Point8
traffic engineering and transport planning

Kamerunga to Woree Traffic Impact Assessment

Powerlink

JBS&G
P24005

July 2024

About Us

Our Focus

Point8 provides professional services in the field of traffic engineering and transport planning. Our objective is to provide services that add value to our client's organisations.

Quality Assurance

Point8 is committed to providing expert traffic engineering and transport planning services. We aim to exceed our clients' expectations by consistently delivering excellent outcomes. Point8's Quality Management System is certified to ISO 9001:2015.

Document Control

D01 – P8 Report Template – version 16

Revision	Author(s)	Reviewer	Date	Comments
A	Joseph McGorry	Rosie Toohey Mark Plattz	31/05/2024	Draft
B	Joseph McGorry	Rosie Toohey Mark Plattz	19/06/2024	Updated following client comments
C	Joseph McGorry	Rosie Toohey Mark Plattz	24/07/2024	Updated following client comments, final issue

Contact Us

Point8 Pty Ltd | ABN 74 149 275 883
office address: 28 Old Cleveland Road, Stones Corner QLD 4120
postal address: PO Box 14, Coorparoo QLD 4151
phone: 07 3040 9998
email: info@point8.com.au
web: point8.com.au

AN ISO 9001 QUALITY ASSURED COMPANY

Table of Contents

1.0 Introduction

1.1 Background

Point8 has been commissioned by JBS&G to prepare a Traffic Impact Assessment (TIA) for the Powerlink Kamerunga to Redlynch replacement overhead transmission line (Stage 1), construction of the new T274 Substation (Stage 1A) and construction of the proposed Redlynch to Woree High-Voltage underground transmission line (Stage 2), in Cairns, Queensland. The project is located within several road corridors under the control of either Transport and Main Roads (TMR) or Cairns Regional Council (CRC).

This report outlines the proposed development's compliance with the relevant criteria specified within the TMR's Guide to Traffic Impact Assessments (GTIA). In addition, the following documents were referenced:

- Austroads Guide to Traffic Management (AGTM) Part 6
- Austroads Guide to Temporary Traffic Management (AGTTM)
- Austroads Guide to Road Design (AGRD) Part 4A

1.2 Purpose

Approval for the project is being sought via the Ministerial Infrastructure Designation (MID) Process under the Queensland *Planning Act 2016* (Planning Act). To support approval, this TIA has been prepared in accordance with Queensland's GTIA. This TIA documents the impacts of the proposal on both the State-controlled and CRC-controlled road networks.

The GTIA provides guidance to stakeholders involved in the development of the principles and framework to assess and document traffic impacts. A TIA documents the impacts a development proposal is likely to have on both the SCR network operation, and any additional transport infrastructure that may be affected, and recommends measures to avoid, manage and mitigate these impacts.

This TIA does not assess nor seek any approval of works on roads permits or traffic management impacts associated with the construction of the proposal. These works will be assessed and documented within a construction management plan or sub-document when all delivery and program details are understood.

1.2.1 Traffic Management Principles

Traffic management principles associated with the construction of the overhead and underground powerlines are included in this report. This information is for the benefit of TMR and CRC, to understand the strategies that a Principal Contractor may implement if potential impacts and risks may occur on or near the road network (both SCR and CRC-controlled roads).

Due to the location of the works, it is anticipated both the SCR network and CRC network will provide direct and indirect access to the construction activities.

The traffic management principles have also been provided for Powerlink as consideration for future planning. Controls that should be considered during the planning and staging development to avoid, manage or mitigate impacts and risks are identified. It is noted that these impacts, risks and controls are not comprehensive and additional traffic management investigations will be required during the development of project Traffic Management Plans and Traffic Guidance Schemes.

The construction period for all components is anticipated to commence in 2026 (pending regulatory approvals) and is estimated to be three years. All construction activities will occur in the "dry season" period and will be completed concurrently.

It is noted that construction of the substation is not anticipated to require extensive traffic management as the proposed work area does not interface directly with the road network.

2.0 Site Locality

2.1 Key Roads

There are five key SCRs that will interface with the underground and overhead transmission lines. Details of the key roads, including the road form, speed limit and road classification are outlined in Table 2.1. No traffic survey data has been captured for any of the proposed impacted road networks.

Table 2.1 - Key Road Network Details

NO.	SCR ROAD NAME	ROAD DESCRIPTION	ROAD CLASSIFICATION
1.	Brinsmead Road/Cairns West Arterial Road (CWAR)	• Four lane, two-way • Divided carriageway • 80km/h speed limit	Secondary (Sub-arterial Road)
2.	Mulgrave Road/Bruce Highway	• Four lane, two-way • Divided carriageway • 60km/h speed limit	Secondary (Sub-arterial Road)
3.	Bruce Highway/Ray Jones Drive/ Rigg Street	• Four lane, two-way • Divided carriageway • 80km/h speed limit	Highway (Arterial Road)/Local Road
4.	Redlynch Bypass Road/Cairns Western Arterial Road (CWAR)	• Two lane, two-way • Undivided carriageway • 80km/h speed limit	Secondary (Sub-arterial Road)
5.	Kamerunga Road/Cairns West Arterial Road (CWAR)	• Two lane, two-way • Undivided carriageway • 80km/h speed limit	Secondary (Sub-arterial Road)

Site 1 – Brinsmead Road

The surrounding road network has the following characteristics and use cases:

- Posted speed limit of 80km/h.
- Brinsmead Road is a Secondary Road (Sub-arterial).
- Intersection of View Street and Brinsmead Road will be an indirect access point for Stage 2.
- Intersection of Cairns Western Arterial Road and Brinsmead Road could potentially be an indirect access point for Stage 1 construction.

Figure 2.2 - Site 1 Typical Cross Section (Southbound direction)

Site 2 – Mulgrave Road

The surrounding road network has the following characteristics and use cases:

- Posted speed limit of 60km/h.
- Mulgrave Road is a Secondary Road (Sub-arterial).
- The underbore construction alignment of Stage 2 intersects with Mulgrave Road.
- Intersection of Henley Street and Mulgrave Road will be used as indirect access for Stage 2.

Figure 2.3 - Site 2 Typical Cross Section (Northbound direction)

Site 3 – Bruce Highway/Ray Jones Drive/Rigg Street

The surrounding road network has the following characteristics and use cases:

- Posted speed limit of 80km/h.
- Bruce Highway is a Highway.
- Ray Jones Drive and Rigg Street are Local Roads.
- Stage 2 proposed alignment intersects with Bruce Highway, Ray Jones Drive and Rigg Street.

Figure 2.4 - Site 3 Typical Cross Section (Southbound direction)

Site 4 – Redlynch Bypass Road / Cairns Western Arterial Road

The surrounding road network has the following characteristics and use cases:

- Posted speed limit of 80km/h.
- Redlynch Bypass Road is a Secondary Road (Sub-arterial).
- Intersection of Redlynch Connection Road and Redlynch Bypass Road will be an indirect access point for Stage 1 construction.
- Intersection of Kamerunga Road and Redlynch Bypass Road will be an indirect access point for Stage 1 construction.

Figure 2.5 - Site 4 Typical Cross Section (Northbound direction)

Site 5 – Kamerunga Road

The surrounding road network has the following characteristics and use cases:

- Posted speed limit of 80km/h.
- Kamerunga Road is a Secondary Road (Sub-arterial).
- An access point for Stage 1 construction is proposed on Kamerunga Road.
- Intersection of Harley Street and Kamerunga Road could potentially be an indirect access point for Stage 1 construction.
- Intersection of Lower Freshwater Road and Kamerunga Road could potentially be an indirect access point for Stage 1 construction.
- Intersection of Lake Placid Road and Redlynch Kamerunga Road will be an indirect access point for Stage 1 and 1A construction.

Figure 2.6 - Site 5 Typical Cross Section (Northbound direction)

Twelve key intersections within the SCR network will be used by construction traffic to travel to the site access locations. The locations of these intersections can be seen in Figure 2.1 below.

Figure 2.1 - Locality Figure

2.2 Site Inspections

A site inspection was undertaken on 5th September 2023 to observe and take an inventory of the SCRs interfacing with the Stage 2 underground transmission lines. A second site inspection was undertaken on 21st February 2024 to observe and take an inventory of the SCRs interfacing with the Stage 1 overhead transmission lines.

Sight distance checks were undertaken in locations where direct construction access to the SCR road corridor is proposed and most locations were deemed to have sufficient sight distance based on the environment.

3.0 Development Proposal

3.1 Overall Development Summary

Works proposed by Powerlink include the replacement of the existing 132kV transmission line between Kamerunga and Woree Substations with the following.

Stage 1 Proposed Overhead Line

Stage 1 will involve construction of a new 132kV overhead transmission line from the Kamerunga Substation to a new Substation (T274), through to a new overhead to underground transition site in Redlynch. The proposed transmission line will cross over farmland and will interface with two SCRs and a small number of CRC-controlled Roads.

Stage 1A Kamerunga Substation

Stage 1A will involve the construction of a new substation that will use similar equipment to the existing Kamerunga Substation (air insulated switchgear, overhead transmission lines, transformers, control room and amenities buildings) and will be constructed on a Powerlink-owned greenfield site with a total constructed area of 255 x 156m. The Substation is proposed to be located east of the existing Substation, south of Kamerunga Road.

Stage 2 Proposed Underground Line

Stage 2 will involve construction of a 132kV double-circuit underground transmission line between the proposed transition site in Redlynch to the existing Woree Substation. The proposed transmission line will cross residential areas and will intersect three SCRs and a number of CRC-controlled roads.

The ongoing operation of the overhead and underground transmission lines will not require any daily/regular vehicular activities that ought to be considered from GTIA's perspective; therefore, only the construction activities have been addressed in this TIA.

The ongoing operation of the new T274 substation is not anticipated to vary from the daily/regular vehicular activities that currently occur at the existing substation. In addition, the current site movements are expected to be minimal (not more than 10vpd). Therefore, only the construction activities have been addressed in this TIA.

3.2 Programme and Assumptions

Powerlink will undertake the detailed design for the overhead line component and the T274 Substation component post-approval, with the underground component to be undertaken under a Design/Procure/Construct (DPC) Contract. As such, the proposed construction activities and staging is not currently available, however the following assumptions have been made.

- Key construction activities include:
  - Stringing of overhead powerlines.
  - Civil and electrical.
  - Excavation, conduit and cable installation.
  - Work fronts at key stages may occur simultaneously over the duration of the stage.
- Stage 1 Proposed Overhead Line
  - Based on movements provided by Powerlink it is assumed that the most intensive construction stage is the stringing of overhead powerlines.
  - The stringing plan has not been developed. It can be assumed that typical stringing will be four to six structures, Where there are bend towers close together there may be stringing between two towers,
  - The construction process will occur for an unknown duration (at this time) but will most likely occur for no greater than three years, consisting of approximately:
    - Mobilisation (site set out and establishment of site office and laydown areas) – year 1
    - Access (Installation of access tracks and veg clearing) – year 1-2
    - Tower construction (site benching (if required), tower foundation installation, structure assembly and erection, conductor and earth wire stringing) – year 1-3
    - Rehab (site rehab and demob) – year 1-3
- Stage 1A Kamerunga Substation
  - Based on movements provided by Powerlink it is assumed that the most intensive stage is the construction of the substation with each stage occurring independently.
  - It is assumed that construction access to the substation will occur via Lake Placid Road and Stewarts Road, noting that the access location is approximately 40m from the intersection with Kamerunga Rd (SCR).
  - Construction is estimated to occur between January 2026 and December 2028.
- Stage 2 Proposed Underground Line
  - Based on construction movements provided by Powerlink the largest volumes are expected to be generated from August to October 2026 with multiple construction tasks occurring at concurrent sites. This is the worst-case scenario of volume impact on the SCRs.
  - The construction process will occur for an unknown duration (at this time) but will most likely occur for no greater than three years, consisting of approximately:
    - Underborings (establish launch and retrieval locations, install underborings) – year 1
    - Trenching and conduits (install conduits, backfill with thermal backfill, temp surface reinstatement and final surface reinstatement) – years 1-2
    - Joint Bays (install framework, pour concrete footing and walls, install covers) – years 1-2
    - Cable installation and jointing (set up cable drums and winching equipment, pull cable in, make joints, testing and commissioning) – years 2 and 3
- All Stages
  - Minimal to no traffic volumes will occur post-construction

3.3 Construction Activities

The majority of traffic generation will occur during the construction stage of the project, with ongoing maintenance works expected to have minimal impact on the SCR network. Based on information provided by Powerlink the following activities are expected to occur within each stage:

- Stage 1 Proposed Overhead Line
  - Foundation construction of 17 overhead powerlines
  - Erection of towers and poles
  - Delivery of 17 overhead powerlines steel
  - Stringing of 17 overhead powerlines
- Stage 1A Kamerunga Substation
  - Earthworks
  - Construction
  - Testing and commissioning
  - Decommissioning of equipment no longer operational
- Stage 2 Proposed Underground Line
  - Trench Excavation and Conduit Installation
  - Road Reinstatement
  - Joint Bay Excavation and Installation
  - Cable Installation
  - Cable Jointing
  - Testing and Commissioning

3.4 Operational Activities

The operational/maintenance activities for the development proposal are as follows:

- Transmission line (overhead and underground)
  - The infrastructure does not require regular maintenance. Inspections will be carried out typically over two days, every three years for the overhead lines and over ten days per year for the underground cables.
- Substation
  - T274 will use similar equipment and have similar maintenance requirements as the existing Kamerunga Substation. On average, nine to ten maintenance activities per year will be required.

4.0 Development Trips

Powerlink has provided estimated construction activity movements and indicative construction programs for each stage of the proposed project which is attached in Appendix A. This information has been used to inform the development of construction volumes, the numbers and estimates are documented in the following section.

4.1 Stage 1 - Kamerunga to Redlynch Overhead Transmission Line

4.1.1 Construction Assumptions

Based on information provided by Powerlink it was assumed that:

- The most intensive activity during Stage 1 is the stringing phase which is summarised in Table 4.1 below.
- Separate construction activities will not occur concurrently.

4.1.2 Vehicle Movements

Table 4.1 below summarises the vehicle movements provided by Powerlink for the activity of stringing.

Table 4.1 – Stage 1 Vehicle Movements

DISCIPLINE	ACTIVITY	VEHICLE TYPE	NO. (TRIPS)
Stringing	Delivery (Tower)	8x8 Truck	2
	Hanging Insulator, Pulley and Prep	Light Vehicles	3
	Hanging Insulator, Pulley and Prep	8x8 mounted EWP	1
	Helicopter Draw Wire Run Out (Slack)	Light Vehicles	8
	Conductor Change out	Light Vehicles	4
	Mid Span Cover	8x8 mounted EWP	1
	Clamping In	Light Vehicles	3
	Clamping In	8x8 mounted EWP	1
	Termination & Sagging	Light Vehicles	8
	Termination & Sagging	8x8 mounted EWP	2
	Termination & Sagging	4x4 Hino Winch Truck	2
	B&W Site Setup (Block Anchor)	8x8 Truck	46
	B&W Site Setup (Tower Anchor)	8x8 Truck	6
	B&W Runout	Franna	1
	B&W Runout	Light Vehicles	8
STAGE 1 TOTAL MOVEMENTS (vpd)			**96**

4.1.3 Distribution

The following was considered when determining the distribution of construction vehicle movements (refer Table 4.2):

- Directional splits were chosen using proposed vehicle route information provided by Powerlink.
- Intersections 3 and 5 are connected and it is assumed the majority of movements will be undertaken at site five.

Intersection locations are outlined in Figure 2.1.

Table 4.2 – Stage 1 In Out Directional split

INTERSECTION NUMBER	LOCATION	IN NORTH	IN SOUTH	OUT NORTH	OUT SOUTH
2	Lake Placid Road/Kamerunga Road	20%	80%	20%	80%
3	Harley Street/Cairns Western Arterial Road	20%	80%	20%	80%
4	Kamerunga Road/Cairns Western Arterial Road	-	10%	10%	-
5	Redlynch Connection Road/Cairns Western Arterial Road	20%	80%	20%	80%
6	Brinsmead Road/Cairns Western Arterial Road	20%	70%	10%	80%

4.1.4 Peak Traffic

The calculated peak construction movements for all SCR intersections are attached in Appendix B.

The peak construction traffic generation for Stage 1 is estimated to be 96vpd through each SCR intersection and 38vpd at a single intersection movement (various locations and movements).

4.2 Stage 1A – Substation T274

4.2.1 Construction Assumptions

Based on information provided by Powerlink it was assumed that:

- The most intensive activity during Stage 1A is the construction stage of the new Substation T274.
- The construction period is from February 2026 to February 2027.
- Separate construction activities will not occur concurrently.

4.2.2 Vehicle Movements

Table 4.3 below summarises the vehicle movements provided by Powerlink for the activity of construction of the new Substation T274.

Table 4.3 – Stage 1A movements

ACTIVITY	ESTIMATED TOTAL NUMBER OF VEHICLES	ESTIMATED DAILY MOVEMENTS
Construction (Civil/electrical)	141	12

4.2.3 Distribution

It was assumed that the distribution of construction vehicle movements in Stage 1A is similar to those expected in Stage 1 at the Lake Placid Road/Kamerunga Road intersection (refer Table 4.4).

Intersection locations are outlined in Figure 2.1.

Table 4.4 – Stage 1A In Out Directional split

INTERSECTION NUMBER	LOCATION	IN NORTH	IN SOUTH	OUT NORTH	OUT SOUTH
1	Stewarts Road/Kamerunga Road	20%	80%	20%	80%

4.2.4 Peak Traffic

The calculated peak construction movements for all SCR intersections are attached in Appendix B.

The peak construction traffic generation for Stage 1A is estimated to be 12vpd at the SCR intersection and 5vpd at a single intersection movement (various movements).

4.3 Stage 2 – Redlynch to Woree High-Voltage Underground Transmission Line

4.3.1 Construction Assumptions

Based on information provided by Powerlink it was assumed that:

- The most intensive activities occurring concurrently during Stage 2 is trench excavation, conduit installation, road reinstatement, joint bay excavation and installation, cable delivery and installation which is expected to occur concurrently.
- Total movements do not include testing movements as this activity will occur after the work is complete.
- Separate construction activities will occur concurrently.

4.3.2 Vehicle Movements

Table 4.5 – Stage 2 vehicle movements below summarises the vehicle movements provided by Powerlink.

Table 4.5 – Stage 2 vehicle movements

DISCIPLINE	VEHICLE TYPE	ACCESS MOVEMENTS TO WORK AREA PER SHIFT
Trench excavation and conduit installation	Excavator	1
	5t truck	24
	20t truck	6
	Agitator	8
Traffic control	1 tonne truck	8
Road reinstatement	Excavator	2
	Milling machine	1
	5t truck	8
	20t truck	4
Traffic control	1 tonne truck	8
Joint bay excavation and installation	Backhoe	1
	10 tonne truck	4
	20 tonne truck	4
Traffic control	1 tonne truck	8
Cable installation	Cable trailer	1
	5 tonne truck	4
Traffic control	1 tonne truck	8
Cable jointing	1 tonne truck	4
	5 tonne truck	4
	10 tonne truck	2
Underbore	Excavator	1
	5t truck	8
	20t truck	4
	Small drill (crew 1)	4
	Large drill (crew 2)	4
TOTAL MOVEMENTS (vpd)		**131**

4.3.3 Distribution

The estimated distribution of construction vehicle movements is shown Table 4.6. Directional splits were chosen using proposed vehicle route information provided by Powerlink.

Intersection locations are outlined in Figure 2.1.

Table 4.6 – Stage 2 In Out Directional split

INTERSECTION NUMBER	LOCATION	IN NORTH	IN SOUTH	OUT NORTH	OUT SOUTH
7	View Street/Cairns Western Arterial Road	20%	80%	20%	80%
8	Ramsey Drive/Cairns Western Arterial Road	20%	80%	20%	80%
9	Henley Street/Bruce Highway	0%	100%	100%	0%

4.3.4 Peak Traffic

The calculated peak construction movements for all SCR intersections are attached in Appendix B.

The peak construction traffic generation for Stage 2 is estimated to be 131vpd through each SCR intersection and 66vpd at a single intersection movement (various movements).

5.0 Development Impact and Mitigation

5.1 Operational Impact

There is no operational impact on the SCR network due the infrastructure either located beneath the roadway (Stage 2) or located on land that does not interface with SCRs (Stage 1 and 1A). Operations and maintenance will be short-term and have low impact on the SCRs for the majority of activities.

5.1.1 Road Safety

In accordance with GTIA Part C Section 9, an assessment of road safety for all intersections is required. This is to assess if there is an impact on road safety through increased traffic volumes, conflict points, the presence of new infrastructure and changes to site lines, vehicle types and on-street parking. The desired outcome is to ensure that the road's safety is not 'significantly worsened' as a result of the operational traffic.

Across all site locations that interface SCRs, the proposal will not impact road safety. Operational traffic is expected to be very occasional for below and above ground, and very low for the sub-station. No road safety impacts are expected to occur across all sites as a result of the operational traffic.

5.1.2 Access and Frontage

In accordance with GTIA Part C Section 10, an assessment of access and frontage at all intersections is required. This is to assess if there is an impact on access and frontage ensuring that safety or efficiency of the SCR is not worsened by the operational traffic.

Across all site locations that interface SCRs, the proposal will not impact road access and frontage. No access and frontage impact are expected to occur across all sites as a result of the operational traffic.

5.1.3 Intersection Delay

In accordance with GTIA Part C Section 11, an assessment of intersection delay for all impacted intersections is required. This is to assess if there is an economic and social impact on the community through increased travel times, driver impatience and associated economic cost of these delays.

Across all site locations that interface SCRs, the proposal is not expected to impact intersection delay. No operational traffic is required to service the underground or overhead power lines (Stages 1 & 2).

Operation of the new T274 substation (Stage 1A) is not anticipated to vary from the daily/regular vehicular activities that currently occur at the existing substation. In addition, the current site movements are expected to be minimal (not more than 10vpd).

Therefore, no intersection delay increase is expected to occur across all sites as a result of the operational traffic.

5.1.4 Road Link Capacity

In accordance with GTIA Part C Section 12, an assessment of the road link capacity (between intersections) is required. This is to assess the impacts based on incremental worsening of the level of service (LOS), whereby increases in operational-generated traffic may result in safety impacts on road links. The desired outcome is to ensure that traffic generated by the operations does not significantly worsen the operational capacity of the SCR road links.

Across all site locations that interface SCRs, the proposal will not impact road link capacity. As stated in Section 5.1.3 above, additional movements generated by the proposed developments are very minimal or none. Therefore, no road link capacity reduction is expected to occur across all sites as a result of the operational traffic.

5.2 Construction Impact

The construction impact on SCR is minimal as the infrastructure is either located beneath or away from the SCR. The construction is expected to be undertaken over a number of years, however due to the moving work-front nature of the construction, impact at any given location is expected to be short-term and will have a low impact on the surrounding road network and infrastructure.

5.2.1 Road Safety

In accordance with GTIA Part C Section 9, an assessment of road safety for all intersections is required, based on the construction activities of the proposal.

Across all site locations that interface SCRs, negligible impact on road safety is expected. Whilst some traffic impact will occur from the construction activities, these activities will only occur for a short period of time, under the specific design and management requirements of the Queensland Guide Temporary Traffic Management. Further works on roads and traffic management approvals from TMR will be sought when construction requires. No mitigation is deemed required for this development proposal.

5.2.2 Access and Frontage

In accordance with GTIA Part C Section 10, an assessment of access and frontage at all intersections is required, based on the construction activities of the proposal.

Across all site locations that interface SCRs, negligible impact on access and frontage is expected. Whilst some traffic impact will occur from the construction activities, these activities will only occur for a short period of time, under the specific design and management requirements of the Queensland Guide Temporary Traffic Management. No mitigation is deemed required for this development proposal.

5.2.3 Intersection Delay

In accordance with GTIA Part C Section 11, an assessment of intersection delay for all impacted intersections is required, based on the construction activities of the proposal.

Across all site locations that interface SCRs, the estimated construction generated trips on the SCR network will be below 5% and therefore will not impact intersection delay. The highest traffic volume scenario calculated for the proposed developments is 131 vehicle trips per day during the construction of Stage 2. For the construction traffic to comprise 5% or greater of the intersection traffic, the total daily volume of the intersection would need to be 2,620vpd or less. Due to the nature of the SCR intersections, these volumes are expected to have substantially less than a 5% impact on the SCR. Therefore, no intersection delay increase is expected to occur across all sites as a result of the operational traffic.

5.2.4 Road Link Capacity

In accordance with GTIA Part C Section 12, an assessment of the road link capacity (between intersections) is required, based on the construction activities of the proposal.

Across all site locations that interface SCRs, the proposal will not impact road link capacity. The highest traffic volume scenario calculated for the proposed developments is 131 vehicle trips per day during the construction of Stage 2. For the construction traffic to comprise 5% or greater of the link traffic, the total daily volume of the link would need to be 2,620vpd or less. Due to the nature of the SCR links, these volumes are expected to have substantially less than a 5% impact on the SCR. Therefore, no road link capacity impacts are expected to occur across all SCRs as a result of the operational traffic.

6.0 Traffic Management Principles

A schedule of traffic management principles has been included below. This schedule is to provide TMR and CRC with an understanding of the potential traffic impacts that may occur as a result of the proposed development construction. Additionally, this schedule is to provide guidance to Powerlink for the planning of the construction processes. This schedule may help to appropriately construct the transmission line with respect to the safety of the road network users and assist in creating safe construction processes.

CRC has advised that the following must be undertaken before the commencement of works:

- Public notice for full lane closures, a minimum of 14 days' notice to residents/businesses along the affected route and placing a notice in a newspaper in the affected area advising details.
- Contact Queensland Police (Cairns Traffic Branch) at a minimum of 21 days' notice before the event to ascertain if a permit is required.
- Suitably signpost notification of the works at either end of the site 24 hours prior to the commencement of the works.
- Notify Emergency Services of any traffic control which may affect response times.
- Meet all conditions of approval for Cairns Regional Council Application for Temporary Road Closure Form (RC1) to conduct construction works within the road reserve.
- When planning check Cairns Regional Council's relevant bin collection service timings to avoid conflict.
- Check for special events throughout the work period and schedule around events accordingly.

Table 6.1 - Temporary Traffic Management Principles

WORK ACTIVITY	MANAGEMENT STRATEGY
Legislative compliance	• Traffic management is to comply with the relevant AGTTM Part 3, QGTTM Part 3 and AS 1742.3 standards and guidance. • Ensure workers preparing or implementing traffic management are appropriately qualified.
Intersections	• Ensure at least one lane in each direction is maintained at all times. • Ensure no greater than a 15-minute delay is incurred as a result of the works. • Undertake works during low volume periods where possible. • Provide short-term detours or side tracks where appropriate.
Shoulder closures	• Ensure appropriate sight distances are maintained between pathways and intersections, driveways, and site access points. • Ensure shoulder closures comply with relevant AGTTM Part 3, QGTTM Part 3 standards and guidance.
Shuttle Flow	• Ensure the maximum lane width provided is 3.5m. • Ensure the swept path can accommodate heavy and over-dimensional vehicles where required, or provide suitable detour. • Ensure single lane section lengths comply with the maximum length requirements outlined in AGTTM Part 3 section 5.4.4. • Ensure clear communication with property owners prior to commencement.

WORK ACTIVITY	MANAGEMENT STRATEGY
Driveways and Accesses	• Maintain access to and from premises, where access cannot be maintained an agreed alternative is to be arranged. • Ensure clear communication with property owners prior to commencement. • Maintain minimum sight distance requirements for accesses. • Maintain minimum turn warrant design, as identified in AGRD specifications for accesses.
Footpaths	• Ensure pedestrians and cyclists are not led into direct conflict with works or traffic and are kept safe. • Ensure road shoulders are kept free of hazards including signage or an appropriate tapered treatment is used to close off lanes and direct cyclists to alternative facilities.
Site Compliance	• Ensure regular safety inspections are undertaken on the sites. • Ensure accurate documentation of traffic management arrangements is undertaken.
Oversize vehicle transport	• Ensure relevant permits and loading/unloading plans are organised.

Outside of these work activities:

- If detours of vehicular traffic are required, ensure that implementation duration is minimised and that all access requirements are considered, including local access and bus routes. Contact the passenger transport company if any activity is to be conducted on a bus route during normal operating hours.
- Consult with the relevant departments regarding activities related to Goomboora Park.

These work activities and associated management techniques are provided as an overarching guideline only. They are listed to provide an understanding of the potential impacts that may be faced by TMR and CRC as the road asset owners, and Powerlink as a mechanism to plan for the construction processes as principal contractor. These activities are all in relation to long-term works. All short-term works should be analysed separately.

7.0 Conclusion

7.1 Summary of Findings

Point8 has been commissioned by JBS&G to prepare a TIA for the construction of the proposed Kamerunga to Redlynch replacement overhead transmission line (Stage 1), construction of the new T274 Substation Substation (Stage 1A) and construction of the proposed Redlynch to Woree High-Voltage underground transmission line (Stage 2) in Cairns, Queensland. Powerlink Queensland (Powerlink) is the owner, developer and operator of Queensland's electricity transmission network.

Approval for the project is being sought via the Ministerial Infrastructure Designation (MID) Process under the Queensland *Planning Act 2016* (Planning Act). To support approval, this TIA has been prepared in accordance with Queensland's GTIA.

The proposed project is located within several road corridors under the control of either Transport and Main Roads or Cairns Regional Council, as identified in Figure 2.1.

The development proposal will have negligible ongoing/operational impacts to the SCR nor CRC controlled road networks.

The proposed construction works will produce additional traffic generation onto the SCR and CRC controlled road networks. The construction will entail a variety of tasks and it is understood Powerlink proposes to construct Stage 1 and 1A between 2026 to 2028 and Stage 2 between 2026 to 2027. The construction is expected to be delivered in a moving work-front programme, with impacts at any individual location to be short-term. During the construction phase, no more than 131vpd (per work front) are expected to be required to facilitate the construction of the development proposal.

Based on this low daily construction generated traffic volume estimate, the impacts on the SCR and CRC-controlled road networks are considered to be negligible. These impacts have been considered based on the requirements of GTIA for:

- road link capacity
- intersection delay
- road safety
- access and frontage

From a traffic and transport perspective, it is considered that the development proposal be given MID approval, with a condition that appropriate construction traffic management planning is prepared and submitted for TMR and CRC approval prior to commencement of works.

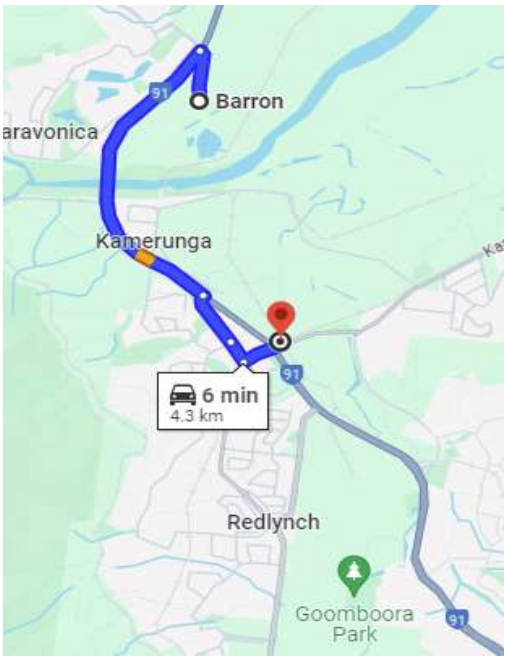
Appendix A

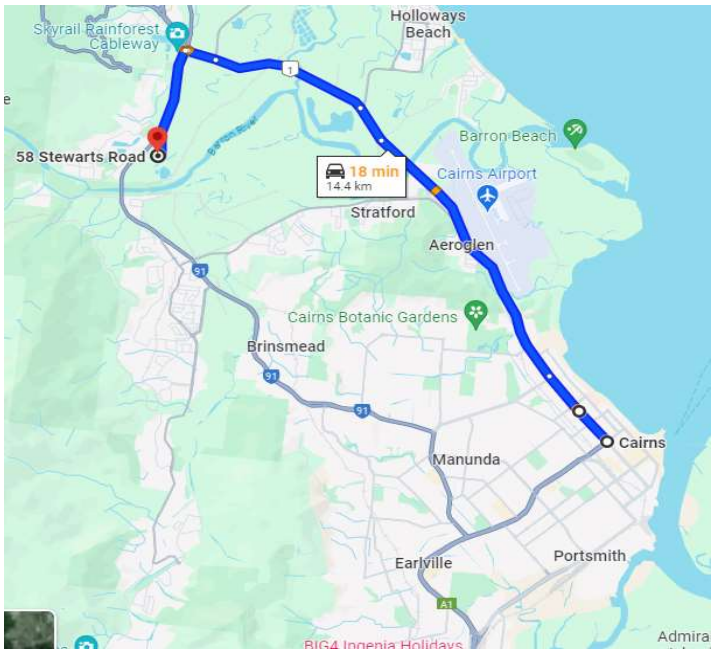
Received Data

Kamerunga to Redlynch
Indicative Vehicle Movement Volume

Vehicle Type	Discipline	No. Trip	Location	Comment	Sites	Stewarts Road (Assumed Contractor site office and base) Cairns > Captain Cook Highway > CWAR > Stewarts Road
Indicative T/L Demolition Traffic Volume						
Light Vehicles	Demolition	12 to 18	Each Tower Site	Incl. Winch Ute	15	270
8x8 Truck	Demolition	1	Each Tower Site		15	15
4x4 Hino Winch Truck	Demolition	1	Each Strain Site		15	15
8x8 mounted EWP	Demolition	1	Each Strain Site		15	15
Excavator	Demolition	2	Each Tower Site		15	30
Excavator Shearer	Demolition	1	Each Tower Site		15	15
Tip Truck	Demolition	1	Each Tower Site		15	15
100T Crane	Demolition	1	Each Tower Site		15	15
50T Crane	Demolition	1	Each Tower Site		15	15
Bobcat	Demolition	1	Each Tower Site		15	15
Indicative T/L Construction Traffic Volume						
Light Vehicles	Construction	40 to 50	Each Tower Site	Incl. Winch Ute	17	850
8x8 Truck	Construction	10	Each Tower Site		17	170
SR 30 Soilmec or Smililar	Construction	1	Each Tower Site		17	17
Bobcat	Construction	2	Each Tower Site	Incl. Bobcat trencher for earthing	17	34
Telehandler	Construction	1	Each Tower Site		17	17
Concrete Agitator	Construction	3 to 9	Each Tower Site		17	153
50T Crane	Construction	1	Each Tower Site		17	17
130T Crane	Construction	1	Each Tower Site		17	17
8x8 mounted EWP	Construction	2 to 4	Each Tower Site		17	68
4x4 Hino Winch Truck	Construction	2	Each Strain Site		17	34
Franna	Construction	1	Each Brake/Winch Site		4	4
8x8 Truck	Construction	46	Each Brake/Winch Site	Only for Block Anchor sites.	4	184
8x8 Truck	Construction	6	Each Brake/Winch Site	Tower Anchor Sites.	4	24
Light Vehicles	Construction	8	Each Brake/Winch Site		4	32
Indicative Clearing and Access Construction Traffic Volume						
Light Vehicles	Construction	8	Per site	** regionally based contractor	15	120
Water Truck	Construction	4	Per site		15	60
Single Tipper 12m3	Construction	20	Per site		15	300
Low loader (float)	Construction	10	Total	Roller, 2 x excavators, dozer, mulcher	1	10
8x8 Truck	Construction	4	Total	Delivery construction materials	1	4
Plant	Construction	4	Total	Grader	1	4

Vehicle Type	Discipline	No. Trip	Location	Comment	Brisbane Port > M4 > M1 > A1 > CWAR > Stewarts Road
Indicative T/L Procurement Construction Traffic Volume					
Semi low loader	Tower Steel Delviery	6	3 twr / truck		6
Semi low loader	Conductor OPGW EW	6	6 drums / truck		6
Semi low loader	Line materials	5	7 drums / truck		5
Semi low loader	Contractor plant	10	BNE to Site	Cranes, EWP, 8*8 trucks, tip trucks, telehandlers, excavator, bobcats etc	10





Construction

Task	towers per day	no days per tower	no days per line
Mark out	3		
Clear	1		
Bore	2		
Steel	2		
Concrete pour	1		
Concrete cure		28	
Tower assembly		2	
Tower erection		3	
Stringing		4	5

Demolition

Task	towers per day	no days per tower	no days per line
De stringing			6
Undress	1		
De-erection		2	
Remove footings		2	
Backfill		1	
Make good		2	

Kamerunga Substation (New)	Current schedule standard engerisation May 2027	Scheduled Month after commencement of works at Kamerunga (New)	Light Vehicle	Heavy Rigid	Prime Mover and trailer	Truck and Dog	Estimated total number of vehicles	Estimated average movements per day
Mobilisation	Oct-25	3	75	2	8	5	**90**	**8**
Earth Works	Nov-25	4	50	8	4	25	**87**	**8**
Earth Works	Dec-25	5	50	8	2	25	**85**	**8**
Earth Works	Jan-26	6	50	8	2	25	**85**	**8**
Construction (Civil/ electrical)	Feb-26	7	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Mar-26	8	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Apr-26	9	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	May-26	10	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Jun-26	11	100	8	8	15	**131**	**12**
Construction (Civil/ electrical)	Jul-26	12	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Aug-26	13	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Sep-26	14	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Oct-26	15	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Nov-26	16	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Dec-26	17	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Jan-27	18	100	8	8	25	**141**	**12**
Construction (Civil/ electrical)	Feb-27	19	100	8	8	25	**141**	**12**
Testing/ Commissioning	Mar-27	20	50	2	0	25	**77**	**8**
Testing/ Commissioning	Apr-27	21	50	2	0	25	**77**	**8**
Testing/ Commissioning	May-27	22	50	2	0	25	**77**	**8**
Demobilisation	Jun-27	23	50	2	2	25	**79**	**8**
			1725	**138**	**122**	**495**		

Assumptions

25 working days per month

Heavy Rigid for construction materials and concrete truck

Truck and Dog for platform materials and concrete batching.

P/M and Trailer for cement, water and HV plant deliveries

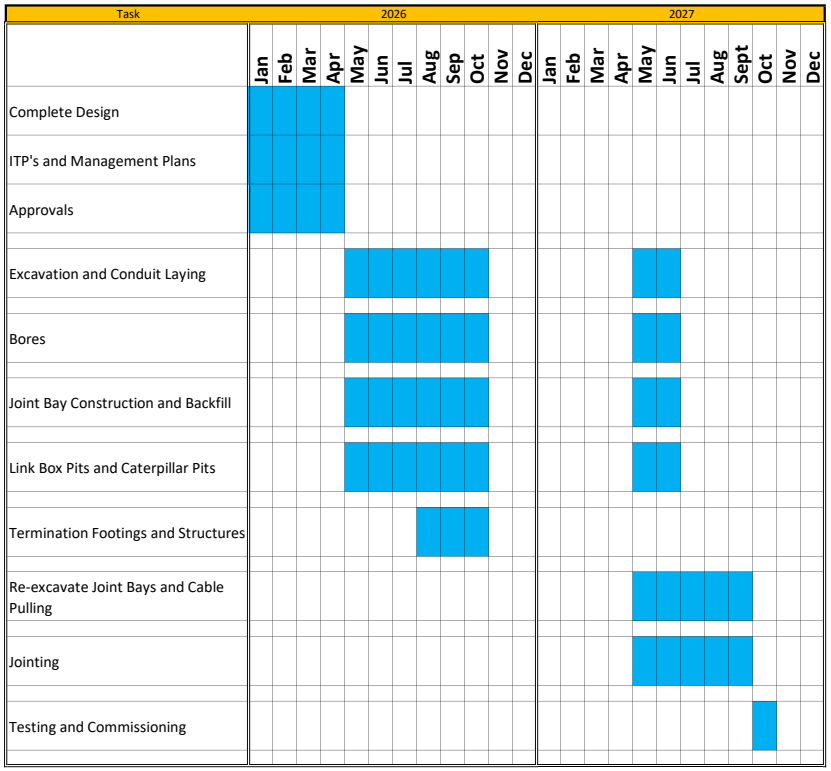
Light Vehicles for site crews. If they bus the crews to site this would change to 50 LV/50 Bus

Average number of vehicles per day rounded up.

Each vehicle has two movements per day (to and from site)

crew	Plant type	capacity	no /crew	no of crews	metres/day	op hrs/day	~~op hrs/week~~	weeks / crew / project	total weeks / project	kW	Access movements to work area per shift	Egress movements to work area per shift
Trench Excavation and Conduit Installation	excavator	14 tonne	8	4	96	8	~~48~~	26	26	81	1	1
	5t truck	5 tonne	1	4		8	~~48~~	26	26	150	24	24
	20t truck	20 tonne	1	4		6	~~24~~	26	26	254	6	6
	Agitator	9m^3	1	4		4	~~24~~	26	26	254	8	8
Traffic Control	1 tonne truck	1 tonne	4	4		8	~~48~~	26	26	110	8	8
Road Reinstatement	excavator	14 tonne	4	4		8	~~48~~	26	26	81	2	2
	Milling Machine	25 tonne	4	2	500	8	~~48~~	26	26	315	1	1
	5t truck	5t	1	2		8	~~48~~	26	26	150	8	8
	20t truck	20 tonne	1	2		8	~~48~~	26	26	254	4	4
Traffic Control	1 tonne truck	1 tonne	4	4		8	~~48~~	26	26	110	8	8
Joint Bay Excavation and Installation	Backhoe	9 tonne	4	1		8	~~6~~	16	16	81	1	1
	10 tonne truck	10 tonne	1	1		8	~~6~~	16	16	130	4	4
	20 tonne truck	20 tonne	1	1		8	~~48~~	16	16	254	4	4
Traffic Control	1 tonne truck	1 tonne	4	4		8	~~48~~	26	26	110	8	8
Cable Delivery (off site)	Low Loader	90 tonne	2	1		8	~~6~~	4	4	350	nil	nil
Cable Installation	Cable Trailer	70 tonne	12	1	1000	8	~~6~~	10	10	350	1	1
	5 tonne truck	5 tonne	2	2		8	~~8~~	10	10	150	4	4
Traffic Control	1 tonne truck	1 tonne	4	4		8	~~48~~	10	10	110	8	8
Cable Jointing	1 tonne truck	1 tonne	6	1		10	~~6~~	20	20	110	4	4
	5 tonne truck	5 tonne	4	1		8	~~6~~	20	20	150	4	4
	10 tonne truck	10 tonne	4	1		8	~~6~~	20	20	200	2	2
Testing	2 tonne truck	2 tonne	1	2		8	~~6~~	4	4	130	4	4
	Utility	1 tonne	4	2		8	~~6~~	4	4	150	8	8
Traffic Control	1 tonne truck	1 tonne	4	4		8	~~48~~	26	26	110	8	8
underbore	excavator										1	1
	5t truck	5t									8	8
	20t truck	20t									4	4
	small drill (crew 1)	<50t	5	*1	250	10	~~60~~	32	32		nil	nil
	large drill (crew 2)	>50t	10	1	250	10	~~70~~	10	10		nil	nil

metres of trench / conduit crew per day 24 *number of crews will be dependant on schedule



No site construction activities

10.3 km of cable. 12.5km of excavation etc based on 4 crews, 24m per day each crew, 5 day weeks = 26 weeks

5 short bores at 4 weeks each, 4 long bores at 6 weeks each, 2 crews. Max = 24 weeks

8 joint bays at 2 weeks per joint bay = 16 weeks

1 crew, 8 link boxes & 8 Caterpiller pits at 1 week per link box / pit = 16 weeks

12 weeks each end, 1 crew at each end = 12 weeks

1 day per joint bay to re-excavate (in parallel), 1 day pulling per cable, 9 cable sections with 6 cables each section, 5 day weeks = 11 weeks

1 crew, 2 weeks per joint bay, 8 joint bays = 16 weeks plus 2 weeks each end = 4 weeks, total = 20 weeks. Backfilling in parallel

1 crew, 3 weeks

rate per day - metres	24		
no days	5	6	7
no weeks	26.0		
no crews	3	4	5

days	**crews**		
	3	**4**	**5**
5	9.4	12.5	15.6
6	11.2	15.0	18.7
7	13.1	17.5	21.8

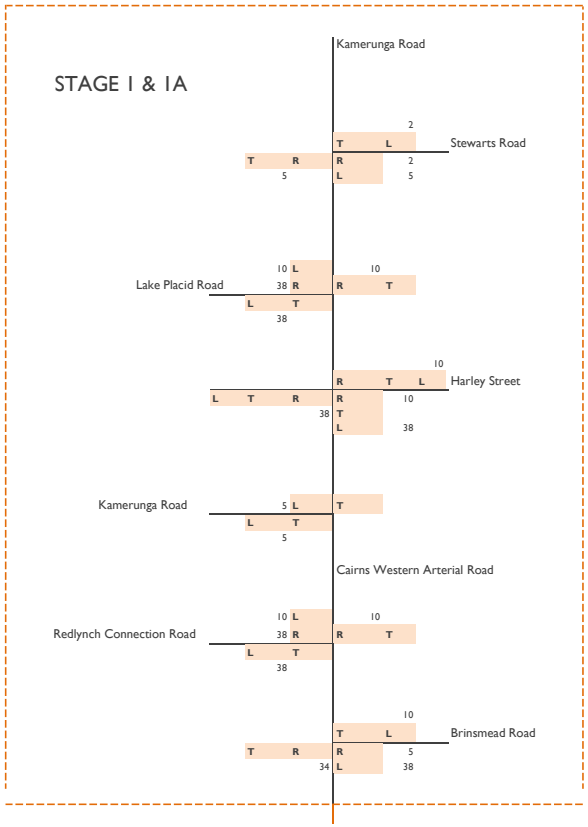
Appendix B

Calculated Network Construction Movements

2B - Distribution Map

Project Name: P24005 Powerlink Redlynch to Woree TIA
Project Number: P24005
Client: JBS&G
Site: Cairns

Entered By: Joseph McGorry
Checked By: Rosie Toohey
Reviewed By: Mark Plattz



STAGE 1 In/out split

Site Numb	Location	In North	In South	Out North	Out South
2	Lake Placid Road / Kamerunga Road	20%	80%	20%	80%
3	Harley Street / Cairns Western Arterial Road	20%	80%	20%	80%
4	Kamerunga Road / Cairns Western Arterial Road		10%	10%	
5	Redlynch Connection Road / Cairns Western Arteria	20%	80%	20%	80%
6	Brinsmead Road / Cairns Western Arterial Road	20%	70%	10%	80%

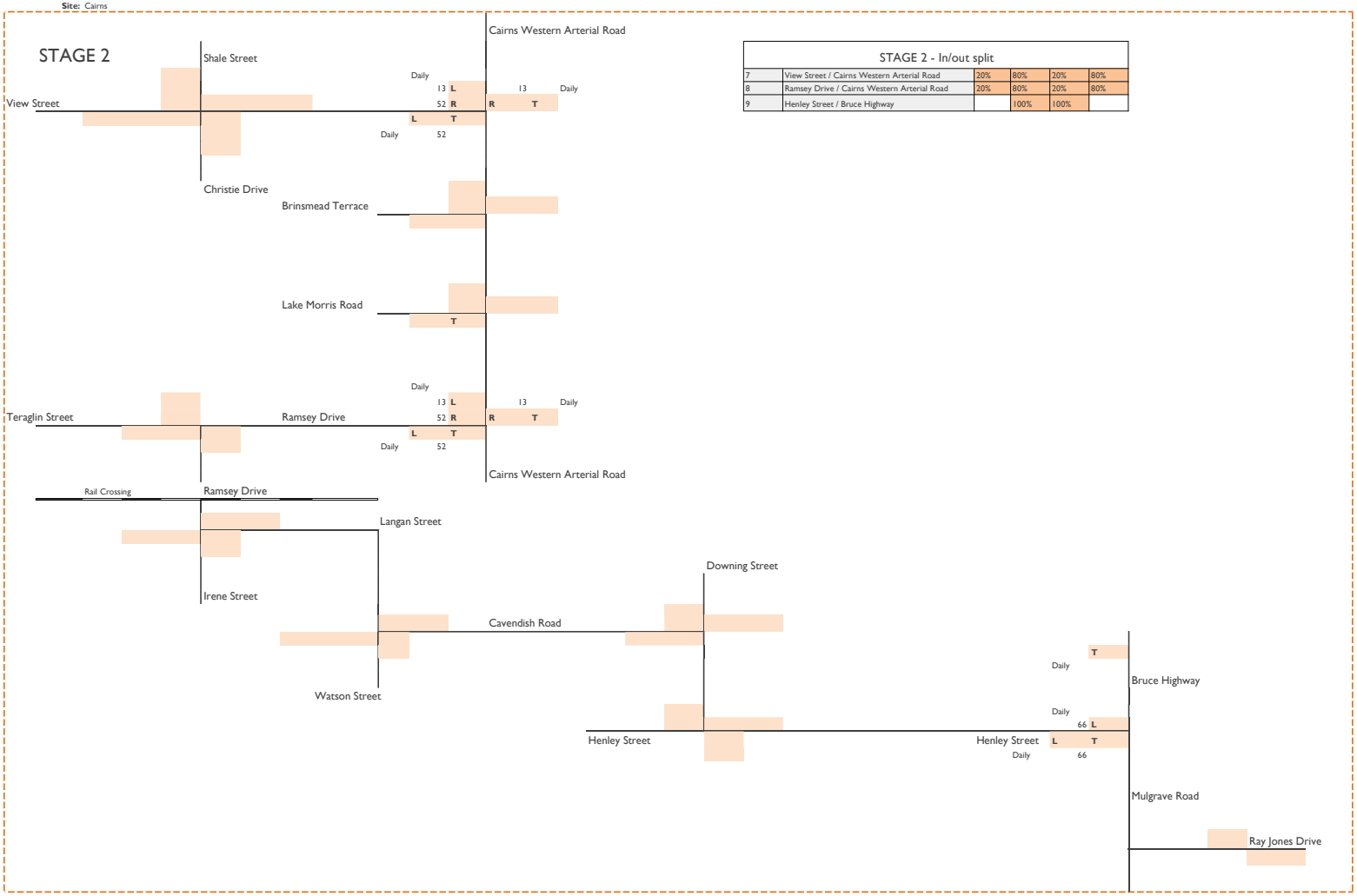
STAGE 1A In/out split

Site Numb	Location	In North	In South	Out North	Out South
1	Stewarts Road / Kamerunga Road	20%	80%	20%	80%

2B - Distribution Map

Project Name: P24005 Powerlink Redlynch to Woree TIA
Project Number: P24005
Client: JBS&G
Site: Cairns

Entered By: Joseph McGorry
Checked By: Rosie Toohey
Reviewed By: Mark Plattz



STAGE 2 - In/out split					
7	View Street / Cairns Western Arterial Road	20%	80%	20%	80%
8	Ramsey Drive / Cairns Western Arterial Road	20%	80%	20%	80%
9	Henley Street / Bruce Highway		100%	100%	