habitat for koala and is within the South East Queensland Koala Protection Area (SEQKPA) (Appendix D, Figure 8). It is possible that koala might occur in this area, given the historical sightings; however the quality of available koala habitat is mapped as low. Historically, populations of koala were known to move between the Mooloolah River / Palmview floodplain, the Mooloolah River National Park and north into the Buderim escarpment (Eco 9 Pty Ltd, 2011).

Threatened flora

In addition to the MNES listed threatened flora species, results from the Wildlife Online (results presented in Appendix H) and ALA searches have indicated that seven flora species listed under the NC Act have been sighted and recorded within 3 km of the project area:

- Tiny wattle (*Acacia baueri* subsp. *Bauera*);
- Australian reed-warbler (*Acrocephalus australis*);
- Wide Bay boronia (*Boronia rivularis*);
- *Lenwebbia;*
- Slender milkvine (*Marsdenia coronate*);
- *Pararistolochia praevenosa;* and
- *Zieria exsul*

A large portion of the project area has been cleared for rural pursuits. The north and east of the project area are dominated by the Mooloolah River National Park and the Birtinya Wetlands ecosystem. The Mooloolah River has a continuous fringe of riparian vegetation as it crosses the floodplain.

The project area is mapped as a 'high risk' area on the NC Act protected plants flora survey trigger map (Appendix D, Figure 6). Prior to clearing, a targeted protected plants survey must be undertaken to determine the presence/absence of threatened flora species, confirm fauna habitat values and inform mitigation and management requirements (if required). The flora survey and reporting must be undertaken in accordance with the Department of Environment and Heritage Protection (DEHP) *Flora Survey Guidelines – Protected Plants* (DEHP, 2014).

The Richmond Birdwing Butterfly vine (*Pararistolochia praevenosa*) is a climbing plant which is the exclusive food host plant for caterpillars of the Richmond Birdwing Butterfly (*Ornithoptera richmondia*) which is listed as Vulnerable under the NC Act, and has been identified within the project area (Eco 9 Pty Ltd, 2011). Four individual Richmond Birdwing Butterfly Vines were identified by Eco 9 Consulting (2011) as occurring within remnant RE 12.3.1, along the southern boundary of the Lower Mooloolah River Environmental Reserve (directly north of the project area). In addition, two other taxa considered to be of significance (Significant Flora Species – Sunshine Coast Council) were also identified as part of the Flora Assessment. These plants were the Large-leaved Hop Bush (*Dodonea triquetra*) and the Featherwood (*Polyosma cunninghamii*).

Remnant vegetation and essential habitat

The riparian vegetation along the Mooloolah River and the entire Birtinya Wetlands is classified as Category B: remnant vegetation on the VM Act mapping. The remaining landscape is classified as non-remnant.

Essential habitat, for protected wildlife, means a Category A area, a Category B area or Category C area shown on the regulated vegetation management map-

- that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database; or
- in which the protected wildlife, at any stage of its life cycle, is located.

The Mooloolah River and the Birtinya Wetlands remnant vegetation contains essential habitat under the NC Act for the Wallum Rocketfrog (V) and Wallum Froglet (V) (Appendix D, Figure 5).

Vegetation communities

Mapped vegetation types within the Mooloolah River National Park (Appendix D, Figure 5) include:

- 12.3.5: *Melaleuca quinquenervia* open forest on coastal alluvium (least concern);
- 12.3.13: Closed heathland on seasonally waterlogged alluvial plains usually near coast (least concern); and
- 12.3.14a: *Eucalyptus racemosa* woodland to open-forest (of concern).

Mapped vegetation types within the Birtinya Wetlands (Appendix D, Figure 5) include:

- 12.3.5/12.3.1: *Melaleuca quinquenervia* open forest on coastal alluvium/Gallery rainforest (notophyll vine forest) on alluvial plains (endangered);
- 12.3.1: Gallery rainforest (notophyll vine forest) on alluvial plains (endangered); and
- 12.3.2: *Eucalyptus grandis* tall open forest on alluvial plains (of concern).

Mapped vegetation types associated with the Mooloolah River riparian fringe (Appendix D, Figure 5) include:

- 12.3.5: *Melaleuca quinquenervia* open forest on coastal alluvium (least concern); and
- 12.3.1: Gallery rainforest (notophyll vine forest) on alluvial plains (endangered).

Mapped vegetation types associated with Sippy Creek (Appendix D, Figure 5) include:

- 12.3.5: *Melaleuca quinquenervia* open forest on coastal alluvium (least concern); and
- 12.3.13: Closed heathland on seasonally waterlogged alluvial plains usually near coast (least concern).

Mapped vegetation types associated with the Palmview Regional Park (Appendix D, Figure 5) include:

- 12.3.5: *Melaleuca quinquenervia* open forest on coastal alluvium (least concern); and
- 12.3.2: *Eucalyptus grandis* tall open forest on alluvial plains (of concern).

The various vegetation communities across the project area provide a variety of fauna habitats. Habitat suitable for wallum dependent frogs (i.e. acid frogs) occurs across the east and north of the project area (ARUP, 2011). Kangaroos, black swans and migratory birds including cattle egrets have been observed across the project area in previous assessments (ARUP, 2011). The significance of the wetlands as habitat for EPBC Act listed species such as the wallum sedge frog (*Litoria olongburensis*) would require further investigation.

Impacts, Opportunities and Mitigation Measures

Impacts on MNES

The EPBC Act is a federally administered act which provides protection to MNES. Self-assessment using the DoEE *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* needs to be undertaken for the project at the Business Case phase, to establish the likelihood of the project significantly impacting on MNES. Anyone wanting to undertake an action that may have a significant impact on a MNES is required to submit a referral to the federal DoEE. DoEE then makes a decision as to whether the project is deemed a 'controlled' or 'non-controlled' action. Where a project is deemed to be a 'controlled action', further assessment and approval under the EPBC Act is required.

Site investigations should be undertaken to determine the presence or absence of flora and fauna species protected under the EPBC Act within the project area. The site investigation will also confirm the

presence/absence of the TEC *Lowland Rainforest of Subtropical Australia*, as mapping indicates that this TEC would be impacted by the project. It is considered likely that an EPBC referral would be required based on current desktop information. Offset requirements under the EPBC Act are detailed below: Possible Environmental Offsets, and in Section 2.1.

Impacts on MSES

The current high level concept design footprint indicates that the 'endangered' RE 12.3.1 and the 'least concern' RE 12.3.5 would need to be cleared as part of the proposed works, as well as essential habitat and wetlands of high ecological significance under the EP Regulation. Under the SP Act, operational works that is high impact earthworks in a wetland protection area is self-assessable and does not required approval.

The Department of State Development, Infrastructure and Planning (DSIP) Significant Residual Impact Guideline should be used to assist in determining whether or not a prescribed activity (assessable under SP Act) will, or is likely to have a significant residual impact on a MSES.

An environmental offset condition may be imposed under various State assessment frameworks (such as the SP Act and EP Act for an activity prescribed under the *Environmental Offsets Act 2014* (EO Act)), if the activity will, or is likely to have a significant residual impact on a prescribed environmental matter that is a MSES.

State and Territory reserves

There will be no direct impact on any national or regional parks.

Impacts on Animal breeding places protected under the NC Act

For any proposed activity that will impact on breeding places of protected animals (Endangered, Vulnerable, Near Threatened, special least concern, colonial breeder or least concern), a species management program will be required. The process for determining when an approved species management program is required is to:

1. Undertake desktop assessment to determine what species of fauna may be on site.
2. Undertake field fauna survey to determine animal breeding places.
3. Dependent on the field survey results, the proponent may be required to prepare either:

- Species Management Program for tampering with animal breeding places (low risk of impacts); or
- Species Management Program for tampering with animal breeding places (high risk of impacts); or
- The person removing or tampering with the breeding place holds a damage mitigation permit for the species identified and the permit authorises the removal or tampering.

It is anticipated that a Species Management Program for tampering with animal breeding places (high risk of impacts) will be required for, as a minimum, the Wallum Froglet, Wallum Rocketfrog and Wallum Sedgefrog. Further Species Management Programs may be required to manage impacts on animal breeding places for least concern fauna. Adequate resources should be set aside to support the detailed ecological survey and preparation of Species Management Plan(s) (SMPs). Specific survey requirements apply approval for the SMPs must be obtained from DEHP.

Impacts to protected plants under the NC Act

The TMR DEHP approved Compliance Management Plan (CMP) (03 December 2016) allows clearing where there is evidence vegetation was previously cleared using the Protected Plant Exemption issued under

section 89 of the NC Act and section 41 (1) (a) (ii) of the Nature Conservation (Protected Plants) Conservation Plan issued by DEHP in May 2013 (note: this exemption applies to the taking of protected plants up until, and including, 31 March 2018). As works will extend into remnant vegetation that may not have been previously cleared and the Protected Plant Exemption cannot be applied, a targeted protected plants survey must be undertaken to determine the presence/absence of EVNT flora species, confirm fauna habitat values and inform mitigation and management requirements (if required). The flora survey and reporting must be undertaken in accordance with the NC Act flora survey guidelines.

Koala

Impacts on koala and koala habitat must be assessed under both Commonwealth and Queensland statutory provisions, therefore the EPBC Act impact assessment process as previously described will apply to koala. Further under the State Government Supported Community Infrastructure koala Conservation Policy (July 2014), the planning of this project must undertake a self-assessment and ensure the planning, design and construction of the community infrastructure in the SEQKPA is carried out in a way that reduces adverse impacts on koala. This is achieved through compliance with the Community Infrastructure Assessment Criteria.

The Community Infrastructure Assessment Criteria apply to any koala habitat value type within the SEQKPA as shown on the SPP koala habitat maps. The alignment occurs in areas mapped as a combination of 'low value bushland' habitat and 'low value rehabilitation' habitat for koala (Appendix D, Figure 8), and therefore the project must comply with the following design and construction criteria:

Design

Site design must avoid clearing non-juvenile koala habitat trees in the identified areas of low value bushland habitat. Impacts to low-value rehabilitation habitat do not trigger mandatory mitigation; however TMR may consider including these areas in impact mitigation strategies.

- Site design must avoid clearing non-juvenile koala habitat trees in the identified areas of low value bushland habitat. Impacts to low-value rehabilitation habitat do not trigger mandatory mitigation; however TMR may consider including these areas in impact mitigation strategies.
- Any unavoidable clearing in the area of low value bushland must be minimised and offset. The size and other characteristics of the offset must be as required by the *Environmental Offset Policy 2016*.
- Site design must provide safe koala-movement opportunities, including koala movement infrastructure, as appropriate to the development type and habitat connectivity values to the site.
- Landscape activities must provide food, shelter and movement opportunities for koalas consistent with the site design.

Additional Investigation

- It will be necessary to survey and provide evidence for the number of non-juvenile koala habitat trees that will be cleared for the project, as part of determining the offset requirement. Record keeping and reporting will need to be a mandatory requirement of the construction contract to comply with the community infrastructure koala policy and may be subject to audit by DEHP.

Construction

- Native vegetation clearing must be undertaken as sequential clearing and under the guidance of a koala spotter where the native vegetation is non-juvenile koala trees.

- During construction, measures must be taken in construction practices not to increase the risk of death or injury to koala, and native vegetation that is cleared, or intended to be retained for koala movement opportunities is progressively restored and rehabilitated.

Vegetation communities

In future plans for the proposed E-W Link, removal of mapped RE should be minimised where possible. The current high level concept design footprint indicates that the 'endangered' RE 12.3.1 would need to be cleared as part all options. Options 9A, C and D would require the removal of the 'least concern' RE 12.3.5 and options 9D and E would require the removal of the 'of concern' RE 12.3.2. Where removal of RE cannot be avoided, TMR is exempt from requiring permits and offsets as the project is considered 'community infrastructure' (under Schedule 2 of the *Sustainable Planning Regulation 2009* (SP Regulation)) which is made exempt from assessment under Schedule 24, Section 16 of the SP Regulation.

The biodiversity planning assessments map indicates that the project would transverse the State ecological corridor, and the local ecological corridor. TMR should consider fauna crossings, fauna sensitive road design and habitat recreation where possible to retain habitat connectivity where the proposed E-W Link impacts the corridors.

Pest species

Construction and operation of a new road corridor has the potential to introduce new biosecurity risks. Under the *Biosecurity Act 2014,* individuals and organisations have a general biosecurity obligation to manage biosecurity risks, by taking all reasonable and practical steps to prevent or minimise each biosecurity risk. During detailed planning, it will be necessary to conduct a biosecurity risk assessment on likely activities, potential for harm and identify reasonable management methods to control each risk. This should include arrangements for treating pests, diseases, contaminants and carriers, restrictions on moving material into / outside a biosecurity zone and a mandatory code of practice for reducing the risk.

Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	2/10 Koala Conservation State Planning Policy (SPP) *Biosecurity Act 2014* *DEHP Flora Survey Guidelines – Protected Plants* *DoEE Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* DSIP Significant Residual Impact Guideline *Environment Protection and Biodiversity Conservation Act 1999* *Environment Protection Regulation 2008* *Environmental Offset Act 2014* *Environmental Offset Policy 2016* *Environmental Protection Act 1994* *Nature Conservation Act 1992* *Nature Conservation (Wildlife Management) Regulation 2006*

	SEQ Koala Conservation State Planning Regulatory Provisions (SPRP) *State Government Supported Community Infrastructure – Koala Conservation Policy July 2014* *State Planning Policy* *Sustainable Planning Act 2009* *Sustainable Planning Regulation 2009* *Transport Infrastructure Act 1994* *Vegetation Management Act 1999* *Water Act 2000*
☒ Identified permits, codes or other requirements	A referral to the federal DoEE will be required where a self-assessment finds that the proposed project will have a significant impact on MNES. Self-assessment should be carried out as the project enters the business case phase. The *Queensland Environmental Offsets Policy 2016* applies where there will be significant residual impacts on MSES. Under the State Government Supported Community Infrastructure Koala Conservation Policy, compliance must be achieved with Table 1, Column 2 of the Community Infrastructure Assessment Criteria Dependent on the field survey results, the proponent may be required to prepare either: · Species Management Program for tampering with animal breeding places (low risk of impacts); or · Species Management Program for tampering with animal breeding places (high risk of impacts); or · The person removing or tampering with the breeding place holds a damage mitigation permit for the species identified and the permit authorises the removal or tampering. TMR's Compliance Management Plan (CMP) for clearing of previously cleared areas for transport infrastructure, dated 03 December 2016 (expiring 04 December 2018); states that exempt clearing does not require surveys for clearing in high-risk areas or clearing permits to take protected plants under the NC Act within a Protected Plant Exemption. A targeted protected plants survey of the clearing impact area must be undertaken prior to any potential clearing within remnant areas outside of the road reserve. Should there be a requirement to clear threatened flora, a clearing permit will be required from DEHP and offsets for any significant residual impacts may be required under the EO Act. No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the

	EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals. TMR are able to operate under the following exemptions: · Schedule 24, Part 1, Section 16 of the SP Regulation provides exemption for the Clearing of Vegetation for Community Infrastructure; and · TMR Compliance Management Plan (CMP) for clearing of previously cleared areas for transport infrastructure.

CULTURAL HERITAGE	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint*	
☒ Indigenous heritage	☒ Natural Heritage
☒ Historical heritage	

Indigenous heritage

There are three DATSIP sites mapped within 500 m of the alignment, one earthen arrangement (KC:A04) and two artefact scatters (KC:F91 and KC:H10). Given the known inaccuracies of the DATSIP database, these locations should be regarded as approximate only.

Overall much of the study area has been previously cleared, most likely by heavy machinery, causing significant ground disturbance. However, there are two areas in or adjacent to the alignment (Lot 802 SP244924 (plus adjacent road reserve) and Lot 2 RP97720) that appears to be undisturbed. Works in these areas have been assessed as activities that pose the highest risk of harming Aboriginal Cultural Heritage (Category 5) under the Duty of Care Guidelines.

The remainder of the alignment is previously cleared pastoral/agricultural land and has been assessed as activities in an area subject to significant ground disturbance (Category 4) under the Duty of Care Guidelines (Appendix I: Cultural Heritage Risk Assessment).

Native Title

Native Title: Aboriginal and Torres Strait Islander owned land and identified interests (including areas in which a claim under the *Native Title Act* has been registered by the National Native Title Tribunal). Legislation provides Native Title claimants an opportunity to comment on construction over waterways and Trustee Reserves. Generally, Native Title is extinguished over freehold land; however the TMR Project Manager should investigate the process to determine native title requirements, if any.

QLD heritage

There are no QLD heritage places within or near the project area.

World heritage

There are no World heritage places within or near the project area.

Impacts, Opportunities and Mitigation Measures	
Indigenous heritage Category 4/5 activities should not proceed without further Cultural Heritage Assessment and consultation with the Aboriginal Party/ies. Further detail is provided in Appendix I: Cultural Heritage Risk Assessment. **Native title** Native title implications for the project should be confirmed once the layout and land resumption plan has been finalised for the project. TMR will manage any provisions under the *Native Title (Queensland) Act 1993* internally.	
Legislation – *identify any applicable permits, codes or other regulatory requirements*	
☒ Applicable legislation	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984* *Aboriginal Cultural Heritage Act 2003* *Native Title (Queensland) Act 1993* *Native Title Act 1993* *Queensland Heritage Act 1992*
☒ Identified permits, codes or other requirements	Management requirements under the ACHA 2003 Duty of Care Guidelines will be determined in consultation with the Aboriginal Party/ies. Under the Queensland Government native title work procedures, TMR must complete a native title assessment, prior to the commencement of all of its land / resource dealings. A native title assessment will need to be undertaken prior to construction to determine if native title interests impact waterway crossings under USL tenure. Native title notification requirements under section 24KA of the NT Act may apply.

PUBLIC AMENITY / HEALTH	
Factors Identification - *Factors present, or potentially present, within / near to the project footprint or associated with the project*	
☒ Air	☒ Vibration
☒ Noise	☐ Fire and Burning
Air, noise, vibration The proposed E-W Link is approximately 500 m north from the nearest sensitive receptor. Land use adjacent to the project is open pasture; therefore no sensitive receptors are expected to be impacted by the works. Minimal air quality, noise and vibration impacts are likely to result from construction activities (clearing vegetation, ground disturbance and vehicle movements) and operation of the road corridor. **Bushfire** The Mooloolah River and the Birtinya Wetlands are mapped as 'high potential bushfire intensity' on the SPP	

mapping tool (Appendix D, Figure 10).

Impacts, Opportunities and Mitigation Measures

Air, noise, vibration

Construction activities such as excavation, earthmoving and heavy vehicle movements are expected to generate noise and vibration during construction. Control of noise and vibration from construction of transport projects can be effectively managed through implementation of a Noise and Vibration Management Plan, including early community consultation, incident response and corrective actions processes.

It is recommended to undertake a noise and vibration assessment in accordance with Volume 1 and Volume 2 of the Transport Noise Management Code of Practice.

Bushfire

Given that a significant proportion of the project is located in areas identified as at potential risk from bushfire hazards, this will be a consideration for construction and operation of the project. A Bushfire Management Plan will need to be developed for the project, specifying appropriate clearance distances, and emergency service access requirements during construction.

Construction activities do have the potential to temporarily increase the risk of bushfires; however this is considered a low risk. No burning off of cleared vegetation would be permitted as part of construction activities.

Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	*Environmental Protection (Air) Policy 2008* *Environmental Protection (Noise) Policy 2008* *Environmental Protection Act 1994* *Local Government Act 2009*
☒ Identified permits, codes or other requirements	Transport Noise Management Code of Practice Volume 1: Road Traffic Noise Transport Noise Management Code of Practice Volume 2: Construction Noise and Vibration No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals.

RESOURCE USE AND MANAGEMENT

Resources Identification – *Resources potentially used or impacted upon by the project*

☒ Waste ☒ Material Extraction and Use

☒ Chemicals, Dangerous Goods and Explosives

Waste

Project waste streams likely to be generated include general solid waste from construction workforce and packaging materials, greenwaste, construction and demolition (inert) materials such as pavement, reinforcing and pipe. Energy (fuel) and water supplies will be consumed during construction activities.

Chemicals, Dangerous Goods and Explosives

Some minor chemical storage is anticipated during construction.

UXO

Unexploded ordnance (UXO) is ammunition such as artillery shells, mortar bombs and grenades that did not explode when used. UXO is a potential safety risk because it may detonate if disturbed. It may also release chemicals that pose a risk to human health and the environment. Most of the project area is in an area that the Department of Defence (Defence) has assessed as "having a 'slight', 'substantial', and/or 'other' potential for residual UXO" (Appendix D, Figure 10).

Sites categorised as being 'substantial' will have a history of numerous UXO finds or heavy residual fragmentation. Areas categorised as 'slight' will have a confirmed history of military activities that have resulted in residual UXO but which Defence considers it inappropriate to assess as substantial. Areas categorised as 'other' are those where Defence records confirm that the area was used for military training but do not confirm that the site was used for live firing. UXO or explosive ordnance fragments / components have not been recovered from the site. Defence opinion is that it would be inappropriate to assess as either slight or substantial.

Material Extraction and Use

Meridan Plains has been identified as a Key Resource Area (KRA), and is mapped within the project area (Appendix D, Figure 7). This is a significant sand resource that is planned to be developed in line with a resource master plan over many years (refer to Appendix F).

Impacts, Opportunities and Mitigation Measures

Waste

The project should be designed to minimise construction and demolition waste using principles of avoid, reduce, reuse and recycle.

A Waste Management Plan will need to be submitted as part of the EMP (C). Site design should provide for waste segregation and storage for appropriate recycling, treatment or disposal. The requirements of the Waste Management Plan will be implemented for the duration of construction works.

Where possible, consideration should be given to using energy efficient equipment, renewable resources and other recycling initiatives to minimise the environmental impacts during construction activities. These should be investigated during later phases of the project management and implemented through detailed design, contract documents and through an appropriate Environmental Management Plan.

Chemicals, Dangerous Goods and Explosives

Measures must be in place to ensure prevention of spill of oils or other chemicals entering the waterway. In the event that the spill occurs in the waterway, contain and clean up the spills in accordance with the EMP(C).

Schedule 1 of EP Regulation lists all ERAs, their aggregate environmental score and thresholds. The construction of the network may include the environmentally relevant activity 8: Chemical storage. A licence is required if conducting an ERA and will be the responsibility of the Construction contractor.

UXO

Clarification of the categories of UXO potential should be confirmed for each land parcel in the E-W Link.

An area management advice has been written for all land that is categorised as having a 'substantial' potential to be affected by UXO. To reconfigure a lot or make a material change of use on land for which an area management advice has been given for UXO, a development application must be lodged with the assessment manager, usually the relevant local government for the land.

Once a development application has been lodged with the assessment manager, an acknowledgement notice will be issued and the application will need to be referred to the State Assessment and Referral Agency (SARA).

DEHP will provide advice to SARA on the matters related to UXO which may result in certain conditions being imposed on the development approval. For example, a UXO investigation may need to be undertaken, and remediation contractors or consultants may need to be engaged to further investigate and assess the risk of the UXO. If any UXO are encountered, Defence should be informed and the UXO removed by specialist personnel.

Material Extraction and Use

Meridan Plains has been identified as a KRA. The construction of a road through the KRA would most likely adversely affect the development on the long term availability of the extractive resource; however a master plan has been developed by Sunshine Coast Council for the KRA. This master plan indicates that there are roads proposed within the KRA, to provide sufficient access for the Palmview development (Appendix F).

Legislation – *identify any applicable permits, codes or other regulatory requirements*

☒ Applicable legislation	*AS 1940-2004 The storage and handling of flammable and combustible liquids* *Dangerous Goods Safety Management Act 2001* *Environmental Protection Act 1994* *Environmental Protection Regulation 2008* *Sustainable Planning Act 2009* *Waste Reduction and Recycling Act 2011*
☒ Identified permits, codes or other requirements	No approvals are required under the EP Act. However TMR has a general environmental duty to prevent environmental harm under Section 319 of the EP Act. Contractors should confirm construction methodology to determine whether they are likely to carry out an ERA and require associated approvals. A development application must be lodged with the Sunshine Coast Council if the E-W Link is on a lot defined as having 'substantial' potential for UXO.

SPECIAL AREAS AND LAND TENURES

Resources Identification – *Special areas and land tenures potentially impacted upon by the project*

☐ Indigenous Land Tenures	☐ Forestry Land

☐ Commonwealth Land
Commonwealth Land There is no Commonwealth Land within or adjacent to the project area.
Impacts, Opportunities and Mitigation Measures
NIL
Legislation – *identify any applicable permits, codes or other regulatory requirements*

☐ Applicable legislation	None identified
☐ Identified permits, codes or other requirements	None identified

OTHER ACTIVITY REQUIREMENTS
Factors Identification – *Other legislative relevant activities potentially associated with the project*
☐ Other activity requirements[1]
NIL
Impacts, Opportunities and Mitigation Measures
NIL
Legislation – *identify any applicable permits, codes or other regulatory requirements*

☐ Applicable legislation	None identified
☐ Identified permits, codes or other requirements	None identified

[1] Identify what other activities the project may be involved in, that trigger permit or compliance requirements.

POSSIBLE ENVIRONMENTAL OFFSETS

Commonwealth Environmental Offsets

☒ There are EPBC Protected Matter/s potentially or likely to be impacted – koala habitat, threatened species, threatened ecological communities

Could there be a significant impact on the matter? ☐ Unlikely ☒ Possible ☐ Likely

In its current form, the project is not expected to result in a significant impact on the vulnerable koala as the koala habitat is not considered critical to the survival of the koala and will not introduce or exacerbate key threats to the species. As there is known koala habitat within the project site, a significant impact assessment in accordance with the EPBC Act referral guidelines for the vulnerable koala may be required. Should there be loss of critical koala habitat that constitutes a significant impact, referral may be required. If deemed a controlled action offsets may be required for residual impacts.

A self-assessment using the DoEE *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* will be required at the Business Case phase, to determine whether the project will have a significant impact on MNES. Anyone wanting to undertake an action that may have a significant impact on a MNES is required to submit a referral to the federal DoEE (for a cost of $6,577). DoEE then makes a decision as to whether the project is deemed a 'controlled' or 'non-controlled' action.

Impacts on listed threatened species are considered the greatest risk of triggering an environmental assessment under the EPBC Act. Site investigations should be undertaken to determine the presence or absence of flora and fauna species, and threatened ecological communities protected under EPBC within the project area.

If significant impacts are considered likely, and the action is deemed to be a controlled action, then the referral will proceed to the next stages of the process - environmental assessment and approval. If the Project is declared to be a controlled action, offsets may be required for any residual impacts on MNES that cannot be avoided or mitigated. Residual impacts area those that remain after avoidance and mitigation measures have been implemented.

Offsets may be in the form of direct offsets or other compensatory measures, however direct offsets must make up 90% of the total offset package. Direct offsets must result in a net biodiversity gain for the impacted MNES and may include enhancing habitat, creating new habitat, reducing threats or averting loss of an MNES or its habitat. Other compensatory measures include research, educational programs or other relevant actions that are described in an approved recovery plan for the impacted MNES.

Queensland Environmental Offsets

☐ Prescribed Activity

☒ Matter of State Environmental Significance impacted by Prescribed Activity – protected fauna, protected plants, waterway providing fish passage, regulated vegetation intersecting a watercourse

Could there be a significant residual impact on the matter? ☐ Unlikely ☒ Possible ☐ Likely

The project area is mapped as a high risk area on the flora survey trigger map (100% of the project area) and non-juvenile koala habitat trees are located in an area shown as bushland habitat or low-medium rehabilitation habitat on State koala habitat mapping.

Under the TMR Koala Memorandum of Agreement (MoA) and the *State Government Supported Community Infrastructure Koala Conservation Policy 2014*, offsets will be required where there is clearing of vegetation;

extraction of material; and/or excavating and filling in koala habitat (under the SPP koala habitat values) that exceed the nominated criteria.

A targeted protected plants survey will be required to determine whether EVNT flora species are found within areas of remnant vegetation outside of an area under a Protected Plant Exemption. Should there be a requirement to clear threatened flora in the remnant vegetation, a clearing permit will be required from DEHP and offsets for any significant residual impacts may be required under the EO Act. If the survey does not detect any EVNT plants in the clearing impact area or the impacts on EVNT plants can be avoided (i.e. clearing will not take place within 100 m of the EVNT plants), a clearing permit is not required but an exempt clearing notification must be submitted to DEHP within one year of the survey being undertaken and at least one week prior to the clearing commencing. If the flora survey report is satisfactory, DEHP will provide a receipt acknowledging submission of the exempt clearing notification and clearing can commence.

The Department of State Development, Infrastructure and Planning (DSIP) Significant Residual Impact Guideline should be used to assist in determining whether or not a prescribed activity (assessable under SP Act) will, or is likely to have a significant residual impact on a MSES.

An environmental offset condition may be imposed under various State assessment frameworks (such as the SP Act and EP Act for an activity prescribed under the EO Act), if the project will, or is likely to have a significant residual impact on a prescribed environmental matter that is a MSES.

2 SUMMARY OF LEGISLATIVE REQUIREMENTS

2.1 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* (EPBC Act) is a federally administered act which provides protection to matters of national environmental significance (MNES).

As part of the additional environmental assessment for the project at a later planning stage, the consultant should undertake an initial 'self- assessment' to determine whether the project is likely to have a significant impact on MNES. Anyone wanting to undertake an action that may have a significant impact on a MNES is required to submit a referral to the federal Department of Environment and Energy (DoEE). DoEE then makes a decision as to whether the project is deemed a 'controlled' or 'non-controlled' action. Note that referral of the project under the EPBC Act may have significant time and cost implications for the project, particularly if the project is deemed to be a 'controlled action'.

Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The objective of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (ATSIHP Act) is to preserve and protect places, areas and objects that are of particular significance to Aboriginal people. Aboriginal people can request the Australian Government protect places or things of significance to Aboriginal people. These Commonwealth powers override the powers of the States and Territories. The Commonwealth would seek to exercise these powers only after the relevant Aboriginal party had exhausted all opportunities to protect the Aboriginal cultural heritage through the State or Territory legislative process.

Native Title Act 1993

The functions of the *Native Title Act 1993* (NT Act) include setting up processes through which native title can be recognised, in addition to providing protection for native title rights. Proposed activities or developments

that may affect native title are classed as 'future acts' under the NT Act. The NT Act provides for the determination of native title claims, for the treatment of future acts, and the requirement of consultation and/or notification to relevant native title claimants where future acts are involved. Under the Act, any past grants of freehold or leasehold interests that were thrown into doubt by the Mabo decision are validated.

The NT Act operates in conjunction with associated state legislation, such as the *Native Title (Queensland) Act 1993*, the *Aboriginal Land Act 1991* and the *Torres Strait Islander Act 1991*. In Queensland, all of the abovementioned acts are administered by the Department of Natural Resources and Mines (DNRM).

2.2 State legislation

State Development and Public Works Organisation Act 1971

The purpose of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) is to facilitate timely, coordinated and environmentally responsible infrastructure, planning and development to support Queensland's economic and social progress.

Section 25 of the SDPWO Act requires that proper account is taken of the environmental effects of any development. Compliance with this requirement can be achieved by following TMR's assessment process.

Under section 26 of the SDPWO Act, the Coordinator-General may declare the project to be a coordinated project for which an EIS is required. In this event, the assessment processes for an EIS under the SDPWO Act must be followed.

Environmental Protection Act 1994

The purpose of the *Environmental Protection Act 1994* (EP Act) is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. In general terms, the project must comply with section 319 of the EP Act (the 'General Environmental Duty') and not undertake activities that cause or are likely to cause environmental harm unless all reasonable and practical measures are taken to prevent or minimise the harm.

There are also a number of issue-specific Environmental Protection Policies (EPP's) that the project will need to comply with. These include the Environmental Protection Regulation 2008, *Environmental Protection (Air) Policy 2008*, *Environmental Protection (Noise) Policy 2008*and *Environmental Protection (Water) Policy 2009*.

In co-ordination with the *Sustainable Planning Act 2009*, the EP Act provides for licensing and approval of Environmentally Relevant Activities (ERA's). ERA's are activities that require specific regulation because of the likelihood that they could cause environmental harm. To carry out an ERA, an environmental authority (EA) must be obtained prior to commencing the activity. A full list of all of the prescribed ERAs can be found in schedule 2 of the *Environmental Protection Regulation 2008*.

The Act also deals with the assessment and management of contaminated land, including administration of the Environmental Management Register (EMR) and the Contaminated Land Register (CLR).

Sustainable Planning Act 2009

The purpose of the *Sustainable Planning Act 2009* (SP Act) is to achieve ecological sustainability by managing the development process and coordinating and integrating planning at the local, regional and State levels. Under the provisions of the SP Act, a number of activities associated with the project may require development permits through the Integrated Development Assessment System (IDAS). These include material change of use approvals (such as for ERA's and permits to remove contaminated land) and

operational works approvals (such as works within watercourses, waterway barrier works and vegetation clearing).

Under this Act the concept of 'development' includes one or more of the following:

- carrying out building work;
- carrying out plumbing and drainage work;
- carrying out operational work;
- reconfiguring a lot; and
- making a material change of use of premises.

Development of the E-W Link is likely to involve some or all facets of 'development' as defined by the SP Act. Therefore, some development approvals will be required even if the local government (Sunshine Coast Council) were to designate the link as exempt development within their planning scheme.

Schedule 3, table 4, item 1 of the SP Regulation outlines that operational work for the clearing of native vegetation, as defined under the *Vegetation Management Act 1999*, is assessable development unless the clearing is mentioned in schedule 24 of the SP Regulation.

The clearing of native vegetation for road works carried out on a State-controlled road or future State-controlled road is exempt development under schedule 24, part 1, item 11 of the SP Regulation. Road works is defined under the *Transport Infrastructure Act 1994* (TI Act) as "constructing roads or things associated with roads".

Schedule 24, part 1, item 16 of the SP Regulation also exempts clearing for community infrastructure specified in schedule 2 of the SP Regulation. State-controlled roads are defined in schedule 2 as community infrastructure. It is not clearly specified in schedule 24 or schedule 2 whether this exemption applies to clearing for ancillary activities associated with community infrastructure where these activities occur outside of the State-controlled road corridor (or future State-controlled road corridor).

Schedule 3, table 5, item 2 of the SP Regulation states that development carried out by the State does not require a development permit for any aspect of development on a Queensland heritage place, provided TMR has sought and received permission from the Minister.

Schedule 3, table 5, item 3 of the SP Regulation states that development that is mentioned in schedule 4 of the SP Regulation does not require a development permit for any aspect of development on a local heritage place. Consequently, a development permit would not be required if the works interfere with a local heritage place.

There are also a number of State Planning Policies (SPP's) under the SP Act that may be applicable to the project.

State Assessment and Referral Agency

As of 1 July 2013, the State Assessment and Referral Agency (SARA) established within the Department of State Development, Infrastructure and Planning (DSDIP) a single point of lodgement, coordination and decision making on behalf of all state agencies (not including government-owned organisations such as Energex). Under the new arrangements, SARA is the assessment manager or concurrence agency for all development applications where a state agency has a jurisdiction.

The State Development Assessment Provisions (SDAP) set out the matters of interest to the state for development assessment, where the chief executive administering the SP Act (i.e. through SARA) is responsible for assessing or deciding development applications.

The SDAP is prescribed in the SP Regulation, and contains the matters the chief executive may have regard to when assessing a development application. The chief executive may give these matters the weight he or she is satisfied is appropriate.

SDAP contains state codes that are specific to each matter of state interest.

Native Title (Queensland) Act 1993

The *Native Title (Queensland) Act 1993* was enacted to ensure Queensland's laws are consistent with the *Commonwealth Native Title Act 1993* for dealings affecting native title. The *Native Title Act* seeks to formally recognise that native title rights did, and in some cases still do, exist for the descendants of Aboriginal and Torres Strait Islander people, and that descent groups can lodge native title claims. Native title in land can be extinguished by valid government acts that are inconsistent with the continued existence of native title rights and interests, such as the grant of freehold estates.

Aboriginal Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* is intended to provide effective recognition, protection and conservation of Aboriginal cultural heritage within the state. Under this Act it is an offence to knowingly destroy or interfere with places, artefacts and landscapes of Aboriginal heritage or spiritual culture. Individuals or corporations undertaking development in Queensland are obliged to observe the Aboriginal Cultural Heritage Duty of Care Guidelines.

Queensland Heritage Act 1992

The *Queensland Heritage Act 1992* aims to provide for the conservation of Queensland's cultural heritage, including for example, the regulation of the excavation of sites that contain, or may contain, objects of significance to Queensland's heritage. The Heritage Register is the principal mechanism through which the Queensland Heritage Act operates.

Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) seeks to achieve the conservation of nature through an integrated and comprehensive strategy for the whole of Queensland. The Act provides for the conservation of nature by the declaration and management of protected areas, and also the protection of native wildlife not found in a protected area.

Under the provision of the NC Act, permits are required from the Department of Environment and Heritage Protection (DEHP) where a proposed activity involves the taking of 'endangered', 'near threatened' or 'least concern' native plants in the wild.

TMR currently has a number of legislative provisions which can be used as a mechanism to not have to obtain a permit for removal of 'least concern' plants in areas of remnant (i.e. not previously cleared) vegetation, subject to a number of conditions. In areas of previously cleared or regrowth vegetation, TMR has exemption from the requirement to obtain a permit for the clearing of 'endangered', 'near threatened' or 'least concern' species, if certain conditions are met.

Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) seeks to regulate the clearing of native vegetation to preserve remnant endangered and 'of concern' and 'endangered' regional ecosystems, vegetation in areas of high nature conservation values and areas vulnerable to land degradation.

Fisheries Act 1994

The *Fisheries Act 1994* manages and protects fish habitats, fisheries resources and aquaculture. The Act holds provisions for the following:

- tidal work or work within a coastal management district;
- removal, damage or disturbance to marine plants, including mangroves;
- works in a declared fish habitat; and
- constructing or raising waterway barrier works.

Should the project works involve these activities, approval is required in the form of a Development Permit under the SP Act.

Coastal Protection and Management Act 1995

State and regional planning processes for coastal development are established under this Act. The State Coastal Management Plan - Queensland's Coastal Plan, prepared under the Act, provides a vision, principles and policies for coastal development.

The Act is integrated into the SP Act and provides for the regulation of dredging, quarrying, canal construction, tidal works and other activities in the coastal zone, in particular in coastal management districts and erosion prone areas.

Operational works within a CMD have the potential to trigger various development applications, typically tidal works and/or impacts to marine plants and/or interfering with quarry material for road construction, which would be assessed under the *Sustainable Planning Act 2009.* Further investigation will need to be sought through ecological site survey and detailed permitting and approvals assessment.

Forestry Act 1959

The *Forestry Act 1959* (Forestry Act) provides for forest reservations and their management, silvicultural treatment and protection of State forests, and the sale and disposal of forest products and quarry material, the property of the Crown on State forests, timber reserves and on other lands; and for other purposes.

As it is intended that the land required for the project would be acquired by TMR prior to the commencement of construction, no permits for works within existing State forest land would be required for the project corridor.

Dangerous Goods Safety Management Act 2001

The *Dangerous Goods Safety Management Act 2001* covers the storage and handling of dangerous goods and combustible liquids as well as the operation of major hazard facilities. It is not likely that this Act will be required for assessment in the project during construction or in the operational phase of the development.

Land Act 1994

The *Land Act 1994* provides a framework for the allocation of state land either as leasehold, freehold or other tenure. Permits may be acquired under this Act from the DNRM for the occupation of a reserve, road or unallocated state land.

Acquisition of Land Act 1967

The *Acquisition of Land Act 1967* enables the state to acquire freehold land for public works or other public purposes. The Coordinator-General can compulsorily acquire land:

- By agreement (section 15 of the *Acquisition of Land Act 1967*) - The Coordinator-General's preference is to negotiate with the landowner to compulsorily acquire his or her land by agreement. An agreement can be struck before or after a Notice of Intention to Resume has been issued to the landowner. If the landowner agrees to the acquisition, the amount of compensation can be finalised at a later date. However, if compensation is also agreed to, this will be included in the agreement.
- Without agreement - If the landowner does not agree to the compulsory acquisition of their land, the statutory land acquisition process will run its course.

Water Act 2000

The purpose of the *Water Act* is to promote sustainable management and efficient use of water and other resources by establishing a system for the planning, allocation and use of water. Approval will be required for a number of activities, including:

- Excavation and placement of fill within watercourses (Riverine Protection Permit may be required).
- Taking or interfering with water (including interfering with flow) (also made assessable under SP Act)
- Taking quarry material from the bed or banks of a watercourse (also made assessable under SP Act).

A development permit is not required under the SP Act for water-related infrastructure identified as exempt in the *Sustainable Planning Regulation 2009*. Taking of water is exempt for a construction authority if in line with the Exemption requirements for the taking of water without a water entitlement under the *Water Regulation 2016*.

2.3 Planning scheme policies

This section lists the planning scheme policies that will need to be considered for the proposed works. Planning scheme policies support the Sunshine Coast Planning Scheme 2014. These policies must be considered as part of the assessment process for development of land:

- SC6.4: Planning scheme policy for the acid sulfate soils overlay code;
- SC6.6: Planning scheme policy for the biodiversity, waterways and wetlands overlay code;
- SC6.7: Planning scheme policy for the bushfire hazard overlay code;
- SC6.9: Planning scheme policy for the flood hazard overlay code;
- SC6.10: Planning scheme policy for heritage and character areas overlay code;
- SC6.14: Planning scheme policy for development works;
- SC6.18: Planning scheme policy for waste management code;
- SC6.20: Planning scheme policy for Palmview Structure Plan; and
- SC6.21: Planning scheme policy for biodiversity offsets.

3 SCOPING ASSESSMENT SUMMARY AND RECOMMENDATIONS

Based on identified risks associated with proposed E-W Link, and taking into consideration the resulting environmental assessment requirements, the component classification is considered to be ***HIGH***.

This decision has been made for the following summarised reasons:

- Project works create a new road corridor with freehold land resumed from adjacent properties changed from its current land use to road corridor.
- Potential impact to the Mooloolah River water quality and hydrology.
- The proximity of works to nationally important wetlands, significant watercourses and national parks.
- Impacts on Queensland fisheries in relation to fish passage and potential fish habitat. Multiple waterway crossings that vary between low (green), moderate (amber), high (red) and major (purple). The Code for self-assessable development, *Minor waterway barrier works Part 3: culvert crossings (WWBW01)*, applies to waterway barrier works for the construction of a new, or replacement of an existing culvert crossing on a low (green), moderate (amber) or high (red) impact waterway as marked on the spatial data layer *Queensland Waterways for Waterway Barrier Works*. This code does not apply if the new or replacement works are on an assessable (purple) waterway or within a tidal (grey) zone as marked on the data layer, such as the crossing of the Mooloolah River. For these works, a Development Approval must be lodged under the SP Act.
- The project area is mapped as 'high risk' on the NC Act flora survey trigger map.
- Non-juvenile koala habitat trees are potentially located in an area shown as low bushland habitat and low-medium rehabilitation habitat on State koala habitat mapping (SPP mapping).
- Clearing of native vegetation and potential koala habitat will be required that has the potential to impact on habitat functionality and connectivity for protected fauna known to occur in the area.
- Offsets may be required for significant residual impact to a MSES (under the EO Act), MNES (under the EPBC Act), koala habitat (under the EPBC Act and/or the EO Act) and/or the clearing of threatened plants within remnant vegetation (under the EO Act).
- Construction activities and the new road alignment have the potential to generate air quality and noise impacts to adjacent sensitive receptors.

As a ***HIGH*** environmental risk project, further environmental assessment will be required for the following:

- Confirmation of the presence or absence of contaminated land, acid sulfate soils and UXO are required prior to construction works.
- Survey of the full extent of properties impacted by the E-W Link where vegetation meets remnant status and is within a 'high risk' area on the NC Act flora survey trigger map.
- Field surveys will be required to determine potential impacts to MNES.
- Significant impact assessments of all EPBC Act species known or likely to occur within the impact area in accordance with the *Significant Impact Guidelines 1.1* to determine whether referral is necessary under the EPBC Act.
- Self-assessment needs to be undertaken for the project to establish the likelihood of the project significantly impacting on MNES:

    - Listed threatened species: 41
    - Listed threatened ecological communities: 2
    - Listed migratory species: 16
- If significant impact to MNES is likely, a referral to DoEE will be required.
- Self-assessment needs to be undertaken for the project to establish the likelihood of the project having a significant impact on MSES:
    - The Mooloolah River National park, the Mooloolah River, Sippy Creek and the Birtinya Wetlands are classed as 'wildlife habitat', 'regulated vegetation' and 'high ecological significance wetlands'.
    - The vegetation along all waterways that intersects the E-W Link are classed as 'regulated vegetation intersecting a watercourse'.
    - Removal of 'Endangered' RE 12.3.1.
    - Removal of essential habitat.
- Once detailed designs of the drainage works are confirmed, waterway barrier works approvals will need to be confirmed; self-assessment can be completed for low, moderate and high-impact waterway barrier works.
- Offsets requirements will need to be assessed.

A breakdown of further work and actions to be completed as part of the environmental component project is included in Appendix A – Future Actions & Cost.

Appendix A also includes work items that are recommended to managed / mitigate environmental impacts identified in the ESR.

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Appendix A – Future Actions & Cost

The table below outlines the recommended actions required as part of the environmental assessment and management for the project.

OUTPUT	RECOMMENDED ACTION (P/O)	OPTIONAL ESTIMATE	
		DURATION	COST
PRE-CONSTRUCTION			
Environmental Assessment Report (Internal/External)			
Review of Environmental Factors (Internal / External)	**P**		
Environmental Management Plan (Planning) (Internal / External)	**P**		
Cultural Heritage Risk Assessment	**P**		
Environmental Management Plan (Site Investigations)	**P**		
Factor-specific assessment (Internal / External) · EPBC Self Assessment · EVNT flora survey · Non-juvenile koala habitat tree survey · Phase 1 contaminated land investigation · Acid sulfate soil testing (to be combined with geotechnical investigations)			
Landscape Design (Internal / External)	**P**		
Environmental Design Report	**P**		
Cultural Heritage Field Assessment	**P**		
Cultural Heritage Field Agreement			
Cultural Heritage Management Plan			
Cultural Heritage Management Agreement	**P**		
Prepare and submit applications for Licences / Permits / Agreements including notifications for relevant Self Assessable Codes [please specify]	**P**		
Develop Construction Contract (Environmental)	**P**		
Develop Administration Contract (Environmental)	**P**		

OUTPUT	RECOMMENDED ACTION (P/O)	OPTIONAL ESTIMATE	
		DURATION	COST
[Required for when an external Contractor Administrator is employed by Principal.]			
Other, please specify			
CONSTRUCTION			
Administer Construction Contract (Environmental)	**P**		
Administer Administration Contract (Environmental)	**P**		
Environmental Audits	**P**		
FINALISATION			
Surrender and finalise relevant licences / Permits / Agreements including sending post-works notifications for relevant Self Assessable Codes [please specify]	**P**		
Post Implementation Review / Handover Report (Environment)	**P**		
Other, please specify			
Total Cost Estimate		$	

Appendix B – Assessment References

AECOM reviewed existing available reports and studies from within the local area that are relevant to the project. In addition, desktop environmental and planning information and data sources were reviewed, including:

- CSIRO's Australian Soil Resource Information System (ASRIS)
- Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) Cultural Heritage Search Tool
- Department of Agriculture and Fisheries (DAF) Fish Habitat Mapping under the *Fisheries Act 1994*
- Department of Defence Unexploded Ordnance Search
- Department of the Environment (DoE) Protected Matters Search Tool
- Department of Environment and Heritage Protection (DEHP) Wildlife Online species lists
- Atlas of Living Australia species list
- DEHP Protected Plants Flora Survey Trigger Map
- DEHP Environmentally Sensitive Areas Map
- DEHP Queensland Heritage Register
- DEHP Koala Habitat Area Map
- DEHP Referable Wetlands Mapping
- DEHP Coastal Hazard Areas Map
- Department of Natural Resources and Mines (DNRM) Vegetation Maps
- Department of State Development, Infrastructure and Planning (DSDIP) SPP Mapping Tool
- Queensland Government 'Queensland Globe'
- UNESCO World Heritage List

Appendix C – Glossary

Explains technical and unfamiliar words—but not abbreviations—used in a publication.

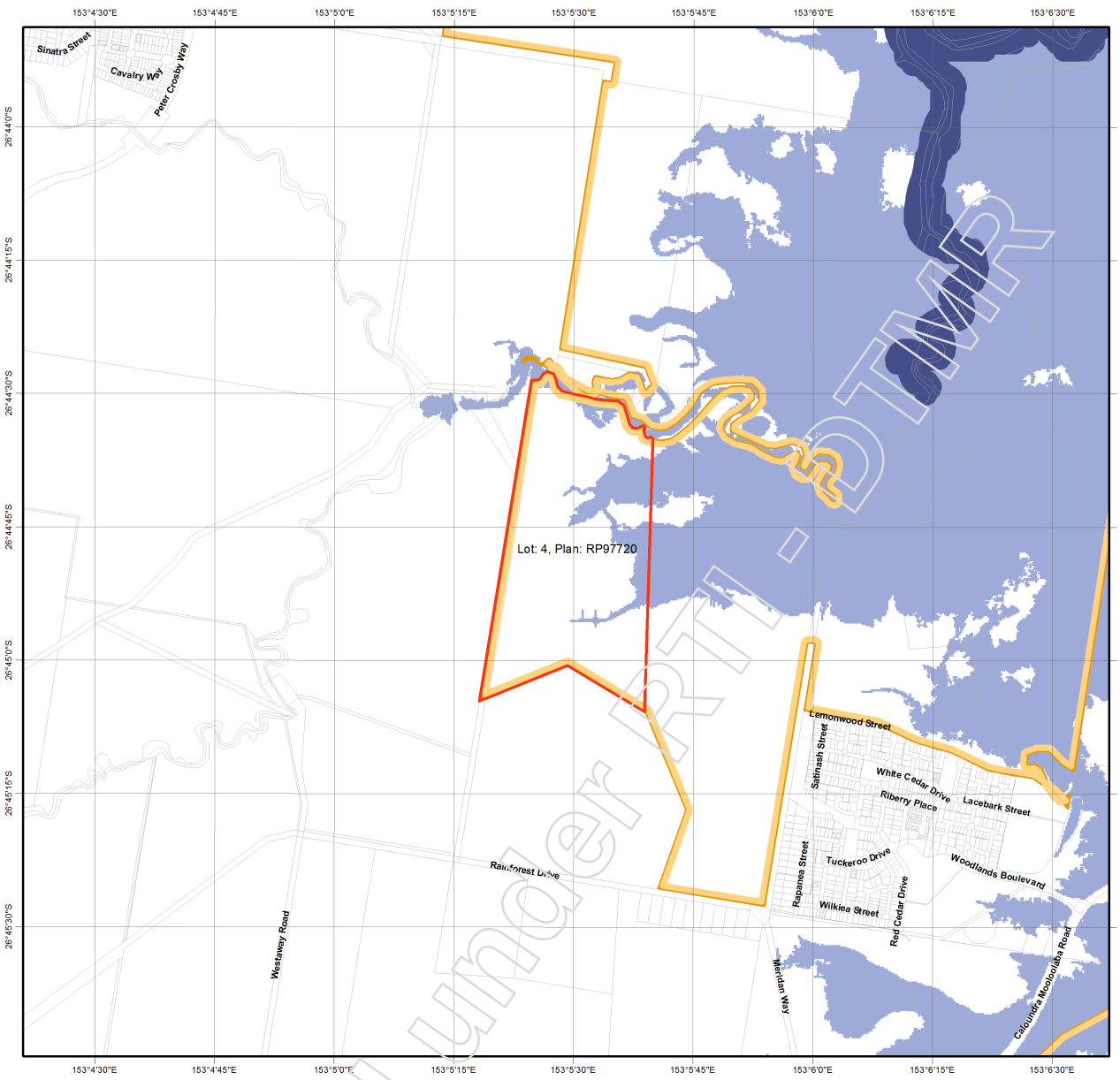
Term	Description
Negligible environmental risk	Negligible environmental risk projects are works that from the Environment and Heritage Service Request, do not require any further assessment. Furthermore, due to the negligible risk involved with the works, the environmental management requirements of MRTS51 and MRTS52 are not required as part of the Contract requirements.
Low environmental risk	Low environmental risk projects are projects where the Environmental Scoping Report does not identify a need for further environmental assessment. Site specific issues or legislative requirements needed to be managed are very few and minor in consequence. TMR's due diligence is sufficiently addressed by incorporation of MRTS 51 and MRTS52 and completed annexure within contract documentation. Low risk projects are typically minor works and programed maintenance within existing road formation.
Medium environmental risk	Medium environmental risk projects are projects that have at least one environmental factor requiring further environmental assessment identified in the Environmental Scoping Report. Medium Risk projects will generally have at least one site specific impact or legislative requirement that needs to be managed through design or contract. Medium Level projects are also typically characterised by: · being works on existing infrastructure and within existing corridor; · having disturbed or uncomplicated receiving environment · having few or uncomplicated legislative requirements · being generally managed and / or performed in-house by department staff · having some project tasks outsourced where necessary.
High environmental risk	High risk environmental risk projects are projects that involve numerous environmental factors and legislative triggers and requirements that may be associated with the project. The Environmental Scoping Report will identify that a comprehensive environmental assessment is required for the project. Projects commonly identified as high environmental risk are characterised by: · being works on new infrastructure · having longer lead time · having numerous options

Term	Description
	· having multi-faceted elements · having sensitive or complex receiving environment · having numerous or complex legislative requirements · having detailed strategic (Link Study) evaluation.

Appendix D – Figures

Pages 54 through 63 redacted for the following reasons:
- -
Deliberation

Appendix E – Coastal Zones and Storm Tide Inundation Mapping



Coastal Hazard Areas Map
Erosion Prone Area

Legend

- Lot and Plan
- Erosion due to storm impact and long term trends including sediment supply deficit and channel migration
- Erosion from permanent tidal inundation due to sea level rise
- Coastal Management District
- Coastal Building Lines

N

0 150 300 450 600 750 m

This product is projected into:
GDA 1994 MGA Zone 56

Notes

1. The areas shown on this map are indicative of the extent of erosion and permanent inundation defined by erosion prone area plans declared under the Coastal Protection and Management Act 1995. Only the declared erosion prone area plans should be used for development assessment. To determine the actual position of the erosion prone area a registered surveyor or geotechnical consultant may be required if there is any doubt.

2. Erosion prone area plans for each local government area and a comprehensive description of their determination are available from the Department of Environment and Heritage Protection website at www.ehp.qld.gov.au

Version 7 - October 2016

Disclaimer

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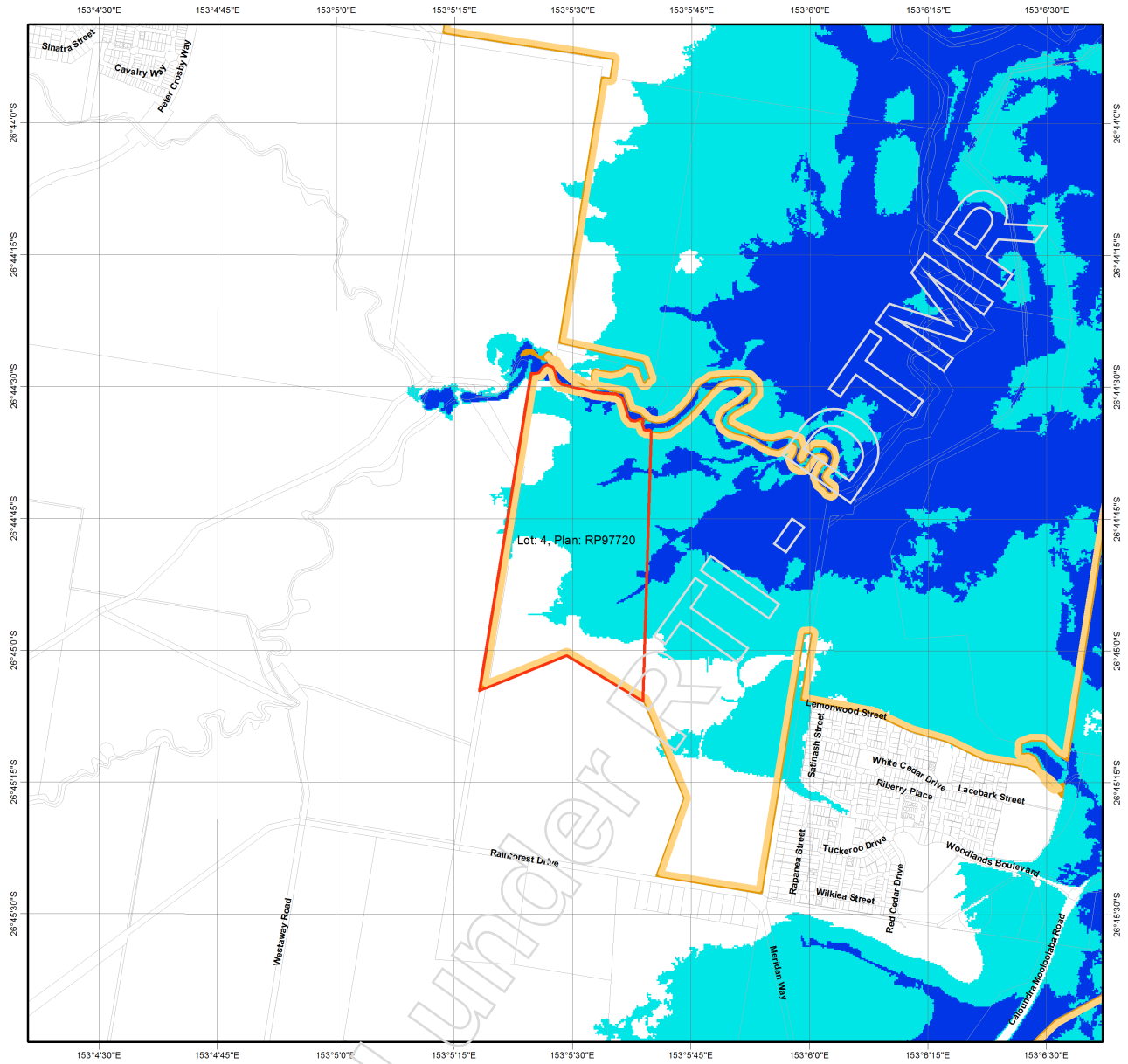

Coastal Hazard Areas Map
Storm Tide Inundation Area

Legend

- Lot and Plan
- High hazard area (greater than 1.0m water depth)
- Medium hazard area (less than 1.0m water depth)
- Coastal Management District
- Coastal hazard data not available in this area Refer to note 1 to determine
- Coastal Building Lines

* **Regional default values for a 100yr ARI inundation level including 0.8m sea level rise.**

LOCALITY DIAGRAM

N

0 150 300 450 600 750 m

This product is projected into:
GDA 1994 MGA Zone 56

Notes

1. A default storm tide inundation level of 1.5 m HAT in South East Queensland regional planning area and 2 m HAT for the remainder of Queensland is used where projected storm tide inundation levels have not been determined locally.

2. The high hazard area may coincide with the area of permanent inundation - refer to the Erosion Prone Area map.

3. The map should be used as a guide only. Field surveys are recommended to verify feature boundaries.

Version 4 - July 2015

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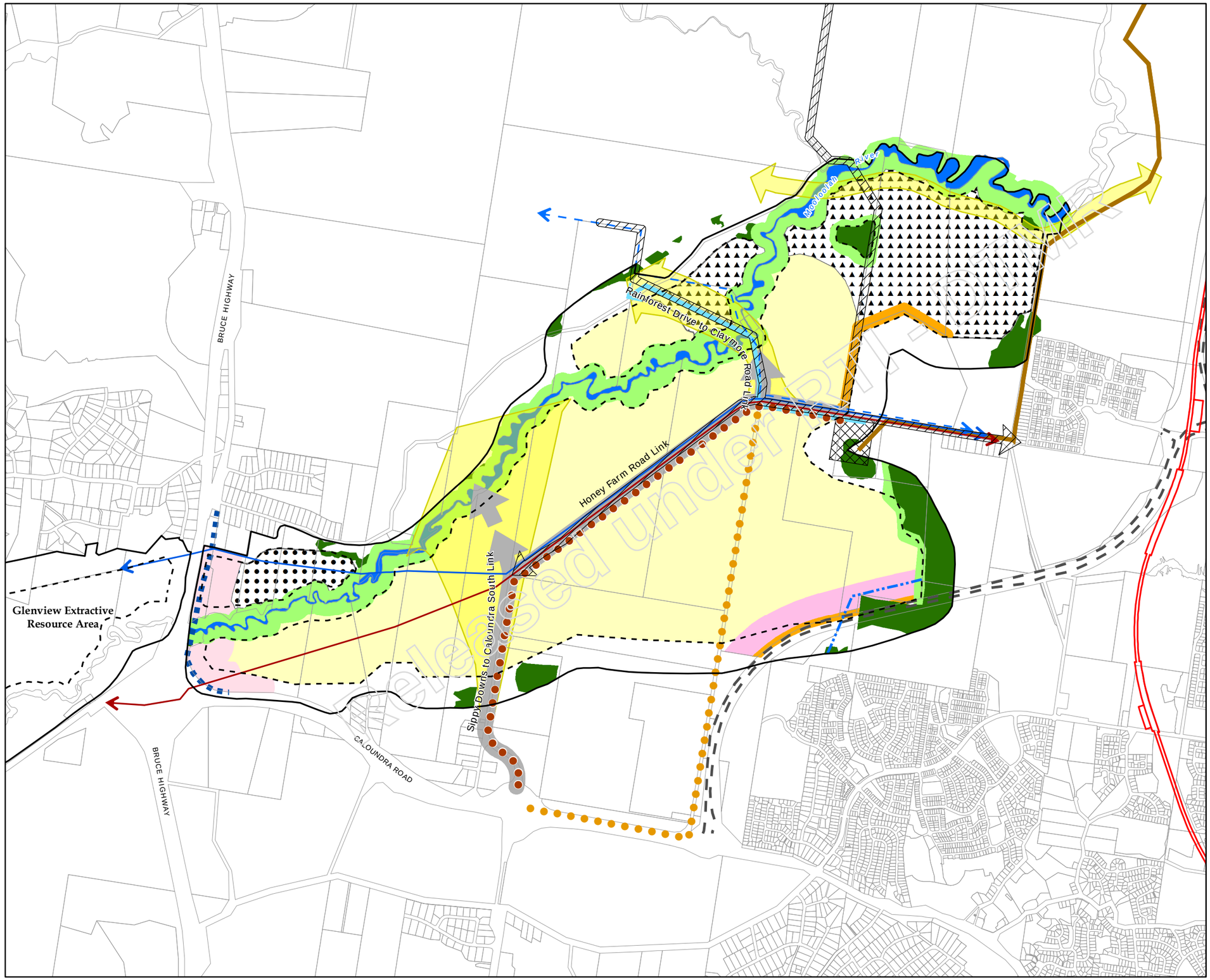
Appendix F – Meridan Plains Extractive Resource Area Mapping



Meridan Plains Extractive Resource Area Master Plan

Meridan Plains Extractive Resource Elements

- Main Roads - Bruce Highway Possible Resumption Boundary
- Haulage Route
- Interim Haulage Route
- Future Meridan Plains Sewerage and Advanced Waste Water Treatment Plants
- Trunk Sewer Pipe
- Trunk Water Pipe
- Aquagen Pipeline
- Trunk Pressure Main
- Future Infrastructure Corridor
- Future Transport and Infrastrucure Study Area
- Open Landscape Buffer
- Visual Screen
- Transport Infrastructure Corridor
- Batter Stability Zone
- Regional Significant Vegetation (areas shown within and adjoining extractive resource area only)
- Ecological Buffer (areas shown within and adjoining extractive resource area only)
- Mooloolah River
- Indicative Future 132kv Electricity Corridor
- Primary Resource Area
- Constrained Resource Area (Type A)
- Constrained Resource Area (Type B)
- SPP Key Resource Area Boundary
- SPP Extractive Resource Area Boundary

Other Elements

- DCDB 28 January 2013 © State Government
- CAMCOS Transport Corridor
- Major Road Corridor
- Indicative Proposed Drainage Line

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Geocentric Datum of Australia 1994 (GDA94)

Approx Scale @ A3 1:25,000

0 125 250 500 750 Metres

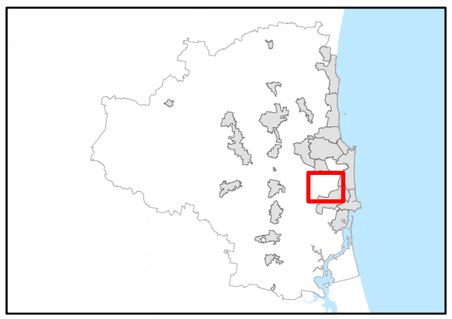

Figure 9.3.7A

Appendix G – EVNT Species Likelihood of Occurrence

Table 1 EPBC Act threatened fauna species likelihood assessment

Species name	Common name	Status	Preferred habitat	Likelihood of occurrence within project area
Birds				
Anthochaera Phrygia	Regent honeyeater	Critically endangered	Most records are from box-ironbark eucalypt associations, and it seems the species prefers wetter, more fertile sites within these associations such as along creek flats, broad river valleys and lower slopes.	**Low** Species habitat exists in the project area but no recorded occurrences in the region.
Botaurus poiciloptilus	Australasian Bittern	Endangered	Occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands. Favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water.	**Unlikely**. No records of this species exist in the project area. Rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions.
Calidris ferruginea	Curlew Sandpiper	Critically endangered	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters.	**Unlikely**. No records of this species exist in the project area.
Cyclopsitta diophthalma coxeni	Coxen's Fig-Parrot	Endangered	In the past, most abundant in lowland subtropical rainforests. Recent records from subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, sub-littoral mixed scrub, riparian corridors in woodland, open woodland and otherwise cleared land, and urbanised and agricultural areas with fig trees.	**Unlikely**. No records of this species exist in the project area.

Dasyornis brachypterus	Eastern Bristlebird	Endangered	Found in habitats with a variety of species compositions, but which are defined by a similar structure of low, dense, ground or understorey vegetation.	**Unlikely**. No records of this species exist in the project area.
Erythrotriorchis radiates	Red Goshawk	Vulnerable	Occupies a range of habitats, although primarily found in extensive areas of coastal and sub-coastal open forest and woodland supporting a mosaic of vegetation types. Favoured areas contain permanent water, are relatively fertile and biologically rich with large population of birds. Rarely seen away from large areas of intact vegetation. Nests are typically within tall trees less than one kilometre from permanent water.	**Unlikely**. No records of this species exist in the project area.
Lathamus discolour	Swift Parrot	Critically endangered	Breeds in Tasmania, migrates to mainland Australia in autumn, where it is seminomadic during winter. Key habitats for the species in northern New South Wales and south-eastern Queensland are *Eucalyptus crebra*, *E. tereticornis* or *E. melliodora* forest, while on the western slopes *E. sideroxylon* and *E. microcarpa* are commonly utilized.	**Unlikely**. No records of this species exist in the project area.
Limosa lapponica bauera	Bar-tailed Godwit	Vulnerable	Found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	**Possible**. One sighting record of this species within 3 km of the project area.

Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit	Critically endangered	Occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	**Unlikely**. No records of this species exist in the project area.
Numenius madagascariensis	Eastern Curlew	Critically endangered	Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally occurs on ocean beaches, and coral reefs, rock platforms or rocky islets.	**Possible**. One sighting record of this species within 3 km of the project area.
Pachyptila turtur subantarctica	Fairy Prion (southern)	Vulnerable	The southern subspecies of the Fairy Prion is a marine bird, found mostly in temperate and subantarctic seas. The Fairy Prion sometimes forages over continental shelves and the continental slope, but it can come close inshore in rough weather. This species breeds on islands and rock stacks. It burrows in soil, or uses crevices and caves in cliffs or rock falls. The subspecies can also nest in scrub, herbland, tussock or pasture.	**Unlikely**. No records of this species exist in the project area.
Poephila cincta cincta	Southern Black-throated Finch	Endangered	Typically occurs in grassy open woodlands and forests dominated by *E. Corymbia*, *Melaleuca* and *Acacia*, often in the vicinity of water courses and occasionally in tussock grasslands or freshwater wetlands. Requires access to seeding grasses, water and trees providing suitable nesting habitat. Probably requires a mosaic of different habitat types in which to find seed during the wet season.	**Low**. No records of this species exist in the project area. Species habitat exists in the project area; however current distribution of this species does not include the Sunshine Coast region.

Rostratula australis	Australian Painted Snipe	Endangered	Inhabits shallow, well vegetated, temporary or infrequently filled wetlands, which may have associated trees, shrubs or samphire. Occasionally inhabits brackish wetlands, saltmarsh or claypans. Typical sites include those with rank emergent tussocks of grass, sedges, rushes, reeds or samphire, often with clumps of *Muehlenbeckia* or sometimes *Melaleuca*.	**Low**. No records of this species exist in the project area. Species habitat exists in the project area but has limited occurrences in the region and is migratory in nature.
Turnix melanogaster	Black-breasted Button-quail	Vulnerable	Inhabits periodically water-stressed rainforests, vine thickets and *Brachychiton* scrubs that may incorporate Brigalow and belah, low thickets or woodlands with a dense understorey but little ground cover (typically dominated by *Acacia* sp.), and vine scrubs and *Acacia* thickets in littoral situations.	**Unlikely**. No records of this species exist in the project area.
Frogs				
Litoria olongburensis	Wallum Sedge Frog	Vulnerable	Can be found along creeks and in marshy or swampy lowland habitats amongst emergent vegetation and reeds of the wallum.	**Known**. Is known to occur in the project area.
Mixophyes iterates	Giant Barred Frog	Endangered	The Giant Barred Frog occurs in rainforests and wet sclerophyll forests in upper to lower catchment areas. During surveys in the Cooroy to Curra area of south-east Queensland, Giant Barred Frogs were observed to prefer a closed forest canopy with a relatively light cover of vegetation at ground level.	**Known**. Is known to occur in the project area.
Mammals				
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	The species is most commonly recorded from dry sclerophyll forest; however there are also records from rainforest, wet sclerophyll forests and *Callitris*-dominated forest. Fertile wooded valley habitat in close proximity to sandstone cliffs appear to be particularly important to this species.	**Low**. Is known to occur in the Beerwah State Forest; however no records of this species exist in the project area.

Dasyurus hallucatus	Northern Quoll	Endangered	Northern quolls do not have highly specific habitat requirements, and occur in a variety of habitats across their range. Most quoll populations are now associated with rocky or rugged upland areas. Recent surveys throughout Queensland suggest that northern quolls are more likely to be present in areas of high relief that have shallower soils, greater boulder cover, less fire impact and that are closer to permanent water.	**Unlikely**. No records of this species exist in the project area.
Dasyurus maculatus maculatus	Spot-tailed Quoll	Endangered	Recorded in rainforest, wet and dry sclerophyll forest and woodland habitats. Has been found on the margins of farmland and its preferred habitat includes escarpments, gullies, saddles and riparian habitat as well as rocky areas where it finds den sites.	**Low**. Is known to occur in the Beerwah State Forest; however no records of this species exist in the project area.
Petauroides volans	Greater Glider	Vulnerable	Greater gliders are typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The distribution may be patchy even in suitable habitat. The Greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.	**Unlikely**. No records of this species exist in the project area.

Phascolarctos cinereus	Koala	Vulnerable	Koala habitat can be broadly defined as any forest or woodland containing species that are known koala food trees, or shrubland with emergent food trees. The distribution of this habitat is largely influenced by land elevation, annual temperature and rainfall patterns, soil types and the resultant soil moisture availability and fertility. Preferred food and shelter trees are naturally abundant on fertile clay soils.	**Possible**. Suitable habitat exists within the project area. Three sighting records of this species within 3 km of the project area. Historically, populations of koalas were known to move between the Mooloolah River / Palmview floodplain, the Mooloolah River National Park and north into the Buderim escarpment. Another population also possibly persists traversing the fragmented Mooloolah River floodplain and associated taller *Eucalypt* stands in an east west fashion across the flood plain from the Glenview Range to Palmview through to Birtinya.

Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	The Grey-headed Flying-fox is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops and on introduced tree species in urban areas.	**Possible**. No individuals or roosts have been identified in previous field surveys of the wider project area; however as none of the vegetation communities used by the Grey-headed Flying-fox produce continuous foraging resources throughout the year, the species has adopted complex migration traits in response to ephemeral and patchy food resources.
Xeromys myoides	Water Mouse	Vulnerable	Habitat includes mangrove communities and adjacent sedgelands, grasslands and freshwater wetlands.	**Possible**. Historically, the Water mouse was found along the Mooloolah River and has been encountered during previous works by TMR in the local area.
Reptiles				
Delma torquate	Collared Delma	Vulnerable	The Collared Delma has been recorded from a number of different soil types throughout south-east Queensland (e.g. sandy loams, grey and black cracking clays, stony lithosols and basalt derived Podzolics).	**Unlikely**. No records of this species exist in the project area.

Saiphos reticulatus	Three-toed Snake-tooth Skink	Vulnerable	In Queensland, the Three-toed Snake-tooth Skink has been recorded in rainforest, closed forest, wet sclerophyll forest, tall open Blackbutt (*Eucalyptus pilularis*) forest, tall layered open eucalypt forest and closed Brush Box (*Lophostemon confertus*) forest. It has also been recorded from extensive regrowth in heavily logged areas.	**Unlikely**. No records of this species exist in the project area.

Table 2 EPBC Act threatened flora species likelihood assessment

Species name	Common name	Status	Preferred habitat	Likelihood of occurrence within project area
Acacia attenuata	No common name	Vulnerable	The species occurs in high rainfall areas of south-east Queensland and is confined to coastal lowland sand plains, where it is never more than 40 km from the coast.	**Known**. This species is known to occur in the Mooloolah National Park and surrounding areas.
Allocasuarina emuina	Emu Mountain Sheoak	Endangered	The Emu Mountain Sheoak grows in open and closed heath on fine-grained rhyolite rocky slopes (Mt Peregian) and in wallum heath on undulating coastal plain. The soils range in texture from sands, sandy loams and light to medium clays, usually with a weak acidic reaction.	**Known**. This species is known to occur in the Mooloolah River National Park and surrounding areas.
Arthraxon hispidus	Hairy-joint Grass	Vulnerable	Hairy-joint Grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland. In south-east Queensland, Hairy-joint Grass has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests.	**Possible**. One record of this species within 3 km of the project area.

Bosistoa transversa	Three-leaved Bosistoa	Vulnerable	Three-leaved Bosistoa grows in lowland subtropical rainforest up to 300 m above sea level.	**Unlikely**. No records of this species exist in the project area.
Cryptocarya foetida	Stinking Cryptocarya	Vulnerable	The Stinking Cryptocarya is restricted to coastal sands, or if not, then close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m.	**Unlikely**. No records of this species exist in the project area.
Cryptostylis hunteriana	Leafless Tongue-orchid	Vulnerable	Occurs in a variety of habitats including heathlands, woodlands, sedgelands, sclerophyll forests, grasslands and rainforests containing moist sandy or peaty soils	**Unlikely**. No records of this species exist in the project area.
Eucalyptus conglomerata	Swamp Stringybark	Endangered	The Swamp Stringybark occurs on coastal flats up to 30 m above sea level. It occurs mostly in the ecotone between wet heath (wallum) and tall open forest communities. The soils are infertile, deep and sandy or peaty in texture. Drainage is poor and soils can be seasonally water-logged.	**Possible**. One sighting record of this species within 3 km of the project area.
Macadamia integrifolia	Macadamia Nut	Vulnerable	Occurs within remnant rainforest and closed forests patches. The species has been recorded within hill crests, slopes, gullies and terrace plains	**Possible**. Suitable habitat for this species is mapped in the remnant vegetation throughout the project area (RE 12.3.1).
Macadamia ternifolia	Small-fruited Queensland Nut	Vulnerable	Occurs within lowland notophyll vine forests and Araucarian vine forests on fertile, basalt-derived soils on steep southern slopes and restricted to an area from near Pomona to near Maleny	**Possible**. Suitable habitat for this species is mapped in the remnant vegetation throughout the project area (RE 12.3.1).

Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable	Rough-shelled Bush Nut is a rare species that generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of these forests and in mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well-drained sites.	**Unlikely**. No records of this species exist in the project area.
Phaius australis	Lesser Swamp-orchid	Endangered	The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedgeland wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark or Swamp Mahogany are found. Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest, swampy rainforest, or fringing open forest.	**Possible**. Suitable habitat for this species is mapped in the remnant vegetation throughout the project area (RE 12.3.5).
Phebalium distans	Mt Berryman Phebalium	Critically endangered	Mt Berryman Phebalium is found in semi-evergreen vine thicket on red volcanic soils, or in communities adjacent to this vegetation type. Geology of the area in which this species occurs is deeply weathered basalt with undulating to hilly terrain.	**Unlikely**. No records of this species exist in the project area.
Prasophyllum wallum	Wallum Leek-orchid	Vulnerable	Grows in wallum communities and on stabilised dunes. Associated species include *Melaleuca quinquenervia* and *Banksia robur.*	**Possible**. Suitable habitat for this species is mapped in the remnant vegetation throughout the project area (RE 12.3.5).
Samadera bidwillii	Quassia	Vulnerable	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses.	**Unlikely**. No records of this species exist in the project area.

Triunia robusta	No common name	Endangered	Mainly notophyll vine forest or tall open forest with a rainforest understorey. Mostly occur within 25 m of a watercourse, on southern facing slopes or river terraces. On well-drained soils.	**Unlikely**. No records of this species exist in the project area.

Table 3 EPBC Act threatened migratory species likelihood assessment

Species name	Common name	Status	Preferred habitat	Likelihood of occurrence within project area
Migratory marine birds				
Apus pacificus	Fork-tailed Swift	-	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh.	**Known**. Species has been recorded in the project area.
Fregata ariel	Lesser Frigatebird	-	The Lesser Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground. It feeds mainly on fish (especially flying-fish) and squid, but also on seabird eggs and chicks, carrion and fish scraps.	**Low**. Species may overfly project area.
Puffinus carneipes	Flesh-footed Shearwater	-	Pairs breed on islands in burrows on sloping ground in coastal forest, scrubland, shrubland or grassland. These same burrows are also used for roosting during the breeding season. Burrows are excavated in substrates that are friable and sufficiently deep to accommodate burrows.	**Low**. Species may overfly project area.

Sterna albifrons	Little Tern	-	Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches.	**Low**. Species may overfly project area.
Migratory Terrestrial Species				
Cuculus optatus	Oriental Cuckoo	-	The Oriental cuckoo mainly inhabits forests, occurring in coniferous, deciduous and mixed forest.	**Possible**. One sighting record of this species within 3 km of the project area.
Hirundapus caudacutus	White-throated Needletail	-	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.	**Known**. Species has been recorded in the project area.
Monarcha melanopsis	Black-faced Monarch	-	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical rainforest, subtropical rainforest, mesophyll thicket/shrubland, warm temperate rainforest, dry rainforest and (occasionally) cool temperate rainforest.	**Known**. Species has been recorded in the project area.
Monarcha trivirgatus	Spectacled Monarch	-	The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	**Known**. Species has been recorded in the project area.
Myiagra cyanoleuca	Satin Flycatcher	-	Satin Flycatchers mainly inhabit eucalypt forests, often near wetlands or watercourses. They also occur in eucalypt woodlands with open understorey and grass ground cover, and are generally absent from rainforest.	**Possible**. Two sightings record of this species within 3 km of the project area.

Rhipidura rufifrons	Rufous Fantail	-	Rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps, riverside vegetation.	**Known**. Species has been recorded in the project area.
Migratory wetland species				
Gallinago hardwickii	Latham's Snipe	-	The Latham's Snipe usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies).	**Known**. Species has been recorded in the project area.
Pandion haliaetus	Osprey	-	The Osprey inhabits the areas around shallow waters, being sufficiently tolerant of human settlement to persist in suburban and sometimes urban environments.	**Low**. Species may overfly project area.
Tringa nebularia	Common Greenshank	-	The Common Greenshank 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 and are recorded less often in round tidal pools, rock-flats and rock platforms.	**Low**. Species may overfly project area.

Appendix H – Desktop Assessment Results

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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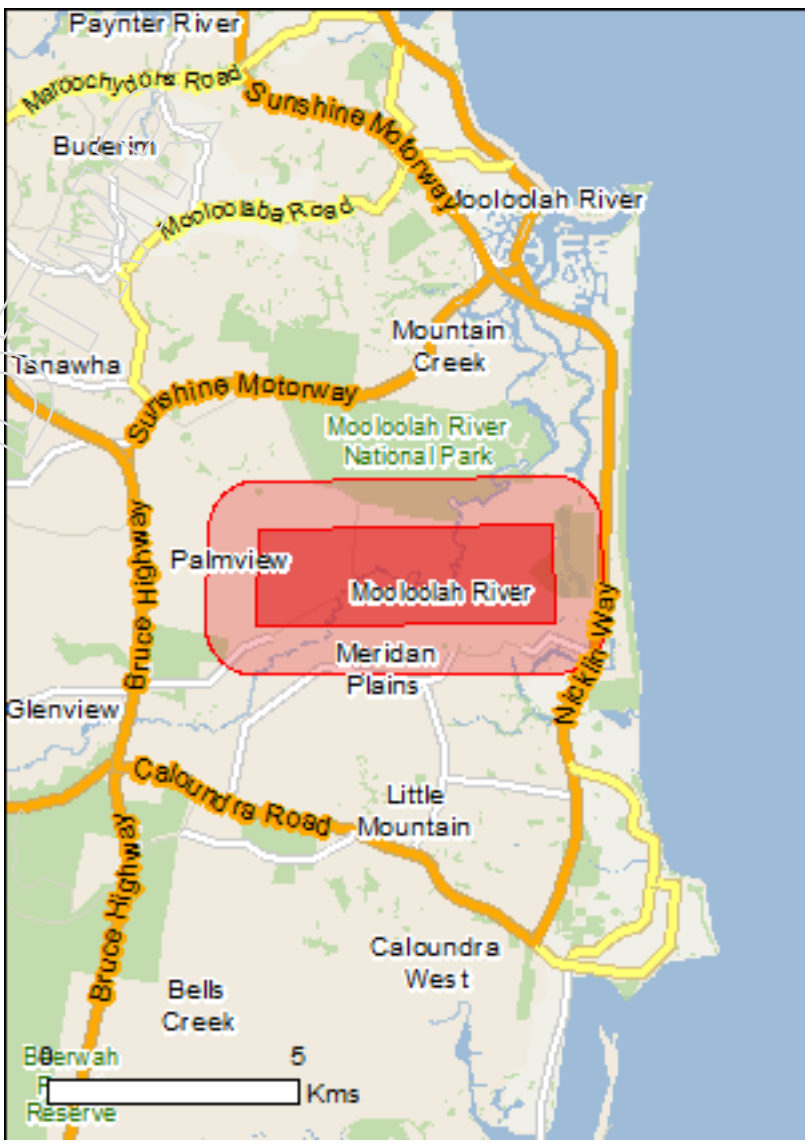

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

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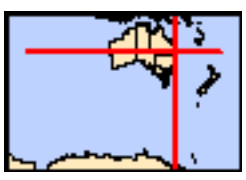

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	41
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	3
Regional Forest Agreements:	None
Invasive Species:	33
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	Within 10km of Ramsar

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat may occur within area
Insects		
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll, Digul [331]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area
Plants		
Acacia attenuata [10690]	Vulnerable	Species or species habitat known to occur within area
Allocasuarina emuina Emu Mountain Sheoak, Mt Emu She-oak [21926]	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Eucalyptus conglomerata Swamp Stringybark [3160]	Endangered	Species or species habitat likely to occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area
Macadamia ternifolia Small-fruited Queensland Nut, Gympie Nut [7214]	Vulnerable	Species or species habitat likely to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Phebalium distans Mt Berryman Phebalium [81869]	Critically Endangered	Species or species habitat may occur within area
Prasophyllum wallum Wallum Leek-orchid [55148]	Vulnerable	Species or species habitat likely to occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Triunia robusta [14747]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Delma torquata Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
[Puffinus carneipes](#) Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
[Sterna albifrons](#) Little Tern [813]		Species or species habitat may occur within area
Migratory Terrestrial Species		
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
[Hirundapus caudacutus](#) White-throated Needletail [682]		Species or species habitat known to occur within area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area
[Monarcha trivirgatus](#) Spectacled Monarch [610]		Species or species habitat known to occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
[Pandion haliaetus](#) Osprey [952]		Breeding known to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur

Name	Threatened	Type of Presence
		within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Meridan Plains	QLD
Mooloolah River	QLD
Palmview	QLD

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern		Species or species

Name	Status	Type of Presence
[66907]		habitat likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. rotundata		
Bitou Bush [16332]		Species or species habitat likely to occur within area
Eichhornia crassipes		
Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis		
Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp.		
Prickly Pears [82753]		Species or species habitat likely to occur within area
Protasparagus densiflorus		
Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Sagittaria platyphylla		
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Lower Mooloolah River	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-26.73479 153.06857,-26.73397 153.12108,-26.74957 153.12179,-26.74984 153.06806,-26.73479 153.06857

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Wildlife Online Extract

Search Criteria: Species List

Species:	All
Type:	All
Status:	All
Records:	All
Date:	Since 1980
Latitude:	-26.7434
Longitude:	153.098
Distance:	3
Email:	amelia.mack@aecom.com
Date submitted:	Tuesday 17 Jan 2017
Date extracted:	Tuesday 17 Jan 2017

Description of the CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the Nature Conservation Act 1992. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the Environment Protection Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Kingdom	Scientific Name	Common Name	I	Q	A	Sighting Records	Specimen	
animals	Rhinella marina	cane toad	Y			13		0
animals	Litoria dentata	bleating treefrog		C		1		0
animals	Litoria peronii	emerald spotted treefrog		C		1		0
animals	Litoria caerulea	common green treefrog		C		2		0
animals	Litoria freycineti	wallum rocketfrog		V		2		0
animals	Litoria gracilenta	graceful treefrog		C		1		0
animals	Litoria olongburensis	wallum sedgefrog		V	V	2		0

animals	Litoria tyleri	southern laughing treefrog	C	1	0
animals	Litoria brevipalmata	green thighed frog	C	1	0
animals	Adelotus brevis	tusked frog	V	1	0
animals	Limnodynastes peronii	striped marshfrog	C	2	0
animals	Crinia tinnula	wallum froglet	V	2	0
animals	Pseudophryne raveni	copper backed broodfrog	C	3	0
animals	Acanthiza pusilla	brown thornbill	C	52	0
animals	Acanthiza lineata	striated thornbill	C	3	0
animals	Gerygone mouki	brown gerygone	C	5	0
animals	Sericornis magnirostra	large-billed scrubwren	C	5	0
animals	Sericornis frontalis	white-browed scrubwren	C	28	0
animals	Gerygone levigaster	mangrove gerygone	C	2	0
animals	Gerygone olivacea	white-throated gerygone	C	33	0
animals	Accipiter novaehollandiae	grey goshawk	C	5	0
animals	Hieraaetus morphnoides	little eagle	C	3	0
animals	Haliastur sphenurus	whistling kite	C	37	0
animals	Haliaeetus leucogaster	white-bellied sea-eagle	C	7	0
animals	Aviceda subcristata	Pacific baza	C	6	0
animals	Accipiter fasciatus	brown goshawk	C	5	0
animals	Circus approximans	swamp harrier	C	2	0
animals	Pandion cristatus	eastern osprey	SL	15	0
animals	Elanus axillaris	black-shouldered kite	C	15	0
animals	Haliastur indus	brahminy kite	C	21	0
animals	Aquila audax	wedge-tailed eagle	C	16	0
animals	Acrocephalus australis	Australian reed-warbler	C	9	0
animals	Aegotheles cristatus	Australian owlet-nightjar	C	1	0
animals	Ceyx azureus	azure kingfisher	C	15	0
animals	Anas rhynchotis	Australasian shoveler	C	1	0
animals	Chenonetta jubata	Australian wood duck	C	30	0
animals	Anas superciliosa	Pacific black duck	C	37	0
animals	Aythya australis	hardhead	C	8	0
animals	Cygnus atratus	black swan	C	17	0
animals	Anas gracilis	grey teal	C	4	0
animals	Dendrocygna arcuata	wandering whistling-duck	C	1	0
animals	Dendrocygna eytoni	plumed whistling-duck	C	1	0

animals	Anhinga novaehollandiae	Australasian darter	C	13	0
animals	Aerodramus terraereginae	Australian swiftlet	C	1	0
animals	Hirundapus caudacutus	white-throated needletail	SL	11	0
animals	Bubulcus ibis	cattle egret	C	40	0
animals	Ardea pacifica	white-necked heron	C	12	0
animals	Ardea intermedia	intermediate egret	C	7	0
animals	Egretta garzetta	little egret	C	4	0
animals	Butorides striata	striated heron	C	2	0
animals	Ardea alba modesta	eastern great egret	C	5	0
animals	Ixobrychus flavicollis	black bittern	C	1	0
animals	Nycticorax caledonicus	nankeen night-heron	C	1	0
animals	Egretta novaehollandiae	white-faced heron	C	37	0
animals	Cracticus tibicen	Australian magpie	C	99	0
animals	Strepera graculina	pied currawong	C	3	0
animals	Cracticus nigrogularis	pied butcherbird	C	64	0
animals	Artamus leucorynchus	white-breasted woodswallow	C	16	0
animals	Cracticus torquatus	grey butcherbird	C	84	0
animals	Burhinus grallarius	bush stone-curlew	C	14	0
animals	Cacatua galerita	sulphur-crested cockatoo	C	6	0
animals	Cacatua sanguinea	little corella	C	1	0
animals	Eolophus roseicapilla	galah	C	17	0
animals	Calyptorhynchus lathami lathami	glossy black-cockatoo (eastern)	V	1	0
animals	Calyptorhynchus funereus	yellow-tailed black-cockatoo	C	14	0
animals	Lalage tricolor	white-winged triller	C	2	0
animals	Lalage leucomela	varied triller	C	21	0
animals	Coracina papuensis	white-bellied cuckoo-shrike	C	4	0
animals	Coracina tenuirostris	cicadabird	C	29	0
animals	Coracina novaehollandiae	black-faced cuckoo-shrike	C	60	0
animals	Vanellus miles novaehollandiae	masked lapwing (southern subspecies)	C	25	0
animals	Charadrius ruficapillus	red-capped plover	C	1	0
animals	Vanellus miles	masked lapwing	C	19	0
animals	Elseyornis melanops	black-fronted dotterel	C	1	0
animals	Ephippiorhynchus asiaticus	black-necked stork	C	2	0
animals	Cisticola exilis	golden-headed cisticola	C	22	0
animals	Cormobates leucophaea metastasis	white-throated treecreeper (southern)	C	53	0

animals	Cormobates leucophaea	white-throated treecreeper	C	9	0
animals	Geopelia humeralis	bar-shouldered dove	C	50	0
animals	Macropygia amboinensis	brown cuckoo-dove	C	15	0
animals	Streptopelia chinensis	spotted dove	Y	8	0
animals	Lopholaimus antarcticus	topknot pigeon	C	4	0
animals	Ptilinopus regina	rose-crowned fruit-dove	C	6	0
animals	Ocyphaps lophotes	crested pigeon	C	61	0
animals	Columba livia	rock dove	Y	2	0
animals	Geopelia striata	peaceful dove	C	33	0
animals	Columba leucomela	white-headed pigeon	C	2	0
animals	Eurystomus orientalis	dollarbird	C	27	0
animals	Corvus orru	Torresian crow	C	141	0
animals	Centropus phasianinus	pheasant coucal	C	47	0
animals	Cacomantis flabelliformis	fan-tailed cuckoo	C	30	0
animals	Scythrops novaehollandiae	channel-billed cuckoo	C	8	0
animals	Chalcites lucidus	shining bronze-cuckoo	C	22	0
animals	Chalcites basalis	Horsfield's bronze-cuckoo	C	8	0
animals	Cuculus optatus	oriental cuckoo	SL	1	0
animals	Cacomantis variolosus	brush cuckoo	C	19	0
animals	Eudynamys orientalis	eastern koel	C	15	0
animals	Chalcites minutillus barnardi	little bronze-cuckoo	C	4	0
animals	Dicrurus bracteatus	spangled drongo	C	19	0
animals	Lonchura punctulata	nutmeg mannikin	Y	1	0
animals	Lonchura castaneothorax	chestnut-breasted mannikin	C	20	0
animals	Taeniopygia bichenovii	double-barred finch	C	31	0
animals	Neochmia temporalis	red-browed finch	C	35	0
animals	Falco berigora	brown falcon	C	4	0
animals	Falco longipennis	Australian hobby	C	5	0
animals	Falco cenchroides	nankeen kestrel	C	19	0
animals	Haematopus longirostris	Australian pied oystercatcher	C	1	0
animals	Todiramphus sanctus	sacred kingfisher	C	15	0
animals	Dacelo novaeguineae	laughing kookaburra	C	90	0
animals	Todiramphus macleayii	forest kingfisher	C	16	0
animals	Cheramoeca leucosterna	white-backed swallow	C	3	0
animals	Petrochelidon ariel	fairy martin	C	25	0

animals	Hirundo neoxena	welcome swallow	C	80	0
animals	Petrochelidon nigricans	tree martin	C	19	0
animals	Irediparra gallinacea	comb-crested jacana	C	8	0
animals	Sterna hirundo	common tern	SL	1	0
animals	Thalasseus bergii	crested tern	SL	1	0
animals	Chroicocephalus novaehollandiae	silver gull	C	2	0
animals	Gelochelidon nilotica	gull-billed tern	SL	1	0
animals	Chlidonias hybrida	whiskered tern	C	3	0
animals	Malurus cyaneus	superb fairy-wren	C	2	0
animals	Malurus lamberti	variegated fairy-wren	C	55	0
animals	Malurus melanocephalus	red-backed fairy-wren	C	90	0
animals	Cincloramphus cruralis	brown songlark	C	1	0
animals	Megalurus timoriensis	tawny grassbird	C	20	0
animals	Alectura lathami	Australian brush-turkey	C	5	0
animals	Philemon corniculatus	noisy friarbird	C	43	0
animals	Manorina melanocephala	noisy miner	C	104	0
animals	Myzomela sanguinolenta	scarlet honeyeater	C	71	0
animals	Philemon citreogularis	little friarbird	C	13	0
animals	Anthochaera chrysoptera	little wattlebird	C	57	0
animals	Melithreptus albogularis	white-throated honeyeater	C	52	0
animals	Melithreptus lunatus	white-naped honeyeater	C	1	0
animals	Lichmera indistincta	brown honeyeater	C	64	0
animals	Phylidonyris niger	white-cheeked honeyeater	C	73	0
animals	Entomyzon cyanotis	blue-faced honeyeater	C	5	0
animals	Caligavis chrysops	yellow-faced honeyeater	C	13	0
animals	Meliphaga lewinii	Lewin's honeyeater	C	95	0
animals	Myzomela obscura	dusky honeyeater	C	1	0
animals	Merops ornatus	rainbow bee-eater	C	68	0
animals	Grallina cyanoleuca	magpie-lark	C	42	0
animals	Monarcha melanopsis	black-faced monarch	SL	5	0
animals	Carterornis leucotis	white-eared monarch	C	1	0
animals	Myiagra inquieta	restless flycatcher	C	1	0
animals	Myiagra alecto	shining flycatcher	C	2	0
animals	Myiagra rubecula	leaden flycatcher	C	39	0
animals	Symposiachrus trivirgatus	spectacled monarch	SL	4	0

animals	Anthus novaeseelandiae	Australasian pipit	C	10	0
animals	Dicaeum hirundinaceum	mistletoebird	C	32	0
animals	Daphoenositta chrysoptera	varied sittella	C	20	0
animals	Sphecotheres vieilloti	Australasian figbird	C	36	0
animals	Oriolus sagittatus	olive-backed oriole	C	30	0
animals	Colluricincla megarhyncha	little shrike-thrush	C	20	0
animals	Colluricincla harmonica	grey shrike-thrush	C	77	0
animals	Pachycephala pectoralis	golden whistler	C	61	0
animals	Pachycephala rufiventris	rufous whistler	C	96	0
animals	Pardalotus striatus	striated pardalote	C	91	0
animals	Pardalotus punctatus	spotted pardalote	C	6	0
animals	Passer domesticus	house sparrow	Y	3	0
animals	Pelecanus conspicillatus	Australian pelican	C	7	0
animals	Microeca fascinans	jacky winter	C	2	0
animals	Petroica rosea	rose robin	C	9	0
animals	Eopsaltria australis	eastern yellow robin	C	62	0
animals	Phalacrocorax sulcirostris	little black cormorant	C	21	0
animals	Microcarbo melanoleucos	little pied cormorant	C	22	0
animals	Phalacrocorax varius	pied cormorant	C	3	0
animals	Phalacrocorax carbo	great cormorant	C	11	0
animals	Coturnix ypsilophora	brown quail	C	18	0
animals	Pitta versicolor	noisy pitta	C	1	0
animals	Podargus strigoides	tawny frogmouth	C	2	0
animals	Tachybaptus novaehollandiae	Australasian grebe	C	11	0
animals	Podiceps cristatus	great crested grebe	C	2	0
animals	Platycercus adscitus	pale-headed rosella	C	51	0
animals	Alisterus scapularis	Australian king-parrot	C	3	0
animals	Parvipsitta pusilla	little lorikeet	C	3	0
animals	Pezoporus wallicus wallicus	ground parrot	V	2	0
animals	Trichoglossus haematodus moluccanus	rainbow lorikeet	C	91	0
animals	Trichoglossus chlorolepidotus	scaly-breasted lorikeet	C	79	0
animals	Platycercus adscitus palliceps	pale-headed rosella (southern form)	C	1	0
animals	Psophodes olivaceus	eastern whipbird	C	44	0
animals	Ailuroedus crassirostris	green catbird	C	6	0
animals	Porzana tabuensis	spotless crake	C	1	0

animals	Amaurornis moluccana	pale-vented bush-hen		C	1	0
animals	Porphyrio melanotus	purple swamphen		C	10	0
animals	Gallinula tenebrosa	dusky moorhen		C	7	0
animals	Fulica atra	Eurasian coot		C	9	0
animals	Gallirallus philippensis	buff-banded rail		C	5	0
animals	Tribonyx ventralis	black-tailed native-hen		C	1	0
animals	Himantopus himantopus	black-winged stilt		C	2	0
animals	Rhipidura leucophrys	willie wagtail		C	47	0
animals	Rhipidura rufifrons	rufous fantail		SL	14	0
animals	Rhipidura albiscapa	grey fantail		C	119	0
animals	Numenius phaeopus	whimbrel		SL	1	0
animals	Gallinago hardwickii	Latham's snipe		SL	7	0
animals	Limosa lapponica baueri	Western Alaskan bar-tailed godwit		SL V	1	0
animals	Numenius madagascariensis	eastern curlew		V CE	1	0
animals	Ninox boobook	southern boobook		C	1	0
animals	Acridotheres tristis	common myna	Y		2	0
animals	Platalea regia	royal spoonbill		C	7	0
animals	Platalea flavipes	yellow-billed spoonbill		C	2	0
animals	Threskiornis molucca	Australian white ibis		C	19	0
animals	Threskiornis spinicollis	straw-necked ibis		C	30	0
animals	Zosterops lateralis	silvereye		C	33	0
animals	Turnix varius	painted button-quail		C	1	0
animals	Tyto delicatula	eastern barn owl		C	1	0
animals	Zizina otis labradus	common grass-blue (Australian subspecies)			1	0
animals	Danaus plexippus plexippus	monarch			7	0
animals	Hypolimnas bolina nerina	varied eggfly			1	0
animals	Tirumala hamata hamata	blue tiger			2	0
animals	Melanitis leda bankia	common evening-brown			4	0
animals	Euploea core corinna	common crow			2	0
animals	Vanessa kershawi	Australian painted lady			2	0
animals	Polyura sempronius sempronius	tailed emperor			1	0
animals	Junonia villida calybe	meadow argus			2	0
animals	Ornithoptera richmondia	Richmond birdwing		V	1	0
animals	Graphium sarpedon choredon	blue triangle			1	0
animals	Papilio aegeus aegeus	orchard swallowtail (Australian subspecies)			1	0

animals	Delias nigrina	black jezebel				5	0
animals	Eurema smilax	small grass-yellow				1	0
animals	Eurema hecabe	large grass-yellow				1	0
animals	Eurema sp.					1	0
animals	Delias sp.					1	0
animals	Belenois java teutonia	caper white				3	0
animals	Catopsilia pomona pomona	lemon migrant				2	0
animals	Delias argenthona argenthona	scarlet jezebel				3	0
animals	Bos taurus	European cattle	Y			1	0
animals	Vulpes vulpes	red fox	Y			1	0
animals	Antechinus flavipes flavipes	yellow-footed antechinus (south-east Queensland)		C		4	0
animals	Felis catus	cat	Y			1	0
animals	Macropus giganteus	eastern grey kangaroo		C		12	0
animals	Macropus sp.					2	0
animals	Wallabia bicolor	swamp wallaby		C		3	0
animals	Rattus tunneyi	pale field-rat		C		1	0
animals	Melomys burtoni	grassland melomys		C		5	0
animals	Rattus fuscipes	bush rat		C		3	0
animals	Rattus lutreolus	swamp rat		C		1	0
animals	Hydromys chrysogaster	water rat		C		1	0
animals	Petaurus breviceps	sugar glider		C		1	0
animals	Trichosurus vulpecula	common brushtail possum		C		5	0
animals	Phascolarctos cinereus	koala		V	V	3	0
animals	Pteropus alecto	black flying-fox		C		1	0
animals	Pteropus scapulatus	little red flying-fox		C		2	0
animals	Pteropus poliocephalus	grey-headed flying-fox		C	V	1	0
animals	Tachyglossus aculeatus	short-beaked echidna		SL		2	0
animals	Ambassis agassizii	Agassiz's glassfish				6	0
animals	Ambassis marianus	estuary glassfish				3	0
animals	Anguilla reinhardtii	longfin eel				24	0
animals	Anguilla australis	southern shortfin eel				1	0
animals	Craterocephalus stercusmuscarum	flyspecked hardyhead				1	0
animals	Hypseleotris galii	firetail gudgeon				14	0
animals	Gobiomorphus coxii	Cox gudgeon				2	0
animals	Hypseleotris compressa	empire gudgeon				24	0

animals	Philypnodon grandiceps	flathead gudgeon		4	0
animals	Hypseleotris klunzingeri	western carp gudgeon		4	0
animals	Gobiomorphus australis	striped gudgeon		24	0
animals	Rhadinocentrus ornatus	ornate rainbowfish		14	0
animals	Melanotaenia duboulayi	crimsonspotted rainbowfish		9	0
animals	Mugil cephalus	sea mullet		20	0
animals	Trachystoma petardi	pinkeye mullet		3	0
animals	Macquaria novemaculeata	Australian bass		10	0
animals	Tandanus tandanus	freshwater catfish		5	0
animals	Xiphophorus maculatus	platy	Y	3	0
animals	Gambusia holbrooki	mosquitofish	Y	8	0
animals	Pseudomugil signifer	Pacific blue eye		7	0
animals	Retropinna semoni	Australian smelt		11	0
animals	Notesthes robusta	bullrout		19	0
animals	Acanthopagrus australis	yellowfin bream		3	0
animals	Leiopotherapon unicolor	spangled perch		7	0
animals	Intellagama lesueurii	eastern water dragon	C	2	0
animals	Pogona barbata	bearded dragon	C	2	0
animals	Tropidonophis mairii	freshwater snake	C	2	0
animals	Hydrophis elegans	elegant sea snake	C	1	0
animals	Tiliqua scincoides	eastern blue-tongued lizard	C	2	0
animals	Lampropholis couperi	plain-backed sunskink	C	1	0
animals	Lampropholis delicata	dark-flecked garden sunskink	C	5	0
animals	Calyptotis scutirostrum	scute-snouted calyptotis	C	1	0
animals	Cyclodomorphus gerrardii	pink-tongued lizard	C	1	0
animals	Eroticoscincus graciloides	elf skink	C	1	0
animals	Varanus sp.	goanna		1	0
animals	Varanus varius	lace monitor	C	5	0
animals	Indeterminate	Unknown or Code Pending	C	1	0
fungi	Thelephora		C	1	1
plants	Blechnum indicum	swamp water fern	C	1	1
plants	Platysace linearifolia		C	1	1
plants	Xanthosia pilosa	woolly xanthosia	C	1	1
plants	Parsonsia largiflorens		E	1	1
plants	Parsonsia straminea	monkey rope	C	1	1

plants	Parsonsia ventricosa			C		1	1
plants	Allocasuarina emuina	Mt. Emu she-oak		E	E	2	2
plants	Allocasuarina littoralis			C		2	2
plants	Schizomeria ovata	white cherry		C		1	1
plants	Hibbertia vestita			C		1	1
plants	Hibbertia salicifolia			C		1	1
plants	Hibbertia linearis			C		1	1
plants	Drosera spatulata var. spatulata			C		1	1
plants	Drosera binata	forked sundew		C		1	1
plants	Leucopogon leptospermoides			C		1	1
plants	Sprengelia sprengelioides	sprengelia		C		1	1
plants	Epacris obtusifolia	common heath		C		1	1
plants	Ricinocarpos pinifolius	wedding bush		C		1	1
plants	Aotus ericoides	common aotus		C		1	1
plants	Daviesia umbellulata			C		1	1
plants	Pultenaea myrtoides			C		1	1
plants	Mirbelia rubiifolia	heathy mirbelia		C		1	1
plants	Desmodium intortum		Y			1	1
plants	Canavalia papuana	wild jack bean		C		1	1
plants	Aotus lanigera	pointed aotus		C		1	1
plants	Goodenia stelligera			C		1	1
plants	Dampiera sylvestris	blue dampiera		C		1	1
plants	Rotala rotundifolia		Y			1	1
plants	Melastoma candidum		Y			1	1
plants	Acacia baueri subsp. baueri	tiny wattle		V		1	1
plants	Acacia oshanesii			C		1	1
plants	Acacia suaveolens	sweet wattle		C		1	1
plants	Acacia disparrima subsp. disparrima			C		1	0
plants	Acacia attenuata			V	V	1	0
plants	Streblus brunonianus	whalebone tree		C		1	1
plants	Leptospermum liversidgei			C		2	2
plants	Leptospermum semibaccatum	wallum tea-tree		C		2	2
plants	Pilidiostigma rhytispermum			C		1	1
plants	Baeckea frutescens			C		2	2
plants	Homoranthus virgatus	twiggy homoranthus		C		1	1

plants	Leptospermum whitei		C	1	1
plants	Olax retusa		C	1	1
plants	Glochidion sumatranum	umbrella cheese tree	C	1	1
plants	Pseudanthus orientalis		C	1	1
plants	Pittosporum revolutum	yellow pittosporum	C	1	1
plants	Strangea linearis	strangea	C	1	1
plants	Conospermum taxifolium	devil's rice	C	1	1
plants	Banksia robur	broad-leaved banksia	C	1	1
plants	Persoonia virgata	small-leaved geebung	C	1	1
plants	Alphitonia oblata		C	2	2
plants	Zieria minutiflora subsp. minutiflora		C	1	1
plants	Medicosma forsteri		C	2	2
plants	Boronia falcifolia	wallum boronia	C	2	2
plants	Zieria laxiflora	wallum zieria	C	1	1
plants	Zieria exsul		E	1	1
plants	Jagera pseudorhus var. pseudorhus		C	1	1
plants	Stackhousia nuda		C	1	1
plants	Argyrodendron trifoliolatum	booyong	C	1	1
plants	Stylidium ornatum		C	1	1
plants	Stylidium graminifolium	grassy-leaved trigger-flower	C	1	1
plants	Pimelea linifolia subsp. linifolia		C	1	1
plants	Pimelea linifolia		C	2	2
plants	Pararistolochia praevenosa		NT	1	1
plants	Eupomatia laurina	bolwarra	C	1	1
plants	Cryptocarya laevigata		C	1	1
plants	Spirodela polyrhiza	large duckweed	C	1	1
plants	Wolffia angusta	tiny duckweed	C	1	1
plants	Burchardia umbellata		C	1	1
plants	Cyperus haspan subsp. juncoides		C	1	1
plants	Schoenus calostachyus		C	1	1
plants	Schoenus paludosus		C	1	1
plants	Caustis recurvata		C	1	1
plants	Carex appressa		C	1	1
plants	Schoenus brevifolius		C	1	1
plants	Dioscorea bulbifera var. bulbifera		C	1	1

plants	Dioscorea bulbifera		C	1	1
plants	Dioscorea transversa	native yam	C	1	1
plants	Eriocaulon australe		C	1	1
plants	Haemodorum tenuifolium		C	1	1
plants	Dianella caerulea var. vannata		C	1	1
plants	Patersonia fragilis		C	1	1
plants	Caesia parviflora var. parviflora		C	1	1
plants	Juncus kraussii	sea rush	C	1	1
plants	Lomandra elongata		C	1	1
plants	Sowerbaea juncea	vanilla plant	C	1	1
plants	Cordyline rubra	red-fruited palm lily	C	1	1
plants	Corybas undulatus	tailed helmet orchid	C	1	1
plants	Eragrostis paniciformis		Y	1	1
plants	Empodisma minus	spreading rope rush	C	1	1
plants	Alpinia arundelliana		C	1	1
plants	Leucobryum candidum		C	1	1
plants	Indet.		C	1	1

Appendix I – Cultural Heritage Risk Assessment

Cultural Heritage Risk Assessment	Revision Number: 2
	Effective Date: 07.12.2016

Executive Summary

This CHRA provides an analysis of the cultural heritage risks pertaining to Option 9 of the Palmview-Sippy Downs project (the Project), including a consideration of both Historical and Indigenous heritage requirements. The CHRA finds that project Option 9 of the Palmview-Sippy Downs project is a high risk to cultural heritage because it will require clearing of potentially undisturbed vegetation, and passes within 500m of a DATSIP site. In summary, Option 9 of the Palmview-Sippy Downs project has the following risk profile:

☐ No Historical or Indigenous cultural heritage issues (Low Risk)

☐ Historical heritage issues:

☒ Indigenous heritage issues: Project will require clearing of potentially undisturbed vegetation, and passes within 50m of a DATSIP site.

Further details on management recommendations for Option 9 of the Palmview-Sippy Downs project are provided in Table 1.

Project Details			
PDO District	North Coast		
Project name & number	Sunshine Motorway -- Palmview-Sippy Downs		
Project manager	N/A	**Contact**	N/A
Location	Deliberation		
Local Government	Sunshine Coast RC	**WBS**	N/A
Road/Facility No	Sunshine Motorway	**DMS reference**	N/A

Project Scope				
Nature of Works:	☐ Maintenance	☒ New construction	☐ Site Investigations	
	☐ Other:			
Phase:	☒ Concept	☐ Development	☐ Construction	☐ Other:
Estimated works start date:	N/A			
Scope of works: Plans/design drawings/project drawings to be attached in Appendices section (at rear)	Construction of up to 7km of new road west of Kawana Way. Disturbance footprint anticipated to be up to 120m.			

Project Scope	
Are there ancillary works? If Yes, describe briefly	Unknown, but likely.
Aboriginal Party/ies for project area: Complete this section based on results of DATSIP search (question 4 below).	Kabi Kabi First Nation Queensland South Native Title Services Limited PO Box 10832, Adelaide Street BRISBANE QLD 4000 Phone: (07) 3224 1200 Freecall: 1800 663 693 Fax (07) 3229 9880 Email: reception@qsnts.com.au
Has there been previous cultural heritage assessment/s for any or all of the project area? If yes, provide relevant details	N/A

Management Recommendations

Only complete this table when you have completed Tables 2-6 below, if applicable. **Complete this table for ALL works. Describe landscape information for entire project/works (i.e. each section and associated disturbance areas).**

This section requires an ACCURATE DESCRIPTION OF THE 'ON GROUND' SITE CONDITIONS. Ensure that supporting documents are attached in the Appendices section (n.b. the duty of care category can change throughout works sections, e.g. works near specific vegetation &/or features like watercourses etc.)

Table 1 Overall Management Recommendations

Location description: Section / Chainage / GPS Coordinates / Waterway Name	**Property:** Lot on plan	**Past use/ground disturbance description:** (summarise land use/ground disturbance – attach aerials/site photos/other information as appendix to illustrate) E.g. evidence of past mechanical disturbance	**Description of Vegetation / Features within works spans** E.g. Rivers & creeks, rock outcrops, remnant or regrowth, open woodland grassland etc.	**Category** (Low risk or High Risk Duty of Care Category)	**Management Recommendations**
Deliberation		Potentially uncleared vegetation	Old growth/remnant Melaleuca quinquenervia open forest (e.g. vegetated swamp), some gallery rainforest (notophyll vine forest) on alluvial plains.	High Risk Category 5	Further cultural heritage assessment required.
		Approximately 3.5 ha of potentially uncleared vegetation	Old growth/remnant gallery rainforest (notophyll vine forest) on alluvial plains.	High Risk Category 5	Avoid if possible. Further cultural heritage assessment required if impact likely.

Location description: Section / Chainage / GPS Coordinates / Waterway Name	**Property:** Lot on plan	**Past use/ground disturbance description:** (summarise land use/ground disturbance – attach aerials/site photos/other information as appendix to illustrate) E.g. evidence of past mechanical disturbance	**Description of Vegetation / Features within works spans** E.g. Rivers & creeks, rock outcrops, remnant or regrowth, open woodland grassland etc.	**Category** (Low risk or High Risk Duty of Care Category)	**Management Recommendations**
Deliberation		Previously cleared pastoral/agricultural land	Adjacent to low rise which has potential for remnant cultural heritage values	High risk Category 4	Avoid if possible. Further cultural heritage assessment required if impact likely.
		Previously cleared pastoral/agricultural land	Alignment within 200m of DATSIP site KC:A04	High risk Category 4	Avoid if possible. Further cultural heritage assessment required if impact likely.
		Previously cleared pastoral/agricultural land	Alignment within 50m of DATSIP site KC:A04	High risk Category 5	Avoid if possible. Further cultural heritage assessment required if impact likely.
		Previously cleared pastoral/agricultural land	Grass and swamp	Low risk Category 4	Implement chance finds procedures

Historical cultural heritage assessment

Table 2 Historical Heritage Assessment

Are there any historical cultural heritage places/values inside or within 100 metres of the proposed works area? Search the following:	Yes	No
Queensland Heritage Register ***Comment***: There are no SHR places within 5km of the Project.	☐	☒
Australian Heritage Database: ***Comment***: There are no National or Commonwealth Heritage Places within 5km of the Project. The RNE listed Mooloolah River National Park (RNE#8706) is located approximately 1.5km to the north of the Project. However, the RNE is no longer a statutory archive, and the Mooloolah River National Park is listed solely for its natural heritage values (Figure 1).	☐	☒
Australian National Shipwreck Database: ***Comment***: There are no shipwrecks within 5km of the Project	☐	☒
Queensland National Trust Heritage Register ***Comment***: N/A	☐	☐
Contact the relevant local government ***Comment***: There are no Local Heritage Places within 5km of the Project	☐	☒

Stage 1 Indigenous cultural heritage assessment

Table 3 Preliminary Risk Factors

Preliminary Risk Factors	Yes	No
Question 1: Are there any existing Cultural Heritage Management Agreement/s over any part of the project area? Are there any Cultural Heritage Network Agreements, Cultural Heritage Corridor Agreements, Service Level Agreements or any other deed or agreements with Aboriginal Party/ies over any part of the project area (inc. where ancillary works will occur)? Tip: review past project files and/or talk to the local Cultural Heritage Officer. ***Comment***: N/A	☐	☐
Question 2: Are project works proposed in the Torres Strait Islands or in/near remote mainland Aboriginal communities? Important note: if works are within the Torres Strait, the project is automatically High Risk (Category 5) – document in Table 1 and proceed to Step 3 of the CH Process Manual. ***Comment***: Works are in a developed area on the mainland.	☐	☒
Question 3: Are there any political or community issues or concerns in the area to be impacted by the project works? Tip: tick Yes in situations where the works are receiving broader community interest and the project is generally seen to be a high priority, or at risk of media and/or political scrutiny. ***Comment***: None known.	☐	☒
Question 4: Did your DATSIP search identify any recorded cultural heritage sites? ***Comment***: There are three DATSIP sites mapped within 500m of the Project (Figure 2): one earthen arrangement (KC:A04) and two artefact scatters (KC:F91 and KC:H10). Given the known inaccuracies of the DATSIP database, however, these locations should be regarded as approximate only. The exact location of the earthen arrangement (KC:A04) is particularly unclear. Discussions with DATSIP (DATSIP pers. comm. 6/12/16) indicate that the intial listing of the site was made in 1984, possibly based on details provided in Steele's 1984 volume (Steele, 1984:175), which describes a ring 'at the junction of Sippy Creek and the Mooloolah River', going on to note that 'it is poorly preserved, difficult to locate, and rather inaccessable to the public. The ring has dimensions of twenty-one by sixteen metres'. Steele's account was, in turn, based on the 1940s report of an early landholder, M. Rungert, as relayed to the author by a third party in 1982. The DATSIP indicates that the site may have been destroyed by subsequent land clearance, and it is unclear whether the earthen arrangement has been seen in the last 80 years. It should also be noted that the landforms and geology in this area make it an unlikely location for an earthen arrangement. Such arrangements are generally located in elevated locations which are unlikely to flood, and which have sandy soils that drain well and are easy to dig (Satterthwait & Heather, 1987). The Project area, which is located on an esturine floodplain with deep alluvial deposits, features neither of these characteristics. A more likely location for an earthen arrangement in this area is a small	☒	☐

Preliminary Risk Factors	Yes	No
hill adjacent to Option 9A (approximately 1km north west of KC:A04) (Figure 2). However, there is no documentary evidence to support this possibility.		
Question 5: Is it likely that any of the DATSIP recorded sites will be impacted by the project works? ***Comment***: Based on available data, it is unlikely that the works will impact any known Aboriginal heritage places.	☐	☒

Table 4 Category Risk Factors

Category 1 Risk Factors	Yes	No
Question 6: Will ANY project works be undertaken OUTSIDE the footprint of an existing DTMR asset? ***Comment***: Up to 7km of new road will be constructed over land previously used for pastoral purposes.	☒	☐
Question 7: Do the project works involve Surface Disturbance? ***Comment***: Construction will require large scale earthworks over the entirety of the 7km x 120m Project footprint.	☒	☐

Table 5 Category 2 Risk Factors

Category 2 Risk Factors	Yes	No
Question 8: Will ANY project works cause any ground disturbance that is inconsistent with previous surface disturbance? ***Comment***: Review of maps and photographs indicates that the Project area has been used predominately as open pastoral or reserve land through the historical period (see Question 9). The Project will cause additional ground disturbance throughout the 7km x 120m footprint.	☒	☐
Question 9: Will ANY project works impact vegetation? If so, will the works cause any additional disturbance compared to that has previously occurred (e.g. is the clearing of remnant vegetation)? ***Comment***: A 1902 Bribie Parish Map shows that the eastern extent of the Project area was initially taken up as large blocks of freehold land – likely for pastoral or agricultural purposes – and was typified by low-lying swamp. The far western extent of the Project was a part of a large timber reserve (Figure 3). A topographic map from 1945 shows that the far eastern exent of the Project remained as uncleared bush and the far western extent as mangroves, while the remainder had largely been cleared (Figure 4). The extent of clearing is further evidenced by a 1958 aerial photograph, which shows dense bush at the eastern and western extents of the Project. The middle of the Project had been largely cleared, aside from a roughly triangular stand of trees approximately 400m south of the junction of the Mooloolah River and Sippy Creek Figure 5. By 1977, only the far eastern extent, far western extent, and the triangular stand of trees remained uncleared Figure 6. A review of subsequent aerial photographs shows that re-clearing of vegetation has occurred along much of the Project alignment, but that the far eastern and far western extent, and the stand of trees approximately 400m south of the junction of the Mooloolah River and Sippy Creek remain intact throughout this period. Any clearing in any either of these areas will likely constitute additional disturbance (Figure 7).	☒	☐

Table 6 Category 3 Risk Factors

Category 3 Risk Factors	Yes	No
Question 10: Will ANY project works be conducted in areas that are NOT "developed areas"? ***Comment***: As described in Questions 8 and 9, much of the Project area is located in an undeveloped area used primarily for pastoral/agricultural purposes. Some stands of vegetation do not appear to have been previously cleared (Figure 7).	☒	☐
Additional Risk Checklist		
Despite works being duty of care Category 2 or 3, there are other risk factors that can be considered. Some of DTMR's existing asset areas may still have residual Cultural Heritage present, which may or may not be recorded.		
Question 11: Are ANY project works in an high risk landscape or geographic area? Tip: High risk areas include feature such as: • mature and/or remnant vegetation • Rock Outcrops • Caves • Foreshores and coastal dunes • Sand hills • Some hill and mound formations • Wetlands • Permanent and semi-permanent waterholes • Natural springs ***Comment***: As described in Questions 9, there are discrete areas of vegetation in the Project area that do not appear to have been previously cleared (Figure 7).	☒	☐
Question 12: Are you aware of any places, items, features or objects in the proposed works area that might be of Cultural Heritage value (Indigenous and Historical) but which might not have been registered in the past? ***Comment***: The Project is located at the lowest point on an esturine floodplain, a land form that has a very low potential for additional sites. While such areas provided rich resources, occupation or major resource extraction sites tended to be situated on well drained, elevated areas nearby, such as the hill adjacent to Option 9A (Figure 2) (Brockwell, 2013; Lilley, 1984). There is some potential for isolated artefacts throughout the area, but these are likely to have been redeposited during flood events, and so will not be *in situ*.	☐	☒
Question 13: Are ANY project works in an area that is NOT a previously disturbed area? ***Comment***: Much of the Project area has been cleared in the last 50 years (see Question 9), most likely by heavy machinery, causing significant ground disturbance. However, there are three areas in or adjacent to the Project that appear to be undisturbed (Figure 7).	☒	☐

Stage 3 Indigenous cultural heritage assessment

The purpose of this section is to establish whether the project works are 'Low Risk' or 'High Risk'.

'**High Risk**' projects are:

1 **Category 4 Activities** in areas that have been subject to 'Significant Ground Disturbance' under the *ACHA 2003 Duty of Care Guidelines*, but where the following may apply:

- past ground disturbance has not been thorough or extensive across the entire works area; or
- recorded Cultural Heritage site/s within a DTMR asset; or
- works will traverse or be in the vicinity of landscapes that have higher risk of residual Cultural Heritage being present; or
- where there are known high risk bioregions/landscapes; or
- within the vicinity of commonly known Cultural Heritage places; or
- where cultural material is present within or in very close proximity to the corridor/asset.

2 **Category 5 Activities** are those that do not fit under any other category outlined in this process or the *ACHA 2003 Duty of Care Guidelines*. Category 5 works are those that pose the highest risk of harming Aboriginal Cultural Heritage and these works should not proceed without further Cultural Heritage Assessment and consultation with the Aboriginal Party/ies.

Table 7 Category 4 or 5 Risk Factors

Category 4 or 5 Risk Factors	Yes	No
Question 14: Will any of the project works cause additional surface disturbance? ***Comment***: Much of the Project area has been cleared in the last 50 years (see Question 9), most likely by heavy machinery, causing significant ground disturbance. However, there are three areas in or adjacent to the Project that appear to be undisturbed (Figure 7). Works in these areas will cause additional surface disturbance.	☒	☐
Question 15: Will any of the project works cause direct disturbance to any high risk landscapes or features? Note: "Disturbance" is defined under question 14 above. Tip: An accurate answer to this question requires a site inspection, and also review available reports on the EMS Cultural Heritage reports library Tip: Example high risk features include: • mature and/or remnant vegetation • Wetlands ***Comment***: As discussed in Question 9, the works will require the removal of what appears to be previously uncleared vegetation. The works will also disturb areas of wetland but, as discussed in Question 12, there is low potential for additional sites in this area.	☒	☐

Sign-off

Name:	**Name**:
Kate Quirk	insert name
Position:	**Position**:
Senior Cultural Heritage Specialist (AECOM)	**Project Manager**
Signature:	Signature:
Date: / /	Date: / /

Note

This assessment of the project shall remain current for a period of 12 months. Commencement after that date will require revision to ensure its accuracy/currency. Should any part of the project scope (location or activities) change, this assessment must be revised. The results of the revision shall be documented.

Disclaimer

Unless informed otherwise TMR is acting in good faith that all results and information provided to the Department by relevant stakeholders and authorities is accurate and reliable information for the purposes of this risk assessment.

Appendices

Have you attached:

☐ Initial site inspection notes and/or photos

☒ DATSIP Cultural Heritage Database and Register search results

☒ Maps/plans/design drawings showing known Historical and Indigenous sites and boundary of area covered by this assessment

☐ Photos of known Historical and Indigenous sites and/or high risk landscapes/features

☒ Any other documents collected during this CHRA (e.g. historical aerial imagery, evidence of previous ground disturbance, and so on)

References

Brockwell, S. (2013). Australian Wetland Occupation Before and After the Europeans. In F. Menotti & A. O'Sullivan (Eds.), *The Oxford Handbook of Wetland Archaeology* (pp. 211–229). Oxford University Press.

Lilley, I. (1984). Late Holocene subsistence and settlement in subcoastal southeast Queensland. *Queensland Archaeological Research*, *1*(8–32).

Satterthwait, L., & Heather, A. (1987). Determinants of Earth Circle Site Location in the Moreton Region, Southeast Queensland. *Museum*. Queensland.

Steele, J. G. (1984). *Aboriginal Pathways in Southeast Queensland and the Richmond River*. St Lucia, Australia: University of Queensland Press.

Figure 1 RNE places near the Project area

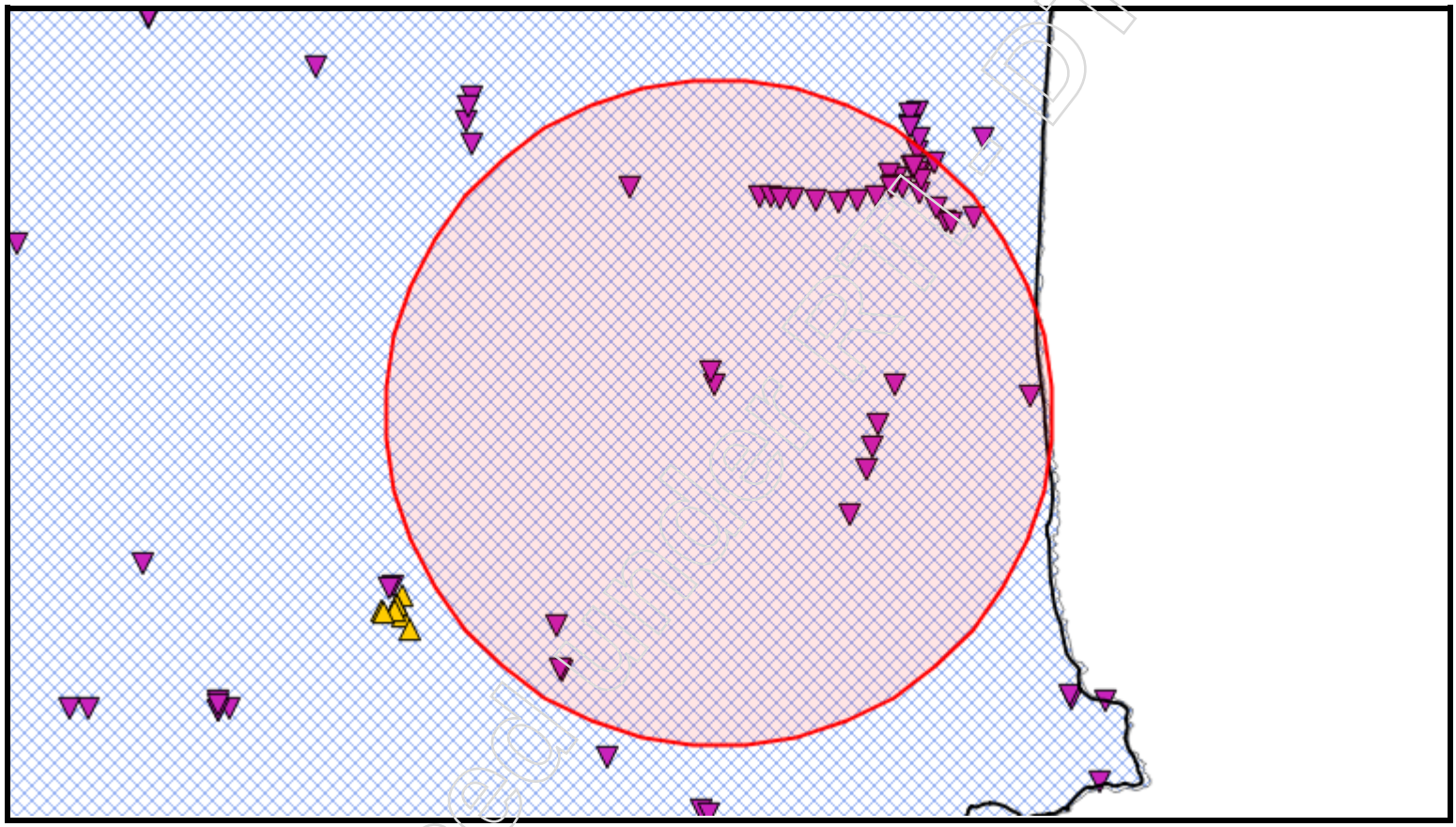
Figure 2 Aboriginal Heritage near the Project area

Pages 123 through 124 redacted for the following reasons:
- -
Deliberation

Queensland Government
Department of Aboriginal and Torres Strait Islander Partnerships

Latitude/Longitude Search

Reference Number:	14623
Latitude:	-26.746800
Longitude:	153.087000
Buffer Distance:	5000 metres



Cultural heritage site points for the area are:

Site ID	Latitude	Longitude	Record Date	Attribute	Aboriginal Party
KC:A04	-26.742516	153.086283	Jan 1, 1984	Earthern Arrangement(s)	Kabi Kabi First Nation
KC:A04	-26.742516	153.086283	Aug 1, 1994	Earthern Arrangement(s)	Kabi Kabi First Nation
KC:B75	-26.712666	153.073446	Oct 4, 1990	Scarred/Carved Tree	Kabi Kabi First Nation
KC:D29	-26.710834	153.112653	Feb 14, 1995	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Aug 1, 1994	Shell Midden(s)	Kabi Kabi First

Oct 19, 2016, 11:33 AM

Latitude/Longitude Search

					Nation
KC:D30	-26.713735	153.117065	Aug 1, 1994	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Jan 29, 2002	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.713735	153.117065	Jan 29, 2002	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.712711	153.113043	Jan 1, 2001	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.713735	153.117065	Jan 1, 2001	Shell Midden(s)	Kabi Kabi First Nation
KC:D30	-26.713735	153.117065	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:E63	-26.717189	153.125357	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:E63	-26.717189	153.125357	Apr 1, 1993	Shell Midden(s)	Kabi Kabi First Nation
KC:E64	-26.709023	153.119336	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:E65	-26.715821	153.119776	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:E66	-26.717933	153.121055	Apr 1, 1993	Artefact Scatter	Kabi Kabi First Nation
KC:F83	-26.714305	153.0947	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F84	-26.714503	153.096138	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F85	-26.714628	153.098299	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F86	-26.714887	153.101607	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F87	-26.715074	153.104915	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F88	-26.714819	153.10779	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F89	-26.714185	153.110746	Jan 29, 2002	Artefact Scatter	Kabi Kabi First Nation
KC:F89	-26.714185	153.110746	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation

Latitude/Longitude Search

KC:F90	-26.714144	153.093011	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F91	-26.740666	153.085833	Oct 22, 2001	Artefact Scatter	Kabi Kabi First Nation
KC:F92	-26.71281	153.114575	Jan 29, 2002	Shell Midden(s)	Kabi Kabi First Nation
KC:F92	-26.71281	153.114575	Oct 22, 2001	Shell Midden(s)	Kabi Kabi First Nation
KC:G82	-26.761977	153.106816	Sep 10, 2004	Artefact Scatter	Kabi Kabi First Nation
KC:G85	-26.778734	153.062559	Dec 12, 2005	Scarred/Carved Tree	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Aug 7, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Aug 7, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.709691	153.116106	Aug 7, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.709691	153.116106	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H02	-26.709691	153.116106	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation

Latitude/Longitude Search

Cultural heritage site points for the area are:

Site ID	Latitude	Longitude	Record Date	Attribute	Aboriginal Party
KC:H02	-26.709691	153.116106	Aug 7, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.711516	153.113896	Aug 7, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H02	-26.712383	153.113274	Aug 7, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H03	-26.709763	153.116257	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H03	-26.709708	153.116418	Apr 2, 2007	Shell Midden(s)	Kabi Kabi First Nation
KC:H06	-26.707297	153.116817	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H07	-26.718209	153.121936	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H08	-26.711522	153.117515	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H08	-26.710891	153.117173	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H08	-26.710656	153.116841	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H09	-26.751824	153.110004	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H10	-26.742576	153.113555	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H11	-26.748474	153.111036	Apr 2, 2007	Scarred/Carved Tree	Kabi Kabi First Nation
KC:H12	-26.755229	153.109223	Apr 2, 2007	Artefact Scatter	Kabi Kabi First Nation
KC:H43	-26.785632	153.063338	Dec 8, 2009	Artefact Scatter	Kabi Kabi First Nation
KC:H44	-26.785434	153.062996	Dec 3, 2004	Artefact Scatter	Kabi Kabi First Nation
KC00000010	-26.744236	153.133948	Jun 13, 2014	Artefact Scatter	Kabi Kabi First Nation

There are no Aboriginal cultural heritage site polygons recorded in your specific search area.

Cultural heritage party for the area is:

Oct 19, 2016, 11:33 AM

Latitude/Longitude Search

QC Ref Number	QUD Ref Number	Party Name	Contact Details
QC2013/003	QUD280/2013	Kabi Kabi First Nation	Queensland South Native Title Services Limited PO Box 10832, Adelaide Street BBRISBANE QLD 4000 Phone: (07) 3224 1200 Freecall: 1800 663 693 Fax (07) 3229 9880 Email: reception@qsnts.com.au

There is no cultural heritage body recorded in your specific search area.

Cultural Heritage Management Plans (CHMP) for the area are:

CHL Number	Sponsor	Party	Approved
CLH000140	Unknown	Unknown	No Date
CLH000436	Caloundra Maroochy Water Supply Board	Dr Eve Fesl - Gubbi Gubbi People	Jul 13, 2006
CLH000737	Sunshine Coast Regional Council	Gubbi Gubbi	Jun 9, 2009

There are no Designated Landscape Areas (DLA) recorded in your specific search area.

There are no Registered Cultural Heritage Study Areas in your specific search area.

Regional Coordinator:

Name	Position	Phone	Mobile	Email
Andrew Rutch	Cultural Heritage Coordinator Southern Region	1300 378 401	N/R	Andrew.Rutch@datsip.qld.gov.au

Latitude/Longitude Search

I refer to your application in which you requested advice on Aboriginal cultural heritage places recorded on the above location.

I wish to advise that the search has been performed on the inventory of recorded Aboriginal sites as per your description. Attached is a list which highlights the identified Aboriginal cultural heritage sites, as recorded for the search area. However, it is not possible to conclusively guarantee the accuracy of these recordings (in particular, the longitude and latitude location description for each site) and extra diligence is required when operating in these locations.

See Attached Report

All significant Aboriginal cultural heritage in Queensland is protected under the Aboriginal Cultural Heritage Act 2003, and penalty provisions apply for any unauthorized harm. Under the legislation a person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal Cultural Heritage. This applies whether or not such places are recorded in an official register and whether or not they are located in, on or under private land.

Aboriginal cultural heritage, which may occur on the subject property, is protected under the terms of the Aboriginal Cultural Heritage Act 2003 even if the Department of Aboriginal and Torres Strait Islander Partnerships has no records relating to it.

Please refer to our website www.datsip.qld.gov.au/people-communities/aboriginal-and-torres-strait-islander-cultural-heritage for a copy of the gazetted Cultural Heritage duty of care guidelines, which set out reasonable and practical measures for meeting the duty of care. In order to meet your duty of care, any land use activity within the vicinity of the recorded cultural heritage, should not proceed without the agreement of the Aboriginal Party for the area or a Cultural Heritage Management Plan undertaken pursuant to Part 7 of the Aboriginal Cultural Heritage Act 2003.

Should you have any further queries, please do not hesitate to contact the approval officer on 1300 378 401.

Kind regards

The Director
Cultural Heritage | Community Participation | Department of Aboriginal and Torres Strait Islander Partnerships

Oct 19, 2016, 11:33 AM

Pages 131 through 132 redacted for the following reasons:
- -
Deliberation

Preferred E-W Link alignment - 4 lanes

Item	UOM	Quantity	Unit Rate	Amount	Quantity Notes	Assumptions / Comments
New Road Embankment						**4847 m**
New pavement	m2	116328			length * 24m	4 x 3.5m lane, 4 x 2.5m shoulder (LHS & RHS)
Road lighting	each	162				Every 60m both sides
Linemarking	m	38776			length * 8 lines	Edge line & broken lane
Cut and Fill	m3	27851			minus bridge length	
Imported materails	m3	321830			minus bridge length	**Assumes Excavated material is suitable for general fill**
Pedestrian Corridor						**4847 m**
Concrete Path	m2	26658.5			length * 5.5m	3m bike path + 2.5 m pedestrian path (one side only)
Bridge Structure (including pavement, linemarking, barriers etc.)						**1055 m**
Complete all bridge works	m2	30595			length * 29m	Allows for road and shared path (excludes transit)
Road lighting	each	36				Every 60m both sides
Transit/Utility Corridor						**4847 m**
New pavement	m2	96940			length * 20m	20m corridor excluded
New track	m	4847				Future track excluded
Powerpoles	each	162				Every 60m
Linemarking	m	19388			length * 4 lines	Edge line & broken lane
Road Connections						
3-way signalised intersection (Palmview Master Planned Road Network)	lump sum	1				Assume all new signals
4-way signalised intersection (Kawana Way & Lake Kawana Blvd)	lump sum	1				Existing 3-way signalised - upgrade
Signage	lump sum	1				Allowance only
Sub-Total						
Environmental (1%)						1%
Traffic Control (5%)						5%
Site Facilities (5%)						5%
Construction Management	Percentage	5	$	-		
Profit & Overheads	Percentage	10	$	-		
Principals Costs (incl design fees)						Assumption
Total (Excl. GST)						
Contingency (50%)						50%
Total Inl. Contingency (Excl. GST)						

Commercial

Alternative connection into Mains Drive - 4 lanes

Item	UOM	Quantity	Unit Rate	Amount	Quantity Notes	Assumptions / Comments
New Road Embankment						**1244 m**
New pavement	m2	29856			length * 24m	4 x 3.5m lane, 4 x 2.5m shoulder (LHS & RHS)
Road lighting	each	42				Every 60m both sides
Linemarking	m	9952			length * 8 lines	Edge line & broken lane
Cut and Fill	m3	180				
Imported materails	m3	186463				**Assumes Excavated material is suitable for general fill**
Pedestrian Corridor						**1244 m**
Concrete Path	m2	8086			length * 6.5m	4m bike path + 2.5 m pedestrian path (on one side only)
Bridge Structure (including pavement, linemarking, barriers etc.)						**0 m**
Complete all bridge works	m2	0			length * 29m	Allows for road, pedestrian and transit corridor
Road lighting	each	0				Every 60m both sides
Culverts	each	450			length * 9 locations	3/1.5 m RCP at 50 m length
Transit/Utility Corridor						**1244 m**
New pavement	m2	24880			length * 20m	20m corridor excluded
New track	m	1244				Future track excluded
Powerpoles	each	42				Every 60m
Linemarking	m	4976			length * 4 lines	Edge line & broken lane
Road Connections						
4-way roundabout (Connect to Milieu Place & Main Drive)	lump sum	1				Existing 4-way roundabout - upgrade
Signage	lump sum	1				Allowance only
Sub-Total						
Environmental (1%)						1%
Traffic Control (5%)						5%
Site Facilities (5%)						5%
Construction Management	Percentage	5				
Profit & Overheads	Percentage	10				
Principals Costs (incl design fees)						Assumption
Total (Excl. GST)						
Contingency (50%)						50%
Total Inl. Contingency (Excl. GST)						

Commercial

Preferred E-W Link alignment - 2 Lanes

Item	UOM	Quantity	Unit Rate	Amount	Quantity Notes	Assumptions / Comments
New Road Embankment						**4847 m**
New pavement	m2	63011			ngth * 13 m	2 X 3.5 m lane, 2 x 2.5m shoulder, 0.5 m median (WCLT) (LHS & RHS)
Road lighting	each	162				Every 60m both sides
Linemarking	m	29082			ngth * 6 lines	Edge line & broken lane
Cut and Fill	m3	19037			inus bridge length	
Imported materails	m3	274737			inus bridge length	**Assumes Excavated material is suitable for general fill**
Pedestrian Corridor						**4847 m**
Concrete Path	m2	26658.5			ngth * 5.5m	3m bike path + 2.5 m pedestrian path (on one side only)
Bridge Structure (including pavement, linemarking, barriers etc.)						**1055 m**
Complete all bridge works	m2	30595			ngth * 29m	Allows for road and sahred path (excludes transit)
Road lighting	each	36				Every 60m both sides
Transit/Utility Corridor						**4847 m**
New pavement	m2	96940			ngth * 20m	20m corridor excluded
New track	m	4847				Future track excluded
Powerpoles	each	162				Every 60m
Linemarking	m	19388			ngth * 4 lines	Edge line & broken lane
Road Connections						
3-way signalised intersection (Palmview Master Planned Road Network)	lump sum	1				Assume all new signals
4-way signalised intersection (Kawana Way & Lake Kawana Blvd)	lump sum	1				Existing 3-way signalised - upgrade
Signage	lump sum	1				Allowance only
Sub-Total						
Environmental (1%)						1%
Traffic Control (5%)						5%
Site Facilities (5%)						5%
Construction Management	Percentage	5				
Profit & Overheads	Percentage	10				
Principals Costs (incl design fees)						Assumption
Total (Excl. GST)						
Contingency (50%)						50%
Total Inl. Contingency (Excl. GST)						

Commercial

Alternative connection into Mains Drive - 2 Lanes

Item	UOM	Quantity	Unit Rate	Amount	Quantity Notes	Assumptions / Comments
New Road Embankment						**1244 m**
New pavement	m2	16172			length * 13 m	2 x 3.5 m lane, 2 x 2.5m shoulder, 0.5 m median (WCLT) (LHS & RHS)
Road lighting	each	42				Every 60m both sides
Linemarking	m	7464			length * 6 lines	Edge lines
Cut and Fill	m3	107				
Imported materails	m3	160009				**Assumes Excavated material is suitable for general fill**
Pedestrian Corridor						**1244 m**
Concrete Path	m2	8086			length * 6.5m	4m bike path + 2.5 m pedestrian path (on one side only)
Bridge Structure (including pavement, linemarking, barriers etc.)						**0 m**
Complete all bridge works	m2	0			length * 29m	Allows for road, pedestrian and transit corridor
Road lighting	each	0				Every 60m both sides
Culverts	each	450			length * 9 locations	3/1.5 m RCP at 50 m length
Transit/Utility Corridor						**1244 m**
New pavement	m2	24880			length * 20m	20m corridor excluded
New track	m	1244				Future track excluded
Powerpoles	each	42				Every 60m
Linemarking	m	4976			length * 4 lines	Edge line & broken lane
Road Connections						
4-way roundabout (Connect to Milieu Place & Main Drive)	lump sum	1				Existing 4-way roundabout - upgrade
Signage	lump sum	1				Allowance only
Sub-Total						
Environmental (1%)						1%
Traffic Control (5%)						5%
Site Facilities (5%)						5%
Construction Management	Percentage	5				
Profit & Overheads	Percentage	10				
Principals Costs (incl design fees)						Assumption
Total (Excl. GST)						
Contingency (50%)						50%
Total Inl. Contingency (Excl. GST)						

Commercial

Sunshine Motorway Option

Item	UOM	Quantity	Unit Rate	Amount	Quantity Notes	Assumptions / Questions
	m2	6,500			1000m x 3.5m + 2+1 m	
	m2	1,235			190m x 3.5m + 2+1 m	
	each	20				Every 60m - one side (parallel to MW)
	lump sum					**Allowance Only**
	m	3,570				Edge line and spotted lines
	each	-				kerb & channel (possible drainage structures)
	lump sum	1				
		Subtotal				
	m2	315			90m x 3.5m	
	m2	1,050			150m x 3.5m x 2	
	m2	455			130 x 3.5 m	
	each	8				Installation of Signalisation (Upgrade existing)
	each	5				Every 60m - both sides
	lump sum					**Allowance Only**
	m	750				Edge line and spotted lines
	each	460				kerb & channel
	lump sum	1				
		Subtotal				
	m2	630			180m x 3.5m	
	m2	140			40m x 3.5m	
	m2	88			25m x 3.5m	
	m2	350			50m x 3.5m	
	m2	-			50m x 3.5m	
	m2	350			30m x 3.5m	
	m2	3,000			400m x 3.5m	
	each	10				
	each	14				Every 60m - both sides
	lump sum					**Allowance Only**
	m	390				Edge line and spotted lines
	each	100				kerb & channel
	lump sum	1				
	m2	770			220m x 3.5m	Rate allowance
	m2	770			220m x 3.5m	
	m2	840			120m x 3.5m x 2	
	m2	1,225			350m x 3.5m	
	m2	7,000			1000m x 3.5m x 2	
Deliberation	m2	1,400		Commercial	200m x 3.5m x 2	
	m2	-			1000m x 3.5m	Covered under Options 1 & 2
	m2	1,225			350m x 3.5m	Rate allowance
	m2	560			80m x 3.5m x 2	
	m2	1,470			420m x 3.5m	Rate allowance
	m2	718			205m x 3.5m	
	m2	960			320 x 3 m	
	each	108				Every 60m - both sides
	lump sum					**Allowance Only**
	m	9,645				Edge line and spotted lines
	m	6,534				RCBC - 1200 x 600 high, 8m long (1960m x 50%)
	lump sum	1				
	m2	13,200			1200m x 2/3.5m + 2/2m	
	m2	2,100			600 x 3.5	
	m2	10,350			1380 x 3.5 + 2/2 m	
	m2	1,890			540m x 3.5m	
	each	82				Every 60m - both sides
	lump sum					**Allowance Only**
	m	9,360				Edge line and spotted lines
	m	10,400				RCBC - 1200 x 600 high, 8m long (2300m x 50%)
	lump sum	1				
	m2	15,750			2100 m x 3.5 + 2/2 m	
	m	10,500				
	lump sum					**Allowance Only**
	m2	13,200			1200 m x 2/3.5 + 2/2 m	Realigned to join proposed duplication project
	m	440			1.1 m high	To provide adequate space to property boundary
	m	6,000				
	lump sum					**Allowance Only**
						2%
						8%
						3%
						Included in rates
						Included in rates
						Assumption

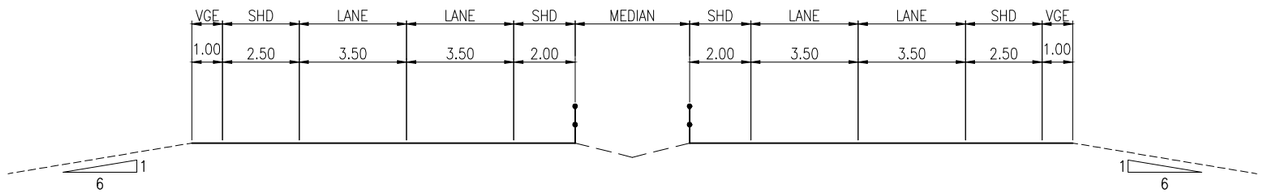
Total (Excl. GST)					
Contingency (50%)			Commercial	50%	
Total Inl. Contingency (Excl. GST)					

Assumptions
Dayworks
Tie into Future Duplication East
Drainage structures to be investigated
Not upgrading existing bridges (overpasses)
Allowance Only for PUP

Exclusions

Principals costs (Including Design Fees)

AECOM



SUNSHINE COAST MOTORWAY

A	Original Issue A3				
	Revisions/Descriptions	Certification	Date	Microfiled	

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Last Modified :- May 23, 2017 - 7:17pm

Associated Job Nos

Auxiliary Drg Nos

Survey Data

Datum	
Horiz. Grid	
Height Origin	
Survey Books	

Scales

0 1 2 3 4m

Dimensions shown in except where shown otherwise

SUNSHINE COAST REGIONAL COUNCIL

LINK STRATEGY – SUNSHINE COAST MOTORWAY

CTL CHGE

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP

Through Chainage from

TYPICAL CROSS SECTIONS
SHEET 1

Drawn

Designed

ENG. AREA	NAME	SIGNATURE	NO.	DATE

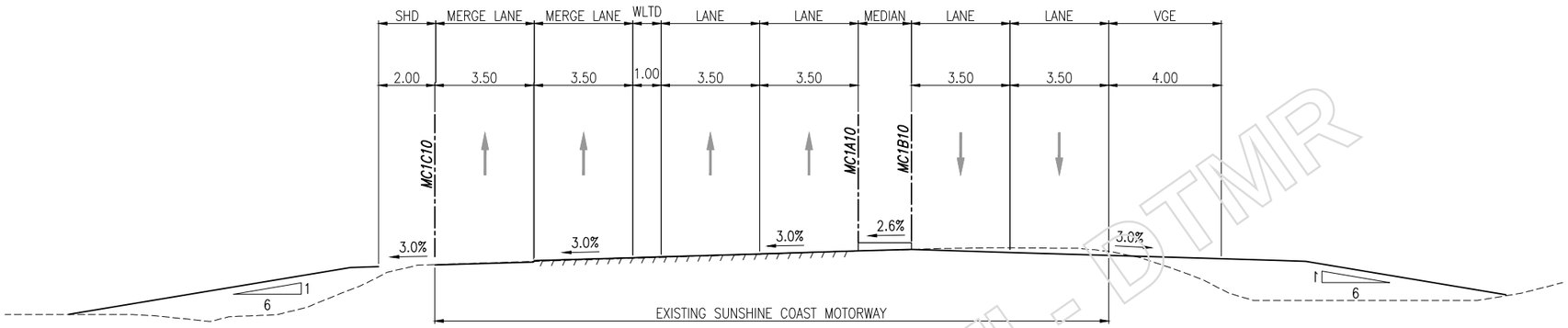
ENGINEERING CERTIFICATION (RPEQ)

Queensland Government

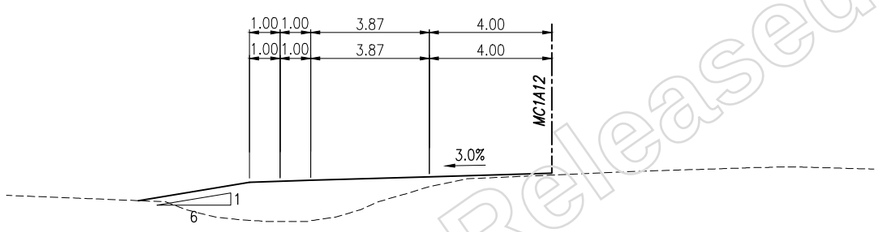
Job No.	
Contract. No.	
Drawing No.	1000111001
Series Number	of

MRR_Detail (06/13)

AECOM



SUNSHINE COAST MOTORWAY
CONTROL LINE MC1A10 – CH. 1350.000



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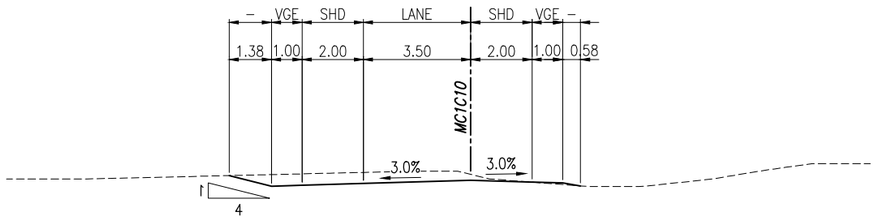

CONTROL LINE MC1C10 – CH. 1000

A	Original Issue A3			
	Revisions/Descriptions	Certification	Date	Microfiled

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Last Modified :- May 04, 2017 – 3:06pm

Associated Job Nos
Auxiliary Drg Nos

Survey Data: Datum; Horiz. Grid; Height Origin; Survey Books

Scales: 0 1 2 3 4m
Dimensions shown in except where shown otherwise

SUNSHINE COAST REGIONAL COUNCIL
LINK STRATEGY – SUNSHINE COAST MOTORWAY
CTL CHGE

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP

Through Chainage from

TYPICAL CROSS SECTIONS
SHEET 2

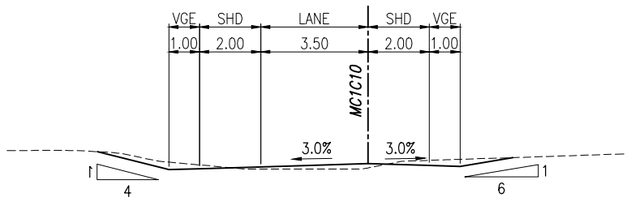
Drawn
Designed

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	NO.	DATE

Queensland Government

Job No.	
Contract. No.	
Drawing No.	1000111002
Series Number	of

MRR_Detail (06/13)



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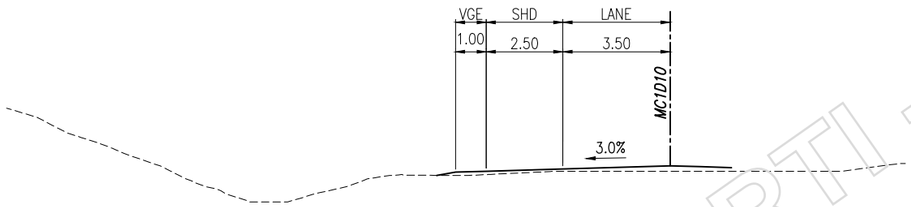

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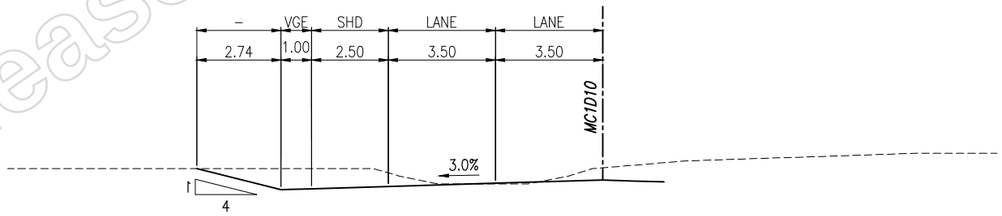

CONTROL LINE MC1D10 – CH. 300

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						Datum		0 1 2 3 4m	LINK STRATEGY – SUNSHINE COAST MOTORWAY							Job No.
					Auxiliary Drg Nos	Horiz. Grid			CTL CHGE							Contract. No.
						Height Origin			Reference Points		Drawn	ENGINEERING CERTIFICATION (RPEQ)				Drawing No. 1000111003
						Survey Books		Dimensions shown in except where shown otherwise	Preceding RP / Dist. to start of job (km) / From start to end of job / From end to Following RP / Following RP			ENG. AREA / NAME / SIGNATURE / NO. / DATE				Series Number of
A	Original Issue A3										Designed					
	Revisions/Descriptions	Certification	Date	Microfiled					Through Chainage from							MRR_Detail (06/13)
CAD FILES	C:\Projects\604x\60487984\5. CAD\20-SHEETS\60487984-1000-111003-TC.dwg							Last Modified :- May 04, 2017 – 3:06pm								

Pages 4 through 9 redacted for the following reasons:
- -
Deliberation

Pages 1 through 11 redacted for the following reasons:
Deliberation

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Memorandum

To	N/R	Page	1
CC			
Subject	Flood Assessment - Palmview/ Sippy Downs Integrated Link Strategy		
From			
File/Ref No.	N/R	Date	24-Mar-2017

1.0 Introduction

AECOM was commissioned by the Department of Transport and Main Roads (DTMR) to undertake a Strategic Transport Planning Study looking to develop an integrated link strategy and preliminary options analysis for the Palmview/Sippy Downs corridor (the Project).

The proposed link corridor traverses the Mooloolah River floodplain, which is approximately 5km wide at the Study Area. The floodplain is formed by two main waterways, namely Mooloolah River and Sippy Creek (**Figure 1**).

Construction of a new road embankment within the floodplain area, and the establishment of new waterway crossings have the potential to increase flood risk elsewhere. Therefore, a hydraulic assessment (the Study) is required to establish the baseline flood conditions and to investigate potential flood risk impacts associated with the Project within the Study Area.

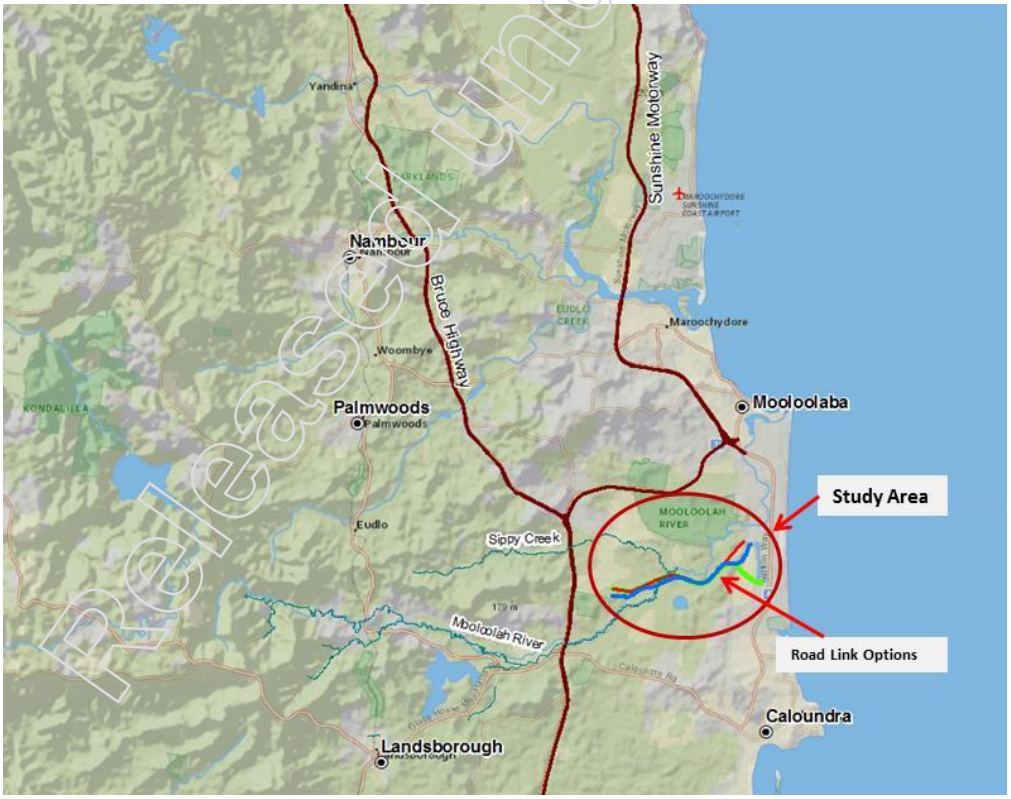

Figure 1 Location of Study Area

2.0 Study Objectives

The aims of this hydraulic assessment were to:

- Estimate the flood extent, levels and velocities within the Study Area for the existing condition in a 100 year Average Recurrence Interval (ARI) flood event.
- Determine the conceptual cross drainage infrastructure (bridges and culverts) required to ensure that the extent of afflux remains contained within the floodplain (i.e. not affecting built development).
- Assess potential impacts of various conceptual design options to existing case flooding in a 100 year ARI event.

3.0 Design Criteria

In the absence of project-specific guidelines the following design criteria were used to estimate conceptual cross drainage structures for the proposed corridor link options.

- 100 year ARI flood immunity required for the road.
- No change in flood inundation footprint as a result of the new road.
- No redistribution of flood flows as a result of the new road.
- Minimise changes in flood levels and flow velocities.

4.0 Available Data and Model

Sunshine Regional Council (SRC) supplied their existing hydraulic model of the Mooloolah River, which covers the Study Area. This is a TUFLOW 2-dimensional model. The model has two domains; namely a coarse grid (20m cell size) representing the floodplain and a finer grid (8m cell size) representing the remaining area covered by landuses such as residential, where more definition is required.

Figure 2 shows the TUFLOW model extent, grid domain and proposed alignment options. SRC also supplied the TUFLOW model's associated inflow hydrographs and tail water boundary files. AECOM have made not changes to the existing hydrology.

AECOM's Civil Design team supplied the proposed alignments of the three corridor link options (**Figure 2**). These alignment options were used to model developed condition scenario.

5.0 Methodology

5.1.1 Existing Condition

The TUFLOW model was used to simulate a 100 year ARI flood event for the existing condition. The model was run using the TUFLOW software package (Version 2013-12-AE-w64). Peak flood depths, flood levels and flow velocities were estimated for the Study Area, effectively defining the baseline conditions.

5.1.2 Developed Condition

A developed condition model was established for each corridor option, including the respective proposed road design options and the conceptual cross drainage structures required to provide flood immunity of 100 ARI, whilst meeting the design criteria outlined in Section 3.0. Concept design details of the respective corridor options are presented in **Table 1**.

The developed condition TUFLOW models were used to simulate the 100 year ARI event. The proposed concept cross drainage structures shown in **Table 2** were determined through iterative model runs, aiming to achieve a 100 year ARI flood immunity for the road and minimum change in existing flood levels for each of the corridor alignment options (9B/D, 9D/A, 9F/E).

Table 1 Corridor Alignment Options

Corridor Alignment Option	Remarks
9B/D	Total length of alignment is approximately 6.2 km
9D/A	Approximately 5km of alignment is common with Option 9B/D except northern eastern part
9F/E	Total length of alignment is approximately 6.6 km, of which 2km of the alignment is common with above two alignments (9B/D and 9D/A)

Deliberation

Table 2 Proposed Conceptual Cross Drainage Structures

Corridor Alignment Option	Proposed Concept Cross Drainage Structures	
	Bridge Length	Culverts
9B/D	1,020m (11 Nos)	4/2.1m RCP, 10/1.5m RCP
9D/A	1,055m (11 Nos)	4/2.1m RCP
9F/E	1,050m (13 Nos)	3/1.8m RCP, 6/1.5m RCP

A total of eleven (11) to thirteen (13) bridges per option are proposed at a concept level for the respective corridor options to maintain existing flow paths and to minimise redistribution of flow. The total bridge lengths proposed for the three corridor alignment options are similar. Option 9F/E has two additional bridges compared to Options 9B/D and 9D/A.

6.0 Existing Condition Results

An indicative flood inundation map of the Mooloolah River floodplain for the existing condition is presented in **Map 1** in **Appendix A** for the 100 year ARI event. This map visually represents estimate peak flood depths and flood extent information. The flood extent along the proposed corridor alignment options is approximately 5.5km wide during a 100 year ARI event. Estimated water depths vary between less than 1m in floodplain areas to over 3.5m within the main flow channel.

Map 2 in **Appendix A** shows a graphical representation of estimated peak flood levels for the 100 year ARI event in the Mooloolah River floodplain for the existing condition. Flood levels in the floodplain along the proposed corridor alignment options vary between 3m Australian Height Datum (AHD) and 7m AHD.

Map 3 in **Appendix A** shows a graphical representation of estimated peak flow velocities for the 100 year ARI event in the Mooloolah River floodplain for the existing condition. The estimated peak velocity in the Mooloolah River floodplain remains largely below 1 m/s.

7.0 Developed Condition Results

Maps 4, 5 and 6 in **Appendix A** show a graphical representation of estimated peak flood levels for the 100 year ARI event for the corridor alignment options 9B/D, 9D/A and 9F/E, respectively. Estimated flood levels in the floodplain along the proposed corridor alignment options vary between 3m AHD and 7m AHD. The modelling results demonstrate a negligible change in flooding extent.

Table 3 summarises the estimated peak flood levels for a 100 year ARI event upstream of the proposed bridge locations for the three corridor alignment options.

Table 3 Estimated Flood Levels Upstream of Proposed Bridge Locations

Location	Estimated Peak Flood Level (mAHD) – 100 Year ARI		
	Option B/D	Option D/A	Option F/E
B1	6.45	6.45	6.45
B2	6.06	6.06	6.38
B3	5.06	5.06	6.34
B4	4.72	4.72	5.10
B5	4.37	4.39	4.92
B6	3.59	3.63	4.07
B7	3.53	3.56	3.92
B8	3.47	3.51	3.63
B9	3.46	3.50	3.56
B10	3.45	3.49	3.52

Location	Estimated Peak Flood Level (mAHD) – 100 Year ARI		
	Option B/D	Option D/A	Option F/E
B11	3.44	3.47	3.51
B12	-	-	3.49
B13	-	-	3.46

Maps 7, **8** and **9** in **Appendix A** show a graphical representation of estimated peak flow velocities for the 100 year ARI event for the corridor alignment options 9B/D, 9D/A and 9F/E, respectively. Estimated peak velocities in the floodplain remain generally below 1 m/s.

8.0 Impact Assessment

Potential impacts to flooding were assessed by comparing the modelling results for the developed case against the results of the existing case model.

The assessment of impacts included the comparison of existing and developed case peak flood levels and peak velocities for each alignment option in the 100 year ARI flood event.

8.1.1 Afflux

Afflux is an industry accepted way of expressing the change in peak flood levels between existing and developed conditions. **Maps 10, 11** and **12** in **Appendix A** show estimated afflux for the 100 year ARI event in the Study Area for the corridor alignment options 9B/D, 9D/A and 9F/E, respectively.

It should be noted that numerical flood modelling has inherent uncertainty as a result of the model's sensitivity to changes in input parameters (such as the hydrology). As such, the flood maps may show a degree of afflux, even outside the influence zone of the proposed road design option. Generally afflux of less than ±0.01 m is deemed insignificant.

The modelling results indicate that afflux caused by the three corridor alignment options remains contained in the floodplain, with the exception of a few isolated areas for option 9B/D. Afflux in these areas could be mitigated further by refining the location and dimension of cross drainage structures, in later stages of design.

8.1.2 Change in Flow Velocity

Maps 13, 14 and **15** in **Appendix A** show a graphical representation of the expected change in peak flow velocity between the existing and developed conditions for the 100 year ARI event for corridor alignment options 9B/D, 9D/A and 9F/E, respectively. The modelling results suggest that changes in flow velocity are generally less than 0.25 m/s in isolated areas for the three options. The average change in velocity of ±0.1 m/s is deemed insignificant, and manageable through further design iteration.

9.0 Conclusion

A hydraulic assessment of the Project was undertaken using the SRC TUFLOW hydraulic model for the Mooloolah River. The hydraulic modelling results indicate that the current Mooloolah River flood inundation extent at the proposed road link alignments in the Study Area is approximately 5 km wide during a 100 year ARI flood event.

Modelling results indicated that a significant number of bridges and culverts (total length of approximately 1km per corridor alignment option) are required to ensure that flood impacts as a result of the Project are contained to an acceptable level. The total bridge lengths required for the three corridor alignment options, at a concept level, are similar.

Estimated flood levels in the floodplain along the proposed corridor alignment options vary between 3m AHD and 7m AHD. The modelling results indicate negligible change to flooding extent as a result of the proposed corridor alignment options.

Modelling results also showed insignificant changes in flow velocity for the three corridor alignment options compared to the existing condition results.

Afflux for the three corridor alignment options remain contained within the floodplain except for a few isolated areas for option 9B/D. Afflux in these areas could be mitigated further by refining the location and dimension of cross drainage structures, in later stages of the design.

Further hydraulic assessment will be required to refine the alignment, cross drainage structure locations and dimensions.

10.0 Limitations and Assumptions

Australian Rainfall and Runoff (ARR2016) outlines several fundamental themes which are also particularly relevant to this Study:

- All models are coarse simplifications of very complex processes. No model can therefore be perfect, and no model can represent all of the important processes accurately.
- Model accuracy and reliability will always be limited by the accuracy of the terrain and other input data.
- Model accuracy and reliability will always be limited by the reliability / uncertainty of the inflow data.
- No model is 'correct' therefore the results require interpretation.
- A model developed for a specific purpose is probably unsuitable for another purpose without modification, adjustment, and recalibration. The responsibility must always remain with the modeller to determine whether the model is suitable for a given problem.
- Recognition that no two flood events behave in exactly the same manner.
- Design floods are a best estimate of an "average" flood for their probability of occurrence.

The interpretation of results and other presentations in this report should be done with an appreciation of any limitations in their accuracy, as noted above.

Unless otherwise stated, presentations in this report are based on peak values of water surface level, flow, depth and velocity. Therefore, using flood levels as an example, the peak level does not occur everywhere at the same time and, therefore, the values presented are based on taking the maximum value which occurred at each computational point in the model during the entire flood. Hence, a presentation of peak levels does not represent an instantaneous point in time, but rather an envelope of the maximum values that occurred at each computational point over the duration of the flood event.

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Enclosed: Appendix A -- Indicative Flood Maps

Appendix A

Flood Maps

Pages 8 through 22 redacted for the following reasons:
- -
Deliberation

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High Level Test	Second level theme	ID	Objective	Criteria	Weighting	Option 1 Score	Option 1 Weighted score	Option 2 Score	Option 2 Weighted score	Option 3 Score	Option 3 Weighted score	Option 4 Score	Option 4 Weighted score	Option 5 Score	Option 5 Weighted score	Option 6 Score	Option 6 Weighted score	Option 7 Score	Option 7 Weighted score	Option 8 Score	Option 8 Weighted score	Option 9a Score	Option 9a Weighted score	Option 9b Score	Option 9b Weighted score	Option 10 Score	Option 10 Weighted score	Comments
						Deliberation																						
Effectiveness	Transport connectivity	E-01	Improvement in connectivity for all transport users	Increase in local trips taken on local network (and less on state network) Improves public transport and active transport (access, mode share)	Very High	5	15	5	15	5	15	5	15	5	15	2	6	2	6	2	6	5	15	5	15	2	6	Based on TMR modelling results
	Road network	E-02	Network benefit/impact	Option reduces traffic congestion on surrounding road network (option reduces forecast total traffic on the SSMW and Claymore Road)	Very High	3	9	3	9	3	9	3	9	3	9	2	6	2	6	2	6	3	9	3	9	5	15	Scored by assumed benefit; based on TMR modelling results
				Option improves performance across the road network (VHT/VKT)	Very High	4	12	4	12	4	12	4	12	4	12	3	9	3	9	4	12	4	12	4	12	2	6	Scored by assumed impact; based on TMR modelling results
	Safety	E-03	Improve safety for all users	Option provides a more legible road network Option improves separation of local and longer distance trips (trip purposes)	Medium	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	Not a differentiator
Feasibility	Costs	F-01	Total cost	Comparative cost estimate	High	3	6	3	6	2	4	2	4	1	2	1	2	4	8	4	8	3	6	3	6	5	10	Comparative very high level costs
	Flexibility and stageability	F-02	Option provides flexible connection to state network	Enables flexible connection for future state network upgrades (for example Main Drive or Lake Kawana Blvd)	Medium	5	5	5	5	1	1	3	3	3	3	1	1	1	1	1	1	3	3	3	3	3	3	Deliberation
		F-03	Option does not constrain future network expansion when required	Option is not build out to its limits and there is physical room to meet further network expansion including future interchanges, accommodating other modes and so on	Low	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	No difference at this short-list phase
	Alignment	F-04	Impacts of construction on existing and planned infrastructure	Option is not impacting on existing and planned infrastructure at Kawana Way	High	4	8	5	10	1	2	4	8	4	8	2	4	3	6	3	6	4	8	4	8	5	10	MMTC/Kawana Freeway planning ongoing
	Risk	F-05	Political/funding risk	Option is politically acceptable/aligns with Palmview IA/ is fundable	High	0	0	0	0	0	0	0	0	0	0	3	6	3	6	3	6	3	6	3	6	3	6	Northern options have uncertainty
		F-06	Constructability	Comparative risk of constructability (complexity, use of existing infrastructure corridors or road alignments)	Medium	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	No difference at this short-list phase
Acceptability	Local planning	A-01	Affects current and future land use planning	Option aligns with statutory planning guidelines/masterplan/development control plan	Medium	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	5	5	Options 1,2,3,4 & 9 impacting on Kawana Waters DCP. Options 6,7,8 & 9 impacting on residential zone in Palmview Masterplan.
	Hydrology & Hydraulics	A-02	Wider implications of up-/downstream flooding (afflux risk)	Option does not have significant detrimental impact on flooding in the wider study area (afflux) Minimise number of crossings	High	1	2	1	2	1	2	1	2	1	2	2	4	2	4	2	4	2	4	2	4	3	6	Option 9 performs closer to option 8 than options 1-5
	Environmental concerns	A-03	Impact on sensitive environmental areas	Quality and severity of area impacted	Very High	0	0	0	0	0	0	0	0	0	0	4	12	5	15	5	15	3	9	2	6	5	15	Refer to separate environmental MCA for explanation
		A-04	Impact on cultural heritage significance	Number and level of significant sites impacted	Medium	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	3	3	3	1	1	Option 9: potential fatal flaw - extremely high cultural heritage value at junction of Deliberation
	Community	A-05	Effect on local amenity and connectivity	Neighbourhood links remain Community facilities not separated/ segregated	Medium	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	Deliberation Option 8 runs alongside a school and close by to residential area
		A-06	Property impacts (including resumptions)	Number of partial or full resumptions	High	3	6	2	4	2	4	4	8	5	10	1	2	1	2	1	2	1	2	1	2	5	10	Options 6,7,8 & 9 traversing landholdings in Palmview
					TOTAL (unweighted)	43		43		34		42		42		37		42		42		47		46		56		
					TOTAL (weighted)		76.5		76.5		62.5		75.5		75.5		66.5		77.5		79.5		88.5		85.5		103.5	

Notes on Option descriptions: EW-SE – refers to East west or South East alignment; north/middle/south refers to alignment through the offset area south of the national park; last text refers to connection point

Deliberation & Commercial

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Environment and Heritage MCU Performance Matrix

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10
EW "North"	EW "North"	EW "North"	EW "middle"	EW "middle"	SE	SE	SE Creek Side Interch	EW "South"	SSMW split service road (north/ south)
Deliberation									

refer to alignments on figures

High Level Test	Second level theme	Criterion ID	Description	Objective	Criteria	Weighting (Low, medium, high, very high)	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score
Environment - Commonwealth	Nationally Important Wetland	A-01-01	Wetland noted under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	0.5	0.5	0.5	1.5	1.5	2.5	2.5	2.5	2.5	1.5
	Threatened Ecological Community	A-01-02	Threatened Ecological Community listed under the EPBC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	0.5	0.5	0.5	0.5	0.5	2	2	2	0.5	2.5
	National Parks	A-01-03	National Park listed under NC Act but requiring Parliament revokement	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	0.5	0.5	0.5	1	2.5	2.5	2.5	2.5	2.5	1
	Threatened Species	A-01-04	Threatened fauna and flora species listed under the EPBC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	1	1	1	1	1	1.5	1.5	1.5	1.5	1
Environment - State	Regional Ecosystems	A-01-06	Regional Ecosystems (RE) listed under the *Vegetation Management Act 1999* (VM Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	1	1	1	1	2	4	4	4	2	4
	Threatened Species	A-01-07	Protected plants and fauna listed under the *Nature Conservation Act 1992* (NC Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	2	2	2	2	2	2	2	2	2	2
	Potential Offset Areas	A-01-08	Including Brue Highway Upgrade Project and Sunshine Coast Airport Project	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	2	2	2	2	2	4	4	4	4	4
	Wetlands/Waterways	A-01-09	Wetlands and waterways under the VM Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	1	1	1	2	2	2	3	3	1	3
	Essential Habitat	A-01-10	Essential habitat protected under the VM Act and NC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	1	1	1	2	2	3	3	3	2	2
	Koala Habitat	A-01-11	Koala habitat managed under the State Government Supported Community Infrastructure – Koala Conservation Policy 2014	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	7.5	7.5	7.5	3	3	3	3	3	3	7.5
	State Significant Biodiversity Corridor	A-01-12	State significant biodiversity corridors managed under the NC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	3	3	3	1.5	1.5	3	3	3	1.5	7.5
	Regional Parks	A-01-13	Regional Parks managed under the NC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	7.5	7.5	7.5	7.5	7.5	3	7.5	3	7.5	7.5
	Local Habitat Biodiversity Corridor	A-01-14	Local corridors managed under the *Sustainable Planning Act 2009* (SP Act) and Local Government Act 2009	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	3	3	3	3	3	3	3	3	3	7.5
	Marine plants	A-01-15	Marine plants found within the tidal zone/under HAT are protected under the Fisheries Act 1994 and require approval for removal with potential offsets	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	4.5	4.5	4.5	4.5	4.5	7.5	7.5	7.5	4.5	7.5
Environment - Other	Acid Sulphate Soil	A-01-17	High probability of presence - construciton and cost implication. If not managed appropriately can have an environmental impact	Reduce likelihood of impacting on the soils	Importance of value and extent of impact	Low	4	4	4	4	4	8	8	8	4	10
	Noise	A-01-18	Proximity to noise sensitive values	Reduce noise for surrounding residents	Importance of value and extent of impact	Low	8	8	8	8	8	8	8	4	8	8
	Air quality	A-01-19	Proximity to air quality sensitive values	Maintain air quality for surrounding residents	Importance of value and extent of impact	Low	8	8	8	8	8	8	8	4	6	6
					A-02 Impact on sensitive environmental areas	Total Score	55	55	55	52.5	55	67	72.5	60	55.5	82.5
						Average Score	4.74	4.74	4.74	4.47	4.74	5.79	6.37	5.47	4.89	7.42
						Ranked Order	6	6	6	7	6	3	2	4	5	1
Heritage	Historic Heritage	A-03-01	World Heritage properties, National Heritage places, Commonwealth Heritage places under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	2	2	2	2	2	2	2	2	2	2
	Aboriginal and Torres Strait Islander Heritage	A-03-02	Listed heritage places under the *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Cultural Heritage Act 2003*	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	QLD heritage	A-03-03	Places of cultural heritage significance listed on the Queensland Heritage Register	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
					A-03 Impact on cultural heritage significance	Total Score	7.5	7.5	7.5	8	8	8	8	8	8	8
						Average Score	2.50	2.50	2.50	2.67	2.67	2.67	2.67	2.67	2.67	2.67
						Ranked Order	2	2	2	1	1	1	1	1	3	1

FOR SHORTLISTING – UTILISE ONLY "HIGH" WEIGHTED CRITERIA

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Option 1 EW "North" | Option 2 EW "North" | Option 3 EW "North" | Option 4 EW "middle" | Option 5 EW "middle" | Option 6 SE | Option 7 SE | Option 8 SE Creek Side Interch | Option 9 EW "South" | Option 10 SSMW split service road (north/ south)

Deliberation

refer notes on option description headers below (and alignments on map)

High Level Test	Second level theme	Criterion ID	Description	Objective	Criteria	Weighting (Low, medium, high, very high)	Score	Score	Score	Score	Score	Score	Score	Score	Score	Score	Comments
Environment - Commonwealth	Nationally Important Wetland	E-01	Wetland listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	Nationally Important Wetland, Mooloolah River National Park for 1240 m	Nationally Important Wetland, Mooloolah River National Park for 1250 m	Nationally Important Wetland, Mooloolah River National Park for 1240 m	Nationally Important Wetland, Mooloolah River National Park for 20 m	Nationally Important Wetland for 20 m	Nationally Important Wetland for 100 m	Nationally Important Wetland for 130 m	Nationally Important Wetland for 100 m	Nationally Important Wetland for 40 m	Nationally Important Wetland for 100 m, Mooloolah River National Park	
	Threatened Ecological Community	E-02	Threatened Ecological Community listed under the EPBC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	Potential TEC for 1260 m: Lowland rainforest of subtropical Australia (RE 12.3.1) Subtropical and temperate coastal saltmarsh (RE 12.1.2)	Potential TEC for 1220 m: Lowland rainforest of subtropical Australia (RE 12.3.1) Subtropical and temperate coastal saltmarsh (RE 12.1.2)	Potential TEC for 1250 m: Lowland rainforest of subtropical Australia (RE 12.3.1) Subtropical and temperate coastal saltmarsh (RE 12.1.2)	Potential TEC for 970 m: Lowland rainforest of subtropical Australia (RE 12.3.1) Subtropical and temperate coastal saltmarsh (RE 12.1.2)	Potential TEC for 970 m: Lowland rainforest of subtropical Australia (RE 12.3.1) Subtropical and temperate coastal saltmarsh (RE 12.1.2)	Potential TEC for 30m: Lowland rainforest of subtropical Australia (RE 12.3.1)	Potential TEC for 20 m: Lowland rainforest of subtropical Australia (RE 12.3.1)	Potential TEC for 30 m: Lowland rainforest of subtropical Australia (RE 12.3.1)	Potential TEC for 910 m: Lowland rainforest of subtropical Australia (RE 12.3.1) Subtropical and temperate coastal saltmarsh (RE 12.1.2)	Unlikley Potential TEC	
	National Parks	E-03	National Park listed under the EPBC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	Mooloolah River National Park for 1360 m	Mooloolah River National Park for 1350 m	Mooloolah River National Park for 1360 m	Mooloolah River National Park for 110 m	Does not impact a National Park	Does not impact a National Park	Does not impact a National Park	Does not impact a National Park	Does not impact a National Park	Mooloolah River National Park for 110 m	
	Threatened Species	E-04	Threatened fauna and flora species listed under the EPBC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	41 threatened species (26 fauna and 15 flora)	33 threatened species (20 fauna and 13 flora)	
Environment - State	Regional Ecosystems	E-05	Regional Ecosystems (RE) listed under the *Vegetation Management Act 1999* (VM Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	Option will intersect the following Res for: 12.3.14a (OC) 12.3.5 (LC) 12.3.5/12.3.1 (E) 12.3.1 (E) E = 1260 m, OC = 600 m , LC = 2030 m	Option will intersect the following REs: 12.3.14a (OC) 12.3.5 (LC) 12.3.5/12.3.1 (E) E = 1220 m, OC = 600 m, LC = 2030 m	Option will intersect the following REs: 12.3.14a (OC) 12.3.5 (LC) 12.3.5/12.3.1 (E) E = 1250 m, OC = 600 m, LC = 2030 m	Option will intersect the following REs: 12.3.14a (OC) 12.3.5 (LC) 12.3.5/12.3.1 (E) E = 970 m, OC = 600 m, LC = 230 m	Option will intersect the following REs: 12.3.5/12.3.1 (E) E = 970 m	Option will intersect the following REs: 12.3.5 (LC) 12.3.1 (E) 12.9-10.14 (LC) E = 30 m, LC = 520 m	Option will intersect the following REs: 12.3.5 (LC) 12.3.1 (E) E = 20 m, LC = 60 m	Option will intersect the following REs: 12.3.5 (LC) 12.3.1 (E) E = 30 m, LC = 280 m	Option will intersect the following REs: 12.3.13 (LC) 12.3.5 (E) 12.3.5/12.3.1 E = 910 m, LC = 330 m	Option will intersect the following REs: 12.3.14a (OC) 12.3.5 (LC) 12.3.13 (LC) OC = 520 m, LC = 200 m	
	Threatened Species	E-06	Protected plants and fauna listed under the *Nature Conservation Act 1992* (NC Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	Occurs within a protected plant trigger area, and alignment intersects remnant vegetation	
	Potential Offset Areas	E-07	Various	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	Option separates Sunshine Coast Airport offset area from Mooloolah River National Park	Option separates Sunshine Coast Airport offset area from Mooloolah River National Park	Option separates Sunshine Coast Airport offset area from Mooloolah River National Park	Option separates Sunshine Coast Airport offset area from Bruce Highway offset area	Option separates Sunshine Coast Airport offset area from Mooloolah River National Park	No regulated offsets	No regulated offsets	No regulated offsets	No regulated offsets	No regulated offsets	
	Wetlands/Waterways	E-08	Wetlands and waterways under the VM Act	Reduce impact on sensitive environment values		High	One waterway crossing Wetlands/Waterways for 3460 m	One waterway crossing Wetlands/Waterways for 3420 m	One waterway crossing Wetlands/Waterways for 3450 m	One waterway crossing Wetlands/Waterways for 1730 m	One waterway crossing Wetlands/Waterways for 1360 m	Two waterway crossings Wetlands/Waterways for 920 m	Two waterway crossings Wetlands/Waterways for 150 m	Two waterway crossings Wetlands/Waterways for 260 m	One waterway crossing Wetlands/Waterways for 2300 m	No waterway crossings. Wetlands for 220 m	
	Essential Habitat	E-09	Essential habitat protected under the VM Act and NC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	Essential habitat for 3890 m	Essential habitat for 3810 m	Essential Habitat for 3840 m	Essential Habitat for 1730 m	Essential Habitat for 900 m	Essential Habitat for 90 m	Essential Habitat for 60 m	Essential Habitat for 60 m	Essential Habitat for 1120 m	Essential Habitat for 720 m	
	Koala Habitat	E-10	Koala habitat managed under the State Government Supported Community Infrastructure – Koala Conservation Policy 2014. Required to offset for loss of koala habitat trees within SPP area	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	Koala habitat for 3410 m: Low value bushland. Within Koala SPP area	Koala habitat for 3510 m: Low value bushland. Within Koala SPP area	Koala habitat for 3540 m: Low value bushland. Within Koala SPP area	Koala habitat for 1710 m: Low value bushland. Within Koala SPP area	Koala habitat for 1290 m: Low value bushland. Within Koala SPP area	Koala habitat for 550 m: Medium value bushland Low value bushland. Within Koala SPP area	Koala habitat for 70 m: Low value bushland. Within Koala SPP area	Koala habitat for 240 m: Medium value bushland Low value bushland. Within Koala SPP area	Koala habitat for 1080 m: Low value bushland. Within Koala SPP area	Koala habitat for 460 m: Low value bushland. Within Koala SPP area	
	Koala KADA	E-11	Developments within KADA have the most stringent requirements as koala populations in these areas are at the greatest risk of extinction.	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	Outside of KADA	Outside of KADA	Outside of KADA	Within KADA	Within KADA	Within KADA	Within KADA	Within KADA	Within KADA	Outside of KADA	
	State Significant Biodiversity Corridor	E-12	State significant biodiversity corridors managed under the NC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	State significant corridor for 520 m	State significant corridor for 530 m	State significant corridor for 530 m	State significant corridor for 1050 m	State significant corridor for 1050 m	State significant corridor for 580 m	State significant corridor for 580 m	State significant corridor for 580 m	State significant corridor for 1800 m	No state significant corridor	
	Regional Parks	E-13	Regional Parks managed under the NC Act	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	No Regional Parks	No Regional Parks	No Regional Parks	No Regional Parks	No Regional Parks	Meridan Plains Regional Park for 200 m	No Regional Parks	Meridan Plains Regional Park for 80 m	No Regional Parks	No Regional Parks	
	Local Habitat Biodiversity Corridor	E-14	Local corridors managed under the *Sustainable Planning Act 2009* (SP Act) and Local Government Act 2009	Reduce impact on sensitive environment values	Importance of value and extent of impact	Low	Local corridor for 720 m	Local corridor for 680 m	Local corridor for 700 m	Local corridor for 790 m	Local corridor for 840 m	Local corridor for 760 m	Local corridor for 760 m	Local corridor for 760 m	Local corridor for 970 m	No Local corridor	
	Marine plants	E-15		Reduce impact on sensitive environment values		Low	Potentially marine plants	Potentially marine plants	Potentially marine plants	Potentially marine plants	Potentially marine plants	No marine plants	No marine plants	No marine plants	Potentially marine plants	No marine plants	
Environment - Other	Acid Sulphate Soil	E-16			Importance of value and extent of impact	High	"High Probability" area for Acid Sulphate soils	"High Probability" area for Acid Sulphate soils	"High Probability" area for Acid Sulphate soils	"High Probability" area for Acid Sulphate soils	"High Probability" area for Acid Sulphate soils	Approximatley 1.5km of road passes through "no known occurrence", remaining road in "low probability" area for Acid Sulphate soils	Approximatley 1.5km of road passes through "no known occurrence", remaining road in "low probability" area for Acid Sulphate soils	Approximatley 1.5km of road passes through "no known occurrence", remaining road in "low probability" area for Acid Sulphate soils	"High Probability" area for Acid Sulphate soils	Entire length within "no know occurrence" area for Acid Sulphate soils	
	Noise	E-17		Reduce noise for surrounding residents	Importance of value and extent of impact	Low	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in noise. Remaining section runs through undeveloped land, terminates at an existing road	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in noise. Remaining section runs through undeveloped land. Road terminates along an existing road in a commercial area - may be increase in noise	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in noise. Remaining section runs through undeveloped land. Road terminates along an existing road in a commercial area - may be increase in noise	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in noise. Remaining section runs through undeveloped land. Road terminates along an existing road - may be increase in noise	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in noise from increased traffic	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in noise from increased traffic to houses located northeast from road	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in noise from increased traffic, but very far away from houses	Most of road runs alkong undeveloped land. Eastern end of road runs adjacent to houses and a school. Noise will increase for these properties	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in noise from increased traffic	No properties on either side of road	

En	Air quality	E-18		Maintain air quality for surrounding residents	Importance of value and extent of impact	Low	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in air pollution. Remaining section runs through undeveloped land, terminates at an existing road	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in air pollution. Remaining section runs through undeveloped land. Road terminates along an existing road in a commercial area - may be increase in pollution	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in air pollution. Remaining section runs through undeveloped land. Road terminates along an existing road in a commercial area - may be increase in pollution	Eastern part runs along existing road (adjacent to houses), increase in traffic may cause increase in air pollution. Remaining section runs through undeveloped land. Road terminates along an existing road - may be increase in pollution	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in air pollution from increased traffic	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in air pollution from increased traffic to houses located northeast from road	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in noise from increased traffic, but very far away from houses	Most of road runs alkong undeveloped land. Eastern end of road runs adjacent to houses and a school. Air pollution will increase for these properties	Entire length of road runs through undeveloped land. Road terminates along an existing road, may be increase in air pollution from increased traffic	No properties on either side of road	
Heritage	Historic Heritage	E-16	World Heritage properties, National Heritage places, Commonwealth Heritage places under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)	Reduce impact on sensitive environment values	Importance of value and extent of impact	Very High	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	No World Heritage properties No National Heritage places No Commonwealth Heritage places	
	Aboriginal and Torres Strait Islander Heritage	E-17	Listed heritage places under the *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Cultural Heritage Act 2003*	Reduce impact on sensitive environment values	Importance of value and extent of impact	High	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area	Approximately 35 cultural heritage sites within area Option potentially impacts on Bora Ring/Earthern Arrangement	
	QLD heritage	E-18	Places of cultural heritage significance listed on the Queensland Heritage Register	Reduce impact on sensitive environment values	Importance of value and extent of impact	Medium	No listed places	No listed places	No listed places	No listed places	No listed places	No listed places	No listed places	No listed places	No listed places	No listed places	

Draft Final Design Criteria Report

D R A F T

Draft Final Design Criteria Report

Client: Department of Transport and Main Roads

ABN: 20 093 846 925

Prepared by

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Rev A	20-Mar-2017	Draft for TMR Review	N/R Associate Director - Transport Planning	
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1.0 Introduction

1.1 Project background

AECOM was commissioned by the Department of Transport and Main Roads (TMR) to carry out the Palmview/Sippy Downs Integrated Link Strategy – Route/Link Planning and Preliminary Options Analysis project. The purpose of the project is to undertake strategic transport planning to develop appropriate corridor link strategies and associated preliminary options analysis to:

- Identify and prioritise investment needs
- Outline roles, functions, demand drivers, performance visions and priority needs for the link
- Make recommendations for further investigations

Key drivers for the project include significant growth in urban development and traffic for the southern Sunshine Coast area including the completion of the Sunshine Coast University Hospital by April 2017, additional development at Kawana town centre and the development of the Palmview Master Planned Priority Development Area.

The project will influence strategy and funding decisions by the Queensland government as well as progressing the Palmview Infrastructure Agreement between the Sunshine Coast Regional Council and private landowners including developer Avid Property Group (formerly Investa Property Group).

The objectives of this project include:

- Review link upgrade requirements in the study area, particularly appropriate strategic staging of link improvements for north-south and east-west road capacity between Palmview/Sippy Downs and Caloundra/Kawana/Mooloolaba.
- Inform TMR's view on infrastructure priorities in relation to the Palmview Infrastructure Agreement (including a decision regarding proposed upgrading the future Southern Road link from 2 lanes to 4 lanes or investing in a new east-west link between Sippy Downs/Palmview and Kawana).
- Review the previous study conducted (by ARUP) for the SCC which focused on a "Green" link (transit/cycle way only) in the area, but which concluded such a link would not provide sufficient benefit in that form. This current Palmview Link Study will need to investigate a general traffic link with provisions for high quality transit and pedestrian/cycle facilities (not a limited "Green" link only).
- Address required upgrades and impacts to existing Council controlled roads (for example, Claymore Road, Pignata Road, Main Drive, Lake Kawana Boulevard) as well as impacts to State controlled roads (Sunshine Motorway, Caloundra Road).
- Conduct appropriate analysis (engineering, modelling, environmental assessment, costing etc.) to determine preferred corridor alignments for preferred upgrades.

1.2 Purpose of this report

The purpose of this draft design criteria report is to document the adopted design parameters that were used for the development of the preferred link options for the Palmview/Sippy Downs Integrated Link Strategy. This draft report initially sets out the design parameters in relation to general road design elements including horizontal and vertical geometry, sight distance and the cross section.

Detailed structural, drainage and pavement design were outside the scope of this project. However, major utilities, drainage structures and bridges have been considered as part of a high level constraints analysis during options development and assessment.

Extensive options development and assessment involving TMR and Sunshine Coast Council (SCC) have occurred as part of the project. Following a multi-criteria assessment (MCA) options selection workshop, two preferred options were shortlisted:

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- Deliberation
-

Traffic modelling was outside the scope of this commission. TMR North Coast staff provided future year 2041 AM and PM peak period VISUM traffic model plots for the relevant section of the Sunshine Motorway to inform concept design.

1.3 Functional design requirements

A set of functional design requirements was developed by the project team that seeks to be acceptable to TMR and appropriate for the future needs of the corridor. The functional design requirements for the corridor have been defined as follows:

- The design speed throughout the extents of the options will consist of speeds ranging from 70 to 110 km/h. Typical design speeds for the different types of road is generally 110 km/h for a motorway, 90 km/h for service roads and arterial roads, and 70 km/h for motorway ramps.
- The design to take cognisance of:
  - Traffic model outputs provided by TMR
  - SCC planning scheme including Palmview Master Planned Priority Development Area
  - Cultural heritage sites and places of indigenous significance
  - Q100 flood levels across the Mooloolah Rover floodplain
  - Environmental constraints including adjacent Mooloolah National Park
- For the Sunshine Motorway, the road corridor width to be minimised where possible, whilst maintaining normal design standards (NDD), to limit impact on adjacent National park and residential land and to make use of existing infrastructure where possible.
- The design intent is to maintain and improve the existing cyclist facilities along the Sunshine Motorway, and for a new E-W Link to provide a high quality facility for cyclists.

1.4 Design extents and existing features

The study area for the Palmview/Sippy Downs Integrated Link Strategy extends across the Mooloolah River floodplain from Palmview west of the Mooloolah River to Kawana to the east of the river. The study area is bounded by the Bruce Highway to the west, Sunshine Motorway (SSMW) to the north, the Kawana Way/Caloundra – Mooloolaba Road to the east and Caloundra Road to the south.

Figure 1-1 illustrates the study area extents and the two preferred link options, E-W link alignment and Sunshine Motorway upgrade.

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Deliberation

1.5 Overview

The assessment of the geometric design was based on the following activities:

- Review of the existing road alignment with respect to current design standards and identification of specific deficiencies that impact on the road corridor requirements
- Identification and review of design standards to be applied for the Route Strategy and how they can be applied to the alignment in the process of confirming the corridor whilst considering land constraints
- Consideration of areas where desirable standards cannot be applied due to existing corridor constraints and application of appropriate departures from the defined design criteria.

1.6 Design standards and relevant documents

TMR's *Road Planning and Design Manual* (2nd edition) and Austroads' *Guide to Road Design* (2010) were the primary references for geometric design criteria used on this project.

2.0 Applied standards for Sunshine Motorway upgrade

2.1 Design criteria

The design criteria described in the following sections apply to:

- Modification of motorway
- Construction of connecting ramps
- Service roads
- Modification of existing intersections

A tabulation of design parameters employed for the Sunshine Motorway corridor layouts is included in Appendix A.

The table provides desirable, minimum and absolute minimum requirements along with relevant reference to the relevant standard. In some instances a need to apply Extended Design Domain (EDD) principles has been identified as it is likely that Normal Design Domain (NDD) values cannot be achieved due to known site constraints and as identified in previous design stages. EDD values have been noted in the following sections to clearly identify potential applications and to facilitate discussion and agreement. If EDD is to be applied during the design process then the normal documentation will be prepared throughout the design process to justify their use.

The table also lists the project applied standards for the defined design speed of 110 km/h (motorway), 90 km/h (service roads) and 70 km/h (relevant local roads).

2.2 Design vehicles

The design vehicles used include:

- 25m B-Double for along the mainline motorway and service roads
- 19m Semi-trailer for swept paths and local roads

2.3 Road design

2.3.1 Design speed

The design speed has consequences for individual elements and is the speed used to coordinate design parameters such as sight distance, vertical curvature, horizontal radius, superelevation and side friction demand. The following are design speeds that are used within the project study extents.

- A design speed of 110 km/h (100 km/h posted) has been adopted along the Sunshine Motorway to be consistent with that used for that for the adjacent sections of the motorway.
- A design speed of 90 km/h (80 km/h posted) has been adopted for the Service Roads off the Sunshine Motorway.
- A design speed of 70 km/h (60 km/h posted) has been adopted for the ramps and intersections connecting the service roads and motorway.

2.3.2 Sight distance

One of the most critical elements of road design is the provision of sight distance to allow all vehicle types and driver abilities to interact safely with other vehicles, travel at speeds that are suitable for the environment and to identify then stop before, or manoeuvre around, hazards on the road. Table 2-1 below lists the critical sight distance and geometric values associated with the relevant design speed. It is noted that these values are for reference only as grade corrections will need to be applied.

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Table 2-1 Critical sight distance and geometrical design values

Criteria	NDD Value	EDD Value
Input Parameter		
Reaction Time (Cars & Trucks)	2.5 sec	2.0 sec
Eye / Target Height – Cars	1.1 m / 0.2 m	1.1 m / 0.2 m
Eye / Target Height – Trucks	2.4 m / 0.2 m	2.4 m / 0.8 m
Coefficient of Deceleration – Cars	0.36	0.46
Coefficient of Deceleration – Trucks	0.29	0.29
Stopping Sight Distance		
110 km/h – Cars	260 m	209 m
110 km/h – Trucks	225 m	225 m
90 km/h – Cars	185 m	151 m
90 km/h – Trucks	172 m	160 m
70 km/h – Cars	123 m	102 m
70 km/h – Trucks	115 m	105 m
Safe Intersection Sight Distance [1]		
110 km/h – SISD	300 m	285 m
110 km/h – Vertical crest curve K	97	87
90km/h – SISD	226 m	201 m
90km/h – Vertical crest curve K	55	43
70 km/h – SISD	151 m	141 m
70 km/h – Vertical crest curve K	25	22
Ramp Sight Distance [2]		
110 km/h – Exit Ramp Sight Distance to Nose with Taper	310 m	-
110 km/h – Exit Ramp Sight Distance to Nose with Auxiliary Lane	215 m	-
100 km/h [3] – Exit Ramp Sight Distance to Nose with Taper	280 m	-
100 km/h [3] – Exit Ramp Sight Distance to Nose with Auxiliary Lane	195 m	-
80 km/h [4] – Exit Ramp Sight Distance to Nose with Taper	230 m	-
80 km/h [4] – Exit Ramp Sight Distance to Nose with Auxiliary Lane	155 m	-
Entry Ramp Sight Distance to Merge	6 sec	4 sec
Mutual Sight Distance between Merging Roadways	4 sec	4 sec
Terminal Visibility to Merge Taper	6 sec	6 sec

[1] *1.1 m eye height to 1.25 m object height*

[2] *1.1 m eye height to 0.0 m object height*

[3] *No value for 90 km/h design speed given. 100 km/h shown instead*

[4] *No value for 70 km/h design speed given. 80 km/h shown instead*

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2.3.3 Typical cross section

Table 2-2 and Table 2-3 below identify the key (minimum) cross sectional design criteria adopted. Widths shown do not include additional widening which may be required, such as the widening of shoulders for sight distance.

Table 2-2 Cross section – lanes and shoulders

Criteria	NDD Value	EDD Value
Motorway		
LH Shoulders (Outside)	3.0 m	2.5 m
Median Shoulders	3.0 m	1.0 m
Median Shoulder (Adjacent Safety Barrier)	3.0 m	3.0 m
Lane Width (Normal)	3.5 m	3.5 m
Verge Width (Shoulder support)	1.0 m	1.0 m
Ramps		
LH Shoulders	2.0 m	2.0 m
RH Shoulders	1.0 m	1.0 m
Lane Width (One lane at nose)	4.0 m	4.0 m
Lane Width (Two lanes at nose)	3.5 m	3.5 m
Service Roads		
Lane Width (One-way)	3.5 m	3.4 m
Shoulder Width	2.0 m	1.5 m
Crossfall		
Road Crossfall	3.0%	2.5%[1]
Shoulder Crossfall[2]	+ 1.0%	+ 0.0%

[1] *Only for Asphalt roads. Bituminous sprayed seal minimum remains at 3.0%*

[2] *Compared to crossfall of traffic lane*

Table 2-3 Cross section – outer separation widths

Criteria	NDD Value	EDD Value
Physical Separation		
Traffic	2.4 m	2.4 m
Accommodate Utilities	3.5 m	3.5 m
Safety Barrier, with kerbs both sides	1.2 m	0.5 m
Pedestrians and Cyclists		
Designated Bicycle Path	2.0 m	2.0 m
Trunk Utility Service	8.0 m	4.1 m
Trees and Shrubs	5.0 m	4.0 m
Intersections		
Traffic Signal Control	2.4 m	2.4 m

Typical cross sections have been developed using the base criteria as described in the above tables and are illustrated in Appendix C.

Verge

Verge widths of 1.0 m are provided adjacent to shoulders. Additional width to be provided as necessary in the case of creating traversable transition to batter slopes (up to 6.0 m verge) or to provide space for the installation of safety barrier (1.5 m).

Barriers

Generally, barrier requirements and the associated risk assessment processes have not been undertaken at this stage of the study; however a general guide to potential barrier treatments is identified within Table 2-4 below.

Table 2-4 Proposed barrier treatments

Location	Test Level	Possible Barrier Type
Outside Shoulder	TL3	W Beam
Adjacent Roadside Overhead Structure Supports	TL4 to TL5	Single Slope Concrete Barrier 1100 mm high
On Bridges / Overhead Ramps	To AS5100 (Regular, Medium, Special Containment)	Single Slope Concrete Barrier 1100 mm high

As a minimum, TL3 barriers should be provided to protect errant vehicles and will be provided on outside shoulders where dictated by roadside hazards. Fill batter slopes have been indicated at 1 in 6 where possible to minimise the need for barrier on the outside shoulders.

Where there are structures, such as ITS and signage infrastructure, higher performance is required as these objects may fall onto the roadway and as such it is proposed to provide TL4 or 5 protection by way of single slope concrete barriers.

Some special cases may require higher protection for the median support structures for the motorway ramps and will be provided in accordance with AS5100. For new barriers on overhead ramps, barriers will be designed to AS5100.

2.3.4 Boundary offsets

Boundary offsets are generally defined as the distance from the top or toe of batter to the boundary. Austroads advises that the general minimum boundary offset for motorway / highway / arterial roads is 10 m, with 15 m as the desired minimum. However, RPDM further advises that Local Government and public utility plant requirements also need to be taken under consideration. Generally, local government's require 4.5 m minimum for service provisions.

Due to the constrained nature of the corridor, boundary offsets will be determined on a case by case basis, with local and government stakeholder approvals being undertaken at later stages.

2.3.5 Horizontal alignment

The proposed horizontal alignment criteria are listed in Table 2-5 below. The horizontal radius will match existing where it is impractical to increase the radius due to excessive additional land requirements or other constraints. Desirable curve radii will be applied on new alignments where practical.

Table 2-5 Horizontal alignment parameters

Design Speed (110km/h)	NDD/Desirable	EDD/Min
Horizontal Radius	600 m	
Horizontal Radius (6% Super Elevation)	529 m	529 m
Rate of rotation	0.025 rad/s	
Maximum Superelevation	6%	
Horizontal Radius – with adverse superelevation	2000 m	2000 m
Design Speed (90km/h)		
Horizontal Radius	300 m	
Horizontal Radius (7% Super Elevation)	319 m	236 m
Rate of rotation	0.025 rad/s	
Maximum Superelevation	7%	
Horizontal Radius – with adverse superelevation	1150 m	1150 m
Design Speed (70km/h)		
Horizontal Radius	200 m	
Horizontal Radius (7% Super Elevation)	148 m	102 m
Rate of rotation	0.035 rad/s	
Maximum Superelevation	7%	
Horizontal Radius – with adverse superelevation	400 m	400 m

2.3.6 Vertical alignment

Table 2-6 and Table 2-7 below reference the vertical alignment parameters to be adopted. It is noted that grade corrections will need to be applied to values shown in Table 2-6.

Table 2-6 Maximum grades

Criteria	NDD/Desirable	EDD/Max/Min
Ramps		
Entry Straight Ramps	-6% / +3%	-8% / +5%
Exit Straight Ramps	-4% / +6%	-6% / +8%
Entry Loop Ramps	-6% / +3%	-8% / +5%
Exit Loop Ramps	-3% / +5%	-4% / +7%
Per Design Speed		
Design Speed – 110 km/h	3%	5%
Design Speed – 90 km/h	4%	6%
Design Speed – 70 km/h	5%	8%

Table 2-7 Vertical curves

Criteria	NDD/Desirable	EDD/Max/Min
110 km/h		
Vertical crest curve K (r = 2.5 sec)	150.6	72.3
Vertical sag curve K (r = 2.5 sec)	84.0	51.0
90 km/h		
Vertical crest curve K (r = 2.5 sec)	76.6	38.8
Vertical sag curve K (r = 2.5 sec)	35.0	21.0
70 km/h		
Vertical crest curve K (r = 2.0 sec)	28.6	14.6
Vertical sag curve K (r = 2.0 sec)	13.0	8.0

2.3.7 Vertical clearance

Table 2-8 details the vertical clearances to be adopted. As shown, at existing structures, it is proposed that the existing clearances are to be maintained. This will need to be determined on a case by case basis; however the actual minimum clearance will need to be confirmed with TMR.

Table 2-8 Vertical clearance

Geometry	Desirable	Minimum
Highways & Motorways [1]	6.0 m	5.6 m
Other Roads[1]	5.5 m	4.8 m
Signs & ITS Gantries over Motorway	6.2 m	5.4 m
Bicycle Paths	2.5 m	2.5 m

[1] *Includes 300 mm overlay allowance*

2.4 Pedestrians and cycle facilities

Section 6A of Austroads Guide to Road Design Part 6C provides guidance on the provision of pedestrian and cycle facilities. A separate investigation into the pedestrian and cycle needs of the corridor will be undertaken as part of the Route Strategy. This investigation will determine the form and function of the pedestrian and cycle facilities required within the road corridor.

The current design aims to retain the existing cycle features through this section of the motorway to avoid land acquisition, instead maintaining the minimum 2.0 m separation to the cycle path as described in **Table 2-3.**

2.5 Heritage sites

The only known cultural heritage site within the project extents is a scarred tree, east of Claymore Road. This scar tree is listed on the DATSIP Aboriginal heritage register and as a result is protected and requires consultation with the relevant Aboriginal Party (Kabi Kabi First Nations). At this stage in the design, efforts have been made to provide as much clearance as possible to the scarred tree. It is to be noted that the appropriate approvals and consultation will be made during the later design stages.

3.0 Applied standards for E-W Link alignment

3.1 Design criteria

The design criteria described in the following sections applies to arterial road connecting the planned residential area at Palmview to Lake Kawana Boulevard. A tabulation of design parameters employed for the E-W Link corridor layouts is included in Appendix B.

The table provides desirable, minimum and absolute minimum requirements along with relevant reference to the relevant standard. The table also lists the project applied standards for the defined design speed of 90 km/h (arterial road).

3.2 Design vehicles

The design vehicle used is a 25 m B-Double for along the mainline.

3.3 Road design

3.3.1 Design speed

The design speed has consequences for individual elements and is the speed used to coordinate design parameters such as sight distance, vertical curvature, horizontal radius, superelevation and side friction demand. A design speed of 90 km/h (80 km/h posted) has been adopted for the E-W Link.

3.3.2 Sight distance

One of the most critical elements of road design is the provision of sight distance to allow all vehicle types and driver abilities to interact safely with other vehicles, travel at speeds that are suitable for the environment and to identify then stop before, or manoeuvre around, hazards on the road. Table 3-1 below lists the critical sight distance and geometric values associated with the relevant design speed. It is noted that these values are for reference only as grade corrections will need to be applied.

Table 3-1 Critical sight distance and geometrical design values

Criteria	NDD Value
Reaction Time (Cars & Trucks)	2.5 sec
Eye / Target Height – Cars	1.1 m / 0.2 m
Eye / Target Height – Trucks	2.4 m / 0.2 m
Coefficient of Deceleration – Cars	0.36
Coefficient of Deceleration – Trucks	0.29
90 km/h – Cars	185 m
90 km/h – Trucks	172 m
90km/h – SISD	226 m
90km/h – Vertical crest curve K	55

3.3.3 Typical cross section

Table 3-2 **and** Table 3-3 **b**elow identify the key (minimum) cross sectional design criteria adopted. Widths shown do not include additional widening which may be required, such as the widening of shoulders for sight distance.

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Table 3-2 Cross section – lanes and shoulders

Criteria	NDD Value
LH Shoulders (Outside)	3.0 m
Median Shoulders	3.0 m
Median Shoulder (Adjacent Safety Barrier)	3.0 m
Lane Width (Normal)	3.5 m
Verge Width (Shoulder support)	1.0 m
Road Crossfall	3.0%
Shoulder Crossfall[1]	+ 1.0%

[1] *Compared to crossfall of traffic lane*

Table 3-3 Cross section – outer separation widths

Criteria	NDD Value
Traffic	2.4 m
Accommodate Utilities	3.5 m
Designated Bicycle Path	2.0 m
Trunk Utility Service	8.0 m
Trees and Shrubs	5.0 m
Traffic Signal Control	2.4 m

Typical cross sections have been developed using the base criteria as described in the above tables and are illustrated in Appendix C.

Verge

Verge widths of 1.0 m are provided adjacent to shoulders. Additional width to be provided as necessary in the case of creating traversable transition to batter slopes (up to 6.0 m verge) or to provide space for the installation of safety barrier (1.5 m).

Barriers

Generally, barrier requirements and the associated risk assessment processes have not been undertaken at this stage of the study.

As a minimum, TL3 barriers should be provided to protect errant vehicles and will be provided on outside shoulders where dictated by roadside hazards. Fill batter slopes have been indicated at 1 in 6 where possible to minimise the need for barrier on the outside shoulders.

Where there are structures, such as ITS and signage infrastructure, higher performance is required as these objects may fall onto the roadway and as such it is proposed to provide TL4 or 5 protection by way of single slope concrete barriers.

For new barriers on any bridge structures required, such as the bridge structure over an existing waterway, barriers will be designed to AS5100.

3.3.4 Boundary offsets

Boundary offsets are generally defined as the distance from the top or toe of batter to the boundary. Austroads advises that the general minimum boundary offset for motorway / highway / arterial roads is 10 m, with 15 m as the desired minimum. However, RPDM further advises that Local Government and

public utility plant requirements also need to be taken under consideration. Generally, local governments require 4.5 m minimum for service provisions.

3.3.5 Horizontal alignment

The proposed horizontal alignment criteria are listed in Table 3-4 below. The horizontal radius will match existing where it is impractical to increase the radius due to excessive additional land requirements or other constraints. Desirable curve radii will be applied on new alignments where practical.

Table 3-4 Horizontal alignment parameters

Design Speed (90km/h)	NDD
Horizontal Radius	300 m
Horizontal Radius (7% Super Elevation)	319 m
Rate of rotation	0.025 rad/s
Maximum Superelevation	7%
Horizontal Radius – with adverse superelevation	1150 m

3.3.6 Vertical alignment

Table 3-5 below references the vertical alignment parameters to be adopted. It is noted that grade corrections will need to be applied to values shown in the table below.

Table 3-5 Vertical curves

Criteria	NDD
Maximum Grade	
Maximum Grade – Design Speed – 90 km/h	4%
Vertical Curve (90 km/h)	
Vertical crest curve K (r = 2.5 sec)	76.6
Vertical sag curve K (r = 2.5 sec)	35.0

3.3.7 Vertical clearance

There are no existing structures along the preferred E-W link alignment.

3.4 Pedestrians and cycle facilities

Section 6A of Austroads Guide to Road Design Part 6C provides guidance on the provision of pedestrian and cycle facilities.

3.5 Public transport

An allowance has been made for a generic transit corridor of 20 m width.

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Appendix A

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Appendix A Project Applied Design Standards – SSMW

Sunshine Motorway
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Design Speed					
Motorway				**110 km/hr**	
Service Roads				**90 km/hr**	
Motorway Ramps				**70 or 90 km/hr**	As per operating speed
Intersections (At Grade)				**70 km/hr**	
Intersections (Roundabout)				**70 km/hr**	
Design Vehicle					
Motorway				**B-Double**	
Service Roads				**B-Double**	
Local Roads				**Semi Trailer**	
Cross Section					
Motorway					
Lane Width	3.5 m	3.5 m		**3.5 m**	Austroads, Part 3, Section 4.2.5 & Table 4.4
Lefthand Shoulder Width		3.0 m	2.5 m	**3.0 m**	RPDM Supp, Part 3, Section 4.2.5
Median Shoulder Width	3.0 m	1.0 m		**3.0 m**	Austroads, Part 3, Section 4.2.5 & Table 4.4
Median Shoulder Width (Adjacent to Safety Barrier or Motorways > 2 Lanes)		3.0 m		**3.0 m**	Austroads, Part 3, Section 4.2.5 & Table 4.4
Ramps					
Lane Width (Interchange Ramps - One Lane at Nose)		4.0 m		**4.0 m**	Austroads, Part 4C, Section 5.2.2 & Table 5.1
Lane Width (Interchange Ramps - Two Lanes at Nose)		3.5 m		**3.5 m**	Austroads, Part 4C, Section 5.2.2 & Table 5.1
Lefthand Shoulder Width		2.0 m		**2.0 m**	Austroads, Part 4C, Section 5.2.2 & Table 5.1
Righthand Shoulder Width		1.0 m		**1.0 m**	Austroads, Part 4C, Section 5.2.2 & Table 5.1
Service Road (Single Carriageway)					
Lane Width (One-way)	3.4 m	3.4 m		**3.4 m**	Austroads, Part 3, Section 4.11.1 & Table 4.26
Lane Width (Two-way)	5.5 m	4.4 m		**5.5 m**	Austroads, Part 3, Section 4.11.1 & Table 4.26
Shoulder Width	2.5 m	2.0 m	1.5 m	**2.0 m**	Austroads, Part 3 & RPDM Supp Part 3 - Section 4.3.2
General					
Road crossfall (Bituminous sprayed seal)	3.0%	3.0%		**3.0%**	Austroads, Part 3, Section 4.2.2 & Table 4.2
Road crossfall (Asphalt)	3.0%	2.5%		**3.0%**	Austroads, Part 3, Section 4.2.2 & Table 4.2
Shoulder Crossfall	+ 1.0%*	+ 0.0%*		**+ 1%***	Austroads, Part 3, Section 4.3.5 & Table 4.8
Shoulder Seal	1.0 m	0.5 m		**1.0 m**	Austroads, Part 3, Section 4.3.3 & Table 4.7
Verge Widths (By Functions)					
- Shoulder Support and locate guide posts		1.0 m		**1.0 m**	Austroads, Part 3, Section 4.4.1 & Table 4.9
- Traversable transition to batter slope	6.0 m	1.0 m		**1.0 m**	Austroads, Part 3, Section 4.4.1 & Table 4.9
- Behind kerb and channel		1.5 m		**1.5 m**	Austroads, Part 3, Section 4.4.1 & Table 4.9
- Provide space for installation of safety barriers		1.5 m		**1.5 m**	Austroads, Part 3, Section 4.4.1 & Table 4.9
Outer Seperation					
Physical Seperation (Traffic)		2.4 m		**2.4 m**	Austroads, Part 3, Table 4.28
Physical Seperation (Accommodate Utilities)		3.5 m		**3.5 m**	Austroads, Part 3, Table 4.28
Physical Seperation (Safety Barrier, with kerbs both sides)	1.2 m	0.5 m		**1.2 m**	Austroads, Part 3, Table 4.28
Pedestrains and Cyclists (Designated Bicycle Path)		2.0 m		**2.0 m**	Austroads, Part 3, Table 4.28
Pedestrains and Cyclists (Trunk Utility Service)	8.0 m	4.1 m		**8.0 m**	Austroads, Part 3, Table 4.28
Pedestrains and Cyclists (Trees and Shrubs)	5.0 m	4.0 m		**5.0 m**	Austroads, Part 3, Table 4.28
Intersections (Traffic Signal Control)		2.4 m		**2.4 m**	Austroads, Part 3, Table 4.28
Clearances					
Clearance to road boundary (Motorway / Arterial Road)	15.0 m	10.0 m		**15.0 m**	Austroads, Part 3, Table 4.30
Clearance to road boundary (Local Road)		5.0 m		**5.0 m**	Austroads, Part 3, Table 4.30

Sunshine Motorway
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Clear Zone*					
Motorway - 110 km/hr design speed					
- 1 on 6 fill batters	10.0 m		Traffic Barrier	**10.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 fill batters	13.0 m		Traffic Barrier	**13.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 fill batters	30.0 m		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 2 fill batters	-		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 6 cut batters	8.0 m		Traffic Barrier	**8.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 cut batters	7.0 m		Traffic Barrier	**7.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 cut batters	6.0 m		Traffic Barrier	**6.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
Service Roads - 90km/hr design speed					
- 1 on 6 fill batters	6.5 m		Traffic Barrier	**6.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 fill batters	9.0 m		Traffic Barrier	**9.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 fill batters	21.0 m		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 2 fill batters	-		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 6 cut batters	6.5 m		Traffic Barrier	**6.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 cut batters	5.5 m		Traffic Barrier	**5.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 cut batters	5.0 m		Traffic Barrier	**5.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
Service Roads - 70km/hr design speed					
- 1 on 6 fill batters	5.5 m		Traffic Barrier	**5.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 fill batters	8.0 m		Traffic Barrier	**8.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 fill batters	9.0 m		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 2 fill batters	-		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 6 cut batters	5.5 m		Traffic Barrier	**5.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 cut batters	5.0 m		Traffic Barrier	**5.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 cut batters	4.5 m		Traffic Barrier	**4.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
* Provide where practical, otherwise investigate traffic barrier use					
Batter Slopes:					
Stable material / Cut / ≤ 1m Height		≤ 1 on 3		**≤ 1 on 3**	RPDM Supp, Part 3, Table 3-4
Stable material / Cut / > 1m Height		≤ 1 on 2		**≤ 1 on 2**	RPDM Supp, Part 3, Table 3-4
Stable material / Fill / ≤ 1m Height	≤ 1 on 6	≤ 1 on 4		**≤ 1 on 6**	RPDM Supp, Part 3, Table 3-4
Stable material / Fill / > 1m Height		≤ 1 on 2		**≤ 1 on 2**	RPDM Supp, Part 3, Table 3-4
Horizontal Alignment					
Sight Distance					
Reaction time - Motorway (110km/h design speed)					
- Cars		2.5 s	2.0 s	**2.5 s**	Austroads, Part 3, Table 5.2.
- Trucks		2.5 s	2.0 s	**2.5 s**	Austroads, Part 3, Table 5.2.
Reaction time - Ramps & Service Roads (90 - 70km/h design speed)					
- Cars	2.5 s	2.0 s	1.5 s	**2.5 s**	Austroads, Part 3, Table 5.2.
- Trucks	2.5 s	2.0 s	1.5 s	**2.5 s**	Austroads, Part 3, Table 5.2.
Coefficient of deceleration					
- Cars	0.26	0.36	0.46	**0.36**	Austroads, Part 3, Table 5.3
- Trucks		0.29		**0.29**	Austroads, Part 3, Table 5.3
Eye / Target height					
- Cars	1.1 m / 0.2 m			**1.1 m / 0.2 m**	Austroads, Part 3, Section 5.2.1 & Table 5.1
- Trucks	2.4 m / 0.2 m	2.4 m / 0.8 m		**2.4 m / 0.2 m**	Austroads, Part 3, Section 5.2.1 & Table 5.1
Stopping Sight Distance					
Cars - 110 km/h		260 m	209 m	**260 m**	Austroads, Part 3, Table 5.5.
Trucks - 110 km/h (d=0.29)		241 m	225 m	**241 m**	Austroads, Part 3, Table 5.6.

Sunshine Motorway
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Cars - 90 km/h	185 m	151 m	132 m	**185 m**	Austroads, Part 3, Table 5.5.
Trucks - 90 km/h (d=0.29)	172 m	160 m	147 m	**172 m**	Austroads, Part 3, Table 5.6.
Cars - 70 km/h	123 m	102 m		**123 m**	Austroads, Part 3, Table 5.5.
Trucks - 70 km/h (d=0.29)	115 m	105 m	96 m	**115 m**	Austroads, Part 3, Table 5.6.
Site Distance at Ramps (1.1m to 0.0m Height)					
Exit ramp sight distance to nose with taper (110km/h)		310 m		**310 m**	Austroads, Part 4C, Table 7.1.
Exit ramp sight distance to nose with auxiliary lane (110km/h)		215 m		**215 m**	Austroads, Part 4C, Table 7.1.
Exit ramp sight distance to nose with taper (100km/h)		280 m		**280 m**	Austroads, Part 4C, Table 7.1.
Exit ramp sight distance to nose with auxiliary lane (100km/h)		195 m		**195 m**	Austroads, Part 4C, Table 7.1.
Exit ramp sight distance to nose with taper (80km/h)		230 m		**230 m**	Austroads, Part 4C, Table 7.1.
Exit ramp sight distance to nose with auxiliary lane (80km/h)		155 m		**155 m**	Austroads, Part 4C, Table 7.1.
Entry ramp sight distance to nose (1.1m to 0.1m)		6 secs	4 secs	**6 secs**	Austroads, Part 4C, Table 7.2.
Mutual Sight Distance between merging roadways		4 secs	4 secs	**4 secs**	Austroads, Part 4C, Table 7.2.
Terminal visibility to merge taper (1.1m to 0.0m)		6 secs	6 secs	**6 secs**	Austroads, Part 4C, Table 7.2.
Safe Intersection Sight Distance (SISD) at intersections at grade*					
SISD - 110km/h (1.1m to 1.25m)	300 m	285 m		**300 m**	Austroads, Part 4A, Table 3.2.
Vertical crest curve K - 110km/h	97	87		**97**	Austroads, Part 4A, Table 3.2.
SISD - 90km/h (1.1m to 1.25m)	226 m	214 m	201 m	**226 m**	Austroads, Part 4A, Table 3.2.
Vertical crest curve K - 90km/h	55	49	43	**55**	Austroads, Part 4A, Table 3.2.
SISD - 70km/h (1.1m to 1.25m)		151 m	141 m	**151 m**	Austroads, Part 4A, Table 3.2.
Vertical crest curve K - 70km/h		25	22	**25**	Austroads, Part 4A, Table 3.2.
Vertical Geometry					
Vertical crest curve K - 110km/h (r = 2.5 sec)	150.6	97.3	72.3	**150.6**	Austroads, Part 3, Table 8.7.
Vertical sag curve K - 110km/h	84		51	**81**	Austroads, Part 3, Figure 8.9.
Vertical crest curve K - 90km/h (r = 2.5 sec)	76.6	51.0	38.8	**76.6**	Austroads, Part 3, Table 8.7.
Vertical sag curve K - 90km/h	35		21	**35**	Austroads, Part 3, Figure 8.9.
Vertical crest curve K - 70km/h (r = 2.0 sec)	28.6	19.1	14.6	**28.6**	Austroads, Part 3, Table 8.7.
Vertical sag curve K - 70km/h	13		8	**13**	Austroads, Part 3, Figure 8.7.
Vertical Gradient (Flat Terrain)					
100km/h operating speed (110km/h design speed)	3%		5%	**3%**	Austroads, Part 3, Table 8.3.
80km/h operating speed (90km/h design speed)	4%		6%	**4%**	Austroads, Part 3, Table 8.3.
60km/h operating speed (70km/h design speed)	6%		8%	**6%**	Austroads, Part 3, Table 8.3.
Minimum Horizontal Radius - 110 km/hr design speed					
- Typical minimum for planning purposes		600 m		**600 m**	RPDM Supp, Part 3, Table 3-6
- with adverse superelevation		2000 m		**2000 m**	Austroads, Part 3, Table 7.12
- with 6% superelevation		529 m	529 m	**529 m min**	Austroads, Part 3, Table 7.6
Maximum Superelevation (High Speed Rural)		6%		**6%**	Austroads, Part 3, Table 7.8
Rate of Rotation		.025 rad/s		**.025 rad/s**	Austroads, Part 3, Section 7.7.7
Minimum Horizontal Radius - 90 km/hr design speed					
- Typical minimum for planning purposes		300 m		**300 m**	RPDM Supp, Part 3, Table 3-6
- with adverse superelevation		1150 m		**1150 m min**	Austroads, Part 3, Table 7.12
- with 6% superelevation		336 m	245 m	**336 m min**	Austroads, Part 3, Table 7.6
- with 7% superelevation		319 m	236 m	**319 m min**	Austroads, Part 3, Table 7.6
Maximum Superelevation (Intermediate Speed Rural)		7%		**7%**	Austroads, Part 3, Table 7.8

Sunshine Motorway
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Rate of Rotation		.025 rad/s		**.025 rad/s**	Austroads, Part 3, Section 7.7.7
Minimum Horizontal Radius - 70km/hr design speed					
- Typical minimum for planning purposes		200 m		**200 m**	RPDM Supp, Part 3, Table 3-6
- with adverse superelevation		400 m		**400 m min**	Austroads, Part 3, Table 7.12
- with 6% superelevation		154 m	104 m	**154 m min**	Austroads, Part 3, Table 7.6
- with 7% superelevation		148 m	102 m	**148 m min**	Austroads, Part 3, Table 7.6
Maximum Superelevation (Intermediate Speed Rural)		7%		**7%**	Austroads, Part 3, Table 7.8
Rate of Rotation		.035 rad/s		**.035 rad/s**	Austroads, Part 3, Section 7.7.7
Maximum Ramp Gradients					
Exit Diamond Ramps	-4% / 6%	-6% / 8%		**-4% / 6%**	Austroads, Part 4C, Table 9.2
Entry Diamond Ramps	-6% / 3%	-8% / 5%		**-6% / 3%**	Austroads, Part 4C, Table 9.2
Exit Loop Ramps	-3% / 5%	-4% / 7%		**-3% / 5%**	Austroads, Part 4C, Table 9.3
Entry Loop Ramps	-6% / 3%	-8% / 5%		**-6% / 3%**	Austroads, Part 4C, Table 9.3
Minimum Crest Curves K (EDD)					
- Truck day - 110km/h (2.0s reaction)	42.5	35.7		**42.5**	Austroads, Part 3, Table A.17
- Norm day - 110km/h (2.0s reaction)	60.6	43.3		**60.6**	Austroads, Part 3, Table A.13
- Truck day - 90km/h (2.0s reaction)	21.4	18		**21.4**	Austroads, Part 3, Table A.17
- Norm day - 90km/h (2.0s reaction)	31.8	23.4		**31.8**	Austroads, Part 3, Table A.13
- Truck day - 70km/h (2.0s reaction)	9.3	7.8		**9.3**	Austroads, Part 3, Table A.17
- Norm day - 70km/h (2.0s reaction)	14.6	11.1		**14.6**	Austroads, Part 3, Table A.13
Aquaplaning					
Maximum water film depth (> 80km/h)	2.5 mm	4.0 mm		**2.5 mm**	Austroads, Part 5A, Section 4.10.1
Maximum water film depth (< 80km/h)	5.0 mm	5.0 mm		**5.0 mm**	Austroads, Part 5A, Section 4.10.1
Pavement Type					
Surface type - Motorways		OGA		**OGA**	Austroads, Part 5A, Section 4.5.1
Surface Type - Local Roads and Ramps		DGA		**DGA**	Austroads, Part 5A, Section 4.5.1
Vertical Clearance					
Highways & motorways - based on 300mm of pavement resurfacing		6.0 m	5.6 m	**6.0 m**	Austroads, Part 3, Table 8.1 & RPDM Supp, Part 3, Section 8.2.2
Other Roads - based on 300mm of pavement resurfacing		5.5 m	4.8 m	**5.5 m**	Austroads, Part 3, Table 8.1 & RPDM Supp, Part 3, Section 8.2.2
Signs and ITS gantries over Motorway	6.2 m	6.1 m	5.4 m	**6.2 m**	Austroads, Part 3, Table 8.1 & RPDM Supp, Part 3, Section 8.2.2
Bicycle Paths		2.5 m		**2.5 m**	Austroads, Part 3, Table 8.1

Highlighted Cells = Application of EDD

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Appendix B

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Appendix B Project Applied Design Standards – E-W Link

E-W Link
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Design Speed					
E-W Link				**90 km/hr**	
Design Vehicle					
E-W Link				**B-Double**	
Cross Section					
Motorway					
Lane Width	3.5 m	3.5 m		**3.5 m**	Austroads, Part 3, Section 4.2.5 & Table 4.4
Lefthand Shoulder Width		3.0 m	2.5 m	**3.0 m**	RPDM Supp, Part 3, Section 4.2.5
Median Shoulder Width	3.0 m	1.0 m		**3.0 m**	Austroads, Part 3, Section 4.2.5 & Table 4.4
Median Shoulder Width (Adjacent to Safety Barrier or Motorways > 2 Lanes)		3.0 m		**3.0 m**	Austroads, Part 3, Section 4.2.5 & Table 4.4
General					
Road crossfall (Bituminous sprayed seal)	3.0%	3.0%		**3.0%**	Austroads, Part 3, Section 4.2.2 & Table 4.2
Road crossfall (Asphalt)	3.0%	2.5%		**3.0%**	Austroads, Part 3, Section 4.2.2 & Table 4.2
Shoulder Crossfall	+ 1.0%*	+ 0.0%*		**+ 1%***	Austroads, Part 3, Section 4.3.5 & Table 4.8
Shoulder Seal	1.0 m	0.5 m		**1.0 m**	Austroads, Part 3, Section 4.3.3 & Table 4.7
Verge Widths (By Functions)					
- Shoulder Support and locate guide posts		1.0 m		**1.0 m**	Austroads, Part 3, Section 4.4.1 & Table 4.9
- Traversable transition to batter slope	6.0 m	1.0 m		**1.0 m**	Austroads, Part 3, Section 4.4.1 & Table 4.9
- Provide space for installation of safety barriers		1.5 m		**1.5 m**	Austroads, Part 3, Section 4.4.1 & Table 4.9
Outer Seperation					
Physical Seperation (Traffic)		2.4 m		**2.4 m**	Austroads, Part 3, Table 4.28
Physical Seperation (Accommodate Utilities)		3.5 m		**3.5 m**	Austroads, Part 3, Table 4.28
Pedestrains and Cyclists (Designated Bicycle Path)		2.0 m		**2.0 m**	Austroads, Part 3, Table 4.28
Pedestrains and Cyclists (Trunk Utility Service)	8.0 m	4.1 m		**8.0 m**	Austroads, Part 3, Table 4.28
Pedestrains and Cyclists (Trees and Shrubs)	5.0 m	4.0 m		**5.0 m**	Austroads, Part 3, Table 4.28
Intersections (Traffic Signal Control)		2.4 m		**2.4 m**	Austroads, Part 3, Table 4.28
Clearances					
Clearance to road boundary (Motorway / Arterial Road)	15.0 m	10.0 m		**15.0 m**	Austroads, Part 3, Table 4.30

E-W Link
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Clear Zone*					
E-W Link - 90km/hr design speed					
- 1 on 6 fill batters	6.5 m		Traffic Barrier	**6.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 fill batters	9.0 m		Traffic Barrier	**9.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 fill batters	21.0 m		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 2 fill batters	-		Traffic Barrier	**Traffic Barrier**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 6 cut batters	6.5 m		Traffic Barrier	**6.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 4 cut batters	5.5 m		Traffic Barrier	**5.5 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
- 1 on 3 cut batters	5.0 m		Traffic Barrier	**5.0 m**	RPDM Supp, Part 6, Figure 6-1 and Figure 6-2
* Provide where practical, otherwise investigate traffic barrier use					
Batter Slopes:					
Stable material / Cut / ≤ 1m Height		≤ 1 on 3		**≤ 1 on 3**	RPDM Supp, Part 3, Table 3-4
Stable material / Cut / > 1m Height		≤ 1 on 2		**≤ 1 on 2**	RPDM Supp, Part 3, Table 3-4
Stable material / Fill / ≤ 1m Height	≤ 1 on 6	≤ 1 on 4		**≤ 1 on 6**	RPDM Supp, Part 3, Table 3-4
Stable material / Fill / > 1m Height		≤ 1 on 2		**≤ 1 on 2**	RPDM Supp, Part 3, Table 3-4
Horizontal Alignment					
Sight Distance					
Reaction time (90 km/h design speed)					
- Cars	2.5 s	2.0 s	1.5 s	**2.5 s**	Austroads, Part 3, Table 5.2.
- Trucks	2.5 s	2.0 s	1.5 s	**2.5 s**	Austroads, Part 3, Table 5.2.
Coefficient of deceleration					
- Cars	0.26	0.36	0.46	**0.36**	Austroads, Part 3, Table 5.3
- Trucks		0.29		**0.29**	Austroads, Part 3, Table 5.3
Eye / Target height					
- Cars	1.1 m / 0.2 m			**1.1 m / 0.2 m**	Austroads, Part 3, Section 5.2.1 & Table 5.1
- Trucks	2.4 m / 0.2 m	2.4 m / 0.8 m		**2.4 m / 0.2 m**	Austroads, Part 3, Section 5.2.1 & Table 5.1
Stopping Sight Distance					

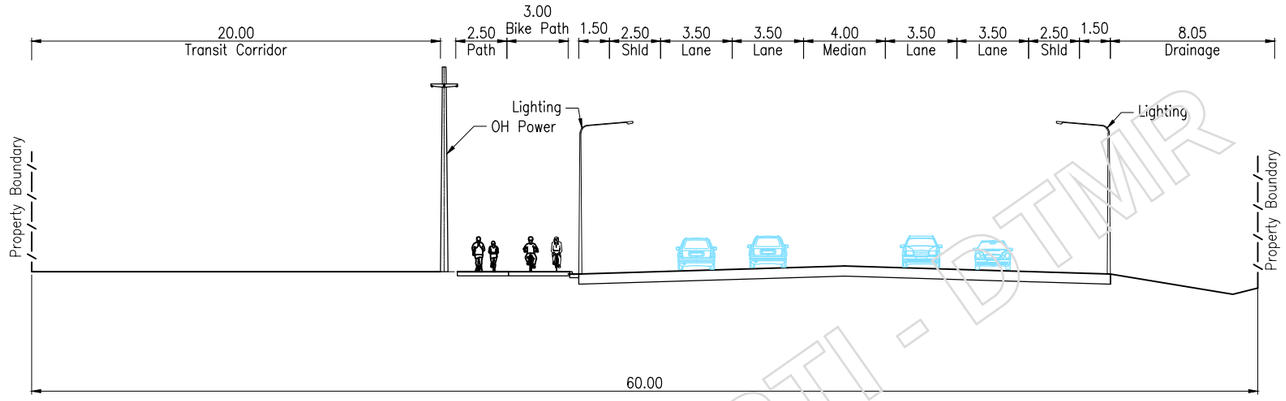
E-W Link
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Cars - 90 km/h	185 m	151 m	132 m	**185 m**	Austroads, Part 3, Table 5.5.
Trucks - 90 km/h (d=0.29)	172 m	160 m	147 m	**172 m**	Austroads, Part 3, Table 5.6.
Safe Intersection Sight Distance (SISD) at intersections at grade*					
SISD - 90km/h (1.1m to 1.25m)	226 m	214 m	201 m	**226 m**	Austroads, Part 4A, Table 3.2.
Vertical crest curve K - 90km/h	55	49	43	**55**	Austroads, Part 4A, Table 3.2.
Vertical Geometry					
Vertical crest curve K - 90km/h (r = 2.5 sec)	76.6	51.0	38.8	**76.6**	Austroads, Part 3, Table 8.7.
Vertical sag curve K - 90km/h	35		21	**35**	Austroads, Part 3, Figure 8.9
Vertical Gradient (Flat Terrain)					
80km/h operating speed (90km/h design speed)	4%		6%	**4%**	Austroads, Part 3, Table 8.3.
Minimum Horizontal Radius - 90 km/hr design speed					
- Typical minimum for planning purposes		300 m		**300 m**	RPDM Supp, Part 3, Table 3-6
- with adverse superelevation		1150 m		**1150 m min**	Austroads, Part 3, Table 7.12
- with 6% superelevation		336 m	245 m	**336 m min**	Austroads, Part 3, Table 7.6
- with 7% superelevation		319 m	236 m	**319 m min**	Austroads, Part 3, Table 7.6
Maximum Superelevation (Intermediate Speed Rural)		7%		**7%**	Austroads, Part 3, Table 7.8

E-W Link
Design Criteria

Design Item	Desirable	Minimum	Absolute Minimum	Project Target Standard	Reference
Palmview Sippy Downs Integrated Link Strategy					
Rate of Rotation		.025 rad/s		**.025 rad/s**	Austroads, Part 3, Section 7.7.7
Minimum Crest Curves K (EDD)					
- Truck day - 90km/h (2.0s reaction)	21.4	18		**21.4**	Austroads, Part 3, Table A.17
- Norm day - 90km/h (2.0s reaction)	31.8	23.4		**31.8**	Austroads, Part 3, Table A.13
Aquaplaning					
Maximum water film depth (> 80km/h)	2.5 mm	4.0 mm		**2.5 mm**	Austroads, Part 5A, Section 4.10.1
Pavement Type					
Surface type - Motorways		OGA		**OGA**	Austroads, Part 5A, Section 4.5.1
Vertical Clearance					
Highways & motorways - based on 300mm of pavement resurfacing		6.0 m	5.6 m	**6.0 m**	Austroads, Part 3, Table 8.1 & RPDM Supp, Part 3, Section 8.2.2
Other Roads - based on 300mm of pavement resurfacing		5.5 m	4.8 m	**5.5 m**	Austroads, Part 3, Table 8.1 & RPDM Supp, Part 3, Section 8.2.2
Signs and ITS gantries over Motorway	6.2 m	6.1 m	5.4 m	**6.2 m**	Austroads, Part 3, Table 8.1 & RPDM Supp, Part 3, Section 8.2.2
Bicycle Paths		2.5 m		**2.5 m**	Austroads, Part 3, Table 8.1

Highlighted Cells = Application of EDD



EAST–WEST LINK TYPICAL SECTION

NOTES:

- As per Austroads standard cross sectional widths.
- 4 m median (2 m per side)
- 1 on 6 batter slopes as per TMR planning requirement.
- Allowance for breakdown/pull over area on this section of road.
- Median crossover for emergency vehicles.
- 3.5 m maximum height for vegetation within Regional Services corridor.
- Allowance for maintenance bays within service corridor.
- Utilise footpath and bikepath for subsurface utilities corridor.
- Transit Corridor
  11.8 m Busway corridor (3.5 m Bus Lanes, 1.6 m shoulder and median).
  8.2 m Light Rail corridor.

0 1 2 3 4 5 6m

PALMVIEW/SIPPYDOWNS
TYPE CROSS SECTION
(ZONE 3)

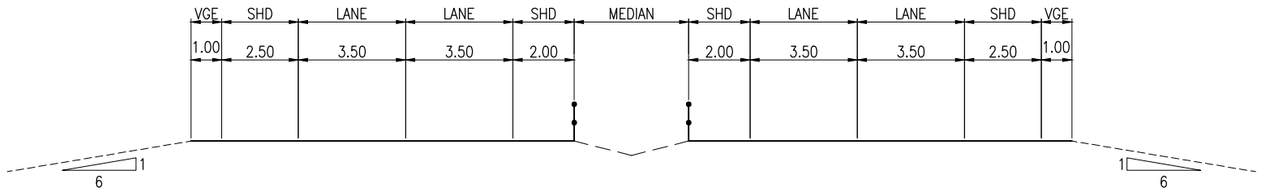
SK-60487984-03021

DRAFT

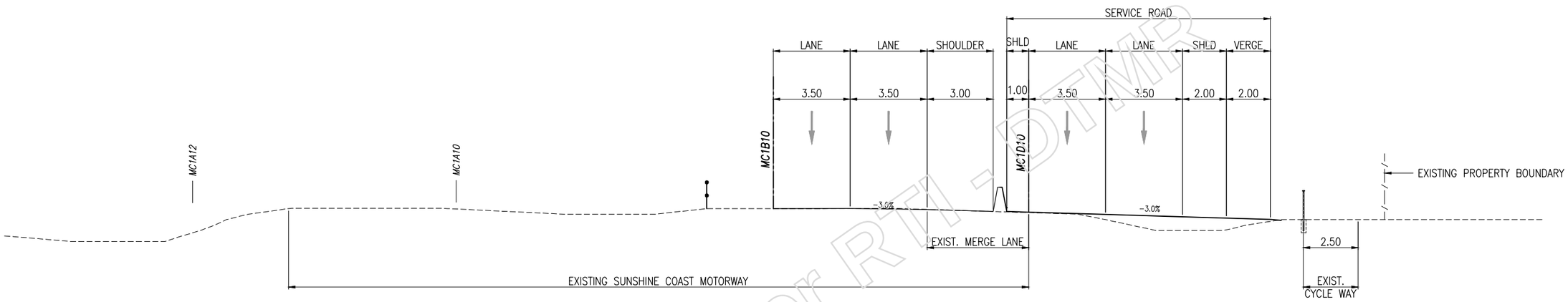
Appendix C

D R A F T

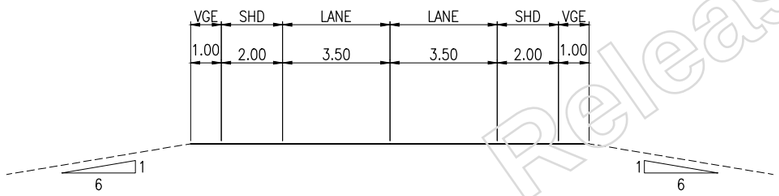
Appendix C Typical Cross Sections



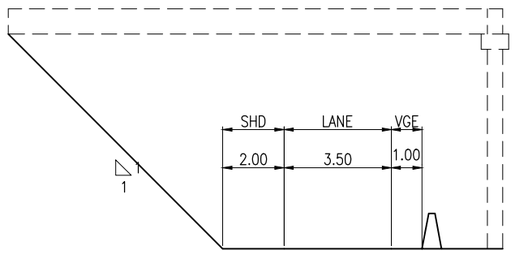
SUNSHINE COAST MOTORWAY



SUNSHINE COAST MOTORWAY
CONTROL LINE MC1B10 – CH. 100



SERVICE ROAD



SERVICE ROAD UNDER DIXON ROAD UNDERPASS

A	Original Issue A3			
	Revisions/Descriptions	Certification	Date	Microfiled

CAD FILES: C:\pwworking\aecom_ds02_au\mouldsd\dms17661\60487984-1000-111001-TC.dwg
Last Modified :- Feb 02, 2017 – 4:59pm

Associated Job Nos
Auxiliary Drg Nos
Survey Data: Datum, Horiz. Grid, Height Origin, Survey Books

Scales: 0 1 2 3 4m
Dimensions shown in except where shown otherwise

SUNSHINE COAST REGIONAL COUNCIL
LINK STRATEGY – SUNSHINE COAST MOTORWAY
CTL CHGE

Reference Points

Preceding RP	Dist. to start of job (km)	From start to end of job	From end to Following RP	Following RP

Through Chainage from

TYPICAL CROSS SECTIONS
SHEET 1 OF 3

Drawn
Designed

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	NO.	DATE

Queensland Government

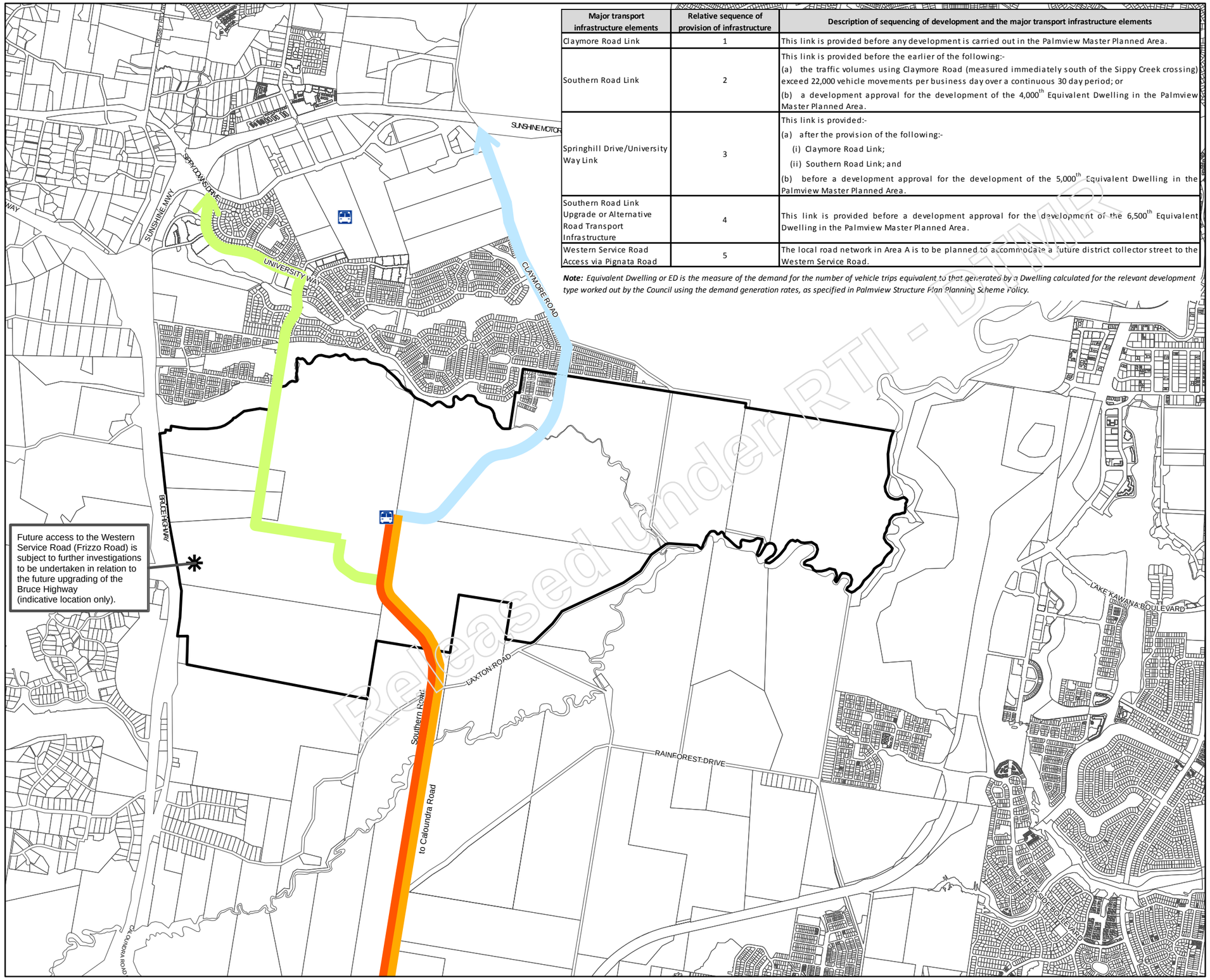
Job No.	
Contract. No.	
Drawing No.	1000111001
Series Number	of

MRR_Detail (06/13)

Sunshine Coast **Planning Scheme 2014**
Palmview Master Planned Area

Major transport infrastructure elements	Relative sequence of provision of infrastructure	Description of sequencing of development and the major transport infrastructure elements
Claymore Road Link	1	This link is provided before any development is carried out in the Palmview Master Planned Area.
Southern Road Link	2	This link is provided before the earlier of the following:- (a) the traffic volumes using Claymore Road (measured immediately south of the Sippy Creek crossing) exceed 22,000 vehicle movements per business day over a continuous 30 day period; or (b) a development approval for the development of the 4,000th Equivalent Dwelling in the Palmview Master Planned Area.
Springhill Drive/University Way Link	3	This link is provided:- (a) after the provision of the following:- (i) Claymore Road Link; (ii) Southern Road Link; and (b) before a development approval for the development of the 5,000th Equivalent Dwelling in the Palmview Master Planned Area.
Southern Road Link Upgrade or Alternative Road Transport Infrastructure	4	This link is provided before a development approval for the development of the 6,500th Equivalent Dwelling in the Palmview Master Planned Area.
Western Service Road Access via Pignata Road	5	The local road network in Area A is to be planned to accommodate a future district collector street to the Western Service Road.

Note: *Equivalent Dwelling or ED is the measure of the demand for the number of vehicle trips equivalent to that generated by a Dwelling calculated for the relevant development type worked out by the Council using the demand generation rates, as specified in Palmview Structure Plan Planning Scheme Policy.*



Palmview Master Planned Area Development and Transport Infrastructure Network Sequencing

Boundaries

- Palmview Master Planned Area Boundary
- DCDB 29 March 2016 © State Government

Classification of Major Road Transport Infrastructure

- Claymore Road Link
- Springhill Drive/University Way Link
- Southern Road Link
- Southern Road Link Upgrade
- Major Transit Station

Geocentric Datum of Australia 1994 (GDA94)

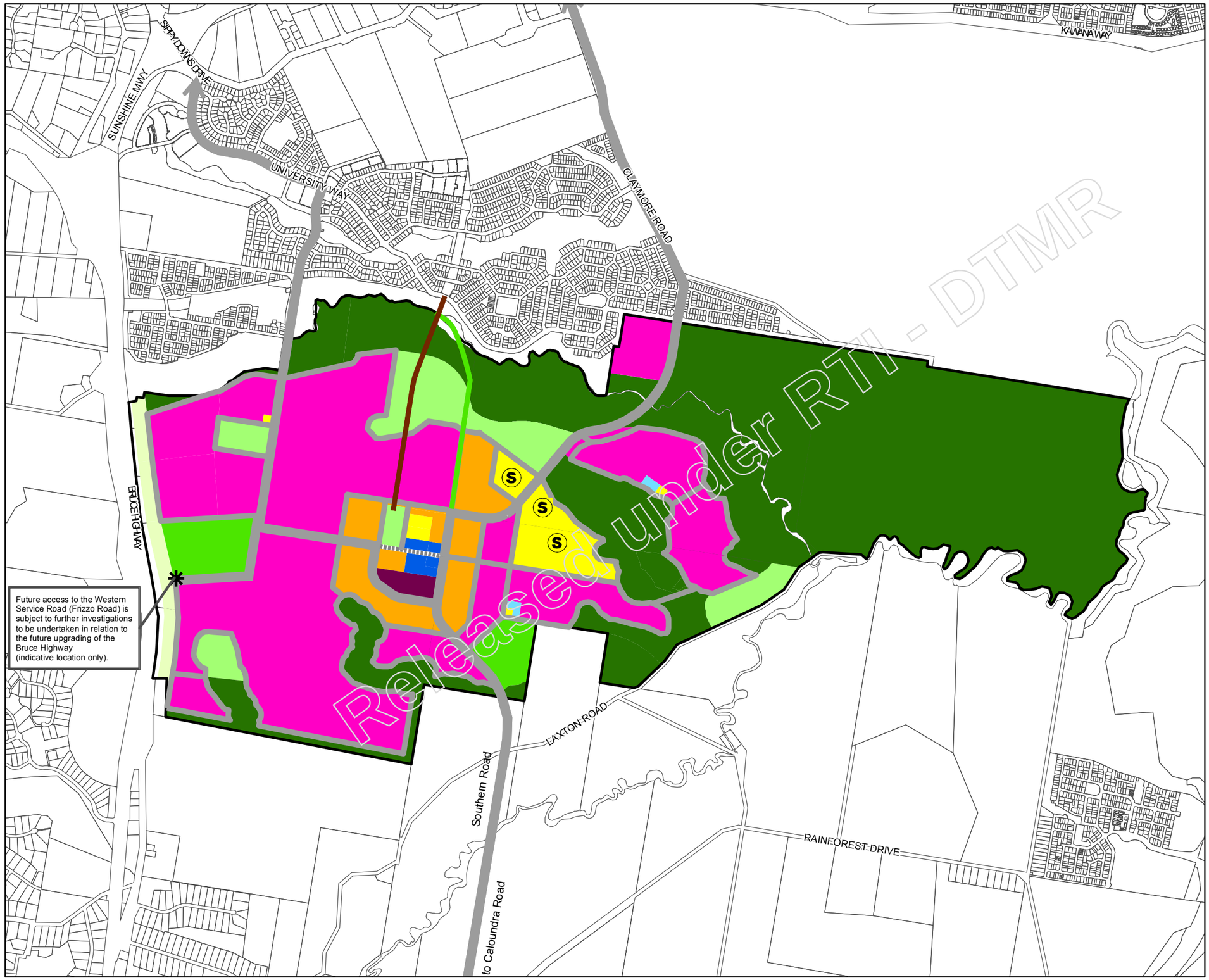
Approx Scale @ A3

0 0.25 0.5 1 1.5
Kilometres

Other Plans Map OPM P7

Sunshine Coast Council

Sunshine Coast **Planning Scheme 2014**
Palmview Master Planned Area



Palmview Master Planned Area Precincts and Sub-precincts

Boundaries

- Palmview Master Planned Area Boundary
- DCDB 29 March 2016 © State Government

Predominant Land Use Areas

Residential

- Mixed Density Residential Precinct
- Medium Density Residential Precinct

Retail and Commercial

- District Activity Centre Precinct
- Local Activity Centre Precinct

Business and Industrial

- Local Employment Area Precinct

Urban Open Space

- Recreation Park Sub-Precinct
- Sports Park Sub-Precinct

Non-urban Open Space

- Environmental protection and Enhancement Sub-precinct
- Landscape Protection and Enhancement Sub-precinct

Community Use

- Community Purpose Precinct (community use)
- S — Community Purpose Precinct (educational establishment)

Major Road Transport Infrastructure

- Major Road
- Neighbourhood/Local Street
- Main Street

Major Public and Active Transport Infrastructure

- Local Public Transport Corridor
- Dedicated Bicycle and Pedestrian Corridor

Geocentric Datum of Australia 1994 (GDA94)

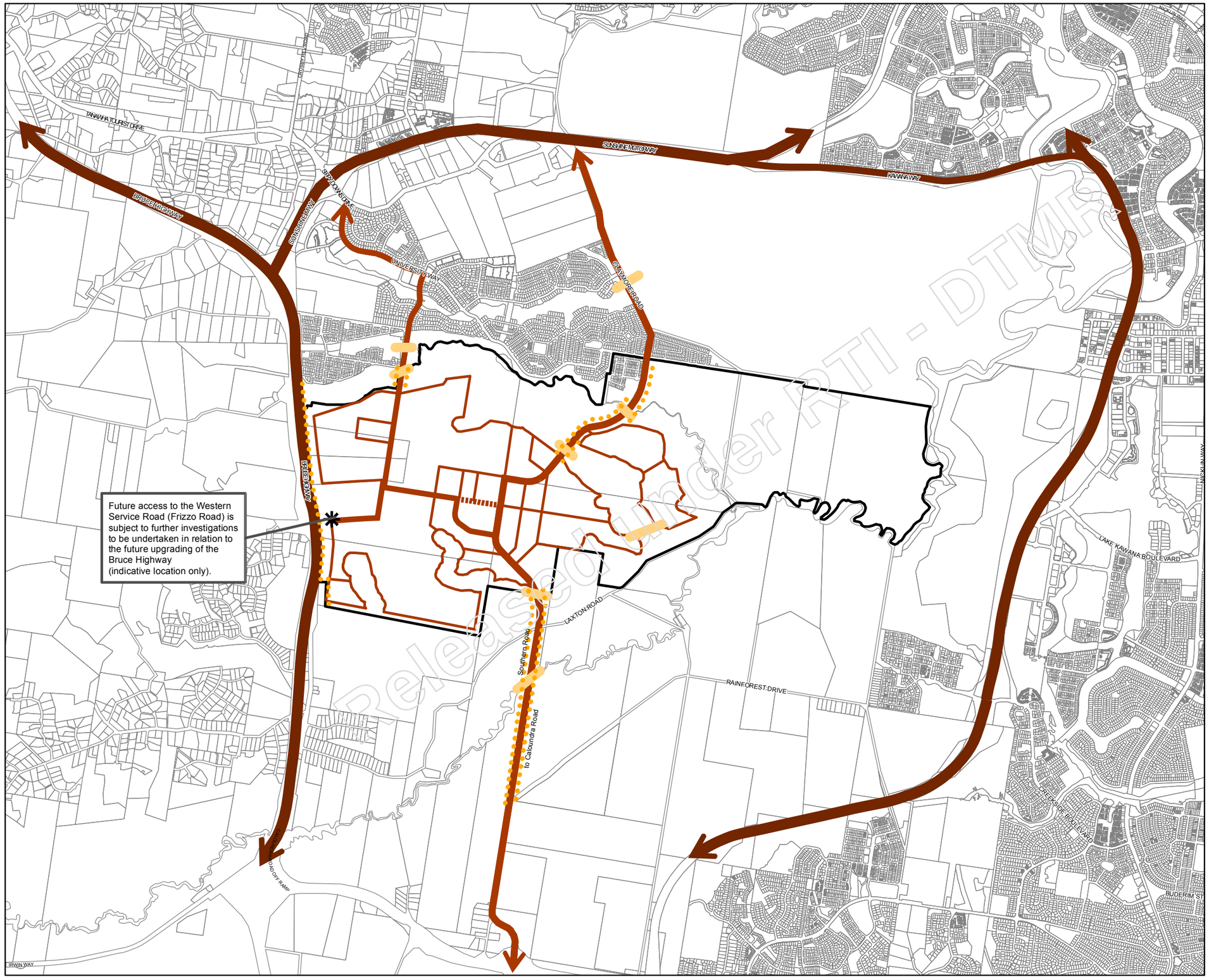
Approx Scale @ A3 1:22,000

0 0.5 1
Kilometres

Other Plans Map OPM P6

Sunshine Coast COUNCIL

Sunshine Coast **Planning Scheme 2014**
Palmview Master Planned Area



Palmview Master Planned Area Road Transport Infrastructure Network

Boundaries

- Palmview Master Planned Area Boundary
- DCDB 29 March 2016 © State Government

Road Transport Infrastructure

- Major Arterial Road
- Arterial Road
- Sub-arterial Road
- District Collector Street
- Neighbourhood/Local Street
- Main Street

Other Transport Infrastructure Elements

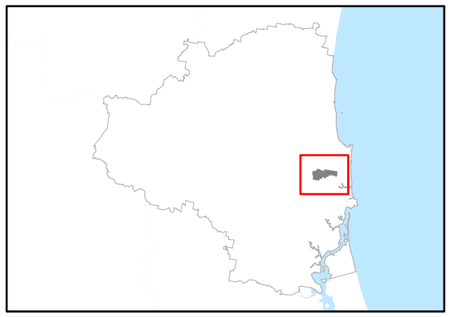
- Fauna Crossing Treatment
- Fauna Fencing

Geocentric Datum of Australia 1994 (GDA94)

Approx Scale @ A3 1:35,000

0 0.5 1 2

Kilometres



Other Plans Map OPM P8

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Preliminary Options Analysis Report

Palmview/Sippy Downs Integrated Link Strategy

DRAFT FINAL

D R A F T

Preliminary Options Analysis Report

Palmview/Sippy Downs Integrated Link Strategy

Client: Department of Transport and Main Roads

ABN: 20 093 846 925

Prepared by

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14-Jun-2017

Job No.: N/R

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

D R A F T

Quality Information

Document Preliminary Options Analysis Report

Ref N/R

Date 14-Jun-2017

Prepared by N/R

Reviewed by

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	23-May-2017	Initial draft for TMR comment	N/R Technical Director	Original signed
B	14-Jun-2017	Final Draft for issue to TMR	N/R Technical Director	Original signed

D R A F T

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Executive Summary

AECOM was commissioned by the Department of Transport and Main Roads (TMR) to undertake a strategic transport planning study to undertake a preliminary options analysis for the Palmview/Sippy Downs Integrated Link Strategy ("the study"). The study was initiated by TMR in response to forecast significant growth in urban development and transport demand at the Palmview Master Plan area and at Sippy Downs and the associated trip demands to the Maroochydore City Centre, Kawana Town Centre and Sunshine Coast Public University Hospital at Kawana.

The main objectives of the study included:

- Review of link upgrade requirements in the study area, particularly appropriate strategic staging of link improvements for north-south and east-west road capacity between Palmview/Sippy Downs and Caloundra/Kawana/ Mooloolaba.
- Conduct appropriate analysis (engineering, modelling, environmental assessment, costing, etc.) to determine preferred corridor alignments and preferred east-west (E-W) link upgrades.

The identification of options commenced with five high level connections that were identified as part of the project brief which sought to address future potential transport needs of the Palmview area. These initial high level connections linked the future Palmview urban area with the Bruce Highway to the west, the Sunshine Motorway to the north, Caloundra Road to the south and Kawana Waters to the east. The high level connections comprised:

1. A link to better utilise Pignata Road access to the Bruce Highway Western Service Road
2. A southern link to Caloundra Road/Racecourse Road interchange
3. A southeast connection between Sippy Downs and southern Kawana
4. An east-west connection between Sippy Downs and central Kawana
5. A link to better utilise Claymore Road (including connecting to the Sunshine Motorway).

This initial list of five high level connections was reduced to three connections following discussions with TMR stakeholders and a review of transport modelling for 2031 and 2041 planning horizons across the southern Sunshine Coast network. The traffic modelling showed that both a Pignata Road connection to the western service road of the Bruce Highway and a Southern Road Link to Caloundra Road (the initial planned two lane road) would be needed as a minimum to cater for expected future trip demands from Palmview. An upgrade of the Southern Road Link to four lanes is not considered necessary based on the outputs provided by TMR North Coast's VISUM modelling.

The remaining three high level connections to the north, east and south-east formed the basis for the development of a total of 10 alternative E-W Link alignment options across the Mooloolah River floodplain, connecting the future urban area of Palmview/Sippy Downs with the Kawana area.

A comprehensive options evaluation for the multi-criteria assessment of the 10 options was undertaken. A desktop constraints analysis covering geotechnical, major utilities, fauna, flora, land use, designated sites, tenure, cultural heritage and flood depth assisted in the assessment of these options. TMR provided VISUM traffic modelling outputs to support the options selection. Sunshine Coast Council was consulted throughout the project and Council feedback informed the preferred option selection and refinement.

Deliberation

Deliberation Concept drawings were prepared to a level sufficient for the purpose of strategic cost estimation (i.e. category 1 estimates as per TMR's Project Cost Estimating Manual, sixth edition, 2015).

N/R

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Deliberation & Commercial

It is recommended TMR consider whether to proceed with planning for the preferred E-W Link alignment given the complexity of the environmental and heritage impacts and the very high potential capital cost. In light of this, the potential benefit of this link will need to be confirmed through TMR North Coast VISUM modelling. Should TMR decide to proceed with planning for the E-W Link, the identified preferred alignment would need to be designated as a future state transport corridor. This requires progressing planning of the corridor from a current Category A (unprotected planning) through to Category B (planning in progress) to a Category C (protected planning) where a future transport corridor or land requirement is identified and gazetted under appropriate legislative processes. This would involve refinement of the concept design options, assessment under the *Sustainable Planning Act 2009* and public consultation activities. As the corridor traverses significant environmental areas, assessment of the corridor under Commonwealth legislation (e.g. EPBC Act, environmental offsets) may also be required. It is recommended a public consultation plan is prepared to address the political and community risks associated with the final preferred E-W Link alignment. Previous consideration of an E-W link by Council ('Greenlink') encountered significant community concerns and the Greenlink was abandoned.

N/R

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1.0 Introduction

AECOM was commissioned by the Department of Transport and Main Roads (TMR) to undertake a preliminary options analysis of potential E-W alignments linking the emerging communities at Palmview/Sippy Downs with Kawana Waters. The outcomes of this study will form an important input into TMR's development of a future Palmview/Sippy Downs Integrated Route/Link Strategy.

1.1 Purpose of this study

1.1.1 Reasons for this study

Significant growth in development and transport demand are forecast for the Southern Sunshine Coast area with the first stage of the Sunshine Coast Public University Hospital completed in April 2017 (and additional development planned between now and 2021), additional development of the Kawana Town Centre, as well as the Caloundra South development of 50,000 residents and 20,000 jobs further south over the next twenty years. The University of the Sunshine Coast continues rapid expansion with current full time equivalent students totalling more than 10,000. Significant growth is also planned in the Palmview Master Plan area and at Sippy Downs, as well as planned development of the Maroochydore City Centre Project which is anticipated to become the new Principal Activity Centre for the Sunshine Coast.

The existing road network is inadequate to support this forecast urban growth and corridor planning as well as investment decisions need to be made to provide a balance of new transport links and existing transport network upgrades. With this forecast growth it is vital that these areas are connected via safe, efficient and sustainable transport links to support existing strategic transport networks and to ensure adequate planning is conducted to identify appropriate future link upgrades and associated corridor preservation to meet future demand.

The outcomes of this study will assist in quantification and prioritisation of these needs particularly for the required access arrangements for Palmview and Sippy Downs (and progressing the Palmview Infrastructure Agreement) and improving corridor planning in the Southern Sunshine Coast area.

1.1.2 Objectives of this study

Objectives for the study include:

- Review link upgrade requirements in the study area, particularly appropriate strategic staging of link improvements for north-south and east-west road capacity between Palmview/Sippy Downs and Caloundra/Kawana/Mooloolaba.
- Inform TMR's view on infrastructure priorities in relation to the Palmview Infrastructure Agreement (including a decision regarding proposed upgrading the future Southern Road link from two lanes to 4 lanes or investing in a new east-west link between Sippy Downs/Palmview and Kawana).
- Review the previous study conducted (by ARUP) for the Sunshine Coast Council which focused on a "Green" link (transit/cycle way only) in the area, but which concluded such a link would not provide sufficient benefit in that form. This study will need to investigate a general traffic link with provisions for high quality transit and pedestrian/cycle facilities (not a limited "Greenlink" only).
- Address required upgrades and impacts to existing Council controlled roads (for example Claymore Road, Pignata Road, Main Drive, Lake Kawana Boulevard) as well as impacts to state controlled roads (such as Sunshine Motorway and Caloundra Road).
- Conduct appropriate desktop analysis (engineering, environmental assessment, costing etc.) to determine preferred corridor alignments and preferred upgrades.

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1.2 Study parameters

1.2.1 Study area

The boundary of the study area is defined by the light blue box marked on Figure 1-1 below. The study area incorporates the Sunshine Motorway in the north, inclusive of the Sippy Downs Drive/Dixon Road/Claymore Road and Kawana Way interchanges, and Caloundra Road in the south, inclusive of intersections with Racecourse Road and Kawana Way/Bells Creek Arterial. The western extent of the study area includes the Bruce Highway Western Service Road, but not the Bruce Highway. The eastern portion of the study area includes Kawana Way, and intersections with east-west collector roads such as Main Drive and Lake Kawana Boulevard, but does not include Nicklin Way.

The study area incorporates the following key urban and natural features:

- Sippy Downs and the University of the Sunshine Coast
- Palmview master planned area
- Mooloolah River floodplain and Mooloolah River National Park
- Kawana Waters including the Sunshine Coast University Hospital precinct.

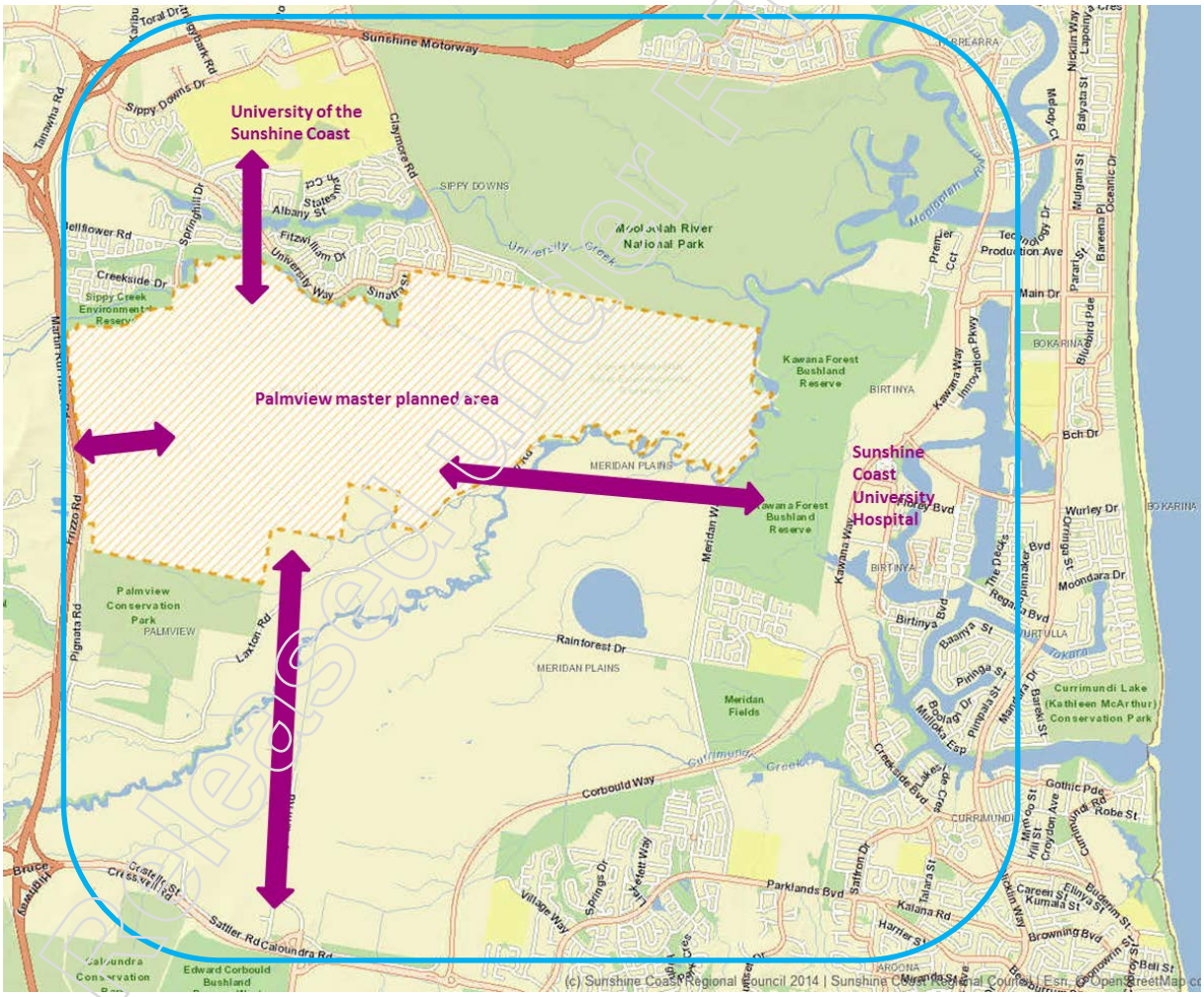

Figure 1-1 Study area and potential transport links (background image source: Sunshine Coast Council, MyMap)

1.2.2 In scope

The scope of the study includes:

- Review of previous relevant planning
- Review and identification of network hierarchy for proposed links
- Outline role and function for the link(s)
- Review of land use plans
- Planning horizon for 2041
- Options development
- Desktop environmental opportunities and constraints assessment
- Multi-criteria analysis for option comparison and preferred option selection
- Corridor preferred alignment
- Engineering concept design
- Typical cross sections
- Strategic cost estimates
- Public utilities analysis (preliminary)
- Land requirements for infrastructure
- Identification and prioritisation of investment needs and corridor protection
- Recommendations for subsequent link planning and/or preliminary options analysis, including potential implementation issues
- Recommendations for further investigations.

1.2.3 Out of scope

The study scope excludes the following:

- Traffic modelling and reporting for local area, link and intersection assessments (traffic modelling was conducted by TMR North Coast staff)
- Economic and financial analysis
- Field investigations
- Detailed design and P50/P90 costing
- Community consultation
- Detailed public transport service planning
- Property resumptions
- Detailed environmental assessment
- Detailed geotechnical investigations and analysis
- Detailed cultural heritage assessment
- Detailed hydraulic modelling and assessment
- Detailed survey.

1.2.4 Methodology

The study methodology is illustrated in Figure 1-2.

As transport modelling and analysis was outside the remit of the AECOM project team (traffic modelling was conducted by TMR North Coast staff), the study focused primarily on:

- Establishing the existing planning and land use context comprising the existing and proposed urban expansion at Palmview and Kawana Waters.
- Identifying existing environmental, flooding and cultural heritage constraints.
- Developing potential alignment options at concept level of a transport corridor across the Mooloolah River floodplain and upgrade options of the Sunshine Motorway between Dixon Road and Kawana Way.
- Applying a two stage multi-criteria assessment including consultation with Sunshine Coast Council to arrive at a preferred corridor alignment for future corridor preservation.

Note: Information and interpretation in relation to existing and future traffic and transport analysis and demand is being prepared in a separate report by the TMR North Coast modelling team.

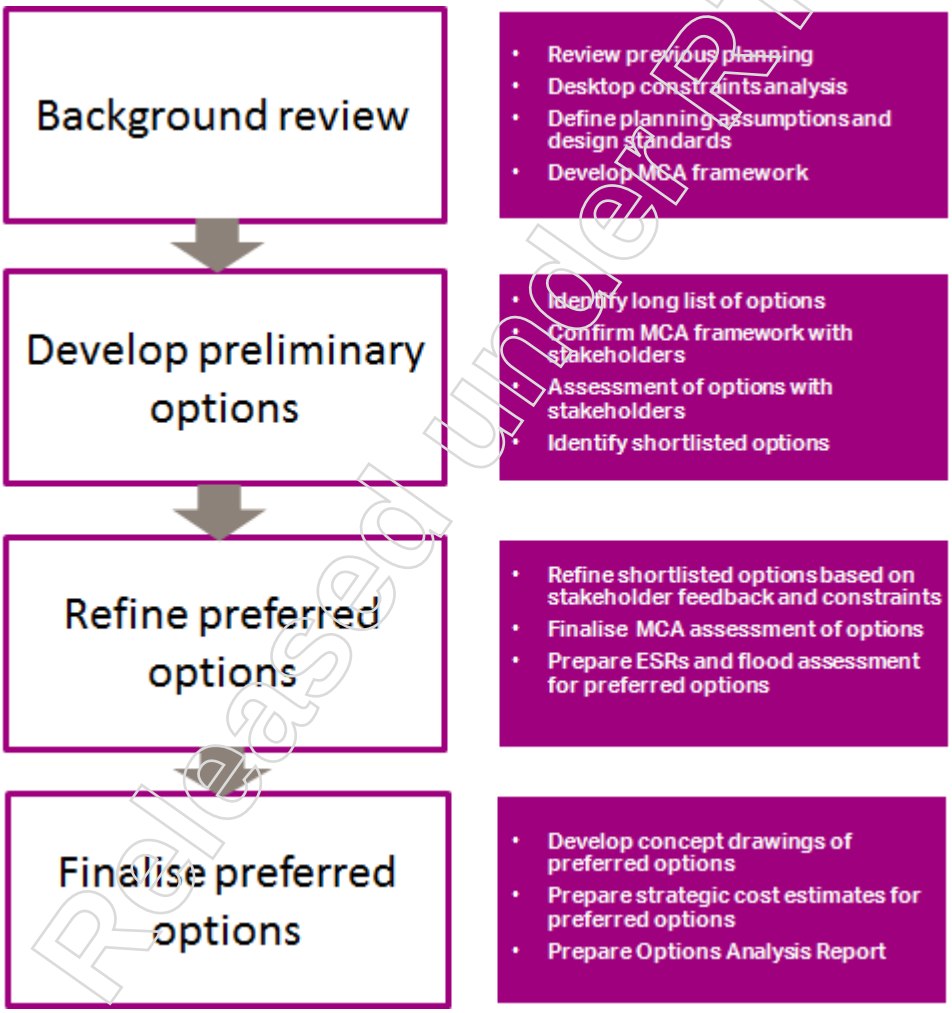

Figure 1-2 Study methodology

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2.0 Strategic context

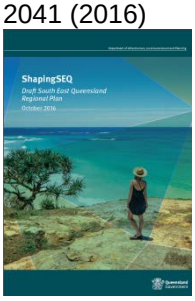
This section identifies the key plans, strategies and projects which have directly influenced the preparation of this study.

2.1 Land use

2.1.1 Plans, strategies and policies

The following table summarises the land use strategies and plans of relevance to this study.

Table 2-1 Relevant land use plans and strategies

Strategy/plan	Relevance to link strategy
Draft Shaping SEQ – South East Queensland Regional Plan 2017 – 2041 (2016) 	The Draft Shaping SEQ is the Queensland Government's new regional planning framework for South East Queensland and is expected to be finalised by mid-2017. The new Regional Plan envisages an additional 207,500 residents on the Sunshine Coast by 2041, taking the population of the Sunshine Coast to close to half a million people. The study area for the link strategy comprises the two major regional activity centres at Kawana and Sippy Downs which are also designated by the Regional Plan as the areas of future regional economic significance on the Sunshine Coast – the University of the Sunshine Coast campus at Sippy Downs and the town centre and adjacent Sunshine Coast University Hospital at Kawana. Future passenger transport trunk services are envisaged by the Regional Plan to link Kawana and Sippy Downs and passenger trunk corridors will provide connections to Maroochydore and Caloundra. **Palmview is identified in the Regional Plan as one of three new Greenfield communities on the Sunshine Coast** (the other two being Caloundra South and Beerwah East (an investigation area)) and is expected to accommodate about 16,000 residents in 7,000 dwellings.
Palmview Structure Plan 2014 and Amendments (2016)	The Sunshine Coast Planning Scheme 2014 was amended in April 2016 to include an updated Palmview structure plan and associated planning documents following a public consultation period and Queensland Government review. The structure plan aligns with the Infrastructure Agreement signed by Sunshine Coast Council with the three land owners at Palmview. The Palmview Structure Plan defines major transport elements of the master planned area that are required to be provided sequentially as follows: • Claymore Road Link – this link is provided before any development is carried out in Palmview • Southern Road Link – this link is provided before the earlier of the following: – the traffic volumes using Claymore Road (measured immediately south of the Sippy Creek crossing) exceed 22,000 vehicle movements per business day over a continuous 30 day period; or – A development approval for the development of the 4,000th Equivalent Dwelling in the Palmview Master Planned Area.

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Strategy/plan	Relevance to link strategy
	• Springhill Drive/University Way Link – This link is provided: – After the provision of Claymore Road Link and Southern Road Link, and – Before development approval for the development of the 5,000th equivalent dwelling in the Palmview Master Planned Area • Southern Road Link Upgrade or Alternative Road Transport Infrastructure – this link is provided before a development approval for the development of the 6,500th Equivalent Dwelling in the Palmview Master Planned Area. • Western Service Road Access via Pignata Road – the local road network in Area A (which comprises a District Activity Centre precinct, i.e. the future Palmview town centre) is to be planned to accommodate a future district collector street to the Western Service Road of the Bruce Highway. **Identification of a potential Alternative Road Transport Infrastructure corridor instead of a Southern Road Link Upgrade is the subject of this study.** A set of relevant structure plan maps is provided in **Appendix A**.
Kawana Waters Development Control Plan 1 (DCP), gazetted 2011, amended 2013	The DCP for Kawana Waters gives effect to the Kawana Waters Development Agreement and identifies preferred land uses and planning guidelines to be applied to the DCP area and its detailed planning areas. It includes an Infrastructure Agreement with respect to the regional hospital land. Key features contained in the DCP that are relevant to the link strategy include: • Kawana Way corridor as a future multi-modal transport corridor including a potential interchange at Lake Kawana Boulevard • Future public transport corridor along Lake Kawana Boulevard linking the Sunshine Coast University Hospital with Nicklin Way • Transit precinct adjacent to the hospital and Lake Kawana Boulevard/ Kawana Way interchange • Future open space for mixed recreational uses to the west of Kawana Way up to the edge of the Mooloolah River (referred to as DPA4). The Master Plan for the Kawana Waters DCP area consists of a Structure Plan and a set of Detailed Planning Area Plans, Neighbourhood Plans, Precinct Plans and Site Development Plans.

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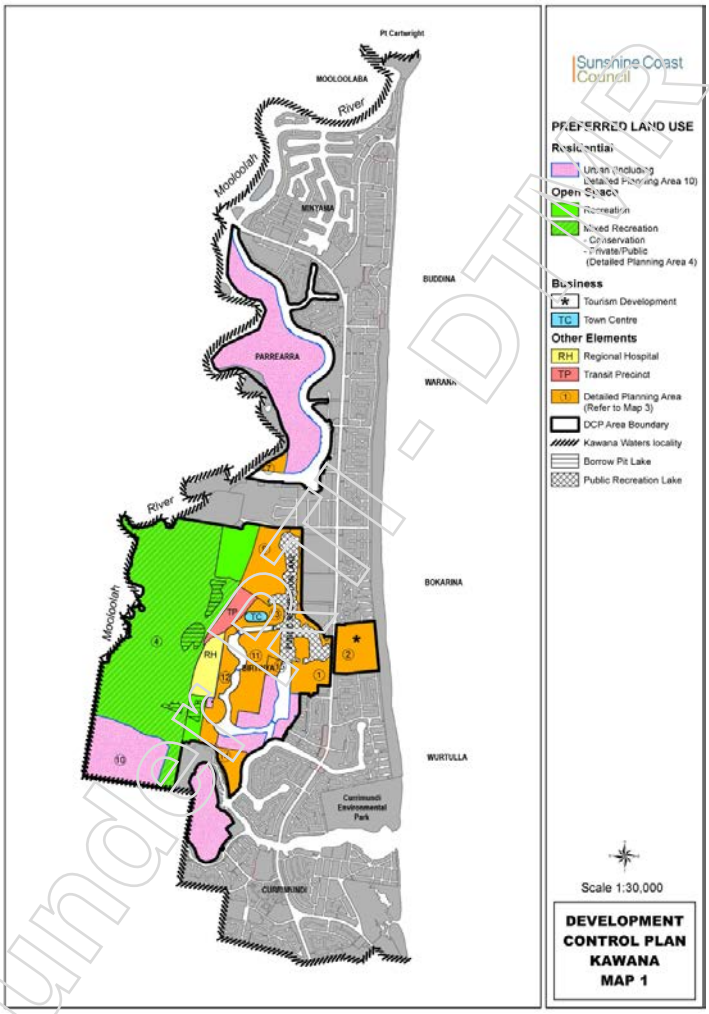
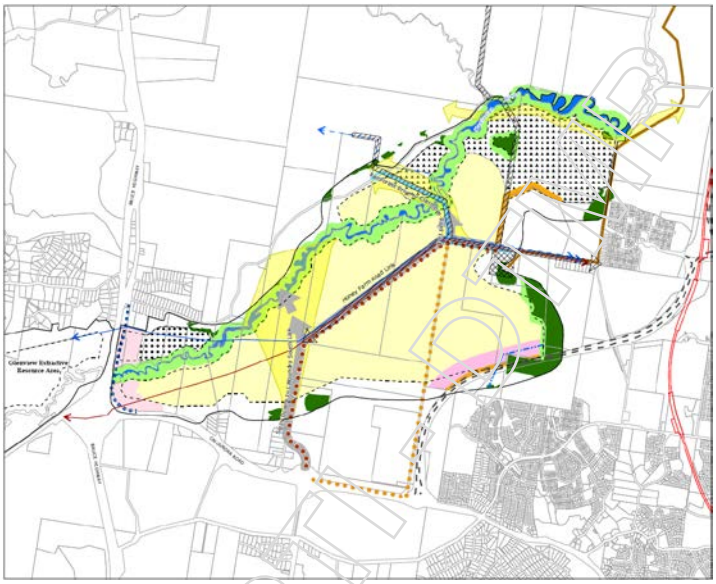
Strategy/plan	Relevance to link strategy
	
Meridan Plains Extractive Resource Area (ERA) Master Plan, 2014	The Meridan Plains ERA is located within the Mooloolah River floodplain to the east of the Bruce Highway and south of the Palmview master planned area. Access to the resource area is envisaged through the future Southern Road Link and Honey Farm Road Link. The Meridan Plains ERA is identified as a Key Resource Area (KRA 49) for the extraction of fine to coarse-grained sand under the State Planning Policy 2016 and associated Guideline. The Draft South East Queensland Regional Plan (Shaping SEQ) also identifies and protects the Mooloolah River floodplain for extractive resources.

Strategy/plan	Relevance to link strategy
	

2.1.2 Projects

The following table summarises the land use projects that will have a transport impact on the study area and are therefore relevant to this study.

Table 2-2 Relevant land use projects

Project	Relevance to link strategy
Sunshine Coast University Hospital (SCUH)	The SCUH opened in April 2017 and is located on a 20 hectare site on Kawana Way at Birtinya which is being transformed by the Queensland Government into the $1.8 billion Sunshine Coast Health Campus with the SCUH at its centre. The hospital opened with approximately 450 beds with the remaining capacity expected to be commissioned by 2020/21 which will see all 738 beds utilised. The hospital has been planned to allow further expansion up to a total of 900 beds. The Kawana Health Campus will incorporate the hospital's Skills, Academic and Research Centre (SARC), the co-located Sunshine Coast University Private Hospital and opportunities for health-related commercial developments. Around 3,500 staff are employed in the new public hospital and about 6,000 staff will be required at the facility by 2021. The site includes 3,500 car parking spaces on the Kawana Health Campus and access to the future Kawana Transit precinct.
Expansion of the Sunshine Coast University campus at Sippy Downs	The university has recently been expanding its Sippy Downs campus to be able to accommodate an anticipated increase of students from 12,500 in 2016 to a total of 20,000 students by 2020.
Oceanside Kawana	Oceanside Kawana is the new name for the central Kawana area that is planned to transform into an estimated $5 billion world-class destination for the Sunshine Coast. The new regional identity will encompass around 100 hectares of land in the heart of the coast, taking in Birtinya, Bokarina

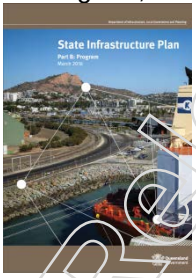
Project	Relevance to link strategy
	Beach and the future town centre and commercial precinct. At the heart of Oceanside Kawana will be the Kawana Health Campus. Its creation will feature one of the largest infrastructure projects ever undertaken on the coast with new roads, bridges, parks and services on a massive scale. The total economic benefit during the development of Oceanside is forecast to top $5.3 billion over the next 15 years and generate more than 3000 jobs per annum during the development phase. On completion, the new heart of the Sunshine Coast is expected to create approximately 12,000 ongoing jobs and contribute $828 million annually to the local and state economy. 

2.2 Transport

2.2.1 Plans, strategies and policies

The following table summarises the transport strategies and plans of relevance to this study.

Table 2-3 Relevant transport planning strategies and plans

Strategy/plan	Relevance to link strategy
State Infrastructure Plan (SIP) Part B: Program, 2016 	The SIP identifies the Queensland Government's infrastructure priorities by setting the strategic direction and planning the delivery of infrastructure to meet anticipated service needs and infrastructure investment opportunities. The SIP is underpinned by an infrastructure program that is informed by Building Queensland and supported through an initial $500m state infrastructure investment. The SIP contains immediate and longer term projects and initiatives that were raised by stakeholders through consultation. Proposals relevant to the link strategy include: • Bruce Highway six laning – Caloundra Road to Sunshine Motorway • Improved transport connections to the Sunshine Coast University Hospital • Sunshine Motorway and the Mooloolah River Interchange • Sunshine Coast light rail project.

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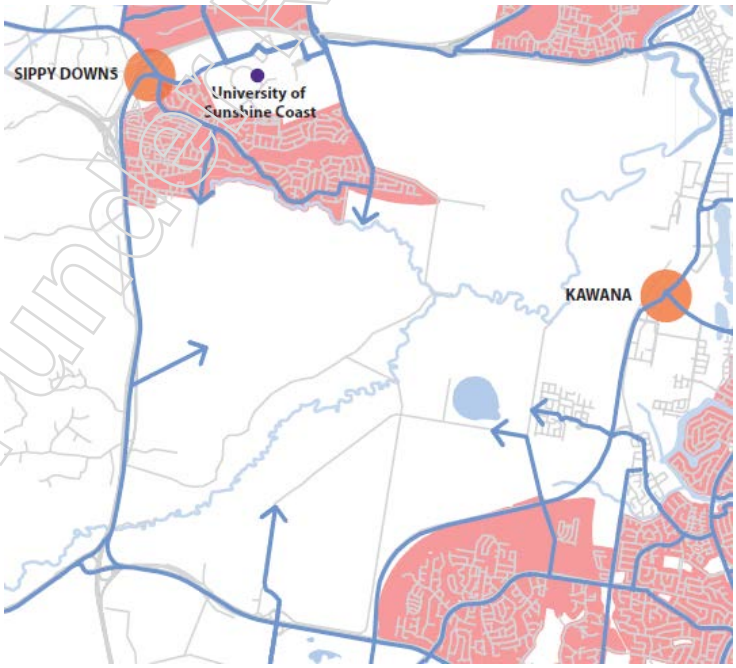
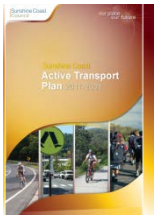
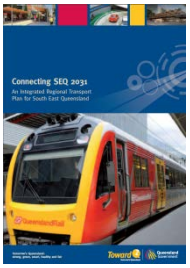
Strategy/plan	Relevance to link strategy
South East Queensland Principal Cycle Network Plan, 2016 	The SEQPCNP provides a vision for the principal cycle network in the region to support, guide, and inform practitioners involved in the planning, design, and construction of the region's transport network. The principal cycle routes represent cycling desire lines. These indicate the most important routes and known missing links for cycling within the study area. In most instances, further planning and design will be required to determine the precise route and design of cycle facilities. The routes shown for the Palmview/Sippy Downs area are designated as future principal cycle routes (shown in the figure below) and include: • Bruce Highway • Sunshine Motorway • Dixon Road/Claymore Road • Kawana Way from Sunshine Motorway to Caloundra Road • Caloundra Road • Future links into Palmview. 
Sunshine Coast Sustainable Transport Strategy 2011 – 2031, 2014 version 	Council adopted the Sunshine Coast Sustainable Transport Strategy 2011-2031 working towards a sustainable, efficient, integrated and safe transport system for the Sunshine Coast. This strategy was refreshed in August 2014 replacing the 2010 version to reflect the new Sunshine Coast local government area whilst maintaining the approved policy content. Of relevance to the link strategy: • Outlines how Council will deliver a sustainable transport system – increasing the number of trips made by public transport and active transport (for example cycling and walking) • Explains how a transport system for the Sunshine Coast will be designed and managed into the future.

Strategy/plan	Relevance to link strategy
Sunshine Coast Active Transport Plan 2011 – 2031 	The Sunshine Coast Active Transport Plan 2011 – 2031 sets out the strategic planning for walking and cycling on the Sunshine Coast. The Plan will ensure that planning for active transport is current, consistent and coordinated. The active transport networks consist of all pathways, footpaths and on-road cycling facilities. The Sunshine Coast is recognised as an active transport friendly place where people of all ages walk and cycle for enjoyment and transport. Our community recognises and values our safe, high quality connected networks, which improve our lifestyle, health and sustainability. This document refers to future cycle facilities developed as part of the Palmview Structure Plan. The structure plan identifies Claymore Road as the major cycle connection to/from the Palmview area and a new dedicated bicycle and pedestrian corridor linking Palmview town centre with the existing suburb of Sippy Downs.
Draft Connecting SEQ 2031 – an Integrated Regional Transport Plan for South East Queensland – Consultation Draft, 2011 	Draft CSEQ 2031 was the Queensland Government's proposed long-term transport plan to develop a 20 year sustainable transport system in SEQ. Its purpose was to provide a coherent guide to all levels of government in making transport policy and investment decisions. Key targets include increasing mode share of active transport and public transport by reducing reliance on the private motor vehicles. The plan identifies that Sippy Downs will function as a district hub for ICT business, university and enterprise area that together will accommodate 20,000 jobs and 15,000 students. Key projects identified in the plan directly or indirectly impacting on the project include: • New road corridor linking Sippy Downs with Caloundra South • In the long term, a future high-frequency bus route linking Sippy Downs with Palmview and Caloundra South; implementation would be subject to further detailed land use planning in partnership with local government.

2.2.2 Projects

The following table summarises the transport projects that will have a transport impact on the study area and are therefore relevant to this study.

Table 2-4 Relevant transport projects

Project	Relevance to link strategy
Bruce Highway Upgrade – Caloundra Road to Sunshine Motorway Upgrade Project (280/10A/1)	The project involves upgrading the Bruce Highway to six lanes between Caloundra Road and the Sunshine Motorway. This includes major upgrades to both interchanges and the delivery of a two way service road for local traffic on the western side of the highway between Steve Irwin Way/Caloundra Road and Tanawha Tourist Drive. A direct access from the western service road to Palmview will be provided at Pignata Road. A revised southbound exit from the Bruce Highway to Pignata Road will also be provided. The new exit ramp will meet current design standards and provide a safe and direct access to local businesses and residences, as well as a future connection to the Harmony development in Palmview. The works also include the removal of existing on street parking from both sides of Pignata Road and the provision of a new car pool facility with 240 parking spaces off Pignata Road. The Bruce Highway upgrade also includes provision of a direct access to the Sippy Downs interchange from the western service road for local traffic. This will allow separation of local trips from longer distance trips originating or ending in Sippy Downs and improve access and safety for local traffic to/from Sippy Downs and Palmview.
Sunshine Coast Light Rail	The focus of the light rail project is the provision of reliable, frequent and affordable public transport services, but brings with it a range of other positive spin-offs that will enhance our community connections, business activity, lifestyle and the environment. Sunshine Coast Council identified Light Rail as a desirable future mode of transport to further improve connectivity between the key development precincts of Caloundra, Kawana, Mooloolaba and Maroochydore. The preferred route follows Nicklin Way and diverts to the Sunshine Coast University Hospital and along Kawana Way to Metier Linkway/Main Drive. Council is working towards the delivery of light rail on the Sunshine Coast by 2025, subject to approval and funding. A 'Route Planning and Impact Assessment Report' (Project Phase 2A) was completed in 2013 and short-listed route options. In mid-2015, after extensive community consultation, an alignment for the light rail corridor, between Maroochydore to Caloundra, was endorsed for further investigation. The project is currently in early options development stage.
Sunshine Motorway 4 Laning – Kawana Way to Mooloolah River Interchange, (Mooloolah River Interchange Project)	This project consists of the upgrade of the Sunshine Motorway between Kawana Way and the Mooloolah River Interchange to four lanes including ramp reconfigurations (as part of the Mooloolah River Interchange (MRI) project).
Sunshine Coast University Hospital access improvements	This project provides a Q100 access to the Sunshine Coast University Hospital which was a recommendation of the Preliminary Evaluation to secure a flood-immune access to the hospital from the south. The concept includes provision of traffic signals at the intersection of Kawana Way and Woodlands

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Project	Relevance to link strategy
	Boulevard, a two lane crossing of Currimundi Creek North and a two lane connector to Kawana Way.
Sunshine Motorway (Tanawha – Mooloolaba) Western Interchange Upgrade (280/150A/900)	An outcome of this planning study was the installation in October 2016 of electronic Variable Speed Limit (VSL) signs operating on the eastbound lanes of the Sunshine Motorway between Tanawha Tourist Drive and Kawana Way to improve road safety.
Kawana Arterial (Woodlands Boulevard to the Mooloolah River Interchange) (R07/R002/904)	The project comprises the upgrade of Kawana Way to a four lane, limited access arterial road and Kawana town centre bypass, integrated with the Sunshine Coast University Hospital development.
Mooloolah River Interchange (MRI) Upgrade	The MRI is a section of a new north-south corridor (Multi-Modal Corridor, MMTC) connecting Caloundra, Kawana, Mooloolaba and Maroochydore. It is located at the Sunshine Motorway connection with Brisbane Road and Nicklin Way at Mountain Creek and Mooloolaba. The project includes a new direct connection to the Sunshine Coast University Hospital precinct via a new, land based, two lane Kawana Arterial connecting Kawana Way at Parrearra and crossing the Mooloolah River to the upgraded Mooloolah River interchange. The project will also provide a new direct connection for northbound traffic from Nicklin Way to Brisbane Road and Mooloolaba, and will upgrade the east-west section of the Sunshine Motorway from two to four lanes between Kawana Way interchange and the upgraded Mooloolah River interchange. This project is currently not funded.
CoastConnect – Caloundra to Maroochydore	CoastConnect was undertaking by TMR to increase options for sustainable travel on the Sunshine Coast through a priority bus spine from Caloundra to Maroochydore, including bus priority lanes, on-road cycle lanes, bus station in key activity centres and various other bus related upgrades. This includes a bus priority “spine” to the Sunshine Coast University Hospital using Main Drive and Lake Kawana Boulevard. The Concept Design and Impact Management Plan (CDIMP) was completed in 2011 after community consultation and contains an analysis of the project’s anticipated benefits and impacts, including details on how potential impacts can be mitigated in future detailed design and construction phases. The CoastConnect project was initially proposed as a secondary north-south project to further enhance the Sunshine Coast Multi-Modal Transport Corridor. The lack of funding for the delivery of the Sunshine Coast MMTC project has increased the need for the delivery of the Nicklin Way component of CoastConnect. Future transport connections from the Palmview masterplanned area need to take into consideration and be compatible with the CoastConnect bus priority improvements along Main Drive and Lake Kawana Boulevard.
East – West GreenLink, Palmview to Kawana Feasibility Study, 2011	Sunshine Coast Council undertook this investigation to determine the route feasibility of an East-West Greenlink, and to identify a preferred outcome for a possible public and active transport connection.

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Project	Relevance to link strategy
	The project identified a preferred option for the East-West Greenlink. This preferred option runs from the southern extent of the Palmview masterplanned area across Laxton Road and the Mooloolah River to Rainforest Drive and continuing via Red Cedar Drive to Woodlands Boulevard. The preferred option was subsequently endorsed by Council and included in Council's planning documents as a future 40m wide corridor. Due to concerns raised by local residents and developers, the preferred Greenlink option was removed by Council from the Palmview Structure Plan in 2015. The Council wrote to local community groups stating that the State government, in conjunction with Council would be investigating an alternative to the subsequent upgrading of the Southern Road link from 2 to 4 lanes. Options for this alternative alignment include access to the future Western Service Road along the Bruce Highway via Pignata Road, or a possible connection onto Corbould Way. This study aims to address the preferred option(s) for a future east-west link.
Multi-Modal Transport Corridor (MMTC), 2011	The Multi-Modal Transport Corridor (MMTC) is a future preserved transport corridor from Caloundra Road to the Sunshine Motorway connecting Caloundra, Kawana, Mooloolaba and Maroochydore. The corridor allows for the provision of a motorway standard road along the existing Kawana Way between Caloundra – Mooloolaba Road and the Mooloolah River Interchange, and extension of a new passenger rail line and stations between Caloundra South and Maroochy Boulevard. Delivery of the MMTC is planned in stages, consisting of the following components: • Initial two lane arterial road and future upgrade to four lane motorway standard (Kawana Arterial Project – KAP) • Caboolture to Maroochydore passenger rail line (CAMCOS) • Mooloolah River Interchange (MRI). The initial stage was opened to traffic in 2009 and consisted of a two lane arterial road, from Caloundra Road to Creekside Boulevard and the Kawana Way extension from Creekside Boulevard to the Kawana Town Centre including temporary intersections with the local network at Creekside Boulevard. The arterial road acts as a bypass for Caloundra. The project's subsequent stages are currently not funded.
Caboolture to Maroochydore Corridor Study (CAMCOS), 2001	The Caboolture to Maroochydore Corridor Study proposed a passenger rail service branching off the North Coast railway line at Beerwah and extending through Caloundra to Maroochydore. The study investigated the feasibility, preferred development, impacts and benefits of a new public transportation corridor between Beerwah and the Sunshine Coast Airport. The Queensland Government agreed to implement the recommendations from the Caboolture to Maroochydore Study, including the need to protect the preferred future public transport corridor from Beerwah to Maroochydore and on to the Sunshine

Project	Relevance to link strategy
	Coast Airport. Since then, the government has been actively acquiring land for the corridor. Track upgrading and duplication of the North Coast line from Caboolture to Beerburrum was completed in 2009, as was the elimination of the open level crossing at Beerwah, ultimately providing for the branching off of the new line to Caloundra and Maroochydore.

2.3 Major programs

2.3.1 Queensland Transport and Roads Investment Program

The Queensland Transport and Roads Investment Program (QTRIP) is a four year rolling infrastructure program that is a critical enabler for an integrated transport network that connects all communities across the state, while ensuring our infrastructure is sustainable and reflects economic and community demands. QTRIP outlines approximated billion of works over the next four years across local, state and national transport networks.

The following projects with funding allocated in the QTRIP 2016-17 to 2019-20 are relevant to the study scope:

- Commence improvements at various intersections from Kawana Way to Nicklin Way, near the Sunshine Coast University Hospital
- Widen to six lanes – Bruce Highway (Caloundra Road to Sunshine Motorway) (280/10A/1)
- Undertake transport planning – Major development projects – North Coast District planning (D07/D002/901).

2.3.2 Sunshine Coast Council Priority Infrastructure Plan

The Priority Infrastructure Plan (PIP) outlines the provision of trunk infrastructure by Sunshine Coast Council to integrate with planned urban development. The PIP includes planning assumptions (for population and employment), defines the priority infrastructure areas, desired standards of service and plans for trunk infrastructure. The planning horizon for trunk infrastructure is 2031 and infrastructure requirements beyond 2031 are also identified in the schedule but not in maps.

Relevant future trunk road infrastructure for the study area as identified in the PIP is listed in Table 2-5.

Table 2-5 Sunshine Coast Council trunk road network schedule of works

Item ID	Primary road name	Secondary road details	Description	Estimated time frame
R-00-001	Palmview Southern Link	Caloundra Road to Palmview southern boundary	Construct two lanes (Palmview IA fully funded)	2021-2026
R-20-004	MMTC service road	Meridan Way – Creekside interchange	New link	2026-2031
R-22-001	Sippy Downs Drive	Motorway interchange to University Way	Upgrade to 4 lanes	2016-2021
R-22-009	Claymore Road	University Way to Dixon Road	Duplication northern end and intersection upgrades (Palmview IA fully funded)	2013-2021
R-00-002	Palmview Southern Link	Caloundra Road to Palmview southern boundary	Construct two additional lanes (Palmview IA fully funded)	Post 2031

The infrastructure for the Palmview Declared Master Plan Area in the Palmview Structure Plan is outside the PIP and defined in the Palmview Infrastructure Agreement which is discussed in the next section.

2.4 Other contextual influences

2.4.1 Palmview Structure Plan Area Infrastructure Agreement

The Infrastructure Agreement (IA) between the Sunshine Coast Council, Unitywater and three Palmview land owners sets out the funding requirements for the infrastructure necessary for the development of the Palmview master planned area. The IA was initially negotiated in 2010. On 23 April 2015, council finalised the agreement for infrastructure funding for the Palmview Structure Plan Area with Unitywater and Palmview landowners including Avid Property Group (formerly Investa Land). Avid Property Group sought amendments to the IA in mid to late 2015 and further review will be required to determine if any changes to the 23 April 2015 Council version have occurred. The IA was subsequently amended by Council in Amendment Agreement No 2 in 2016.

The funding mechanism towards the Palmview Structure Plan transport infrastructure was defined in the amended Palmview Infrastructure Agreement which sets out the major transport links.

The infrastructure agreement and Council's Sunshine Coast Planning Scheme 2014 (Palmview Structure Plan is contained in Part 10 (Other Plans)) specify agreed sequencing as well as indicative cross sections of key road links. These general alignments and the associated sequence table of road infrastructure delivery are shown in **Appendix B**.

The IA defines the following land contributions by the land owners towards the provision of the following trunk transport infrastructure:

- Claymore Road extension two lane sub-arterial
- Southern Road Link four lane sub-arterial
- Provision of Southern Road Link two lanes when traffic ranges from 18,000 vehicles per day (vpd) to 22,000 vpd on Claymore Road or approval for 4,000th equivalent dwelling has been given
- Upgrade Southern Road Link to four lanes when approval has been given for 6,200th to 6,500th equivalent dwelling, unless an alternative transport corridor is identified
- Spring Hill Drive/University Way Link when between 4,750th equivalent dwelling and 5,000th equivalent dwelling have been approved
- Land contribution for a road to accommodate a future public transport corridor
- Connection to Western Service Road (adjacent to the Bruce Highway)
- Dedicated cycle bridge over Sippy Creek before 1,000th equivalent dwelling has been approved, minimum 4m width
- Dedicated pedestrian/cycle corridor before 1000th equivalent dwelling has been approved
- Major Transit Station, official local bus service strategy and bus service up to Commercial cost by landowner A
- Local public transport services financial contributio Commercial ach year for four years by landowners B & C.

The financial contributions by the land owners towards transport infrastructure are defined in the IA as follows:

- Establishment cost of prescribed road infrastructure totalling Commercial comprising of the following:
  - Claymore Road Commercial
  - Southern Road Link Commercial upgrade from two to four lanes Commercial
  - Spring Hill Drive/University Way Link Commercial

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- Major transit station, official local bus service strategy and bus service up to Commercial cost by landowner A
- Local public transport services financial contribution Commercial each year for four years by landowners B & C.

One of the key drivers of the study is to determine an alternative transport corridor instead of upgrading the Southern Road Link to four lanes post 2031.

The Palmview Infrastructure Agreement identifies a number of link upgrades, but also requires TMR to determine where future project funding for agreed infrastructure is best invested (for example, upgrading the future Southern Road Link from two lanes to four lanes or investing in other transport infrastructure in the vicinity).

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3.0 Current route function and condition

3.1 Current route function

The Sunshine Motorway via Claymore Road is the existing road route connecting the emerging urban area of Palmview with the Principal Activity Centre of Maroochydore and other centres on the Sunshine Coast.

The Sunshine Motorway is the main strategic road connection for the central and northern Sunshine Coast area. The Sunshine Motorway extends east from the Bruce Highway at Sippy Downs to Mooloolaba, north to Maroochydore and across the Maroochy River to Noosa. At Mountain Creek, the Sunshine Motorway intersects with Kawana Way and at Mooloolaba the Sunshine Motorway intersects with Nicklin Way at the Mooloolah River interchange.

The Sunshine Motorway forms a major transport spine for general traffic and freight on the Sunshine Coast and is a critical piece of transport infrastructure for the region, serving as the main road link for commuter, freight and tourist traffic from to and within the Sunshine Coast. The section of the Sunshine Motorway through Sippy Downs also caters for traffic to and from the University of the Sunshine Coast.

3.2 Existing infrastructure condition

3.2.1 Corridor cross section

The Sunshine Motorway between the Sippy Downs interchange with the Bruce Highway and Kawana Way interchange at Mountain Creek consists of a dual carriageway with two 3.5m wide lanes, a 2.0m median shoulder, a 2.5m outer shoulder and 1m verge in each direction. The posted speed limit is 100km/h.

3.2.2 Condition of structures

The condition of major structures and culverts along the Sunshine Motorway through Sippy Downs are listed in Table 3-1.

Table 3-1 Condition of existing structures

Location	Type	Condition rating	Flood immunity	Vertical clearance
Sippy Downs Drive overpass	Two lane bridge over the motorway	Unknown	N/A	5.4m
Stringybark Road overpass	Two lane bridge over the motorway	Unknown	N/A	5.4m
Dixon Road/Claymore Road overpass	Two lane bridge over the motorway	Unknown	N/A	5.5m
Kawana Way off-ramp overpass	Single lane bridge over the motorway	Unknown	N/A	5.5m
Major culverts at Dixon Road	Box culverts	Unknown	N/A	N/A

4.0 Future route function

4.1 Factors influencing transport demand

The southern Sunshine Coast is identified by State and local government planning as a significant urban growth corridor. In particular, the Sippy Downs and Palmview area are identified for additional infill (Sippy Downs) and additional residential growth (Palmview) through an expansion of the urban footprint. These population changes over the next 20 years will significantly increase transport demand on the southern Sunshine Coast.

The following sections discuss the underlying population forecasts and land use changes and their anticipated effect on the strategic, regional road network.

4.1.1 Demographics

The population growth targets identified in the Regional Plan are given effect in Sunshine Coast Council's Planning Scheme 2014 and associated Priority Infrastructure Plan. The following table summarises the existing and projected population for residential development and employment numbers for the study area. Note that these projections are based on the previous Regional Plan, the new Regional Plan – Shaping SEQ – is still in draft form and has not been incorporated into the local planning scheme.

The total Sunshine Coast population is expected to increase from 254,713 residents in 2011 to 456,966 residents by 2031, an increase of 80 percent with the bulk of the population growth occurring in master planned areas such as Caloundra South and Palmview. The Shaping SEQ – Draft South East Queensland Regional Plan estimates a Sunshine Coast population of 495,000 residents by 2041.

Based on Council projections, the study area is expected to experience an equivalent increase in population of 80 per cent. Employment is projected to grow by 157 percent in the study area, with the majority of the increase in Kawana Waters and Sippy Downs. In Kawana Waters alone, 5,000 jobs are anticipated in the health sector associated with the Sunshine Coast University Hospital and health precinct. Employment in the education sector in Sippy Downs is projected to almost double from currently about 2,200 jobs to 4,200 jobs by 2031 in conjunction with the expansion of the University of the Sunshine Coast campus.

The existing and projected population and employment figures on which the 2014 Sunshine Coast planning scheme is based are provided in Table 4-1.

Table 4-1 Existing and projected population and employment in the study area

Locality name	Existing population (2011)	Projected population (2031)	Existing employment (2011)	Projected employment (2031)
Sippy Downs	10,177	16,727	4,284	8,969
Palmview IA area	0	16,593	0	4,891
Kawana Waters	23,051	27,053	9,161	14,971
Kawana Waters IA area	7,719	12,728	2,234	11,420

4.1.2 Land use

The Sippy Downs/Palmview area is planned to undergo major land use changes over coming years. An overview of the existing and proposed land uses is shown in Figure 4-1.

The key land use changes affecting transport demand relate to the expansion of the University of the Sunshine Coast at Sippy Downs, the establishment and expansion of the Sunshine Coast University Hospital precinct and town centre in Kawana Waters and the future district activity centre at Palmview.

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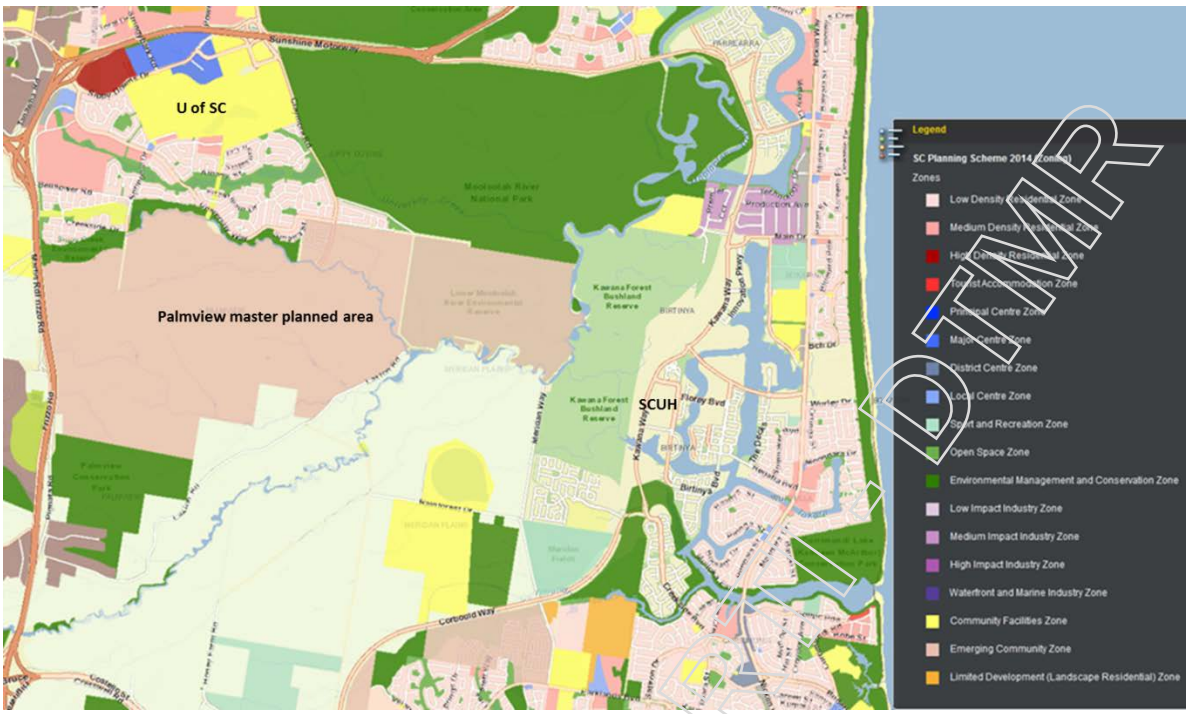

Figure 4-1 Existing and proposed land use in the study area (image source: Sunshine Coast Council, MyMap)

4.2 Future route function

The Bruce Highway, Sunshine Motorway, Caloundra Road and Nicklin Way form an important strategic network around the Palmview master planned area and will provide the road transport connections to and from the major trip destinations in the area, i.e. University of the Sunshine Coast at Sippy Downs and Sunshine Coast University Hospital at Kawana Waters.

Whilst the Bruce Highway will cater for longer distance, tourism/recreational and freight trips, the Sunshine Motorway will also need to cater for commuter and educational trips within the Sunshine Coast. As such, the Sunshine Motorway through Sippy Downs will play a critical role in the Sunshine Coast transport network into the future. The section of the motorway between the Bruce Highway and Kawana Way interchange will experience increased demand due to that section of road being the access to the University of the Sunshine Coast campus at Sippy Downs and the only existing future direct connection between the emerging Palmview urban area and the activity centres at Maroochydore to the north and Kawana to the east, including the hospital and health precinct.

The Sunshine Motorway is planned to be upgraded in stages, with duplication of the existing section of the motorway from Kawana Way to Mooloolah River from two to four lanes including expanded lane connections, and upgrades to river crossings and intersections. There are currently no plans to upgrade the section between the Bruce Highway and Kawana Way interchange.

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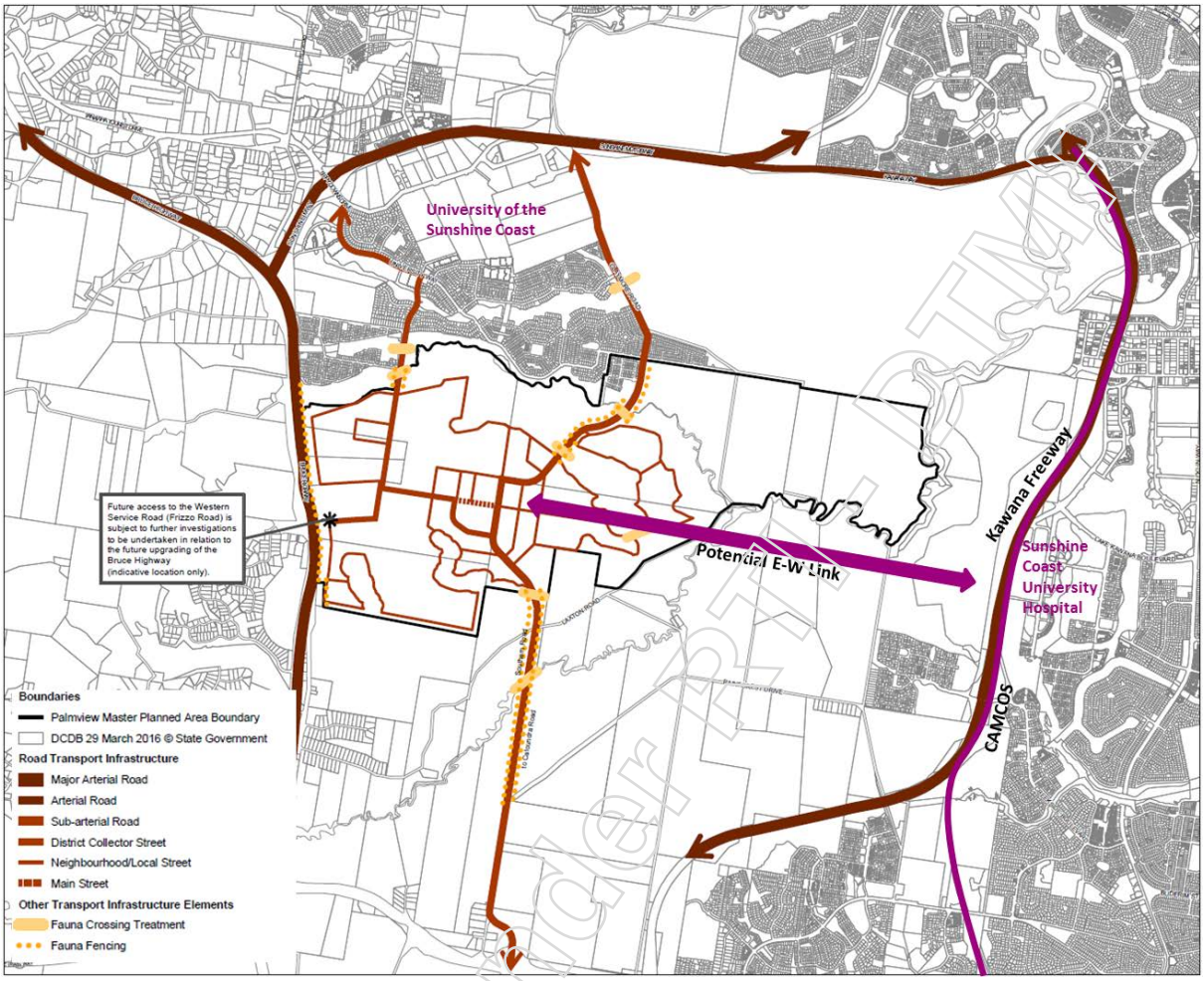

Figure 4-2 Future strategic transport network (background image source: Sunshine Coast Council, 2016)

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5.0 Strategic needs

The Sunshine Motorway currently carries about 40,000vpd along its east west alignment between the Bruce Highway and Mooloolaba. This section will ultimately require upgrading to 6 lanes with associated upgrades to the three intermediate interchanges at Sippy Downs Drive, Dixon Road and Kawana Way as growth continues in Sippy Downs with the growing University of the Sunshine Coast (USC), new Sippy Downs Town Centre and the Palmview development.

With forecast rapid population growth and significant forecast pressure on existing strategic networks this study is required to inform link strategy formulation, corridor protection, prioritisation between potential link upgrades and infrastructure investment decisions for TMR. This will involve an assessment of requirements for additional access roads and to identify the timeframe for all required future link upgrades in association with specified development triggers. TMR's DG and Council's CEO have agreed that a joint planning study will be conducted to determine the requirements.

The Palmview development has an approved development approval (DA) and agreement for an updated Infrastructure Agreement (IA) between the proponent and Sunshine Coast Council has been achieved. TMR requested inclusion in the IA of a clause requiring the proponent to negotiate with TMR on the most effective provision of road infrastructure linked to specified development triggers. Subsequently such consideration has been included in Clauses 8.1 and 8.2 of the revised IA.

This Study needs to determine the most appropriate links to support the Palmview Development, including a staging strategy and infrastructure investment strategy to inform TMR's position in relation to this clause. The assessment will identify the timeframe for link upgrades to support the Palmview development and confirm TMR's position on the future investment timing and corridor protection requirements.

Finally, significant development is planned at Sippy Downs including major growth at the University of the Sunshine Coast. Overall key link upgrade plans are required in this area to ensure TMR's existing strategic road network is protected from significant forecast congestion, and that future corridors are preserved to enable future investment to be delivered in a timely manner to meet network demand. This may include a requirement to upgrade the Sunshine Motorway between Dixon Road and Kawana Way, possibly requiring land-take from the adjacent Mooloolah River National Park.

TMR North Coast's traffic modelling suggests that traffic growth on the Sunshine Motorway could be accommodated in the short-term (5 to 10 years),

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6.0 Link objectives

6.1 Role and function of the future link

TMR's *Strategic Plan 2016 – 2020* provides the overarching direction for the future link strategy as it defines the key objective for TMR to create a single integrated transport network accessible to everyone. One of the strategies to achieve this objective is:

Liveable regions and Active cities – Deliver a single, integrated transport network that promotes prosperity in our cities and regions

This objective can be achieved through:

- Integrating land use and transport to promote community cohesion, economic development and environmental sustainability
- Promoting and investing in active and public transport solutions that support broader community benefits
- Preparing for the freight tasks of tomorrow
- Protecting, maintaining and operating the transport network to ensure resilience and safety.

The development of a link strategy for the Palmview/Sippy Downs area will need to respond to the above strategic objectives by addressing the strategic transport needs over the next 20 plus year planning horizon for the study area. Potential E-W link objectives include:

- Provide a local/arterial road connection between the Palmview masterplanned development and the Sunshine Coast Hospital/Kawana Waters
- Relieve anticipated traffic congestion on Sunshine Motorway between Claymore Road/Dixon Road interchange and Kawana Way interchange
- Meet road network capacity improvements for anticipated future demand in the study area as a result of the Palmview urban development
- Be financially, environmentally and socially sustainable
- Identify additional transport infrastructure priorities in relation to the Palmview Infrastructure Agreement.

These link objectives form the basis for the options assessment framework.

6.2 Planning and design standards

A potential E-W link requires an alignment across the Mooloolah River floodplain that ties into the Palmview master planned area at the western end and into the Kawana Waters master planned area at the eastern end.

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The E-W Link was planned as a multi-modal link, primarily for general traffic as well as public transport and active transport modes. This was achieved by assuming a total corridor width of 60m which would also allow utilities to be provided within that corridor.

The desired planning standards of a potential East-West Link were defined as follows:

- Four lane, median divided arterial road
- Provision for walking, cycling and transit (bus or light rail)
- Provision for utilities, drainage and vegetation buffer
- Design speed 90km/h (posted speed 80km/h)

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- Connectivity into existing and planned local/arterial road network at the eastern end via existing at-grade intersections or grade separation at planned future interchanges
- Connectivity into Palmview future trunk road network as per Palmview Master Plan (Council Planning Scheme 2014, 2016 update), specifically a connection into Claymore Road extension or Southern Road Link
- Flood immunity to be determined (assume embankment with bridge structures and culverts).

Detailed technical design criteria and indicative cross-sections were defined for the Sunshine Motorway and a future East-West Link; these are documented in the Design Criteria Report in **Appendix C**.

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7.0 Options analysis

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Pages 34 through 38 redacted for the following reasons:
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7.2 Options evaluation

7.2.1 Overview

The methodology used to arrive at a preferred option was to undertake two rounds of options assessment. The first round of assessment looked at all the options developed for the study area to determine if any had a 'fatal flaw' and how each option would address the objectives for the link. This first round involved a desktop environmental, hydraulic and land use constraints analysis and undertaking a multi-criteria assessment by the project team, TMR and Council stakeholders. The outcome of the first round of assessment was a shortlist of preferred options – a short-term option and a long-term option. As part of a second round of assessment, the preferred long-term option was refined to respond to specific concerns raised by Council and hydraulic modelling was undertaken to ascertain the amount and size of crossings required to minimise potential afflux during a Q100 flood event. The final preferred options were considered acceptable to TMR and Council and subsequently, concept drawings and costings of both the short-term and long-term option were prepared.

7.2.2 Multi-criteria assessment framework

The multi-criteria assessment framework used for the options appraisal consisted of assessing each option against a set of criteria that reflect the three key questions of a high level test, as follows:

- Effectiveness – will the option address the issues and objectives? The effectiveness measure is a test of how well an option could contribute to the objectives or relieve identified issues within the study area. This forms the basis for the effectiveness test; meaning that the more 'effective' a solution is to enabling the study to meets its objectives then the higher its weighting should be. Essentially it is an impact assessment, but focused at the impacts that are important for the study area.
- Feasibility – will the option be buildable and cost effective? The feasibility measure is focused on costs, timescales and engineering feasibility. It is not the intention to eliminate particularly costly schemes or those which cannot be delivered until the medium or long term. If the potential benefits of an option are significant enough to warrant the costs or the wait then it could be taken forward as a priority. However, costs and timescales are always an issue, particularly if funding streams are limited or tied to a particular timeframe. These issues should therefore be identified separately from the impacts of the option.

- Acceptability – will the option be 'acceptable' publically and politically? This is an important measure because schemes are often held up or have to make expensive revisions because they are considered unacceptable either locally or politically. Therefore, it would be extremely useful to identify any potential acceptability issues at an early stage. This is not to say that just because a solution may be difficult to implement politically then it should not be considered. It could be that a scheme may be contentious because of its required land-take but that its potential benefits to the network are very high. An option such as this should not necessarily be discounted at this stage. What the acceptability test will do is identify options which could be troublesome to deliver; if they also do not generate particularly high benefits then they may fall down the ranking.

For each high-level test, a corresponding set of second level themes and objectives were defined and measurable criteria determined. These themes were tailored to meet the requirements of the study to ensure that all aspects of an option are considered.

A simple scoring approach was used with a score of 0 meaning the option has a fatal flaw in relation to that objective and a score of 6 meaning the option exceeds the objective, as follows:

Table 7-2 Scoring definitions

Assessment	Score	Comment
Strongly Positive	6	Outstanding - exceeds the objectives
Moderately Positive	5	Very good - Fully achieves the objectives
Slightly Positive	4	Good - achieves the objectives better
Neutral	3	Adequate - Just achieves the objectives
Slight Negative	2	Poor - doesn't fully achieve the objectives
Moderately Negative	1	Worst performing - not fatal
Strongly Negative	0	Fatal Flaw - Resulting in Option Automatically Dropping out at this Stage

Each criterion was given a weighting based on its perceived importance by TMR and Council stakeholders; this also assisted in better differentiating between options with the following multipliers applied to each score:

- Low – 0.5
- Medium – 1
- High – 2
- Very high – 3.

The complete MCA framework is shown in Table 7-3 and was agreed with stakeholders (including Council).

Table 7-3 MCA framework

High level test	Second level theme	ID	Objective	Criteria	Weighting
Effectiveness	Transport connectivity	E-01	Improvement in connectivity for all users	Increase in local trips taken on local network (and less on the state network) Improves public transport and active transport (access, mode share)	Very high
	Road network	E-02	Network benefit/impact	Option reduces traffic congestion on surrounding road network (option reduces forecast total traffic on the SSMW and Claymore Road)	Very high
				Option improves performance across the road network (VHT/VKT)	Very high
	Safety	E-03	Improve safety for all users	Option provides a more legible road network Option improves separation of local and longer distance trips (trip purposes)	Medium
Feasibility	Costs	F-01	Total cost	Comparative cost estimate	High
	Flexibility and stage-ability	F-02	Option provides flexible connection to state network	Enables flexible connection for future state network upgrades (for example Main Drive or Lake Kawana Boulevard)	Medium
		F-03	Option does not constrain future network expansion when required	Option is not build out to its limits and there is physical room to meet further network expansion including future interchanges, accommodating other modes and so on	Low
	Alignment	F-04	Impacts of construction on existing and planned infrastructure	Option is not impacting on existing and planned infrastructure at Kawana Way	High
	Risk	F-05	Political/funding risk	Option is politically acceptable/aligns with Palmview IA / is fundable	High
		F-06	Constructability	Comparative risk of constructability (complexity, use of existing infrastructure corridors or road alignments)	Medium
Acceptability	Local planning	A-01	Affects current and future land use planning	Option aligns with statutory planning guidelines/master plan/ development control plan.	Medium
	Hydrology & hydraulics	A-02	Wider implications of up-/downstream flooding (afflux risk)	Option does not have significant detrimental impact on flooding in the wider study area (afflux risk) Minimise number of crossings	High

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High level test	Second level theme	ID	Objective	Criteria	Weighting
	Environmental concerns	A-03	Impact on sensitive environmental areas	Quality and severity of area impacted	Very high
		A-04	Impact on cultural heritage significance	Number and level of significant sites impacted	Medium
	Community	A-05	Effect on local amenity and connectivity	Neighbourhood links remain Community facilities not separated/impacted	Medium
		A-06	Property impacts	Number of partial or full resumptions	High

7.3 Options evaluation outcomes

The comprehensive options evaluation for the multi-criteria assessment of the initial 10 options is provided in **Appendix E**. This includes the summary sheet of MCA scores as well as an explanation for each score. The results of the options MCA were determined by totalling the weighted scores for each option. For comparison purposes, the unweighted scores have also been provided. The final MCA scores were moderated by TMR and Council stakeholders.

A summary of the MCA results is presented in Table 7-4. Deliberation

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Table 7-4 Summary MCA score sheet

Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9A	Option 9B	Option 10
Increase in local trips taken on local network (and less on state network) Improves public transport and active transport (access, mode share)	5	5	5	5	5	2	2	2	5	5	2
Option reduces traffic congestion on surrounding road network (option reduces forecast total traffic on the SSMW and Claymore Road)	3	3	3	3	3	2	2	2	3	3	5
Option improves performance across the road network (VHT/VKT)	4	4	4	4	4	3	3	4	4	4	2
Option provides a more legible road network Option improves separation of local and longer distance trips (trip purposes)	3	3	3	3	3	3	3	3	3	3	3
Comparative cost estimate	3	3	2	2	1	1	4	4	3	3	5
Enables flexible connection for future state network upgrades (e.g. Main Drive or Lake Kawana Boulevard)	5	5	1	3	3	1	1	1	3	3	3
Option is not build out to its limits and there is physical room to meet further network expansion including future interchanges, accommodating other modes and so on	3	3	3	3	3	3	3	3	3	3	3
Option is not impacting on existing and planned infrastructure at Kawana Way	4	5	1	4	4	2	3	3	4	4	5
Option is politically acceptable/aligns with Palmview IA/ is fundable	0	0	0	0	0	3	3	3	3	3	3
Comparative risk of constructability (complexity, use of existing infrastructure corridors or road alignments)	3	3	3	3	3	3	3	3	3	3	3
Option aligns with statutory planning guidelines/master plan/development control plan	2	2	2	2	2	1	1	1	1	1	5
Option does not have significant detrimental impact on flooding in the wider study area (afflux)	1	1	1	1	1	2	2	2	2	2	3

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Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9A	Option 9B	Option 10
Minimise number of crossings											
Quality and severity of area impacted (sensitive environmental areas)	0	0	0	0	0	4	5	5	3	2	5
Number and level of significant sites impacted (cultural heritage)	1	1	1	2	2	3	3	3	3	3	1
Neighbourhood links remain Community facilities not separated/ segregated	3	3	3	3	3	3	3	2	3	3	3
Number of partial or full resumptions	3	2	2	4	5	1	1	1	1	1	5
Unweighted total	**43**	**43**	**34**	**42**	**42**	**37**	**42**	**42**	**47**	**46**	**56**
Weighted total	**76.5**	**76.5**	**62.5**	**75.5**	**75.5**	**66.5**	**77.5**	**79.5**	**88.5**	**85.5**	**103.5**

7.3.1 Traffic analysis

TMR North Coast staff undertook 2041 VISUM traffic modelling for the AM and PM peak periods to help inform the transport related assessment criteria for the options MCA by comparing future year 2041 base and selected options demands. It was assumed that Sippy Downs including Palmview masterplanned area would be fully built out by 2041 as per State and Council strategic plans. However, a future expansion of the University of the Sunshine Coast student numbers was not reflected in TMR's VISUM modelling.

The key network assumptions of the TMR VISUM modelling comprised:

- Upgrade of the Bruce Highway between Caloundra Road and Sunshine Motorway as per the BHUP reference design 2016
- Mooloolah River Interchange (MRI) ultimate upgrade
- Sunshine Motorway upgraded to four lanes between Kawana Way and the MRI
- Kawana Arterial upgraded to four lanes
- Palmview local road network complete with connections to Claymore Road, Springhill Drive, Pignata Road and Southern Link Road.

It should be noted that not all 10 alignment options were modelled by TMR North Coast; only Options 1, 7, 8, 9 and 10 were modelled, as follows:

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Figure 7-3 below presents the network statistics provided by TMR North Coast staff for these options model runs comparing options results against the 2041 Base Case. Note confirmation of the cordon used by TMR North Coast for the extraction of network statistics was not available at the time of writing; presumably it encompasses the study area only.

The TMR modelling results suggest that alignment E-W Link Options 1, 7, 8 and 9A would provide a small reduction in total network VKT and VHT compared to the 2041 Base Case (less than 1 per cent), with Option 1 performing relatively better than the other options tested. Total network VKT and VHT for Option 10 did not differ significantly from the 2041 Base Case.

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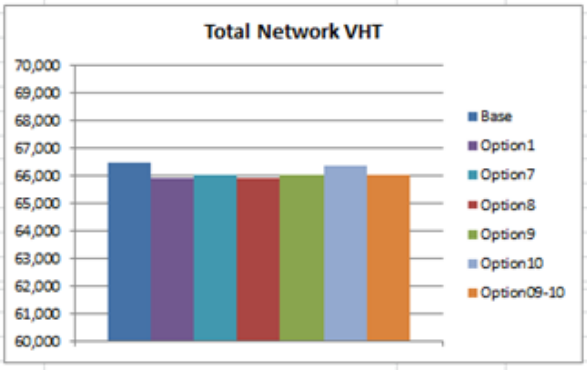
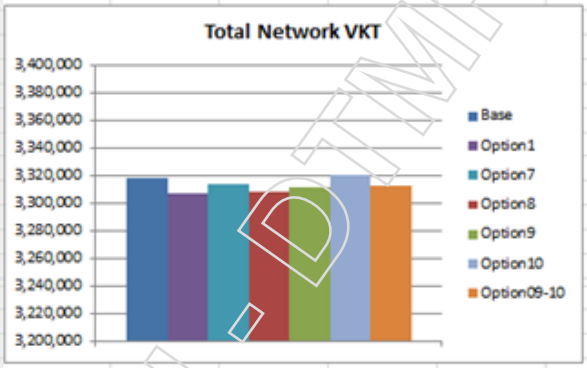
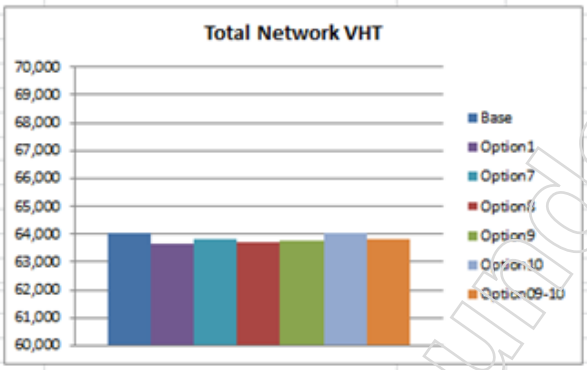
Scenario	2041_AM						
Option	Base	Option1	Option7	Option8	Option9	Option10	Option09-10
Total Network VHT	66,494	65,910	66,011	65,914	66,024	66,381	66,037
Total Network VKT	3,318,889	3,307,060	3,313,546	3,308,521	3,311,985	3,320,535	3,312,419





Scenario	2041_PM						
Option	Base	Option1	Option7	Option8	Option9	Option10	Option09-10
Total Network VHT	64,036	63,680	63,791	63,723	63,770	64,015	63,800
Total Network VKT	3,209,570	3,199,229	3,205,938	3,201,854	3,202,831	3,209,108	3,202,823



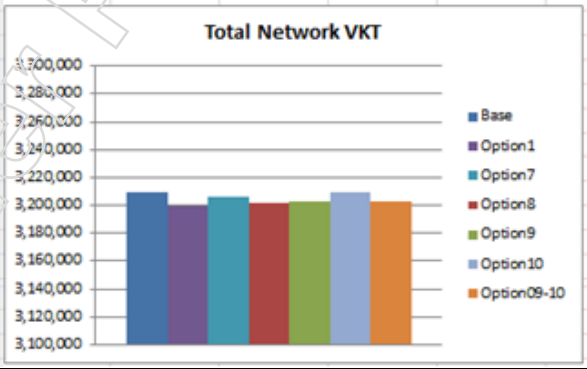


Figure 7-3 Total network statistics for 2041 Base Case and selected options (Source: TMR)

A better indicator of relative performance is the effect of different alignment options on key roads in the study area relative to the 2041 base case. The relevant outputs of TMR's VISUM modelling are presented in Table 7-5. Note that TMR North Coast staff extrapolated the VISUM model's forecast 2041 AM and PM peak hour traffic flows into daily flows for comparison purposes.

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Table 7-6 Travel distance and travel time between Sippy Downs and Kawana Waters (Source: TMR)

		AM Peak					PM Peak				
	Origin	MaroochyCC	PalmviewWst	USC	PalmviewEst	PalmviewWst	USC	MaroochyCC	KawanaHosp	KawanaHosp	KawanaHosp
	Destination	USC	MaroochyCC	KawanaHosp	KawanaHosp	KawanaHosp	MaroochyCC	PalmviewWst	USC	PalmviewEst	PalmviewWst
Travel Distance (km)	Base	12.0	18.0	12.4	13.5	15.5	13.5	19.8	11.2	13.4	15.7
	Option1	12.1	18.0	8.7	6.9	9.3	13.5	19.8	9.0	7.1	9.5
	Option7	12.1	18.0	12.4	9.3	10.5	13.5	19.8	11.2	9.6	10.5
	Option8	12.1	18.0	12.4	8.1	9.1	13.5	19.8	11.2	8.1	9.3
	Option9	12.1	18.0	10.9	6.3	8.6	13.5	19.8	11.2	6.6	8.9
	Option10	12.0	18.0	12.4	13.5	15.5	13.5	19.8	11.2	12.9	15.7
	Option9-10	12.1	18.0	10.9	6.3	8.6	13.5	19.8	11.2	6.6	8.9
Travel Time (m:s)	Base	0:12:23	0:20:39	0:17:23	0:18:16	0:19:50	0:14:26	0:19:41	0:14:11	0:16:33	0:16:55
	Option1	0:12:20	0:20:11	0:13:10	0:08:57	0:15:45	0:14:16	0:19:30	0:13:00	0:09:06	0:15:12
	Option7	0:12:22	0:20:23	0:16:10	0:10:56	0:14:45	0:14:22	0:19:36	0:13:56	0:11:09	0:14:20
	Option8	0:12:22	0:20:20	0:16:08	0:10:27	0:14:13	0:14:22	0:19:35	0:13:54	0:10:37	0:13:52
	Option9	0:12:21	0:20:15	0:15:09	0:07:41	0:15:50	0:14:18	0:19:31	0:14:15	0:07:55	0:14:49
	Option10	0:12:39	0:20:04	0:17:17	0:18:17	0:19:39	0:14:23	0:19:39	0:14:10	0:16:14	0:16:56
	Option9-10	0:12:38	0:19:58	0:15:10	0:07:43	0:15:52	0:14:17	0:19:30	0:14:06	0:07:53	0:14:50

LEGEND	
XXX	MAJOR DECREASE - TT/TD < 80% of base
XXX	MINOR DECREASE - 80% of base < TT/TD < 95% of base
XXX	INSIGNIFICANT DIFFERENCE - 95% of base < TT/TD < 105% of base
XXX	MINOR INCREASE - 105% of base < TT/TD < 120% of base
XXX	MAJOR INCREASE - TT/TD > 120% of base

7.3.2 Environmental and heritage constraints

Desktop studies undertaken early in the project confirmed that there were a high number of environmental and heritage aspects within the study area that would need consideration.

The proposed initial alignments also potentially crossed varying combinations of these aspects and at different levels of potential impact (direct and indirect).

In order to shortlist the potential options it was agreed that a separate and more detailed multi-criteria analysis would be undertaken to account for the large number of environmental and heritage constraints to be considered.

Using information gathered as part of the desktop environmental constraints analysis and desktop Cultural Heritage Risk Assessments, criteria were selected, scored per option, weighted and then a checking process was undertaken in a workshop with TMR.

The environment and heritage MCA is provided in **Appendix E** and the method used and the overall results are summarised below.

7.3.2.1 Selection of criteria

Criteria were selected based on the values identified in the desktop studies found within the study area only. Environmental and heritage values or aspects that were not found as part of the study or highly unlikely to be encountered were not included at this stage.

Values/aspects were identified from local, State and Commonwealth databases, existing reporting, and information provided by Council and by TMR. The selected criteria are presented in Table 7-7.

Table 7-7 Environmental and heritage criteria

Theme	Criteria	Description
Environment - Commonwealth	Nationally Important Wetland	Wetland listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
	Threatened Ecological Community	Threatened Ecological Community listed under the EPBC Act
	National Parks	National Park listed under the EPBC Act
	Threatened Species	Threatened fauna and flora species listed under the EPBC Act
Environment - State	Regional Ecosystems	Regional Ecosystems (RE) listed under the *Vegetation Management Act 1999* (VM Act)
	Threatened Species	Protected plants and fauna listed under the *Nature Conservation Act 1992* (NC Act)
	Potential Offset Areas	Various
	Wetlands/Waterways	Wetlands and waterways under the VM Act and Fisheries Act
	Essential Habitat	Essential habitat protected under the VM Act and NC Act
	Koala Habitat - SPP	Koala habitat mapped under the State Planning Policy
	Koala Habitat - SPRP	Koala habitat regulated under the State Planning Regulatory Provisions
	State Significant Biodiversity Corridor	State significant biodiversity corridors managed under the NC Act
	Regional Parks	Regional Parks managed under the NC Act
	Local Habitat Biodiversity Corridor	Local corridors managed under the *Sustainable Planning Act 2009* (SP Act) and Local Government Act 2009
	Marine plants	Plants protected under the *Fisheries Act 1994*
Environment - Other	Acid Sulfate Soil	Potential presence of acid sulfate soils
	Noise	Potential for impacts to sensitive receptors
	Air quality	Potential for impacts to sensitive receptors
Heritage	Commonwealth Historic Heritage	World Heritage properties, National Heritage places, Commonwealth Heritage places under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
	Aboriginal and Torres Strait Islander Heritage	Listed heritage places under the Aboriginal Cultural Heritage Act 2003 and the Torres Strait Islander Cultural Heritage Act 2003
	QLD and Local heritage	Places of cultural heritage significance listed on the Queensland Heritage Register and/or Local Heritage Registers

7.3.2.2 Scoring and weighting

Following selection of the criteria to be assessed and confirmation on the approach to scoring, a performance matrix (consequence table) was completed.

Initial scoring of the expected consequences to the alignment options (should they impact on the various environmental and heritage values) was undertaken based on the score values within Table 7-2 in section 7.2.2.

Initial scoring did not provide a difference in total and average scores per option sufficient to be able to rank and select preferred options. The project team agreed that weighting should be applied to the individual criterion that reflected a risk rating aligned to the significance of the values and based on the statutory level of protection given to the values (status) and/or complexity of assessment and approval requirements should the value be impacted.

The risk ratings per risk group are provided in Table 7-8.

Table 7-8 Environment and heritage risk rating

Risk group	Risk rating	Commentary
Commonwealth values (may also be State Significant)	Very High	Commonwealth EPBC Act listed values
State Significant values (only)	High	State significant values that are considered EVNT and/or have complex approvals and/or potential offset requirements for impacts
Other State and Local values	Medium	State values that may have complex approvals and/or potential offset requirements for impacts
Other constraints	Low	Other environmental constraints that may have specific or complex construction requirements

7.3.2.3 Environment and heritage MCA outcomes

Option 1 Deliberation was identified as the preferred option due to its limited impacts on designated sites and environmental and cultural values.

Following are Options 7, 6 and 8 which are close in score due to their similar alignments and limited impacts on designated values.

Option 9 sits in the middle in order of preference as it avoids the National Park and potential offset areas. However, its length requires a longer alignment through the Deliberation

Options 1, 2, 3 and 5 score worse than Option 9 and are identical in score due to their similar impacts however, further on site investigations or survey may better differentiate between them.

Option 4 is considered the least preferred due to its potential impacts on designated sites (including the offset areas) and potential for listed environmental values.

Table 7-9 Environment and heritage MCA scores

Criteria	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9A/B	Option 10
Environment – Commonwealth	2.5	2.5	2.5	4	5.5	8.5	8.5	8.5	7	6
Environment – State	32.5	32.5	32.5	28.5	29.5	34.5	40	35.5	30.5	52.5
Environment – Other	20	20	20	20	20	24	24	16	18	24
Env. Total Score	55	55	55	52.5	55	67	72.5	60	55.5	82.5
MCA ranked preference	**6**	**6**	**6**	**7**	**6**	**3**	**2**	**4**	**5**	**1**
Heritage	7.5	7.5	7.5	8	8	8	8	8	6.5	8
MCA ranked preference	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**3**	**1**

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Pages 52 through 53 redacted for the following reasons:
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8.0 Link strategic priorities

An options analysis of potential E-W link alignments in the Palmview/Sippy Downs study area, in conjunction with strategic staging of link improvements for north-south and east-west road capacity between Palmview/Sippy Downs and Caloundra/Kawana/Mooloolaba was undertaken. An assessment of a number of existing and future planned road links and their upgrade or development requirements was undertaken in relation to the strategic planning context and traffic considerations. Interpretation of the latter was based on information provided by TMR North Coast traffic modelling staff. An options analysis was undertaken for a potential new E-W link across the Mooloolah River floodplain to connect the emerging communities of Sippy Downs and Palmview with the Kawana town centre and Sunshine Coast University Hospital precinct. The option analysis took into consideration flooding, environmental and heritage constraints, existing and future land uses and environmental offset areas as well as traffic modelling results provided by TMR North Coast staff.

8.1 Prioritisation approach

In summary, the study identified the following infrastructure priorities:

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8.2 Cost estimation approach

Funding for the initial two lanes of the Southern Road Link is provided for in the Palmview Infrastructure Agreement which put the capital cost for this two lane road at Commercial As a result of this study, TMR negotiated with Council and Palmview landowners further funding to be included in the Palmview Infrastructure Agreement to capture funding for the Pignata Road link and upgrade of Racecourse Road interchange with Caloundra Road in conjunction with the Southern Road Link. The ancillary works required to facilitate the future Pignata Road link at the Bruce Highway were incorporated into the detailed design process for the Bruce Highway upgrade between Caloundra Road and Sunshine Motorway. Hence, neither of these connections was further developed and costed in this study.

For the final preferred E-W Link alignment and the preferred Deliberation Deliberation ption, concept designs have been developed to a level sufficient for the purpose of strategic cost estimation (i.e. category 1 estimates as per TMR's Project Cost Estimating Manual, sixth edition, 2015). The preliminary hydraulic assessment informed the cost estimates for structures and culverts required for the final preferred E-W link alignment. The total length of the preferred E-W Link alignment is approximately 5.9 km long. The potential extension to Mains Drive would add an additional 1.2 km. The preferred alignment would require 13 bridges of approximate total length of 1,055 m as well as 9 major culverts.

Concept drawings for the final preferred E-W alignment across the Mooloolah River floodplain are provided in **Appendix H** and for the Sunshine Motorway in **Appendix I**.

The strategic estimates developed for the preferred options are shown in Table 8-1 below. Deliberation Deliberation Deliberation ould cost in the order of Commercial The final preferred E-W Link alignment across the Deliberation ould cost in the order of Commercial for a two lane road and Commercial for a four lane road. This includes a shared pedestrian/cycling path for the whole length of the alignment but excludes provision of transit (bus or light rail). The alternative connection into Deliberation would cost in the order of Commercial for a two lane road and Commercial for a four lane road. This includes a shared pedestrian/cycling path for the whole length of the alignment but excludes provision of transit (bus or light rail).

Strategic level cost estimating is considered appropriate for the level of planning undertaken for this study. Risk, contingencies and escalation have therefore been incorporated to the level appropriate for this type of estimate. It is noted that detailed survey was not available; hence the design concepts for the final preferred E-W link alignment and Sunshine Motorway directional service roads are at a level where quantities extracted for the purpose of cost estimation have a significant degree of uncertainty.

The full cost estimates including unit cost rates, assumptions and exclusions are provided in **Appendix J**. Cost estimates do not include Principal's costs. A contingency of 50% commensurate with strategic cost estimates has been applied.

A risk analysis and workshop were not undertaken for this study. Future stages of planning and investigation will be required to ascertain a number of risk factors that could have a significant impact on the above strategic estimates such as:

- Deliberation would fit within the existing road reserve (and would not encroach into the Mooloolah River National Park due to earthworks and relocation of sections of the existing cycleway). Also, detailed Public Utility Plant (PUP) investigation has not been undertaken as part of this study and PUP impacts would need to be ascertained as relocation of services could significantly increase cost.
- For the final preferred E-W Link alignment, further design work is required to ascertain the amount of total cut and fill required for a road embankment with 300mm freeboard for Q100 flood immunity and removal of any contaminated materials (e.g. acid sulfate soils). A review of geotechnical literature available for the study area suggested that it is possible that a significant amount of ground settlement may be encountered in some areas due to the location of the alignment across the Mooloolah River floodplain.
- Property and land acquisition costs have not been included in the strategic cost estimates. These could be substantial as the preferred E-W alignment option runs through a designated key resource area. Due to the complexity and potential cost risks associated with property and land acquisitions, if any resumptions or property impacts may occur, advice should be sought from the Property Acquisitions and Disposals (PAD) unit. Indicative land requirements have been identified in the concept drawings provided in **Appendix H**.

8.3 Corridor preservation

An initial assessment of the environmental and heritage legislation and approvals required for the preservation of a future transport corridor along the conceptual alignment of the final preferred E-W Link alignment has been provided in the Environmental Scoping Report (**Appendix K**). This assessment will need to be reviewed and updated as planning for the corridor progresses.

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TMR has at its disposal a number of alternative approaches to designate a future transport corridor.

The *Transport Planning and Coordination Act 1994* in conjunction with the *Transport Infrastructure Act 1994 (Queensland)* establishes the legal framework that allows TMR to investigate, plan, protect and construct transport infrastructure in Queensland. Currently, TMR through the Minister has the power to gazette and acquire land for the purpose of future road transport infrastructure under s24 of the *Transport Infrastructure Act 1994*.

TMR's Approved Planning Policy (Version 2, May 2016) sets out the approach to be taken for transport planning activities affecting land that is not located within an existing state transport corridor. In order for the E-W Link option 9E/A-F alignment to become a future state transport corridor. This requires progressing planning of the corridor from a current Category A (unprotected planning) through to Category B (planning in progress) to a Category C (protected planning) where a future transport corridor or land requirement is identified and gazetted under appropriate legislative processes. This would involve refinement of the concept design options, assessment under the *Sustainable Planning Act 2009* and public consultation activities. As the corridor traverses significant environmental areas, assessment of the corridor under Commonwealth legislation (e.g. EPBC Act, environmental offsets) would also be required.

Under the *Sustainable Planning Act 2009*, TMR has the power to designate land for a state-controlled road as community infrastructure. The planning and assessment framework guiding the approval of a designation for a future transport corridor under the *Sustainable Planning Act 2009* would require TMR to undertake adequate environmental assessment and public consultation that sufficiently addresses issues raised during the public consultation. One way in which the requirements for adequate environmental assessment and public consultation may be met is for the assessment of the proposed corridor to be carried out in accordance with *Guidelines for environmental assessment and consultation procedures for designating land for community infrastructure* under the *Sustainable Planning Act 2009*, section 760.

According to section 201 of the *Sustainable Planning Act 2009*, land may be designated for community infrastructure only if the Minister or Local Government is satisfied the community infrastructure will:

- Facilitate the implementation of legislation and policies about environmental protection or ecological sustainability; or
- Facilitate the efficient allocation of resources; or
- Satisfy statutory requirements or budgetary commitments of the State or Local Government for the supply of community infrastructure; or
- Satisfy the community's expectations for the efficient and timely supply of the infrastructure.

A community infrastructure designation lasts for a period of six years, unless a notice of extension of the designation has been issued by the Minister responsible for the *Sustainable Planning Act 2009*. Therefore corridor designation should be considered closer to the timing of delivery of the corridor.

The current *Sustainable Planning Act 2009* will be replaced with new planning legislation which was passed by the Queensland Parliament on 12 May 2016. The replacement legislation includes:

- The Planning Act 2016
- The Planning and Environment Court Act
- The Planning (Consequential) and Other Legislation Act.

The new legislation will commence on 3 July 2017 and will create a contemporary framework for delivering planning and development across Queensland. Key features of the *Planning Act 2016* include:

- A requirement for assessment managers and referral agencies to publish reasons for their decisions on development application
- Reinstated public access to information
- Reintroduced cost provisions whereby each party bears their own costs
- Streamlined development assessment processes

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- Clearer, simpler categories of development and levels of assessment
- Increased default currency period for a Material Change of Use from 4 to 6 years
- Code assessment decision rules explicitly recognising a presumption in favour of approval for code assessment
- Reinstated requirement for regular review of local planning schemes and infrastructure plans
- Automatic indexing of infrastructure charges
- Environmental impact statement (EIS) process removed
- Clear and simplified transitional arrangements as a result of names and notification requirements.

In summary, the *Planning Act 2016* is a refinement rather than sweeping change. Many of the changes are simply new terms, switching labels and simplified drafting of legislative provisions, with most provisions having a similar effect on the development approval process. 'Community Infrastructure Designation' will cease and it will be replaced with 'Designated Infrastructure' (designation of premises for development of infrastructure) which will still include a provision to designate infrastructure for transport (including state-controlled roads).

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9.0 Implementation plan

9.1 Investment requirements

Given the strategic cost estimate of more than Commercial a Strategic Assessment of Service Requirements (SASR) will be required to initiate the next phase of planning for the provision of

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Deliberation as the estimated capital value of the upgrade would fall under the Project Assessment Framework (PAF) process. The SASR ensures the proposed project aligns with strategic objectives, identifies a strategic need and what outcomes are being sought.

Commercial

Commercial

Also, TMR will need to source topographic survey, PUP and 'as built' drawings of the Sunshine Motorway to ascertain whether the provision of service roads along the Sunshine Motorway could potentially encroach on the Mooloolah River National Park. The concept drawings prepared as part of this study suggest that the upgrade could potentially fit within the existing road reserve but that will need to be confirmed with future survey.

Should the upgrade of the Sunshine Motorway encroach on the national park, the required land would need to be designated as state road infrastructure. In order to gazette the land as state road infrastructure, the land must be purchased from the state (as the owner) and the national park status of the land will have to be revoked. Although a 'National Park', the designation is protected under State legislation – the Nature Conservation Act 1992. The ability to revoke part of the National Park must be approved by the Governor in Council (under Section 32 of the Act), i.e. by the Queensland State Parliament. As the revocation has to be undertaken in parliament, there is no mandated timeframes for approval/refusal. There may also be compensation/offsets required under the negotiation process. As part of the negotiation with the state, demonstration of why there are no alternative options/alignments that do not impact on the national park would need to be provided to justify the revocation.

As the designation of a national park is for its ecological and heritage values (among others), any impacts to the national park would trigger detailed survey, assessment, consultation and potentially a number of other approvals. In light of this eventuality, an Environmental Scoping Report for the Sunshine Motorway upgrade has been prepared and is provided in **Appendix L**. It identifies the environmental legislation and approvals triggered by this project. This assessment will need to be reviewed and updated as planning for the upgrade progresses.

9.2 Other planning recommendations

The potential benefits of this link will need to be confirmed through TMR North Coast VISUM traffic modelling. The traffic demand for the preferred E-W link alignment has not been tested; previous options modelling by TMR (as reported in section 7.3.1)

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Deliberation his connection further south could be less desirable for Palmview and Sippy Downs trips and the forecast 15,000 – 22,000 vpd by 2041 previously identified by TMR North Coast's VISUM options modelling may not be reached.

The results of this traffic modelling will assist in determining whether further planning and corridor preservation is a viable path forward. Given the complexity of the environmental, heritage and land use impacts of the final preferred E-W link alignment and its very high potential capital cost, corridor preservation would be appropriate however future cost of delivering the link will need to be balanced with the potential benefits.

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In addition, further investigations are required to address a number of other risks:

- The 'earthen arrangement' identified within the CHRA (refer **Appendix K**) is a potential Bora Ring which is of extremely high cultural heritage value and is not an artefact that can be moved. Impacts to a Bora Ring are unlikely to be approved by an Aboriginal party. The Mooloolah River is likely to contain a large amount of cultural heritage values, artefacts and places and consultation will be required with the relevant Aboriginal party for all options that are likely to have an impact on the river.
- Community responses to the identified final preferred E-W link alignment. Previous consideration of an E-W link by Council ('Greenlink') encountered significant community concerns. There could be political and community risks associated with the final preferred E-W Link alignment. It is recommended a public consultation plan is developed.

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10.0 Consultation and engagement

10.1 Stakeholders consulted and process

Throughout the preparation of this study, stakeholder consultation was limited to the following branches within TMR and Sunshine Coast Council:

- TMR's North Coast & Wide Bay/Burnett Region – Program Delivery & Operations and Regional Planning Branches. This also included engaging with the Development Assessment Team and the Environment and Cultural Heritage Team for specific feedback on options.
- Sunshine Coast Council's Major Urban Developments and Infrastructure Policy Branches in relation to the Palmview Infrastructure Agreement and feedback on options development and assessment.

The consultation process comprised individual meetings with stakeholders as well as three options workshops on 18 July, 18 August and 17 November 2016. This process allowed stakeholders to provide feedback on options development, the multi-criteria assessment framework and options assessment. The final preferred options were also presented to all stakeholders for comments.

A summary of comments received by stakeholders is provided in **Appendix M**.

10.2 Actions to address issues raised

Council and TMR feedback on all options has been addressed as part of the options assessment process. As a result of consultation with Council, the preferred E-W Link option was identified as option 9E (or 9F).

10.3 Future stakeholder involvement

Should planning for the preferred E-W Link option progress to the next phase, consultation with Council and the wider community will be required as part of the statutory process towards corridor preservation.

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11.0 References

Department of Transport and Main Roads (2015) Project Cost Estimating Manual, sixth edition, September 2015

Department of Transport and Main Roads (2016) Approved Planning Policy, version 2, May 2016

Sunshine Coast Council (2016) Palmview Declared Master Planned Area Maps, last viewed 27 April 2017, https://www.sunshinecoast.qld.gov.au/Development/Planning-Documents/Sunshine-Coast-Planning-Scheme-2014/View-the-Sunshine-Coast-Planning-Scheme-2014-Maps/Palmview-Declared-Master-Planned-Area-Maps.

Sunshine Coast Council (2015) Explanatory Memorandum, Sunshine Coast Planning Scheme 2014 (Major Amendment – Palmview Structure Plan and Consequential Amendments), dated 7 December 2015

Sunshine Coast Council (2014) Sunshine Coast Sustainable Transport Strategy 2011 – 2031, August 2014 edition

Sunshine Coast Council (2011) East – West Greenlink, Palmview to Kawana Feasibility Study Report, Arup, December 2011

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Appendix A

Palmview Structure Plan Maps

DRAFT

Appendix B

Palmview Infrastructure Agreement Map

DRAFT

Appendix C

Design Criteria Report

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Appendix D

East-West Link Options and Constraints Maps

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Appendix E

Detailed MCA Results

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Appendix F

Constraints Maps with Refined Options

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Appendix G

Hydraulic Assessment Technical Note

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Appendix H

Concept Drawings Preferred E–W Link Option

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Appendix I

Concept Drawings Preferred

Deliberation

Deliberation

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Appendix J

Strategic Cost Estimates

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Appendix K

Environmental Scoping Report E-W Link

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Appendix L

Environmental Scoping Report Sunshine Motorway

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Appendix M

Stakeholder Comments

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Appendix M Stakeholder Comments

This section summarises the comments received from stakeholders during project meetings and MCA workshops.

The following TMR and Council officers attended the meetings and workshops:

Peter Bell (TMR)

Mark Bachels (TMR contractor)

Mike Hyslop (TMR)

Terry Upton (TMR)

Stuart Duncan (TMR)

Anthony Fichera (TMR)

Chris Begley (TMR)

N/R

Department of Transport and Main Roads – internal stakeholder comments

The specific feedback provided by TMR's internal stakeholders included:

- In relation to the Palmview Infrastructure Agreement and its amendments:
  - TMR is concerned about the implications of Palmview urban development on state-controlled Sunshine Motorway, Dixon Road interchange and Racecourse Road interchange, and on Pignata Road link to western Bruce Highway service road. The function of Sunshine Motorway as a regional transport link needs to be protected (23 per cent of traffic volume on Sunshine Motorway is expected to be from Palmview by 2041).
  - Options assessment needs to consider the potential of an E-W Link connecting into the future MMTC/Kawana Arterial and the resultant implications for planning and staging of the Kawana Arterial.
- Options development:
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  -
  -
  -
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Deliberation

N/R

Pages 77 through 78 redacted for the following reasons:
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Deliberation

About AECOM

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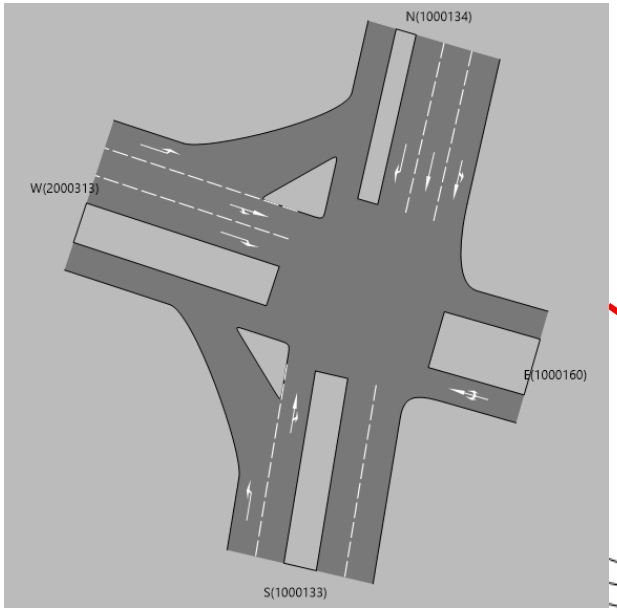
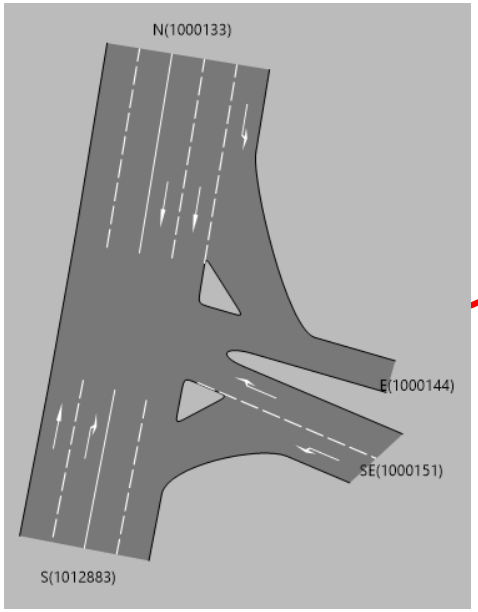
Racecourse Rd Interchange Upgrades

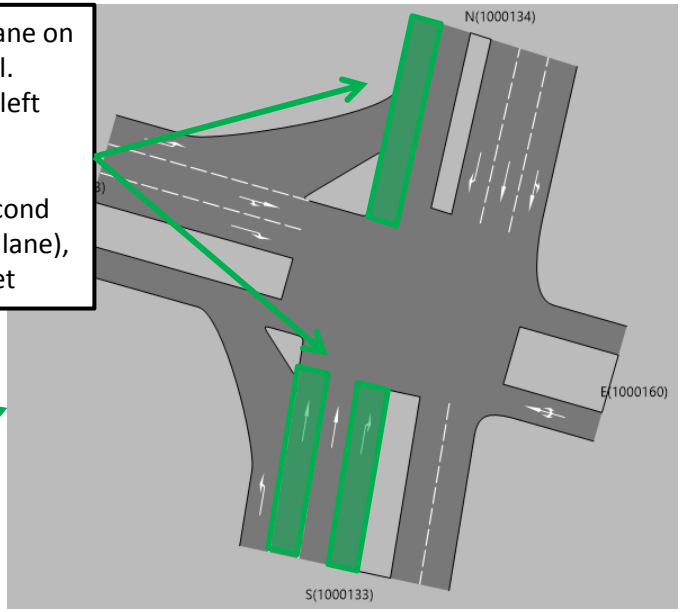
Current Layout

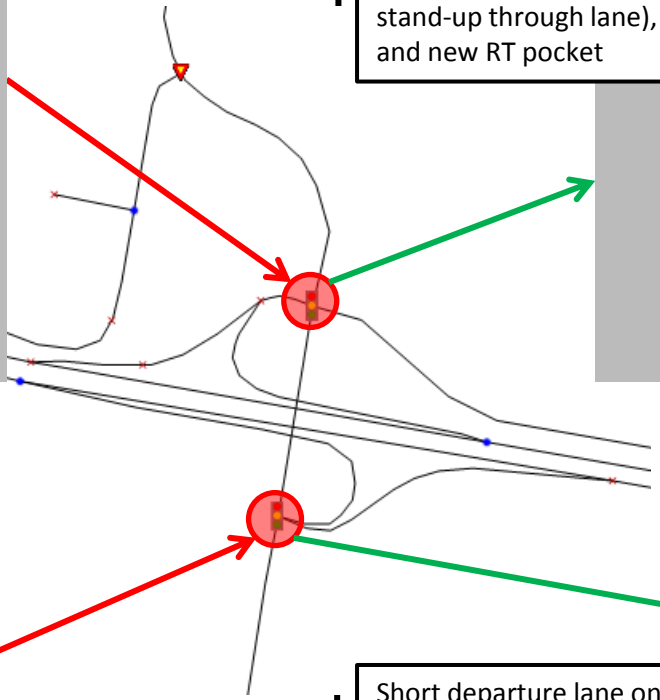




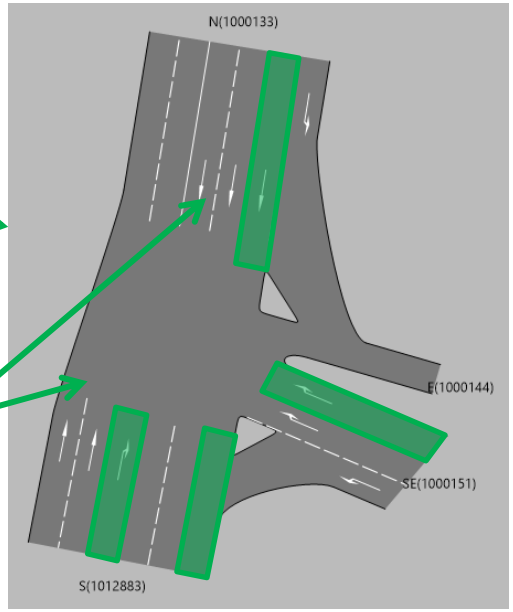
Proposed Layout

Short departure lane on northern side (incl. reconstruction of left turn slip lane on southern side to accommodate second stand-up through lane), and new RT pocket



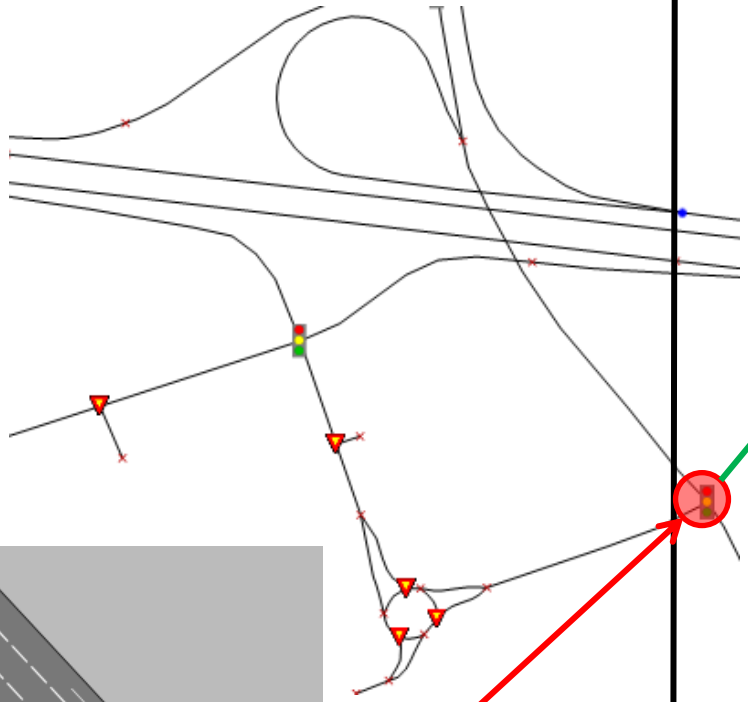


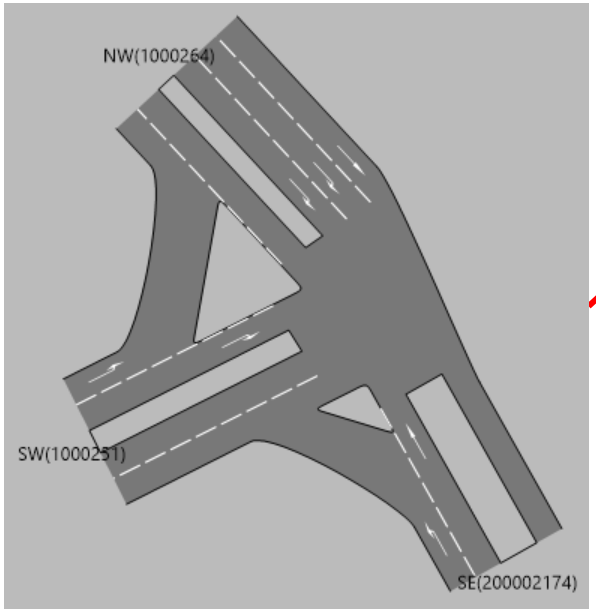
Short departure lane on southern side (incl. reconstruction of left turn slip lane on northern side and third stand-up through lane), and new RT pockets on southern and eastern approaches



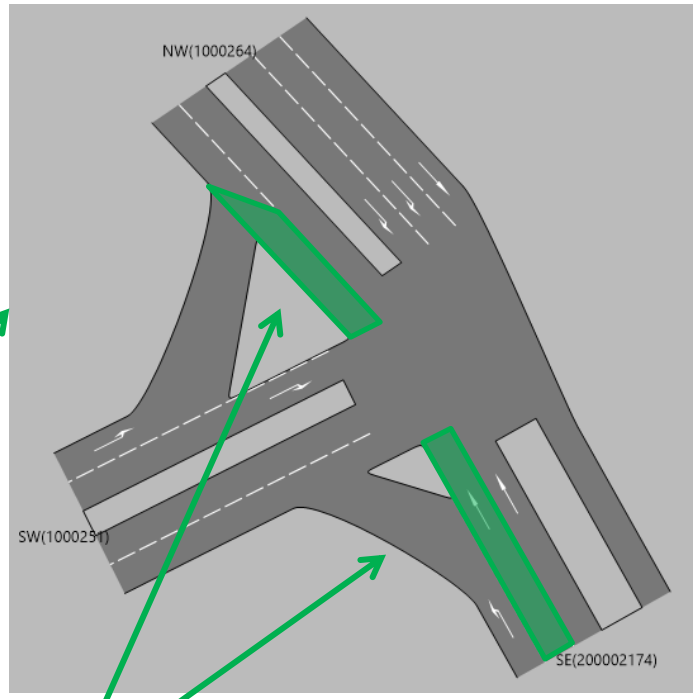
Claymore Rd / Sippy Downs Dr Intersection Upgrades

Current Layout





Proposed Layout



Short approach lane on southern side (incl. reconstruction of left turn slip lane on southern and western sides to accommodate second stand-up through lane)

Pignata Rd Connection

Potential Benefits

TMR Benefits

- Reduces flow on Southern Link Rd (ultimately by 20-25%)
- If constructed early, could defer the need for the Southern Link Rd, which also removes the immediate safety risks associated with pushing more traffic through the sub-standard Racecourse Rd interchange
- Reduces flow across Sippy Downs interchange by approx. 7%
- Potential benefits for Sunshine Mwy weave section between Dixon Rd interchange and Kawana Way interchange due to having traffic on the motorway lanes, rather than exiting / entering to / from the Dixon Rd interchange ramps
- Early construction of the Pignata Rd connection potentially frees up developer funds earlier to contribute to Sunshine Mwy Service Rd (or similar) upgrade, which is the part of the network with the highest need - 2026 models suggest v/c > 100% (approx. 20-25% increase generated by Palmview Devt ultimately)

SCC Benefits

- Reduces flow on Springhill Dr by approx. 20%
- Reduces flow on University Way by approx. 20-25%
- Reduces flow on Claymore Rd by approx. 20%
- Early construction of Pignata Rd connection reduces future risk of building the link through a built-up area

Developer Benefits

- Reduced congestion on critical access links (Springhill Dr, Claymore Rd) - more marketable
- Potential lower upfront costs if Pignata Rd connection is brought forward (and Southern Link Rd delayed)???

Additional Notes

- Sequencing analysis to determine potential impacts of delaying Southern Link Rd, i.e. analysis on Pignata Rd Underpass intersections to ensure that the configuration will cater for demands up to point in time that Southern Link Rd would be delivered

Bruce Highway Upgrade Planning (Caloundra Road - Sunshine Motorway)

Traffic Analysis & Modelling Summary

November 2015

Queensland Government

Creative Commons information

Document control options

Departmental approvals

Refer to the appropriate Risk Assessment Tool for relevant reviewer and approver

Date	Name	Position	Action required *(Review/endorse/approve)*	Due

Risk level

☐ GACC major ☐ GACC minor ☐ High risk (but not GACC) ☐ Medium risk

Prepared by	Anthony Fichera
Title	Senior Advisor (Network Development)
District & Region	North Coast District / North Coast & Wide Bay/Burnett Region
Branch & Division	Program Delivery & Operations / Infrastructure Management & Delivery
Project/program	Bruce Highway Upgrade Planning (Caloundra Road - Sunshine Motorway)
Project number	280/10A/001
Project location	Sunshine Coast
Status	Approved
DMS ref. no.	

Executive Summary

Background

The section of the Bruce Highway between Caloundra Road and the Sunshine Motorway has had its speed limit reduced to 100km/h (from 110km/h) as a result of the existing capacity constraints and safety risks along the route. The current issues are described below:

- The existing at-grade stop-sign controlled intersection of the northbound entry ramp to the Bruce Highway from the Sunshine Motorway and the northbound exit ramp from the Bruce Highway to the Sunshine Motorway is at capacity during weekday peak hours. The northbound exit ramp is approaching capacity, so there are insufficient gaps for northbound entering vehicles to cross, causing significant queueing back onto the Sunshine Motorway westbound. The high traffic volume on the northbound exit ramp also results in slow moving traffic tailing back on to the Bruce Highway.
- The existing Bruce Highway / Caloundra Road interchange is also at capacity during weekday and weekend peak periods. The existing signalised intersection on the western side of the interchange is completely saturated. Traffic queued on the westbound approach to the intersection tails back beyond the priority controlled intersection where Landsborough bound traffic enters the interchange from the Bruce Highway southbound. This causes the queue on the ramp to spill back towards the highway.
- The existing entry ramps at both interchanges have sub-standard merge lengths and the interchange spacing to/from the Frizzo Road and Pignata Road ramps does not meet current standards. This, along with the high volume of local traffic entering and leaving the highway within this section means that there is significant disruption around the ramps causing delays and impacting safety.

Future growth in the region will exacerbate the current congestion problem and increase the frequency of crashes.

To solve the current safety and efficiency issues, the reference design for the project comprises the following:

- Six-laning of the Bruce Highway (with provision for future eight-laning);
- Construction of new interchanges at Caloundra Road and the Sunshine Motorway;
- Provision of a two-lane service road west of the Bruce Highway; and
- Removal of the existing ramps at Frizzo Road and Pignata Road.

Traffic Modelling Methodology

The traffic modelling process adopted for this project was designed to assess the proposed upgrade using different levels of modelling and therefore best incorporate the key strengths of each. This three tier hierarchical approach can be summarised as:

(1) SCIMMM was used as the basis for trip generation, distribution and mode choice, taking into account future development patterns and population forecasts;

(2) The mesoscopic SC-VISUM models were used for traffic assignment, incorporating assumed future network changes and utilising both link and turn delay for network impedance; and

(3) Study area microscopic VISSIM models were developed utilising the assigned traffic volumes and routing from the SC-VISUM models, and providing a detailed assessment of intersection and network operation.

Reference Design Model Results

The models developed for the reference design indicated that the proposed upgrades will operate at satisfactory levels of service during both peak periods in 2021, 2031 and 2041.

The VISSIM models showed that the two signalised intersections at the proposed Bruce Highway / Caloundra Road interchange will operate at LOS B in both peak periods through to 2031 and then improve to LOS A in 2041 due to the reduction in traffic caused by the assumed upgrade to Kawana / Bells Creek Arterial to motorway standard. The high level of performance is achieved through the use of two-phase signals that can be coordinated efficiently. The proposed

roundabout at the confluence of Steve Irwin Way and the future Western Service Road will operate at LOS A with minimal queueing through to 2031. By 2041, this roundabout may require an upgrade to a signalised roundabout to cater for the increased demand on the Western Service Road resulting from full development in Palmview.

The proposed grade separation of the Bruce Highway and Sunshine Motorway interchange ramps resulted in free-flow conditions in all model scenarios.

Efficient operation was observed at the intersections around the Pignata Road underpass in the 2021, 2031 and 2041 peak period models. It should be noted that the Sunday model assumed development in the Tourist Precinct, which caused increased congestion on the access road. If this development occurs, the developer may be required to upgrade the access road to allow more efficient egress from the site.

The six-laning of the Bruce Highway showed vehicles generally travelling at, or very close to their desired speeds through to 2041 (average travel speeds greater than 100km/h with a posted speed of 110km/h).

Conclusions

The project aims to reduce congestion and improve safety on the section of Bruce Highway between Caloundra Road and the Sunshine Motorway. There are numerous existing safety issues within the study area, as well as congestion during peak and holiday periods. Future growth in the region will exacerbate the current congestion problem and increase safety risk.

The proposed reference design has been assessed under forecast peak loading conditions and has been shown to operate efficiently through to 2041. The traffic models indicate that the configurations of the Caloundra Road and Sunshine Motorway interchanges with the Bruce Highway will operate with minimal delays and queueing, providing safe and efficient access to the highway.

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Abbreviations

Abbreviation	Term
AAWDT	Annual Average Weekday Daily Traffic
BHUP (CR-SM)	Bruce Highway Upgrade Planning (Caloundra Road to Sunshine Motorway)
CRI	Bruce Highway / Caloundra Road Interchange
DOS	Degree of Saturation
HCM	Highway Capacity Manual
HCVs	Heavy Commercial Vehicles
LOS	Level of Service
MCVs	Medium Commercial Vehicles
NB	Northbound
PVs	Private Vehicles
SB	Southbound
SC-VISUM Models	Sunshine Coast VISUM Models
SCC	Sunshine Coast Council
SCIMMM	Sunshine Coast Integrated Multi-Modal Model
SCTFM	Sunshine Coast Travel Forecasting Model
SMI	Bruce Highway / Sunshine Motorway Interchange
TMR	Department of Transport and Main Roads
v/c ratio	Volume / Capacity Ratio
WB	Westbound

1. Introduction

The Bruce Highway Upgrade Planning (BHUP) (Caloundra Road to Sunshine Motorway) project comprises upgrade of approximately 7km of highway, two interchanges and provision of a service road situated on the western side of the highway. The project has been through comprehensive options analysis and business case phases and will be delivered by a design and construct type contract over the next five years.

1.1 Background

This section of the Bruce Highway has had its speed limit reduced to 100km/h (from 110km/h) as a result of the existing capacity constraints and safety risks along the route. The current issues are described below:

- The existing at-grade stop-sign controlled intersection of the northbound (NB) entry ramp to the Bruce Highway from the Sunshine Motorway and the NB exit ramp from the Bruce Highway to the Sunshine Motorway is at capacity during weekday peak hours. The NB exit ramp link is approaching capacity, so there are insufficient gaps for NB entering vehicles to cross, causing significant queueing back onto the Sunshine Motorway westbound (WB). The high traffic volume on the NB exit ramp also causes slow moving traffic to tail back on to the Bruce Highway.
- The existing interchange between the Bruce Highway and Caloundra Road is also at capacity during weekday and weekend peak periods. The signalised intersection on the western side of the interchange is completely saturated. Traffic queued on the WB approach to the intersection tails back beyond the priority controlled intersection where Landsborough bound traffic enters the interchange from the Bruce Highway southbound (SB). This causes the queue on the ramp to spill back towards the highway.
- The existing entry ramps at both interchanges have sub-standard merge lengths and the interchange spacing to/from Frizzo Road and Pignata Road does not meet current standards. This, along with the high volume of local traffic entering and leaving the highway within this section means that there is significant disruption around the ramps causing delays and impacting safety.

1.1.1 Project Objectives

The project aims to reduce congestion and improve safety on the section of Bruce Highway between Caloundra Road and the Sunshine Motorway. As discussed above, there are numerous existing safety issues within the study area, as well as congestion during peak and holiday periods. Future growth in the region will exacerbate the current congestion problem and increase safety risk.

To solve the current safety and efficiency issues, the reference design for the project comprises the following:

- Six-laning of the Bruce Highway (with provision for future eight-laning);
- Construction of new interchanges at Caloundra Road and the Sunshine Motorway;
- Provision of a two-lane service road west of the Bruce Highway; and
- Removal of the existing ramps at Frizzo Road and Pignata Road.

1.2 Purpose of this Report

This report details the development of traffic models used for the project. It provides background information regarding the higher order models used within the region, which form the underlying basis of the detailed models used in this project. The report also summarises the output results from the project microsimulation models used for assessing intersection and network operation under forecast peak loading conditions.

2. Reference Design Upgrades

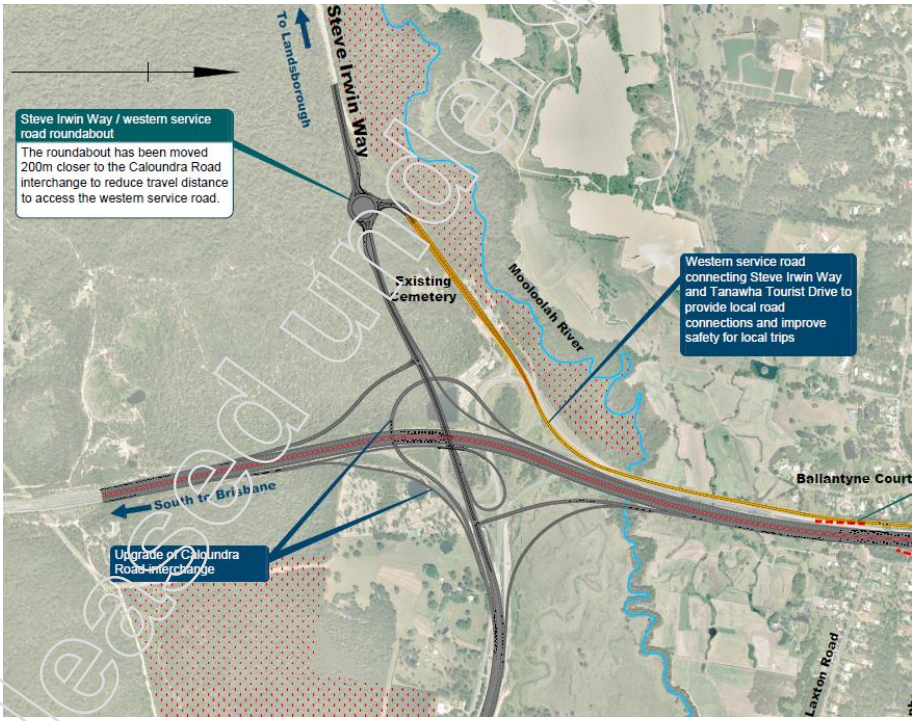
The reference design for the project comprises six-laning of the Bruce Highway (with provision for future eight-laning), construction of new interchanges at Caloundra Road and the Sunshine Motorway, provision of a two-lane service road west of the Bruce Highway and removal of the existing ramps at Frizzo Road and Pignata Road. Further detail regarding the interchange configurations and Western Service Road is provided below.

2.1 Bruce Highway / Caloundra Road Interchange (CRI)

The proposed works at the CRI (refer to Figure 1) include the following:

- Signalised ramp terminals for the Bruce Highway exit ramps;
- Construction of a new four lane bridge;
- Provision of a NB flyover entry ramp (from Caloundra Road to the Bruce Highway); and
- Provision for connectivity to the Western Service Road via a roundabout on Steve Irwin Way.

Figure 1 Reference Design Layout - CRI



2.2 Bruce Highway / Sunshine Motorway Interchange (SMI)

The proposed works at the SMI (refer to Figure 2) include the following:

- Realignment of the NB exit ramp;
- Provision of a free-flow NB entry loop (resulting in removal of the existing at-grade ramp crossing);
- Realignment of Wilson Road to make space for the new NB ramps;
- Upgraded SB ramps; and
- Removal of the weaves on the Sunshine Motorway between the Bruce Highway and Sippy Downs Drive through provision of direct ramps between Sippy Downs and the Bruce Highway (south) (connectivity between Sippy Downs and the Bruce Highway (north) is provided via the Western Service Road).

Figure 2 Reference Design Layout - SMI

2.3 Western Service Road

The project comprises a fully connected Western Service Road including:

- Closure of all ramps at Frizzo Road and Pignata Road (access to the Tourist Precinct and the surrounding areas will be via the Western Service Road);
- A new signalised intersection at the Pignata Road underpass for access to / from the Tourist Precinct);
- A new signalised intersection at Tanawha Tourist Drive;
- A roundabout at Steve Irwin Way (as described in section 2.1); and
- North-facing ramps connecting to the Bruce Highway at the SMI.

2.4 Project Model Scenarios

Forecast year models were developed for the following scenarios:

- 2021 AM and PM weekday peak periods;
- 2031 AM and PM weekday peak periods;
- 2031 Sunday afternoon peak period; and
- 2041 AM and PM weekday peak periods.

3. Regional Transport Models

This section provides a brief summary of the Sunshine Coast region transport models relevant to this study.

3.1 Sunshine Coast Travel Forecasting Model (SCTFM)

SCTFM is a strategic travel forecasting model developed jointly by Sunshine Coast Council (SCC) (formerly Maroochy Shire Council) and TMR (formerly Department of Main Roads), in collaboration with the former Noosa Shire and Caloundra City Councils. The model was used to predict Annual Average Weekday Daily Traffic (AAWDT) and AM and PM (2 hour) peak demands, and was developed using EMME2 software. It should be noted that route choice within SCTFM is based purely on link delay and does not incorporate intersection and turn delays within the assignment process.

Traffic analysis work undertaken for this project during the early planning phases (pre 2013) utilised SCTFM for demand forecasting. SCTFM has been decommissioned and higher order strategic modelling within the region is currently undertaken using the Sunshine Coast Integrated Multi-Modal Model (SCIMMM). Therefore, SCTFM had no direct application to the work undertaken in this latest phase of the project.

3.2 Sunshine Coast Integrated Multi-Modal Model (SCIMMM)

SCIMMM is a strategic travel forecasting model that operates in EMME. It also provides estimates for AAWDT and 2hr peak period demands for 2011, 2016, 2021, 2026 and 2031. Similar to SCTFM, the route choice within SCIMMM is based purely on link delay. In addition to the model years discussed above, a "2031+" scenario has also been developed that assumes full build-out of the key development areas around the Sunshine Coast. For the purposes of this report and modelling reference, this has been referred to as a 2041 dataset. Further discussion on the demographic assumptions within SCIMMM is provided in section 3.4.

The demographic inputs from SCIMMM are based on a review of planning assumptions for the region conducted during 2012. The trip generation, distribution and mode choice models within SCIMMM have been used to calculate the demand matrices that have been applied in the traffic analysis work undertaken in this phase of the project.

3.3 Regional Sunshine Coast VISUM (SC-VISUM) Mesoscopic Models

The regional SC-VISUM mesoscopic models have been recently developed jointly by TMR and SCC and are essentially assignment models that utilise demand matrices from SCIMMM. The VISUM models generally cover the entire Sunshine Coast region and provide 2hr AM and PM peak period flows representative of AAWDT peak period demands. The networks contain detailed intersection geometries, as the assignments are based on volume delay functions for both links and turns at intersections, therefore providing a more accurate representation of route choice than the region's strategic models.

A detailed calibration phase was undertaken during the development of the SC-VISUM models. This calibration utilised 2013 link and intersection counts around the region, with particular attention given to the BHUP (CR-SM) project study area. The future year base model networks incorporate all known planned upgrades, as well as various other assumed upgrades to ensure that a sensible assignment is calculated without significant capacity constraints around the network.

3.4 Modelled Demographic Assumptions

As discussed above, the demographic assumptions adopted for the study align with the base assumptions built into SCIMMM. The population and employment assumptions for the region's key major development areas are presented in Table 1:

Table 1 Key Demographic Assumptions (Approx. % Complete Based on SCIMMM)

Development Area	2031		2041	
	Population	Employment	Population	Employment
Caloundra South	50%	65%	100%	100%
Kawana Town Centre Precinct	100%	100%	100%	100%
Maroochydore Town Centre	75%	75%	100%	100%
Palmview	40%	35%	100%	100%

3.5 Modelled Network Assumptions

As discussed in section 3.3, the base model networks for all modelled years incorporate all known planned upgrades, as well as various other assumed upgrades to ensure that a sensible assignment is calculated without significant capacity constraints around the network.

The 2031 networks comprise an extensive list of upgrades, including lane additions and interchange upgrades along the Bruce Highway and Sunshine Motorway, as well as provision of an arterial standard Kawana / Bells Creek Arterial with an 80km/h speed environment and at-grade intersections. Upgrade to the Kawana / Bells Creek Arterial to motorway standard has been assumed to occur by 2041. Various other arterial and local road upgrades associated with the major development areas, as well as other planned Council upgrades were included in the 2031 and 2041 networks.

4. Broad Modelling Methodology

The traffic modelling process adopted for this project was designed to assess the proposed upgrade using different levels of modelling and therefore best incorporate the key strengths of each. This three tier hierarchical approach can be summarised as:

(1) SCIMMM was used as the basis for trip generation, distribution and mode choice, taking into account future development patterns and population forecasts;

(2) The mesoscopic SC-VISUM models were used for traffic assignment, incorporating assumed future network changes and utilising both link and turn delay for network impedance; and

(3) Study area microscopic VISSIM models were developed utilising the assigned traffic volumes and routing from the SC-VISUM models, and providing a detailed assessment of intersection and network operation.

In addition to the commuter peak periods modelled using demands from the regional models, an indicative 2031 Sunday afternoon project area model has been developed to assess the operation of the reference design layout under the higher loading expected on a weekend (as is experienced currently in this area). This Sunday dataset uses existing counts to develop factors to apply to the weekday demands, since a Sunday land use / demand model is not available. The Sunday demand set also assumes development in the Aussie World zone.

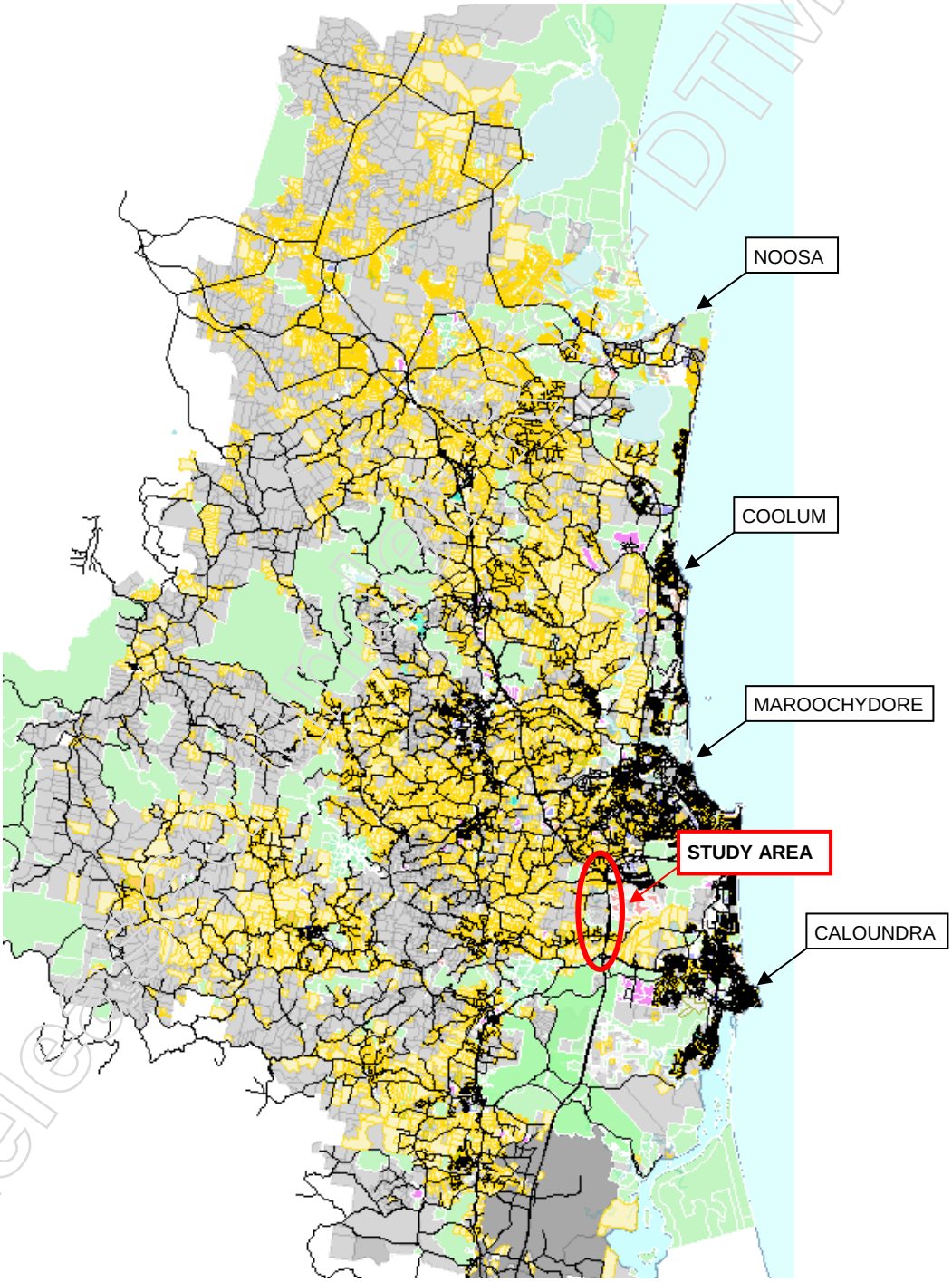
4.1 SC-VISUM Mesoscopic Modelling

This section provides information about the application of the SC-VISUM models for this project.

4.1.1 Model Definition

Figure 3 shows the coverage of the SC-VISUM models:

Figure 3 SC-VISUM Model Coverage Diagram



The models assign demand matrices (output from SCIMMM) for the following time periods:

- 2hr AM peak period: 7-9am; and
- 2hr PM peak period: 4-6pm.

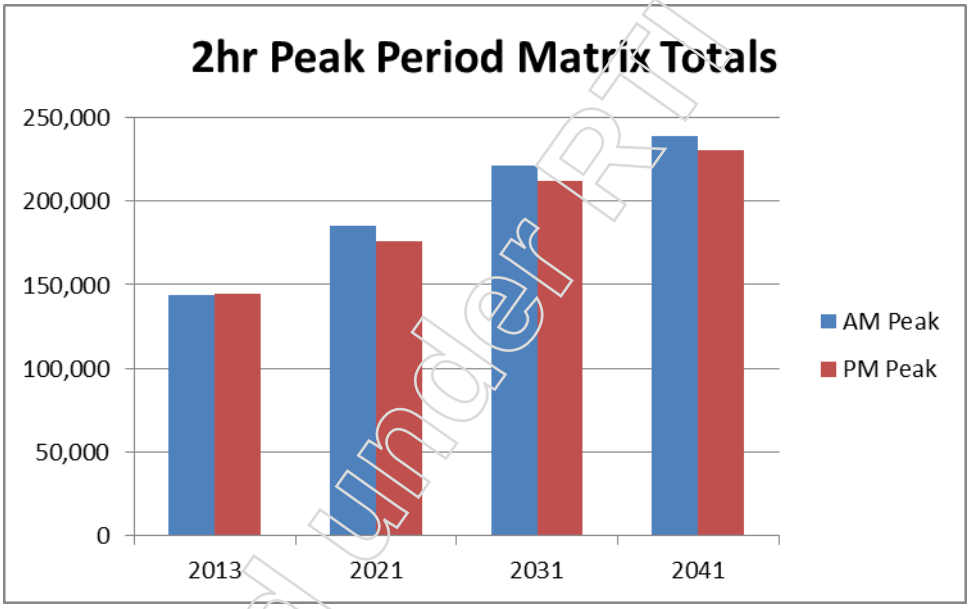
It should be noted that all reported peak hour volumes within this report are based on a 1hr:2hr factor of 0.55 (the 1hr:3hr factor applied for the 3hr Sunday model was 0.367).

The demand matrices from SCIMMM include the following user classes:

- Private Vehicles (PVs);
- Medium Commercial Vehicles (MCVs); and
- Heavy Commercial Vehicles (HCVs).

The assignment in the SC-VISUM models is undertaken as a single class assignment by combining the three SCIMMM demand matrices into a total vehicle matrix. The 2hr peak period matrix totals for the base 2013 model and the forecast 2021, 2031 and 2041 models are presented in Figure 4:

Figure 4 SC-VISUM Model 2hr Matrix Totals



4.1.2 Performance Criteria

The reference design models were assessed in VISUM for link capacity and turn capacity at intersections. The results from VISUM presented within this report show link volume/capacity (v/c) ratios, as well as red node shading for intersections (including merge/diverge locations) where any movement has a v/c ratio exceeding the adopted threshold.

For the purposes of this project, a link DOS (Degree of Saturation) threshold of 0.8 was adopted to ensure flexibility and some degree of future proofing in the design. Similarly, a threshold DOS of 0.8 was adopted for intersection turns in the VISUM model (the intersections were to be later assessed in detail using VISSIM to ensure delays etc. are within target thresholds).

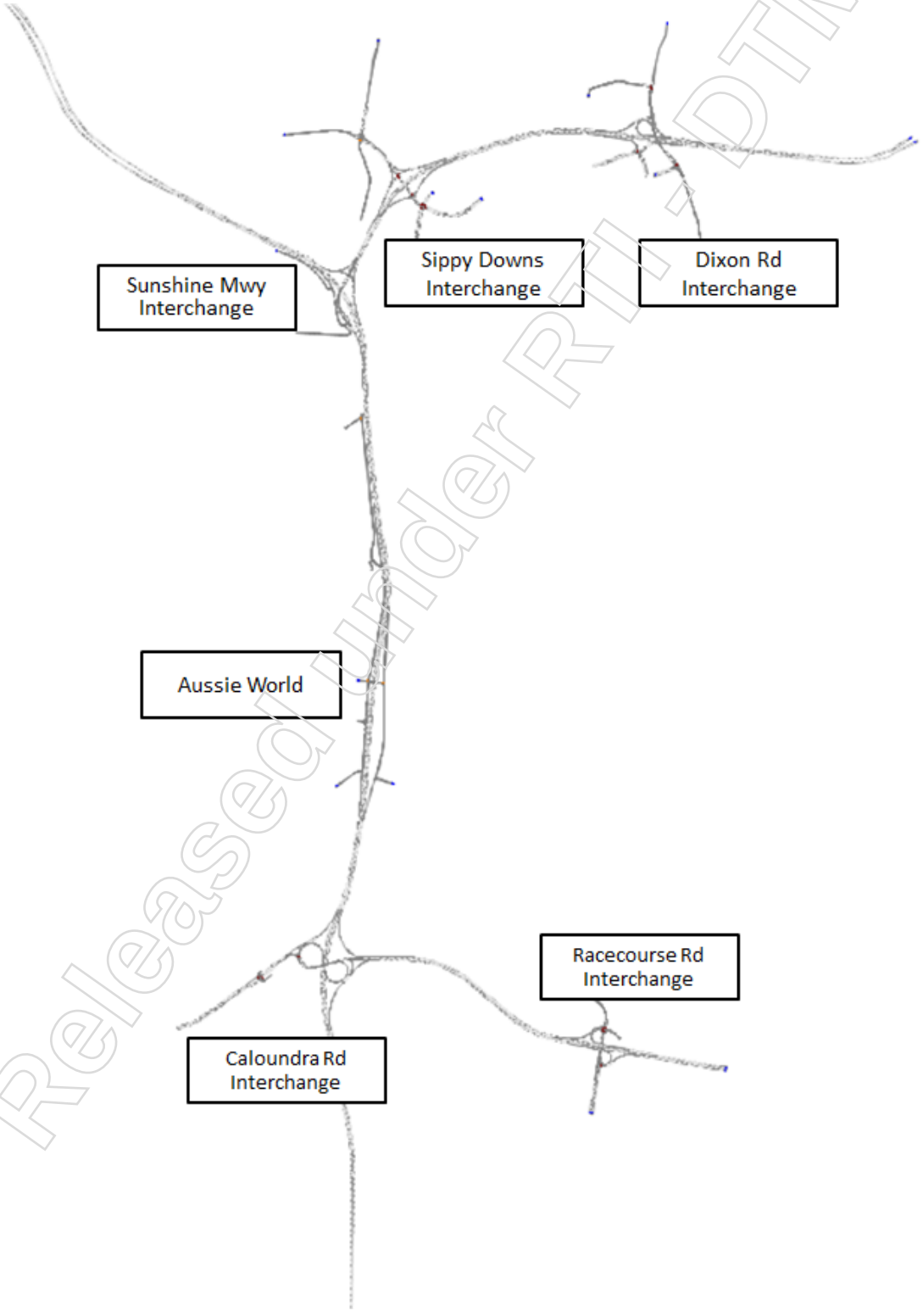
4.2 VISSIM Microsimulation Modelling

This section provides information about the development and application of the VISSIM models developed for this project.

4.2.1 Model Definition

Figure 5 provides the extents of the microsimulation study area:

Figure 5 VISSIM Microsimulation Model Extents (based on Existing Network)



The VISSIM models have been developed by generating a sub-network of the project study area from the SC-VISUM models (including adjacent relevant network, i.e. Sippy Downs interchange, Dixon Road interchange and Racecourse Road interchange). The networks have been refined using AutoCAD files for the reference design model background.

The VISSIM models operate for the following time periods:

- 2hr AM peak period: 7-9am (6:45-7am warm-up period); and
- 2hr PM peak period: 4-6pm (3:45-4pm warm-up period).

As noted in section 4, a 2031 Sunday afternoon model has also been developed for the purposes of this project. It operates for the following time period:

- 3hr Sunday afternoon period: 2-5pm (1:45-2pm warm-up period).

4.2.2 Performance Criteria

The models were used to assess detailed intersection performance, including movement delays and queue lengths, signal co-ordination, dispersion of queues and overall vehicle progression.

The thresholds for delay in the VISSIM models were based on the Highway Capacity Manual (HCM 2010) method. This method is based on the average delay per vehicle for all intersection movements and is dependent on the intersection control type. The HCM does not provide threshold limits for roundabouts, but it recommends that the threshold limits for unsignalised intersections be adopted. Accordingly, the adopted level of service (LOS) thresholds for this assessment are presented in Table 2:

Table 2 HCM LOS Thresholds

LOS	Average Delay per Vehicle (secs)		
	Priority Control Intersections	**Roundabouts**	**Signalised Intersections**
A	00 < d ≤ 10	00 < d ≤ 10	00 < d ≤ 10
B	10 < d ≤ 15	10 < d ≤ 15	10 < d ≤ 20
C	15 < d ≤ 25	15 < d ≤ 25	20 < d ≤ 35
D	25 < d ≤ 35	25 < d ≤ 35	35 < d ≤ 55
E	35 < d ≤ 50	35 < d ≤ 50	55 < d ≤ 80
F	50 < d	50 < d	80 < d

In addition to delay outputs, visual examination of the model animation was conducted to assess the extent of queue build-up, potential vehicular conflicts, merging/weaving issues, overall vehicle progression and the number of cycles for queues to clear at signalised intersections.

5. Reference Design Model Results

The VISUM and VISSIM models for the reference design have been run for the forecast 2021, 2031 and 2041 model years. The results are summarised below.

5.1 2021 VISUM Results

The results shown in Figure 6 and Figure 7 indicate that the proposed upgrades will operate at satisfactory levels of service during both peak periods in 2021. All links and turning movements at intersections are shown to have degrees of saturation less than 80%. It should be noted that the proposed roundabout at the confluence of Steve Irwin Way and the future Western Service Road is highlighted as having a particular turn with a v/c ratio greater than 80%. The regional VISUM models do not model roundabout capacity with a high degree of accuracy, as they are unable to incorporate gap acceptance modelling in their capacity estimates. For this reason, the roundabouts were assessed in detail in the VISSIM models to ensure capacity and delays are satisfactory.

Figure 6 2021 AM Peak Hour v/c Plot - Reference Design Model

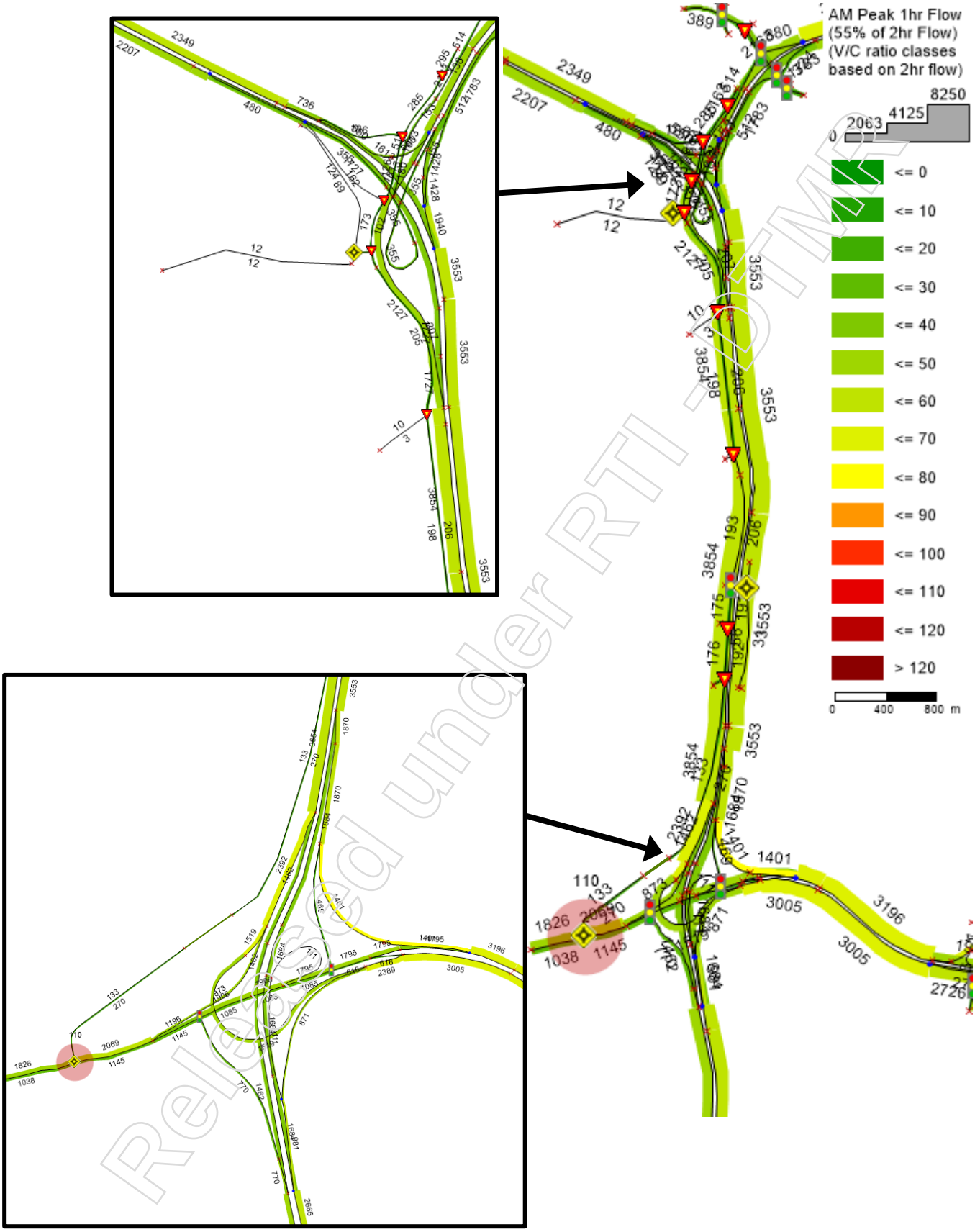
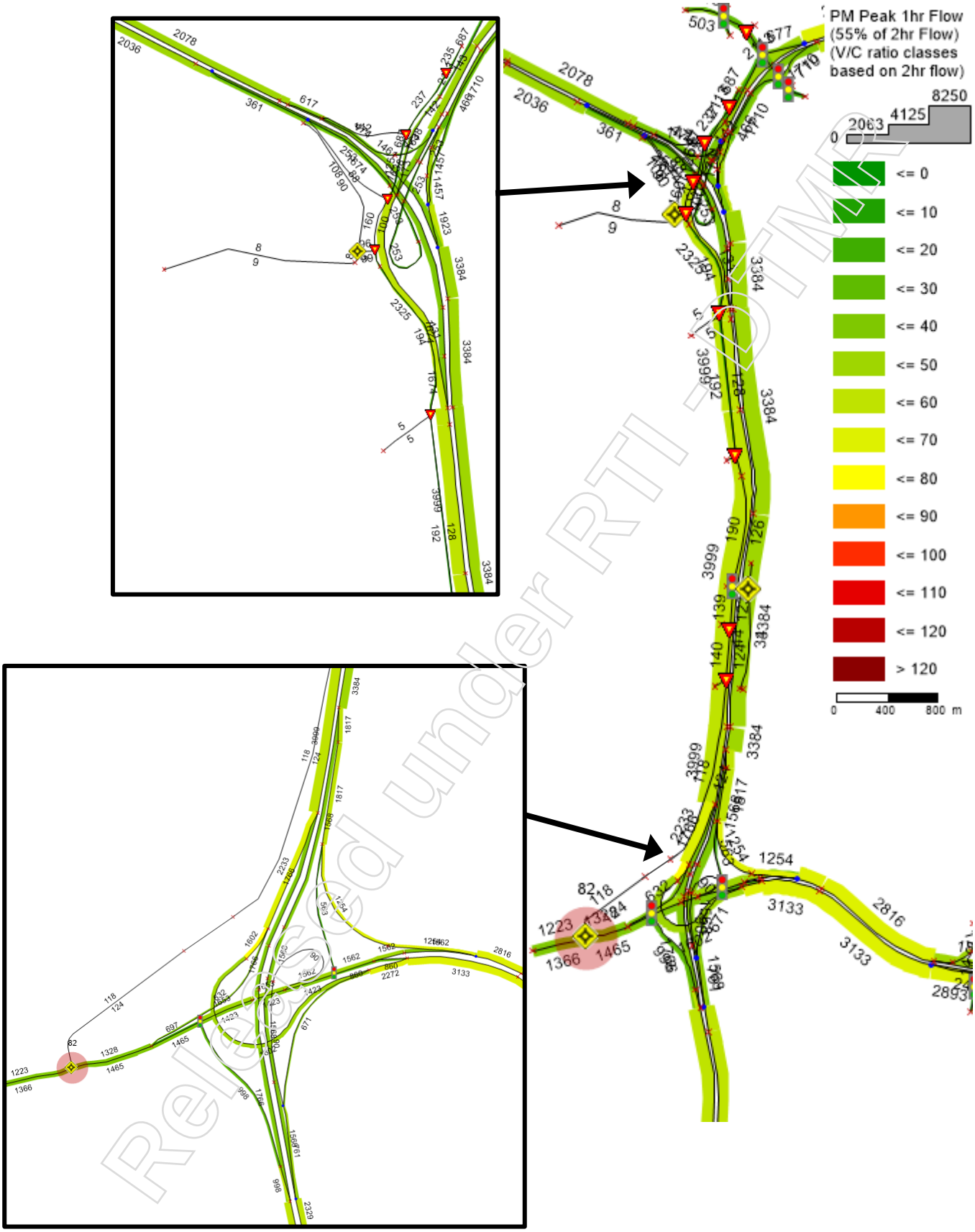


Figure 7 2021 PM Peak Hour v/c Plot - Reference Design Model

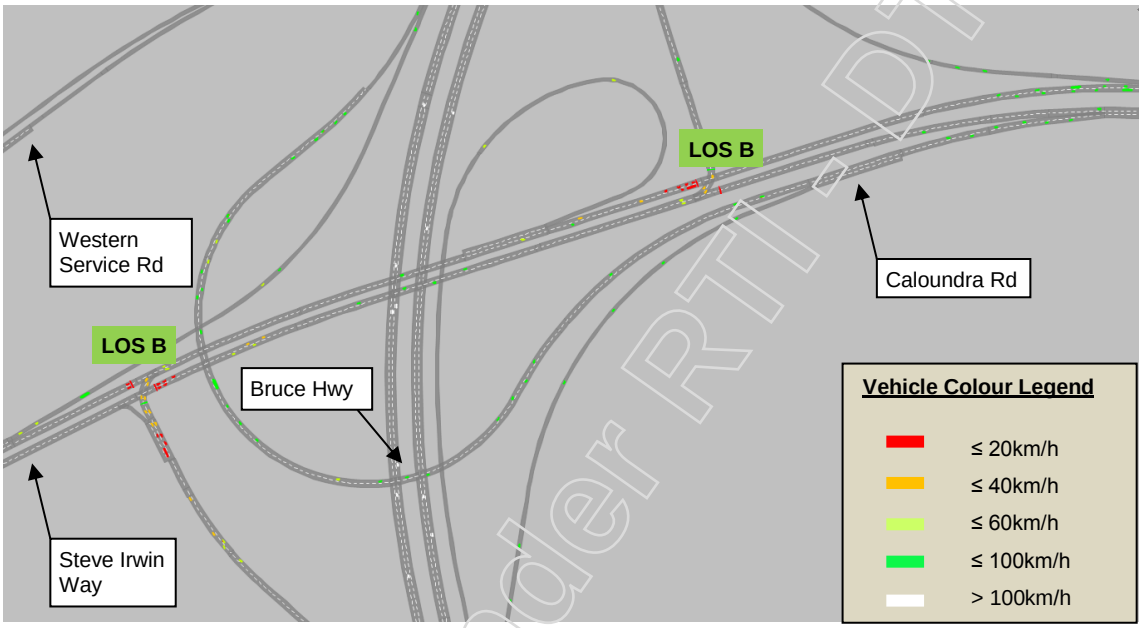


5.2 2021 VISSIM Results

The VISSIM models developed for the reference design showed that the proposed configurations of both the CRI and the SMI will operate efficiently in 2021.

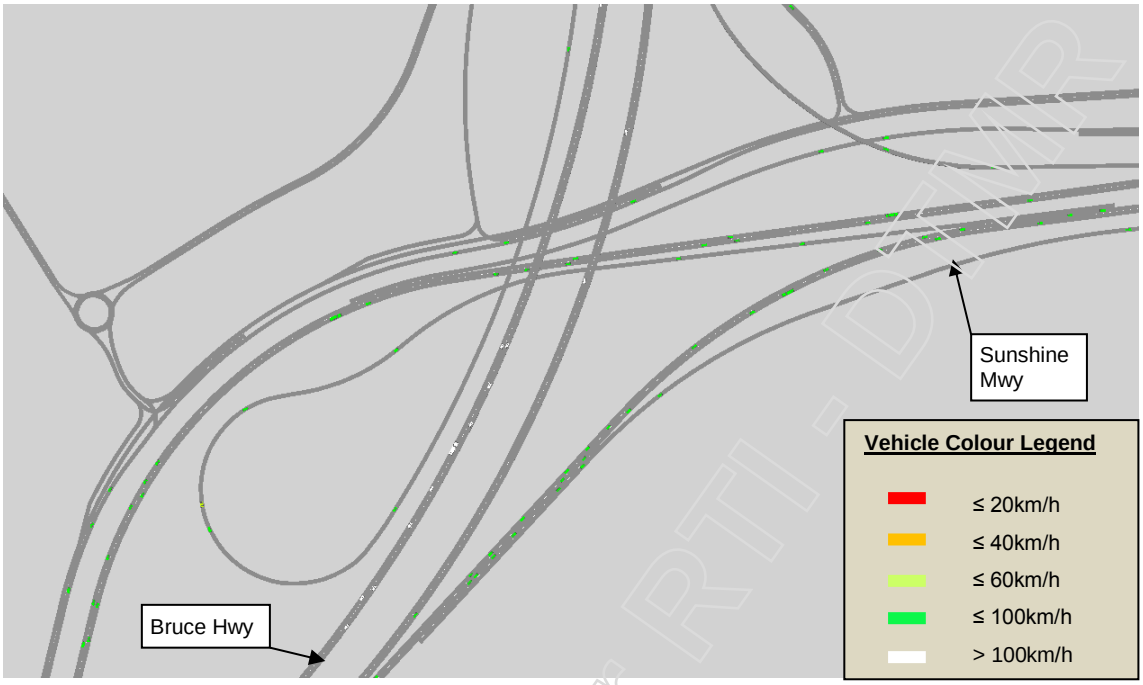
The 2021 VISSIM model results showed that the two signalised intersections at the proposed CRI will operate at LOS B in both peak periods, with queues clearing in each cycle. The high level of performance is achieved through the use of two-phase signals that can be coordinated efficiently. Figure 8 shows the typical operation of the interchange in both peak periods.

Figure 8 2021 Reference Design VISSIM Model - CRI



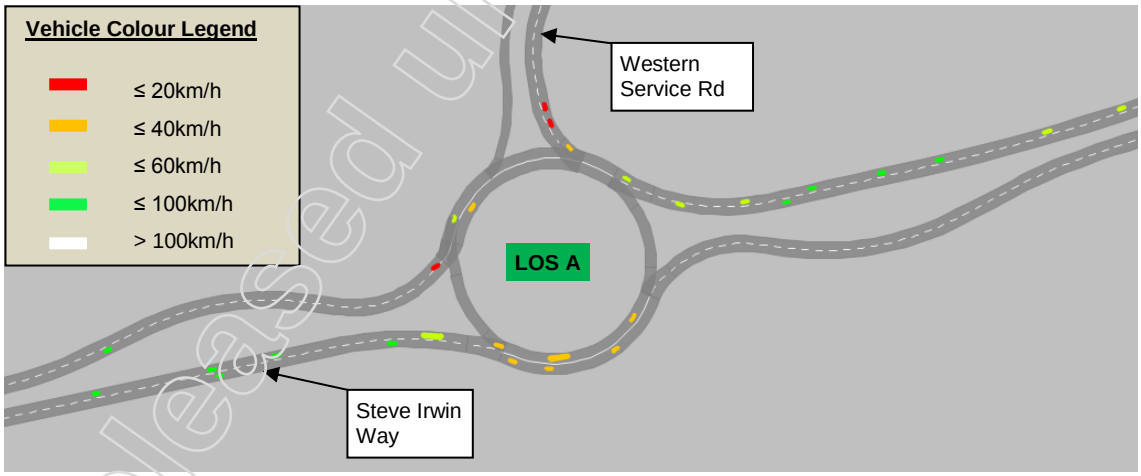
The results for the SMI indicated that the grade separation will allow the proposed interchange ramps to operate under free-flow conditions. Figure 9 shows a screenshot from the 2021 AM peak VISSIM model highlighting the free-flow conditions. This is typical of both peak periods.

Figure 9 2021 Reference Design VISSIM Model - SMI



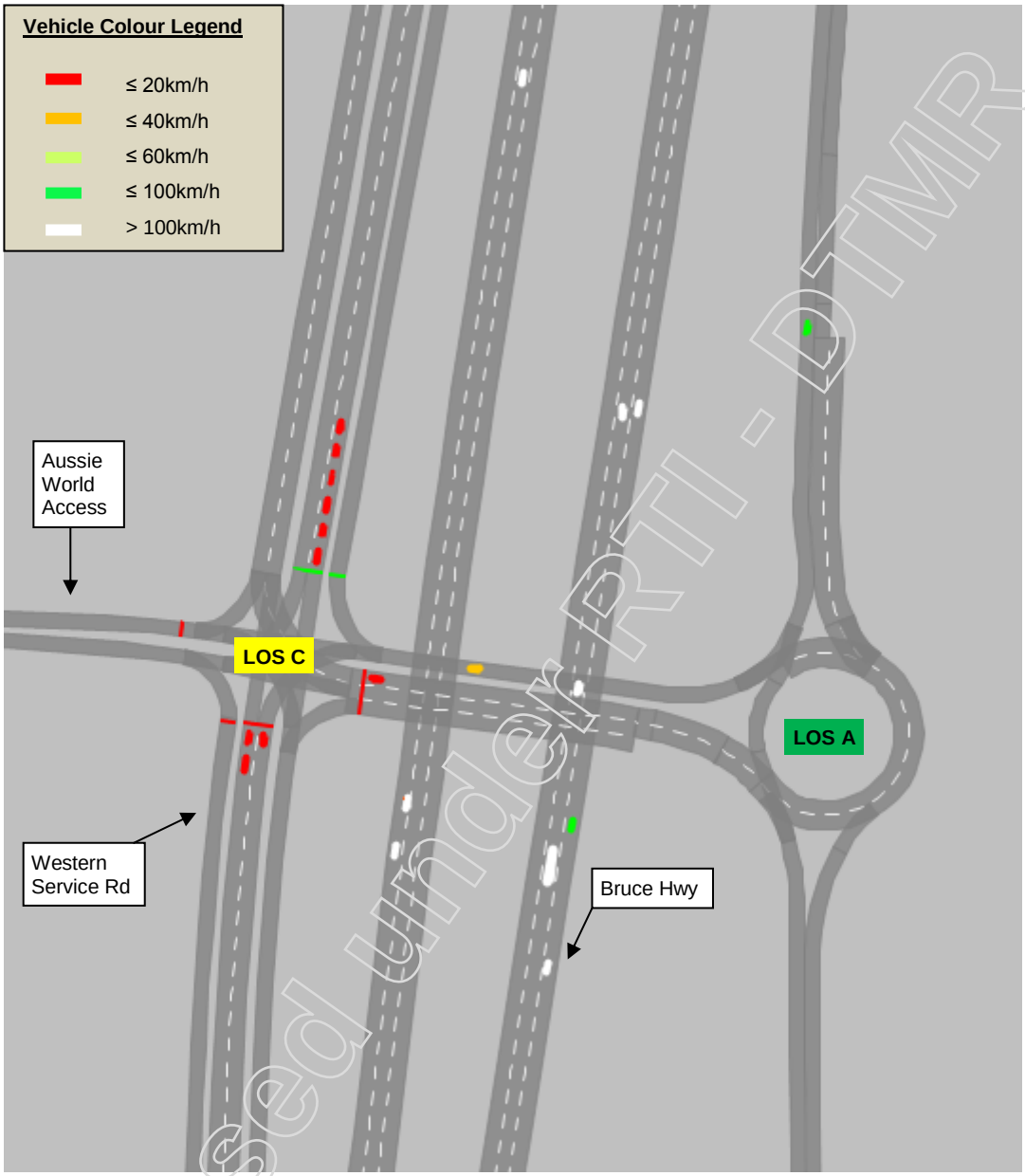
As discussed in section 5.1, the proposed roundabout at the confluence of Steve Irwin Way and the future Western Service Road has been assessed in greater detail in the VISSIM models. The results indicated that the roundabout will operate at LOS A in both peak periods, with minimal queueing as shown in Figure 10.

Figure 10 2021 Reference Design VISSIM Model - Steve Irwin Way / Western Service Road Roundabout



The VISSIM models showed that the proposed configuration at the Pignata Road underpass will operate efficiently in 2021. Typical queueing in both peak periods is shown in Figure 11:

Figure 11 2021 Reference Design VISSIM Model - Pignata Road Underpass Intersections



5.3 2031 VISUM Results

The results shown in Figure 12, Figure 13 and Figure 14 indicate that the proposed upgrades will operate at satisfactory levels of service during both peak periods in 2031. Similar to the 2021 results, all links and turning movements at intersections are shown to have degrees of saturation at 80% or less. It should be noted that the proposed roundabout at the confluence of Steve Irwin Way and the future Western Service Road is highlighted as having a particular turn with a v/c ratio greater than 80%. As discussed in section 5.1, the regional VISUM models do not model roundabout capacity with a high degree of accuracy, as they are unable to incorporate gap acceptance modelling in their capacity estimates. For this reason, the roundabouts were assessed in detail in the VISSIM models to ensure capacity and delays are satisfactory. It should also be noted that the SB carriageway of the Bruce Highway (south of Caloundra Road) is over-saturated in the Sunday afternoon scenario. Six-laning of this section of the Bruce Highway is outside the scope of this project.

Figure 12 2031 AM Peak Hour v/c Plot - Reference Design Model

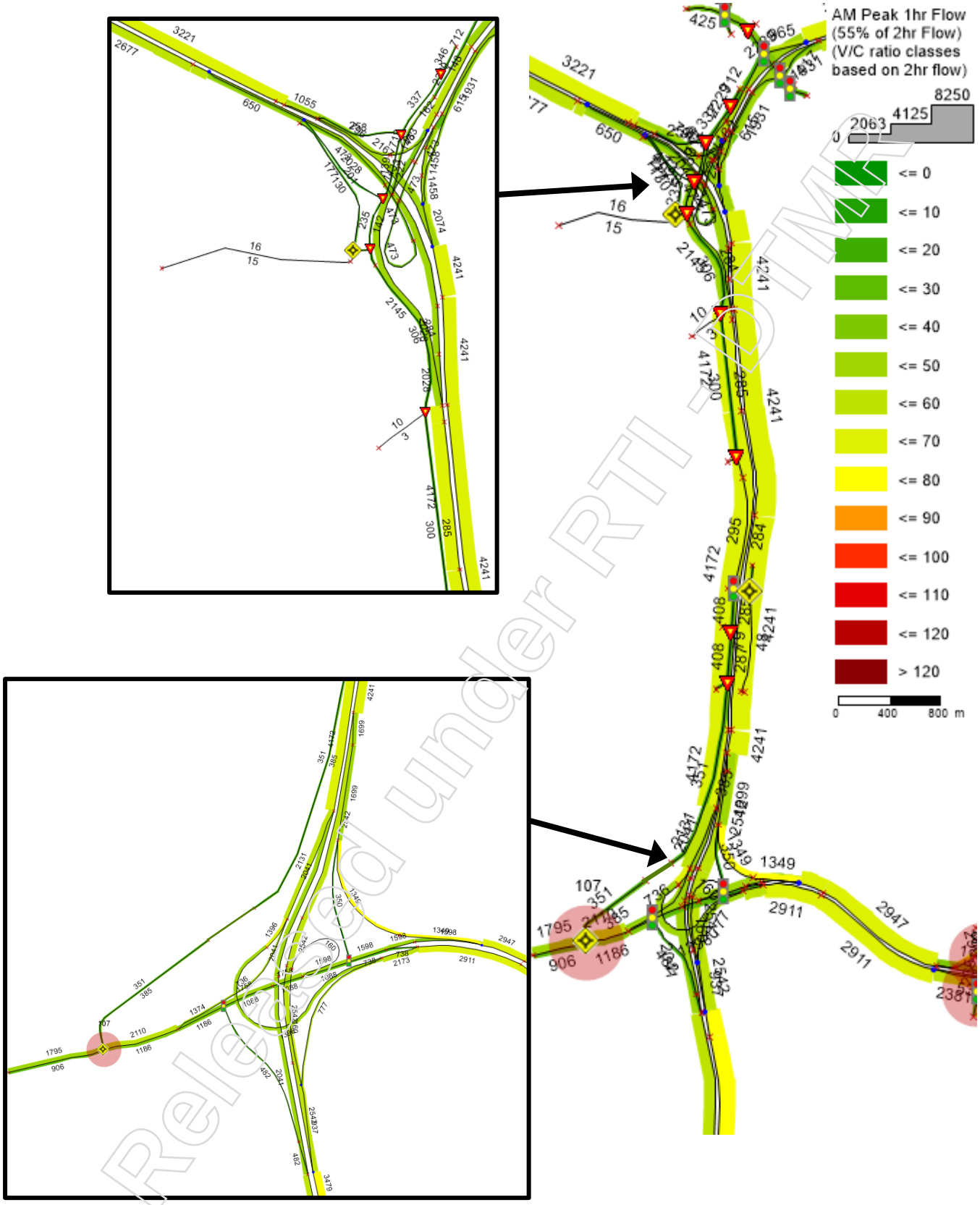


Figure 13 2031 PM Peak Hour v/c Plot - Reference Design Model

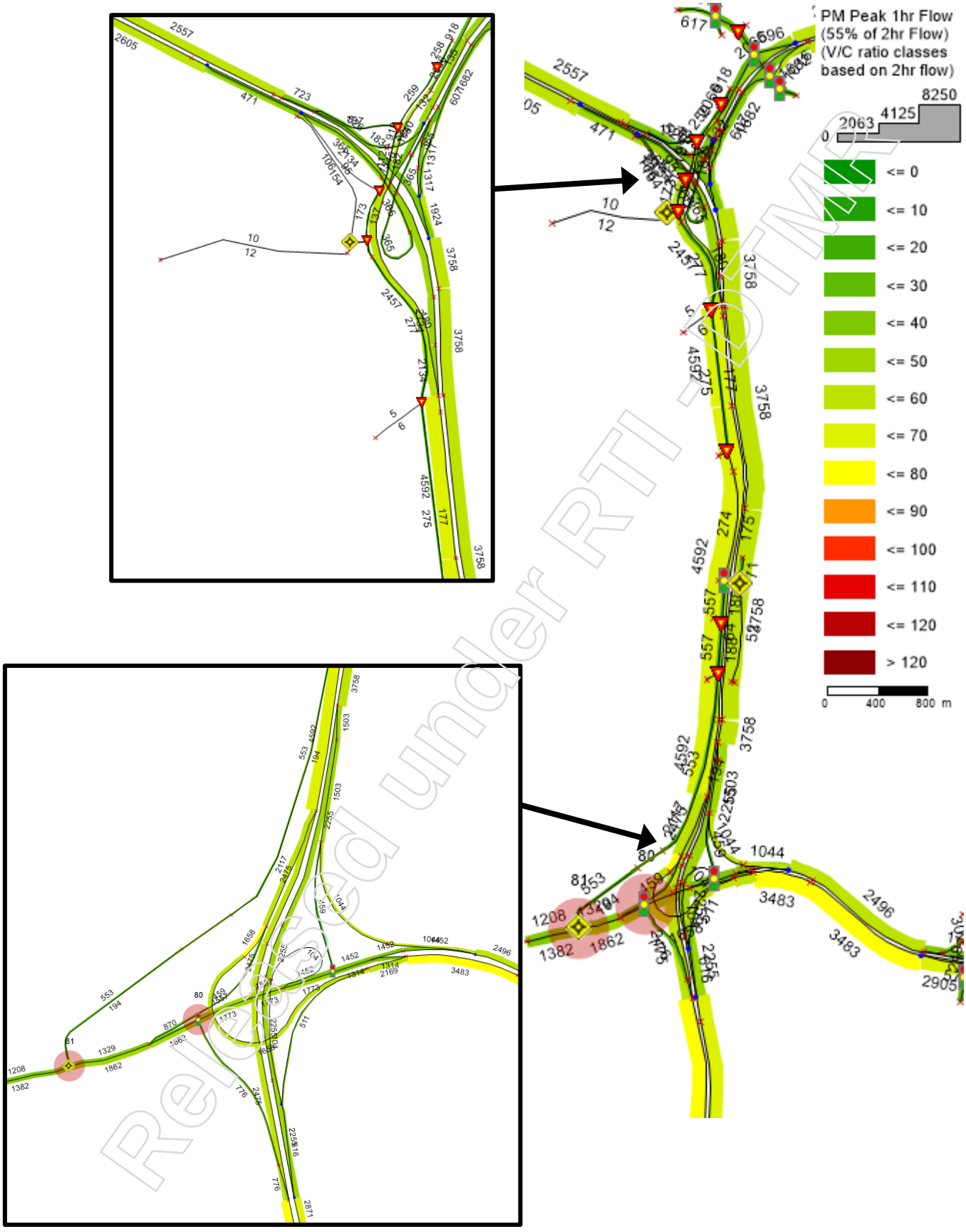
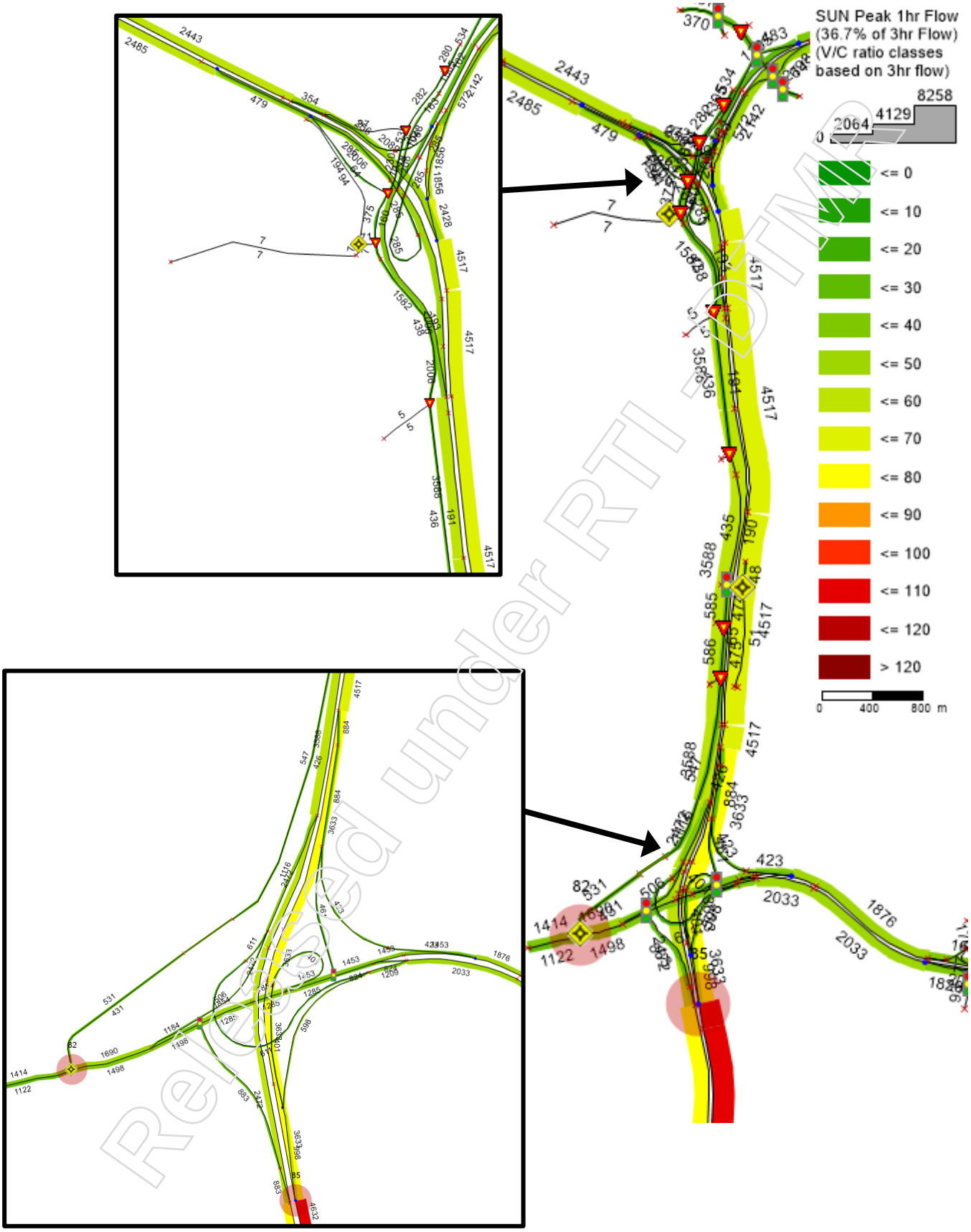


Figure 14 2031 Sunday Afternoon v/c Plot - Reference Design Model

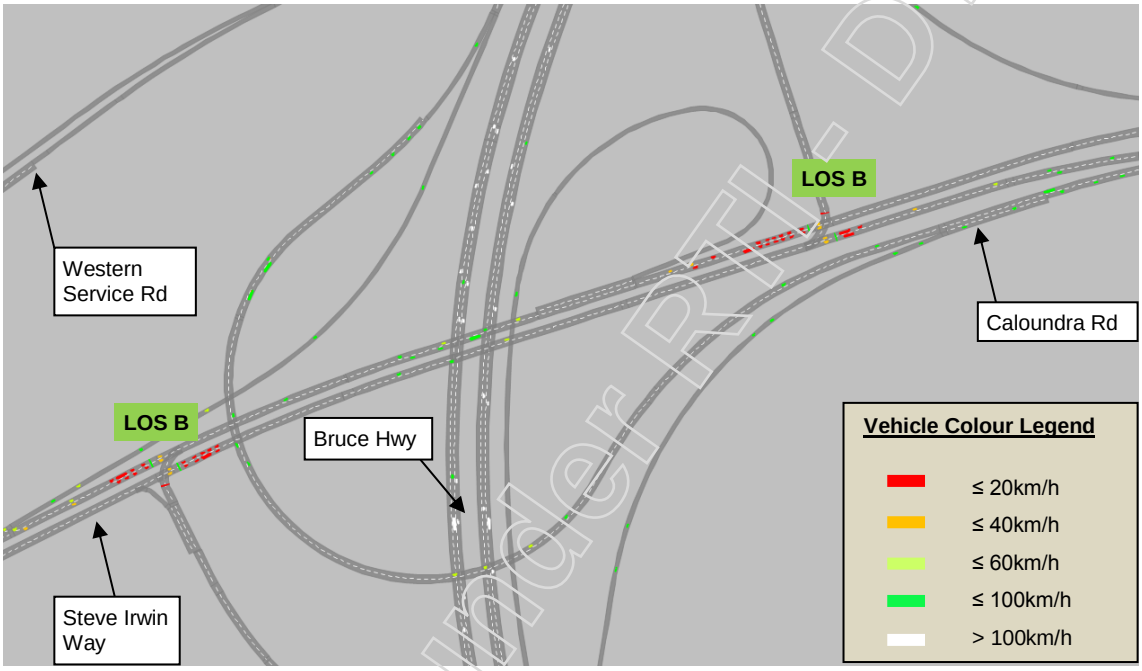


5.4 2031 VISSIM Results

The VISSIM models developed for the reference design showed that the proposed configurations of both the CRI and the SMI will operate efficiently in 2031.

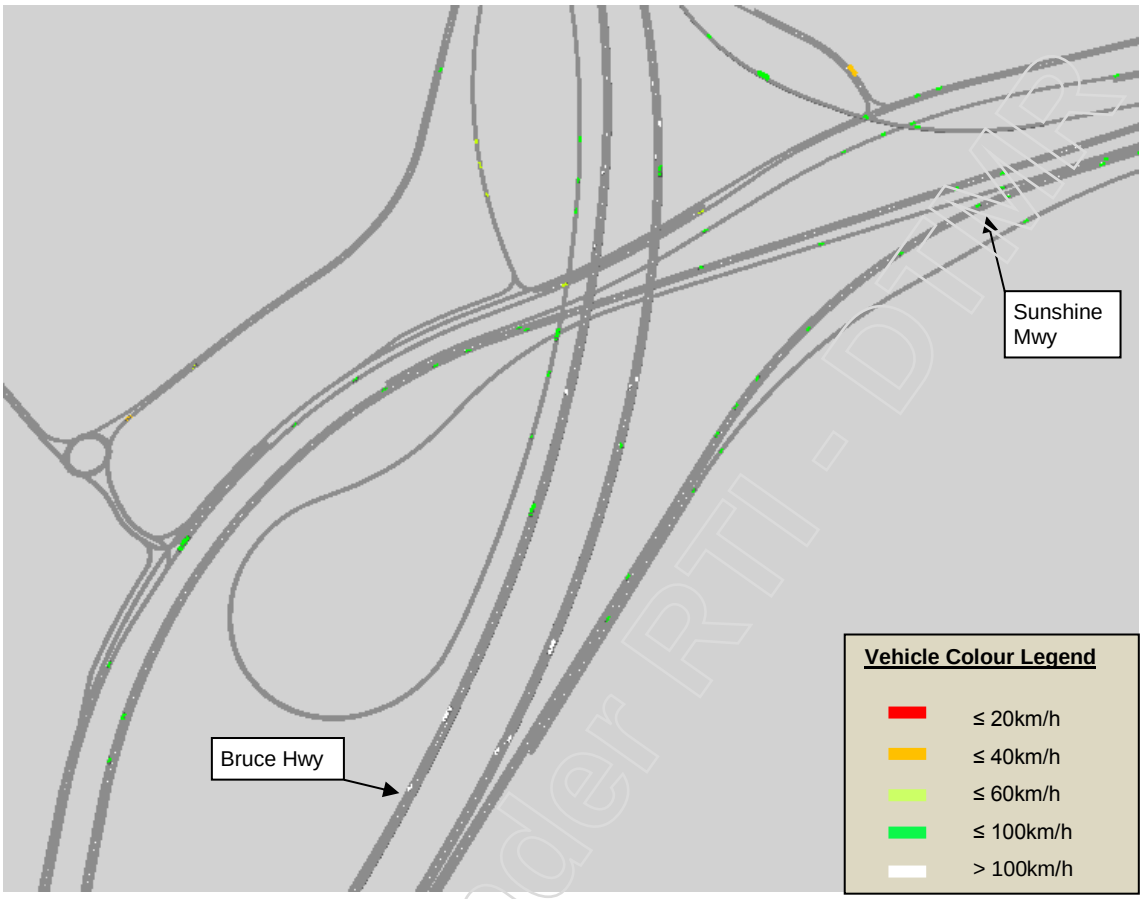
The 2031 VISSIM model results showed that the two signalised intersections at the proposed CRI will operate at LOS B in both commuter peak periods, as well as the indicative Sunday afternoon period, with queues clearing in each cycle. The high level of performance is achieved through the use of two-phase signals that can be coordinated efficiently. Figure 15 shows the typical operation of the interchange in both peak periods.

Figure 15 2031 Reference Design VISSIM Model - CRI



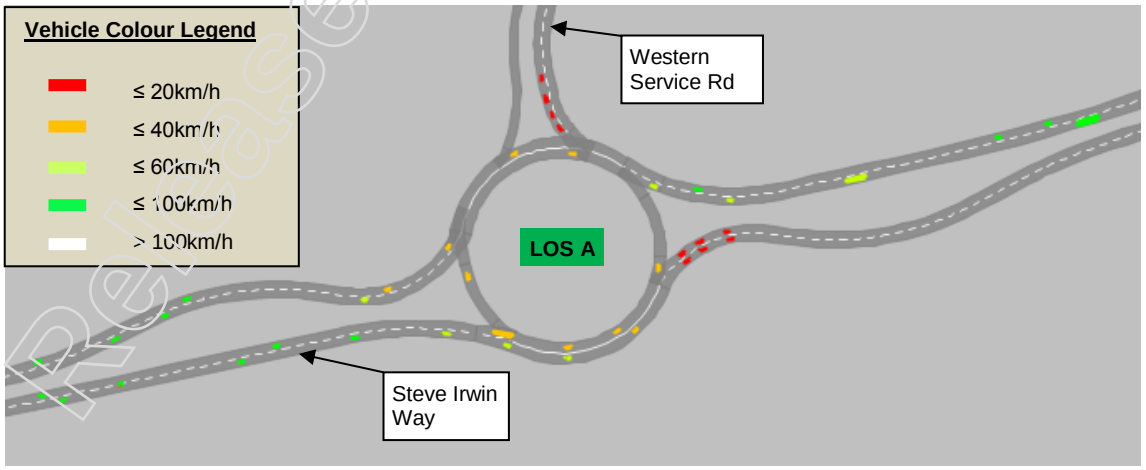
Similar to the 2021 results, the 2031 models showed free-flow conditions at the proposed SMI, as highlighted in Figure 16.

Figure 16 2031 Reference Design VISSIM Model - SMI



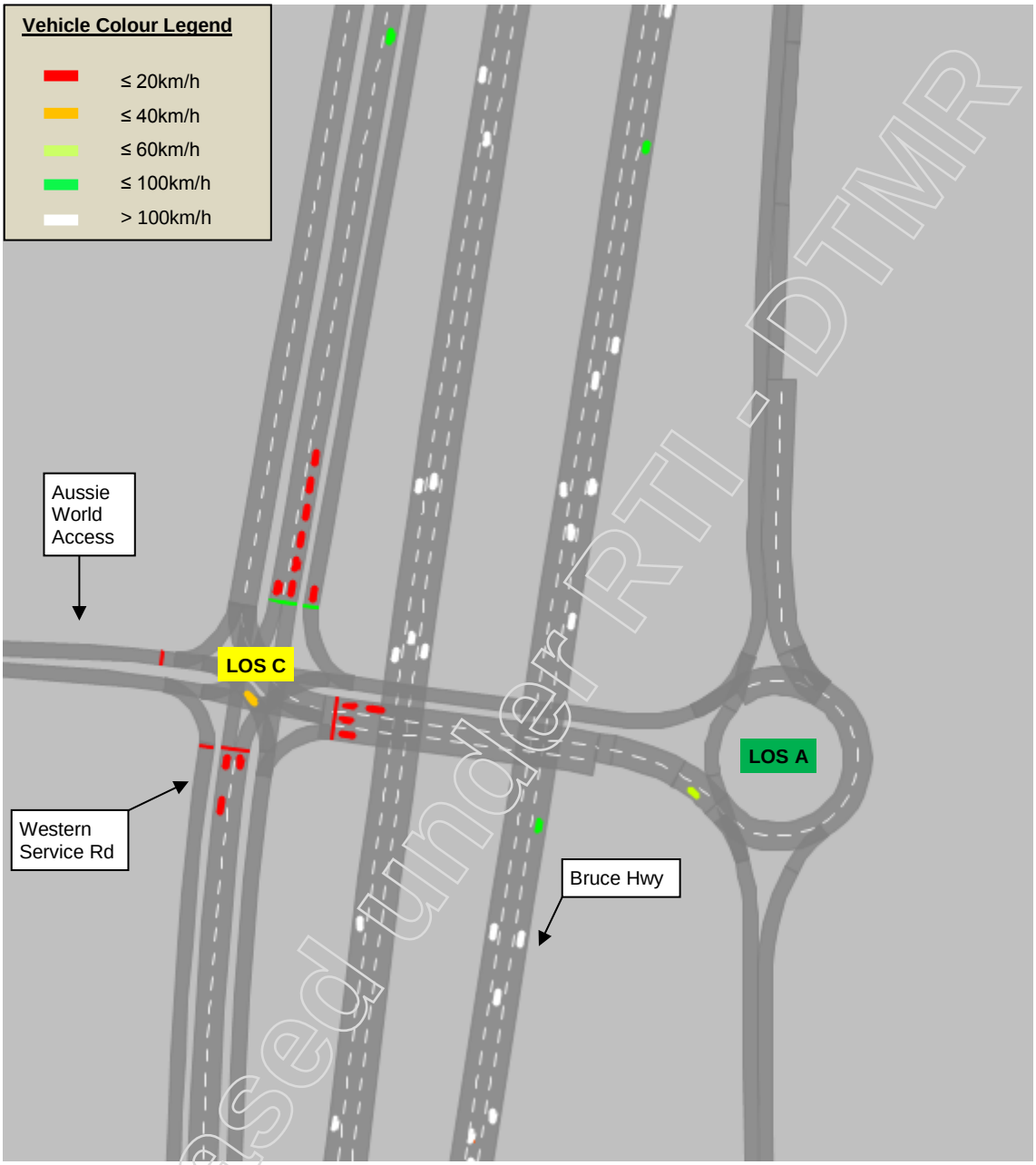
As discussed in section 5.3, the proposed roundabout at the confluence of Steve Irwin Way and the future Western Service Road has been assessed in greater detail in the VISSIM models. The results indicated that the roundabout will operate at LOS A in both commuter peak periods (and the Sunday afternoon period), with minimal queueing as shown in Figure 17.

Figure 17 2031 Reference Design VISSIM Model - Steve Irwin Way / Western Service Road Roundabout



The VISSIM models showed that the proposed configuration at the Pignata Road underpass will operate efficiently in 2031. Typical queueing in both peak periods is shown in Figure 18:

Figure 18 2031 Reference Design VISSIM Model - Pignata Road Underpass Intersections



It should be noted that the Sunday model showed increased congestion around the Aussie World Access due to the assumed increase in demand related to growth in the Tourist Precinct. If this development occurs, the developer may be required to upgrade the access road to allow more efficient egress from the site.

5.5 2041 VISUM Results

The results shown in Figure 19 and Figure 20 indicate that the proposed upgrades will operate at satisfactory levels of service during both peak periods in 2041. All links and turning movements at intersections are shown to have degrees of saturation less than 80%. It should be noted that the proposed roundabout at the confluence of Steve Irwin Way and the future Western Service Road and the roundabout at the eastern end of the Pignata Road underpass are highlighted as having a particular turn with a v/c ratio greater than 80%.

As discussed in section 5.1, the regional VISUM models do not model roundabout capacity with a high degree of accuracy, as they are unable to incorporate gap acceptance modelling in their capacity estimates. For this reason, the roundabouts were assessed in detail in the VISSIM models to ensure capacity and delays are satisfactory.

Figure 19 2041 AM Peak Hour v/c Plot - Reference Design Model

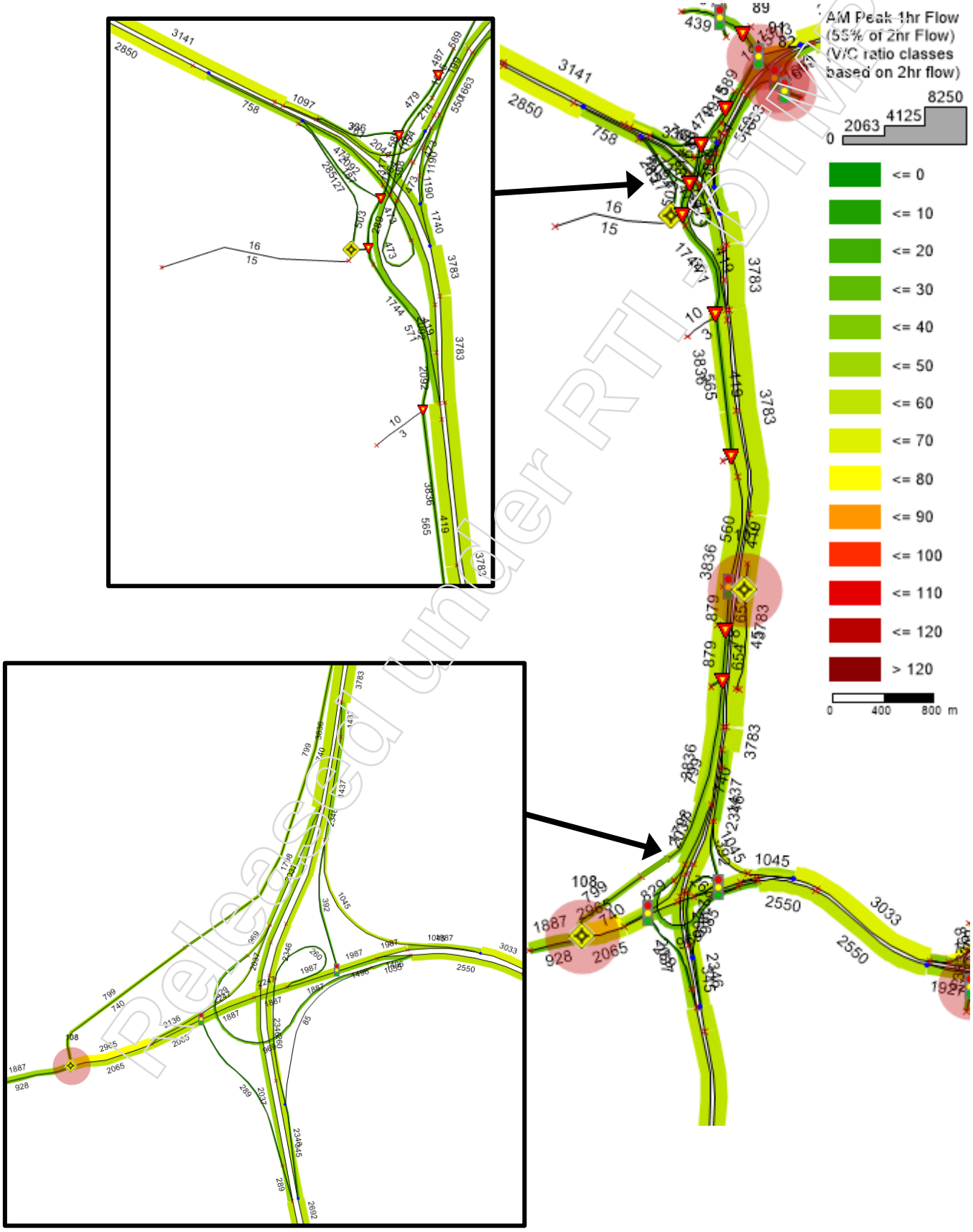
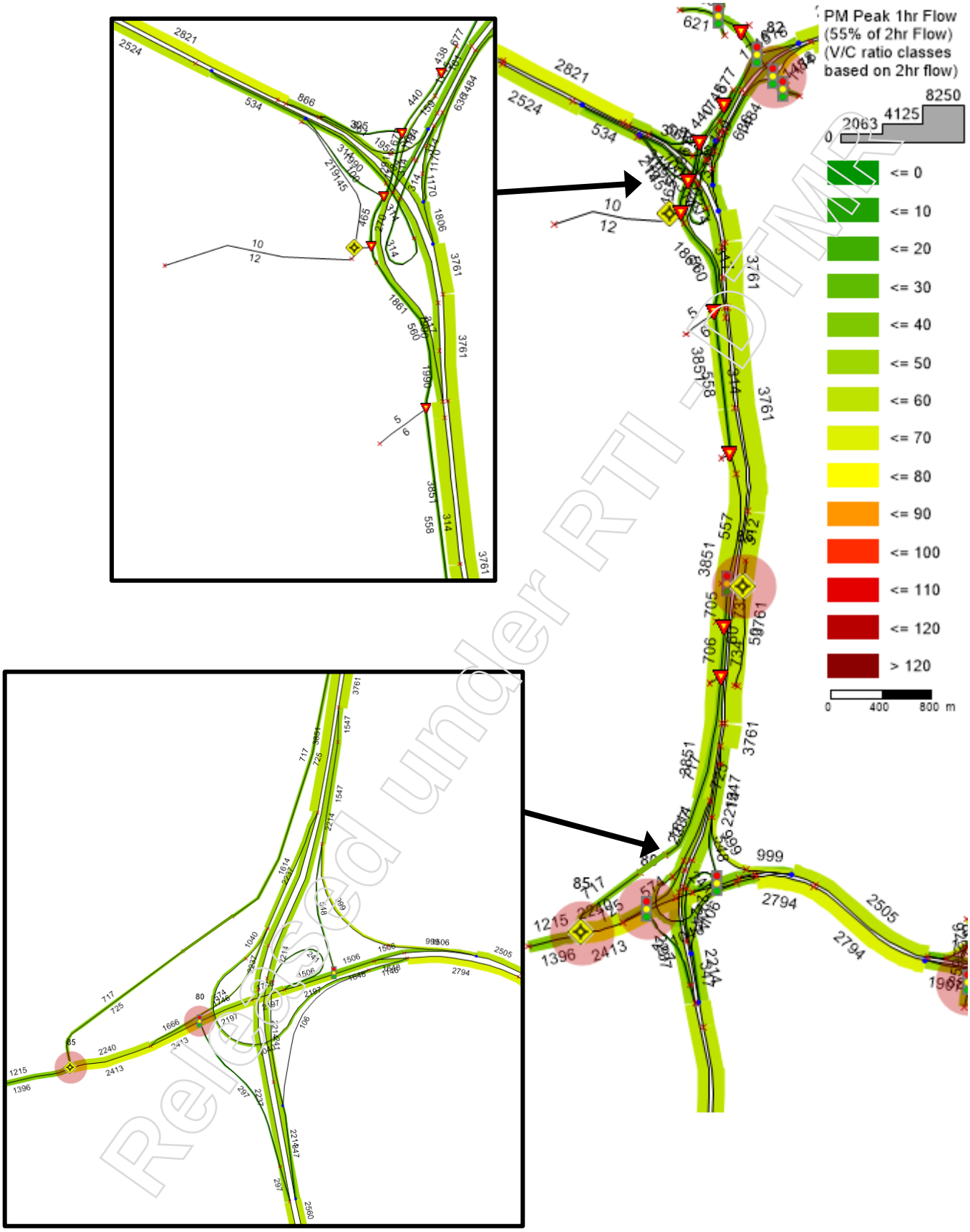


Figure 20 2041 PM Peak Hour v/c Plot - Reference Design Model

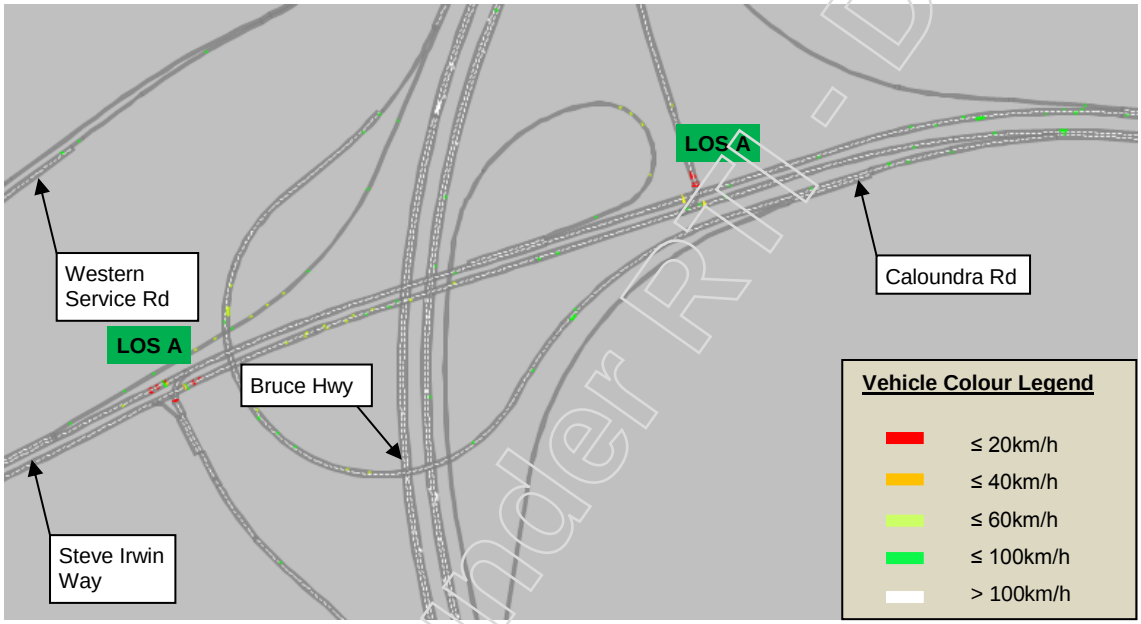


5.6 2041 VISSIM Results

The VISSIM models developed for the reference design showed that the proposed configurations of both the CRI and the SMI will operate efficiently in 2041.

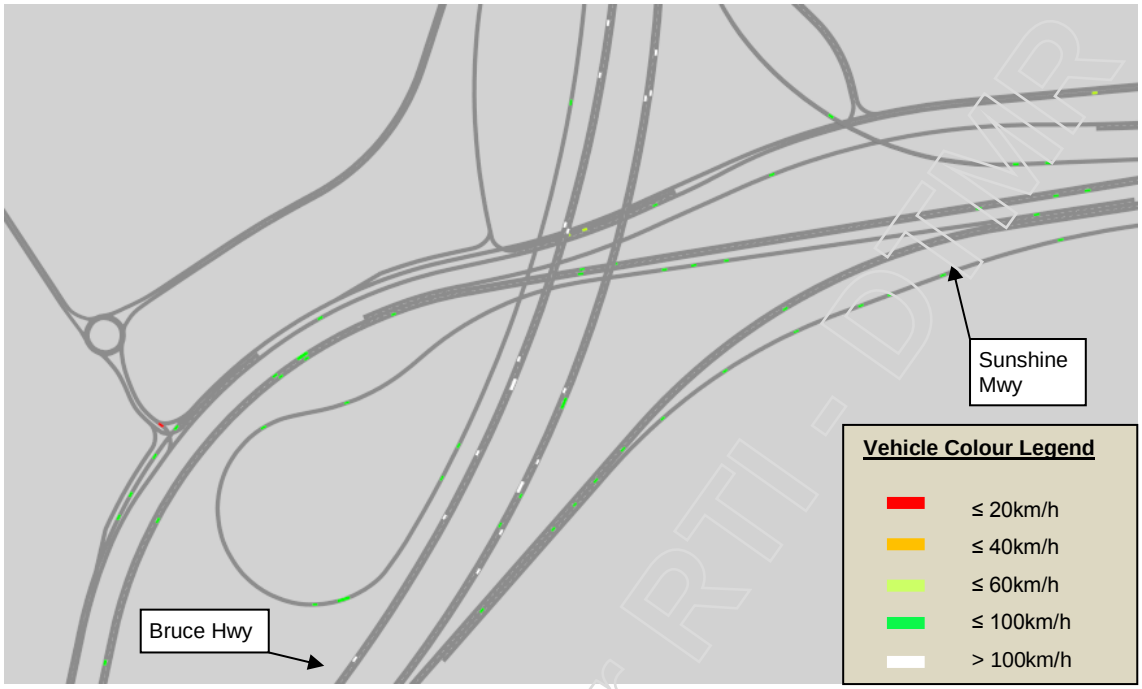
The 2041 VISSIM model results showed that the two signalised intersections at the proposed CRI will operate at LOS A in both peak periods. This is an improvement from the 2021 and 2031 models, which is a result of the reduction in traffic at the interchange due to the assumed upgrade of Kawana / Bells Creek Arterial to motorway standard by this time. The high level of performance is achieved through the use of two-phase signals that can be coordinated efficiently. Figure 21 shows the typical operation of the interchange in both peak periods.

Figure 21 2041 Reference Design VISSIM Model - CRI



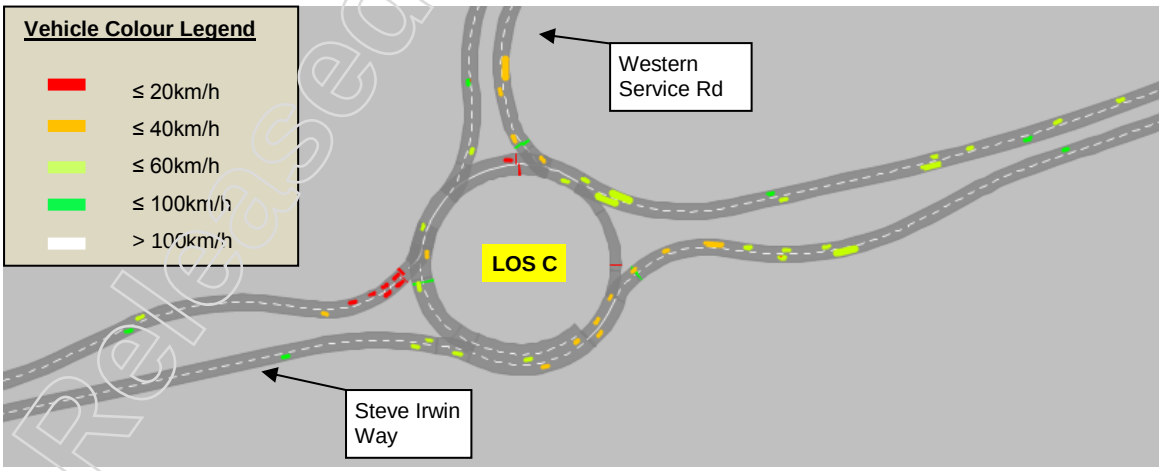
The results for the SMI indicated that the grade separation will allow the proposed interchange ramps to operate under free-flow conditions. Figure 22 shows a screenshot from the 2041 AM peak VISSIM model highlighting the free-flow conditions. This is typical of both peak periods.

Figure 22 2041 Reference Design VISSIM Model - SMI



As discussed in section 5.1, the proposed roundabout at the confluence of Steve Irwin Way and the future Western Service Road has been assessed in greater detail in the VISSIM models. The results showed that the priority-controlled roundabout will have increased queuing by 2041 due to the increase in flow on the Western Service Road resulting from full development in Palmview. Accordingly, the models have determined that the proposed roundabout could be upgraded to a signalised roundabout with minor widening within the circulating area to cater for the 2041 demand. The VISSIM models indicated that the proposed signalised roundabout will operate at LOS C in both peak periods. Typical queuing is shown in Figure 23.

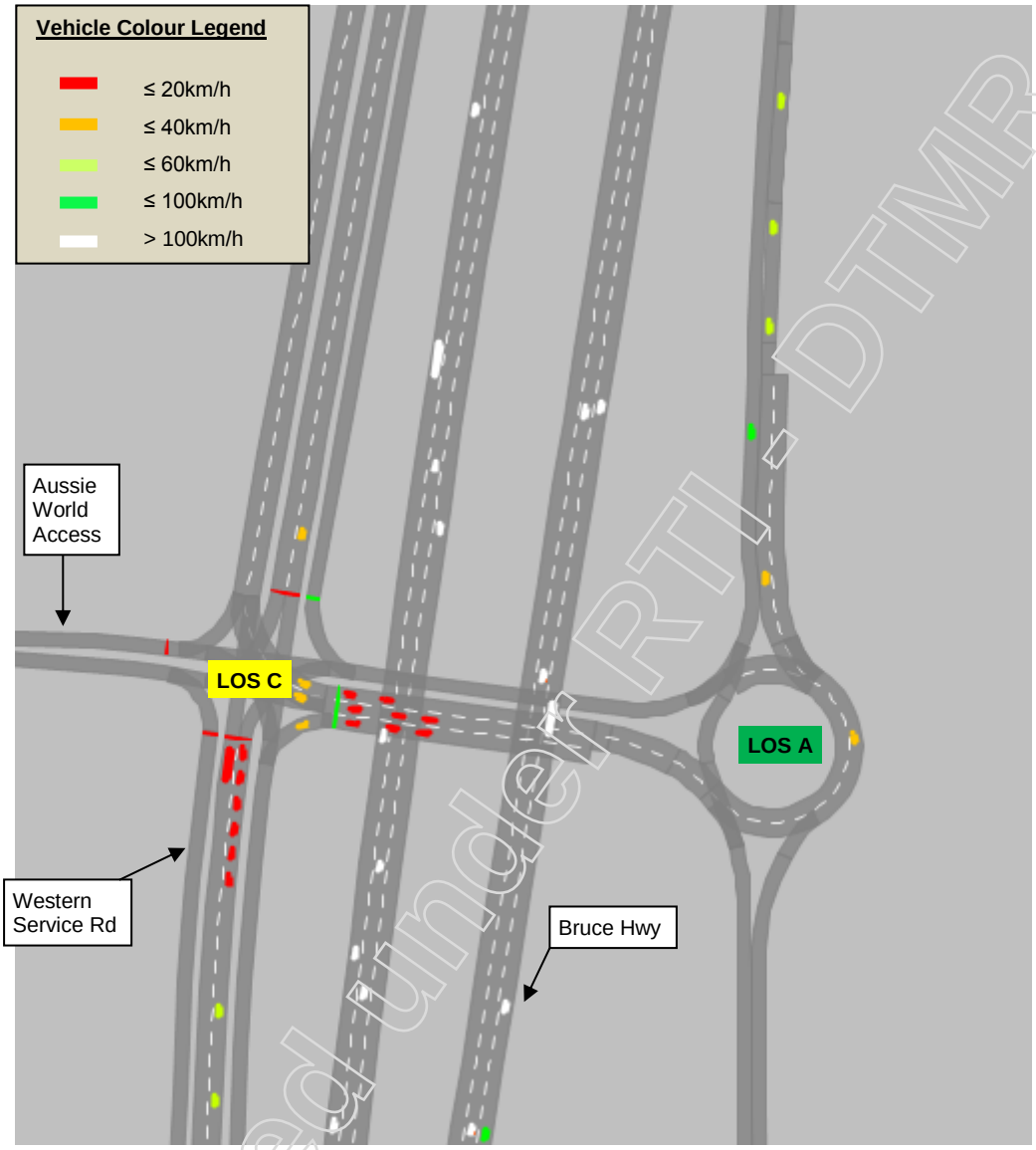
Figure 23 2041 Reference Design VISSIM Model - Steve Irwin Way / Western Service Road Roundabout



Since this intersection would only require upgrade at a point when demands increase significantly (as a result of full development in Palmview), it is recommended that the signalisation would only be provided when / if required.

The VISSIM models showed that the proposed configuration at the Pignata Road underpass will operate efficiently in 2041. Typical queueing in both peak periods is shown in Figure 24:

Figure 24 2041 Reference Design VISSIM Model - Pignata Road Underpass Intersections



6. Conclusions

This report outlined the development and application of traffic models used for the BHUP (CR-SM) project.

The section of the Bruce Highway between Caloundra Road and the Sunshine Motorway has had its posted speed reduced to 100km/h (from 110km/h) as a result of the existing capacity constraints and safety risks along the route. Both the CRI and the SMI are at or approaching capacity and are beginning to cause queued traffic to tail back on to the Bruce Highway. The existing entry ramps have sub-standard merge lengths and the interchange spacing does not meet current standards. Future growth in the region will exacerbate the current congestion problem and increase the frequency of crashes.

To solve the current safety and efficiency issues, the project comprises the following:

- Six-laning of the Bruce Highway (with provision for future eight-laning);
- Construction of new interchanges at Caloundra Road and the Sunshine Motorway;
- Provision of a two-lane service road west of the Bruce Highway; and
- Removal of the existing ramps at Frizzo Road and Pignata Road.

A three-tier traffic modelling process was adopted for this project was designed to assess the proposed upgrade using different levels of modelling and therefore best incorporate the key strengths of each.

The models developed for the reference design indicated that the proposed upgrades will operate at satisfactory levels of service during both peak periods in 2021, 2031 and 2041. The six-laning of the Bruce Highway showed vehicles generally travelling at, or very close to their desired speeds through to 2041 (average travel speeds greater than 100km/h with posted speed of 110km/h).