

Traffic Impact Assessment

Clermont Alpha Road / Alpha Bypass Road Intersection

within
Isaac Regional Council

for
CLERMONT SOLAR PTY LTD

EPURON

3

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11/01/2017

icubed consulting
innovation ingenuity inspiration
ABN 89 106 675 156

Level 2, 39 Sherwood Road
Toowong, Qld 4066

mail@icubed.com.au
www.icubed.com.au

P +61 7 3870 8888



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Prepared By	Matthew Beattie
Released By	Nicola Canto
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Approved for release by:

A handwritten signature in purple ink, appearing to read 'Nicola Canto'.

Nicola Canto
RPEQ 6750

06/02/17 **STATEMENT OF LIMITATION**

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1. Introduction

icubed was commissioned by Clermont Solar Pty Ltd to undertake a traffic impact assessment to be included with a development application to Isaac Regional Council for a proposed Solar Photovoltaic (PV) Facility located at Alpha Bypass Road, Clermont. The Solar PV Facility is to be built by Clermont Solar Pty Ltd.

This report details the results of this assessment, including an evaluation of:

- Existing conditions;
- The proposed access arrangements; and
- The impact of the proposed development on the surrounding road network.

The project will be completed in two stages. Below is a brief synopsis of development that will occur on site.

1.1 Limits of Report

The above tasks have been carried out based on information supplied by other members of the project team, together with observations on site. These are detailed in the report.

While icubed has taken care in the preparation of this report, it neither accepts liability nor responsibility whatsoever in respect of;

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- Any third party whose interests may be affected by any decision made regarding the contents of this report.

2. Existing Conditions

2.1 Site Location

The subject site is located at Alpha Bypass Road, Clermont, and is located on 3 properties which are described as lot 6 on SP159756, Lot 220 on CLM102 and Lot 153 on CLM203. The site is accessible from Lindley Road as shown in Figure 1.



Figure 1 Site Locality Plan
Source Google Maps, 2016



Figure 2 Site Locality Plan – Showing Alpha Bypass Road Entrance
Source Google Earth 2016 / Queensland Globe 2016

2.2 Local Road Network

Clermont Alpha Road is under the control of the Queensland State Government (Transport and Main Roads) and is a Regional Road in the Transport and Main Roads classification. From investigation Clermont Alpha Road is a sealed 7m wide two-way road. Figure 3 to Figure 7 show the main traffic route into the site from Clermont on the Clermont Alpha Road.

Clermont Connection Road / Clermont Alpha Rd / Tropic Street intersection is shown in Figure 3.



Figure 3 Clermont Connection Rd / Clermont Alpha Rd / Tropic St Intersection

Clermont Alpha Road within the vicinity of the site is illustrated in Figure 4.



Figure 4 Clermont Alpha Rd

The intersection of Clermont Road / Alpha Bypass Road within the vicinity of the site is illustrated in Figure 5.



Figure 5 Clermont Alpha Rd / Alpha Bypass Rd Intersection

Alpha Bypass Road is an unsealed local government controlled road (Isaac Regional Council road) and is shown in Figure 6.



Figure 6 Alpha Bypass Rd

2.3 Existing Access

The site and the internal solar farm access road is proposed to access from Alpha Bypass Road which is at the northern end of the site, and Lindley Road which divides the subject site.

The Alpha Bypass Road access to the site property is shown in Figure 7.



Figure 7 Alpha Bypass Road at Proposed Site Entrance Location

2.4 Existing Use

The site is currently utilised for grazing activities. The boundaries of the site on the northern side front onto Alpha Bypass Road. The remaining eastern, western and southern boundaries are surrounded by rural properties. Lindley Road is located through the middle of the proposed site, however this road is typically used for access to the rural properties in close vicinity and is not expected to carry significant traffic volumes. The site area comprises approximately 310 ha.



3. Proposed Development

3.1 Description of Proposed Development

The proposed development is a 150MW Solar PV Facility, which is intended to be built in two stages. It is anticipated that construction will begin within the next 6 years for stage 1 works (by 2023) and within the 8 years for Stage 2 works (by 2025). While the exact timing for construction is uncertain at this stage, it is anticipated that the entire project will be completed in 2024 for stage 1 works and in 2026 for stage 2 works. The site office (operations centre) and substation for the PV Solar Project will be located within stage 1 at the south eastern corner of lot 220 on CLM102 (Refer site layout in Appendix A). The access to this site office and substation will be from a new access road from Lindley Road. The new internal access road will be subject to daily traffic as part of the ongoing operations and maintenance of the facility.

The proposed site layout is attached in Appendix A.

3.2 Proposed Access Arrangements

Access to the operations and maintenance facility for the project shall be from a new internal access road which will connect to Lindley Road and the Alpha Bypass Road. The internal access road will provide access to facilities of the solar farm development.

3.3 Parking and Internal Layout

There will be sufficient areas set aside for parking during the construction stages of this project to accommodate the anticipated number of construction and employee vehicles (approximately 200 people are expected during each construction stage).

The site layout will consist of an internal access road, which will be designed to safely and efficiently allow for the circulation of maintenance vehicles to the site office and substation facility.

The site office and substation facility will be provided with car parking spaces for staff likely to be employed at the facility. It is currently expected that staff numbers at the solar facility will not be more than 5 staff.



4. Traffic Impact Assessment

4.1 Trip Generation – Operational Phase

The completed facility is expected to employ up to 5 staff on site to conduct routine maintenance on the facility. There are very few visitors to the site required and as such the impact of traffic is considered to be negligible with no more than 10 trips per day being generated by the facility.

4.2 Trip Generation – Construction Phase

The trip generation characteristics of the proposed development are anticipated to be significantly different during the construction phases of the project. The majority of the traffic impact of the development will occur during the construction phase when a significant number of workers and trucks access the site.

The number of trips expected to be generated during the construction phase of the Solar PV Facility was estimated using traffic volumes provided by Epuron (the project proponent) and on icubed consulting’s experience with solar farm projects:

- Stage 1: Site preparation and pile installation – 20 weeks estimated; and
- Stage 2: PV system installation and substation – 20 weeks estimated

In calculating the peak hour trip generation during construction of the Solar PV Facility, a number of assumptions were made. These include:

- 90% of employees are expected to arrive during the morning peak hour, and depart during the evening peak hour;
- 20% of employees are expected to car pool;
- Heavy equipment is expected to be delivered to site at the beginning of construction phases and removed at the end, and will not be transported to/from the site every day; and
- Gravel and concrete truck arrivals/departures are expected to be evenly distributed throughout the day.

The estimated number of trips generated during construction is summarised in Table 1, with more detailed calculations provided in Appendix B.

	Morning Peak (veh/hr)	Afternoon Peak (veh/hr)
(a) Phase 1A & 2A - Road & Substation Construction	196	196
(b) Phase 1B & 2B - Other	89	89

Table 1 Peak hour trip generation during construction

It is noted that there is a period of overlap between project phases and the critical period for traffic generation in the weeks when Phases 1 and 2 overlap. These have been provided in Table 1. Initially, during the construction period (shown as “a”), the traffic volumes will be the highest, however after construction completion (shown as “b”), the traffic volumes will significantly reduce.

Based on the estimates of worker numbers, it is expected that between 41% to 66% of the inbound vehicles (at different stages of construction) in the morning peak hour and outbound vehicles entering peak hour will be light vehicles during the construction period. The remainder of the vehicles are expected to be heavy vehicles (trucks), including:



- Flatbed trucks;
- Water trucks;
- Module delivery trucks;
- Tracker delivery trucks; and
- Over-dimension Vehicles (Oversize / Over-mass vehicles) for delivery of 132kV transformer and electricity transmission poles
- Other equipment delivery trucks and/or heavy equipment mobilising to the site at the beginning and end of each construction phase;

The use of buses to transport workers is being investigated but at the moment the trip generation within this report has been based on construction staff travelling to the site by car. If bus transportation proves to be a feasible option, the traffic generation numbers would improve due to less staff vehicles travelling to the site.

4.3 Traffic Distribution

It is anticipated that the majority of site traffic will be travelling from the east along Clermont Alpha Road from Clermont or from Emerald, Mackay and Rockhampton to the site and vice versa on their return trip. The majority of workers are expected to originate from, or be based in either Clermont for the duration of the project with some expected from Emerald, Mackay or Rockhampton also. All construction staff and associated construction trucks and vehicles will be instructed to use Clermont Alpha Road as the access path to the site. The reasons for this is that Clermont Alpha Road is a sealed two way road that is designed as a state regional road. Use of Clermont Alpha Road would also reduce the number of construction traffic passing local residents on minor roads.

There may be some limited travel locally from the western direction on Clermont Alpha Road travelling towards the site to the intersection of Clermont Alpha Road and Alpha Bypass Road. The number of these local movements only is unlikely to be high.

4.4 Intersection Assessment

Due to the designated traffic route for the site from Clermont to the site being located on the regional road networks up to the Alpha Bypass Road, and due to the expected traffic volumes being non-excessive, a detailed intersection analysis has not been undertaken. We have carried out construction vehicle swept paths of the two main intersections on the construction traffic route which are: Clermont Connection Road / Clermont Alpha Road / Tropic Street intersection and the Clermont Alpha Road / Alpha Bypass Road intersection. These swept paths have been completed for a B-Double vehicle and an over-dimensional vehicle which are the largest vehicles expected. Swept paths show that the existing intersections are sufficient in size to cater for these vehicles (Refer to Appendix C for Vehicle Swept path sketches).

4.5 Dust Control

Dust from construction is expected to be mostly be generated from construction traffic during the construction duration when vehicle volumes will be the highest. The traffic route from Clermont to the site will be on sealed roads (Clermont Alpha Road) with a short section of the Alpha Bypass Road from Clermont Alpha Road to the site entrance (approximately 1.5km) being unsealed road, as well as Lindley Road. The designated construction traffic route of Clermont Alpha road will however reduce dust compared to access directly from Alpha Bypass Road to the east of the site as this route would cause vehicles to drive on approximately 3.0km of unsealed road and create more dust. This is why Clermont Alpha Road then onto Alpha Bypass Road will be the construction traffic route.

To control dust created from construction, water trucks will be used to spray on Alpha Bypass Road and Lindley Road and on exposed surfaces caused from the construction activities where required. Regular dust control will be monitored and managed and if alternative methods of dust control are required, these may be investigated during construction where required.



Following the construction duration, the operation and maintenance phase of the project is expected to have very low traffic volumes with only 10 trips per days for 5 vehicles per day. For this reason, dust during this operation and maintenance phase is expected to be minimal.



5. Access and Servicing

5.1 Existing Access

Access to the operations and maintenance facility for the project shall be from a new internal access road which connects from Lindley Road via the Alpha Bypass Road.

Measurements noted that the maximum unsealed width of Alpha Bypass Road fronting the site varies between approximately 6m to 10m which will allow for two vehicles to pass and is acceptable. Vehicles travelling in opposite directions will need to take care on the unsealed road surface especially when passing. The use of this unsealed road at the frontage is however considered acceptable during the construction phase due to the low traffic volumes using this road and consideration that the majority of construction traffic will be travelling in the same direction. It is recommended that the construction phase TMP implement appropriate signage and controls to create an appropriate level of awareness of increased vehicle movements in the area.

5.2 Design Vehicles

The requirements for access to the development are expected to vary between the construction and operational phases of the project.

During the construction phase, vehicles arriving on site will be a combination of workers in light vehicles and delivery and construction in heavy vehicles. It is expected that the design vehicle during the construction phase will be a B-Double Vehicle.

During the operational phase of the project, there are only expected to be occasional visits for inspection, security, maintenance and system monitoring by staff in light vehicles. The largest vehicles expected to travel to/from the site during the operational phase are panel washing vehicles, which are expected to be Medium Rigid Vehicles (MRVs) of 8.8m length or smaller.

5.3 Proposed Upgrades and Control Measures

It is recommended that the following upgrades and measures be implemented as a condition of approval for this project:

Stages 1 & 2

- Conduct Pre and Post Construction Visual Dilapidation Survey and report from the Clermont Connection Road / Clermont Alpha Road intersection through to the intersection of Clermont Alpha Road and Alpha Bypass Road and then along Alpha Bypass Road and Lindley Road into the project site entrance.
- Develop and implement a Traffic Management Plan with appropriate controls and signage for the Clermont Alpha Road through to the project site entrance.
- Undertake localised patching of potholes and sealing of cracks in the asphalt surface on Clermont Alpha Road if damage has been caused from construction traffic.
- Dust control be implemented on Alpha Bypass Road from the intersection with Clermont Alpha Road through to the project site entrance (approximately 1.5km length of road)
- Undertake a patrol grade and rolling of Alpha Bypass Road from the intersection with Clermont Alpha Road and the project site entrance.

It is considered that these measures will be appropriate to mitigate the long and short traffic impacts of this development proposal.



6. Conclusion

This report represents the traffic analysis of the proposed 150MW Solar PV Facility located at Alpha Bypass Road, Clermont. Construction is expected to be commenced by 2023 for stage 1 and by 2025 for stage 2 with the project to be completed in 2024 for stage 1 works and in 2026 for stage 2 works.

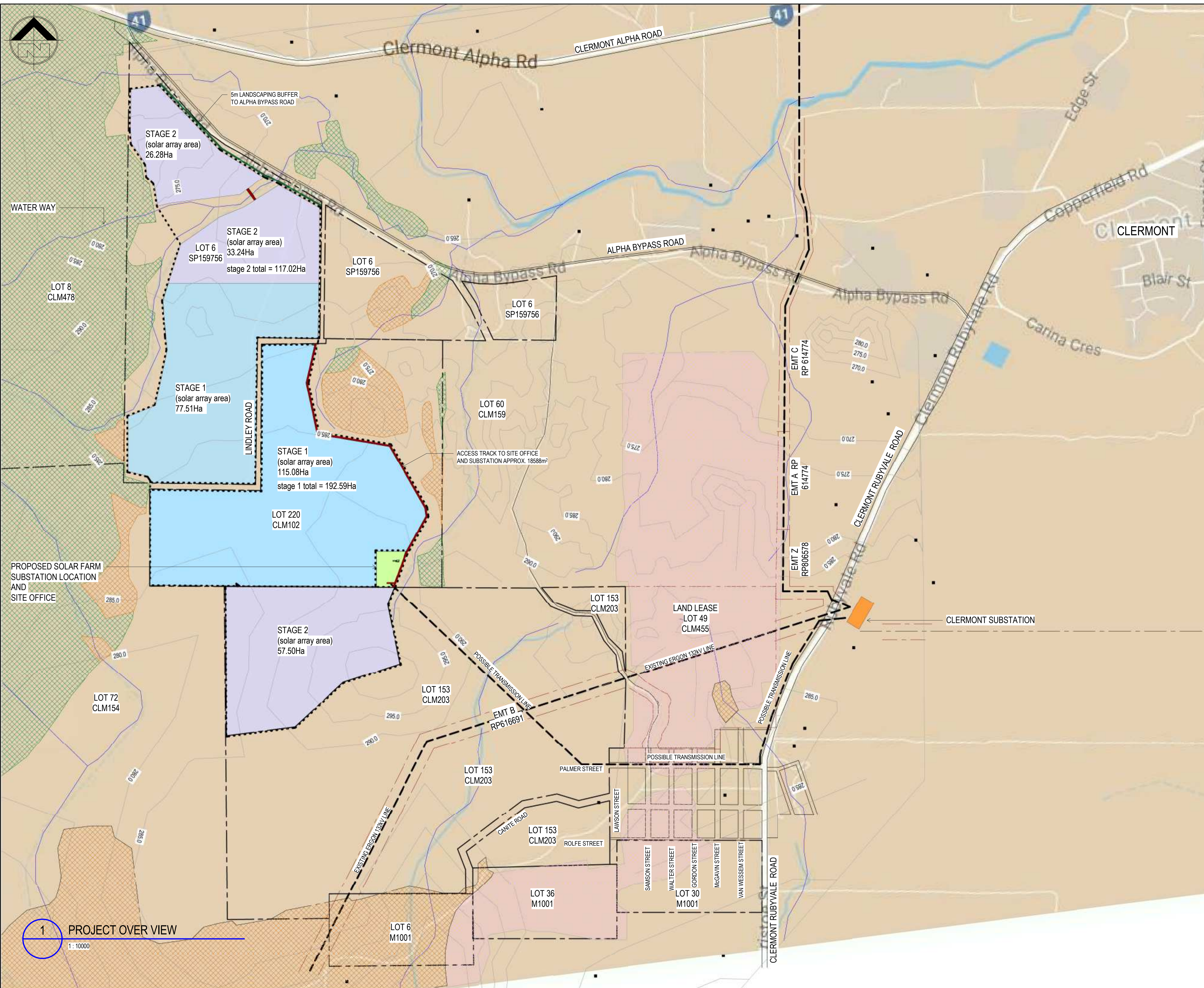
Analysis of the traffic impact of the facility considered two phases of the project, construction and operation. Based on information provided regarding the activities on site during the operational phase of the project, it was found that there would be negligible traffic generated by the site during that phase. The critical phase of the project with respect to traffic generation is the construction phase. The maximum traffic generation was found to be during the overlap between site preparation and PV system installation.

The two main intersections expected to be affected by the development during construction are located at Clermont Connection Road / Clermont Alpha Road and Clermont Alpha Road / Alpha Bypass Road. Given that Clermont Connection Road and Clermont Alpha Road are State Government Regional Roads that already cater for heavy vehicles, there are no further upgrades proposed to be required to cater for the construction and operations phase traffic. No road upgrades are proposed for Alpha Bypass Road given it has sufficient width and that dust generated from construction traffic will be controlled from the unsealed road surface during the construction duration.

Further construction phase controls are recommended as outlined in Section 5.3 of this report.



Appendix A – Site Plans



PROJECT TEAM

Consulting Engineer:
i³ consulting pty ltd
 innovation, ingenuity, inspiration
 LV2, 39 Sherwood Rd PO Box 878
 Toowoong, Qld 4066 Toowoong, Qld 4066
 www.icubed.com.au mail@icubed.com.au
 ABN 89 106 675 156 ACN 106 675 156
 p 07 3870 8888



- SITE LEGEND**
- PROPOSED SOLAR ARRAY AREA STAGE 1
 - PROPOSED SOLAR ARRAY AREA STAGE 2
 - PROPOSED SOLAR FARM SUBSTATION LOCATION
 - PROPOSED LANDSCAPING BUFFER
 - VEGETATION AREA - CATEGORY A AND B AREA THAT IS A LEAST CONCERN REGIONAL ECOSYSTEM
 - VEGETATION AREA - CATEGORY A AND B AREA CONTAINING OF CONCERN REGIONAL ECOSYSTEMS
 - VEGETATION AREA - CATEGORY A AND B AREA CONTAINING ENDANGERED REGIONAL ECOSYSTEMS
 - ACCESS TRACK LOCATIONS
 - EXISTING RESIDENCES
 - WATERWAY CORRIDORS

REV	DESCRIPTION	DATE	BY
G	PLAN UPDATED	18.01.2017	R.J.R.
F	FOR APPROVAL	13.01.2017	R.J.R.
E	ACCESS TRACK AREA ADDED	13.01.2017	R.J.R.
D	LANDSCAPING BUFFER ADDED	11.01.2017	R.J.R.
C	FOR APPROVAL	23.12.2016	R.J.R.
B	FOR APPROVAL	16.12.2016	R.J.R.
A	PLAN UPDATED	09.12.2016	R.J.R.

Status
FOR APPROVAL
 NOT TO BE USED FOR CONSTRUCTION
 Project
CLERMONT SOLAR FARM
 for
 Epuron

PROJECT OVER VIEW

Drawn	Date	Chkd	Date
R.J.R.	05.12.2016	E.C.	
Design	Date	Apprd	Date
R.J.R.			
Scale	A1	Certif	Date
As indicated			
Project No.	Dwg. No.	Rev	
16-076	A00	G	

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1 PROJECT OVER VIEW
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Appendix B – Trip Generation Calculations

Phase 1A - Site Preparation & Piling				Morning Peak Hour					Evening Peak Hour				
Description	Vehicle Type	Daily Two-way Vehicle Trips	Proportion of Trips in Each Peak Hour	% In	Trips In	% Out	Trips Out	Total Trips	% In	Trips In	% Out	Trips Out	Total Trips
Workers	Passenger	66	90%	100%	60	0%	0	60	0%	0	100%	60	60
Water Truck	HRV	7	100%	50%	2	50%	2	4	50%	2	50%	2	4
Flatbed Truck	HRV	4	100%	100%	4	0%	0	4	0%	0	100%	4	4
Module Delivery	AV	4	100%	90%	4	10%	1	5	10%	1	90%	4	5
Tracker Delivery	AV	5	100%	90%	5	10%	1	6	10%	1	90%	5	6
Foundation Pile Delivery	AV	7	100%	90%	7	10%	1	8	10%	1	90%	7	8
Gravel Truck	HRV	4	0%	50%	2	50%	2	4	50%	2	50%	2	4
Total		97			84		7	91		7		84	91
% Light Vehicles								66%					66%
Notes:													
1. 20% of Workers are Assumed to Carpool													
2. Average Labour Force has been Considerd													
3. Gravel deliveries will be spread across the working day													
4. Major Construction plant for earthworks and access will be delivered at the start of the project and remain on site for the construction phase..													



Phase 2A - System Installation & Substation				Morning Peak Hour					Evening Peak Hour				
Description	Vehicle Type	Daily Two-way Vehicle Trips	Proportion of Trips in Each Peak Hour	% In	Trips In	% Out	Trips Out	Total Trips	% In	Trips In	% Out	Trips Out	Total Trips
Workers	Passenger	48	90%	100%	44	0%	0	44	0%	0	100%	44	44
Water Truck	HRV	7	100%	50%	4	50%	4	8	50%	4	50%	4	8
Flatbed Truck	HRV	32	30%	100%	10	0%	10	20	0%	10	100%	10	20
Module Delivery	AV	4	100%	90%	4	10%	1	5	10%	1	90%	4	5
Tracker Delivery	AV	5	100%	90%	5	10%	1	6	10%	1	90%	5	6
Trucks - Inverter Delivery	AV	7	100%	50%	4	50%	4	8	50%	4	50%	4	8
Truck - Sand Delivery	HRV	130	10%	50%	7	50%	7	14	50%	7	50%	7	14
Concrete Truck	HRV	39	0%	50%	0	50%	0	0	50%	0	50%	0	0
Total		272			78		27	105		27		78	105
% Light Vehicles								42%					42%
Notes:													
1. 20% of Workers are Assumed to Carpool													
2. Average Labour Force has been Considerd													
3. Concrete deliveries will be spread across the working day													
4. Major Construction plant for lifting and access will be delivered at the start of the project and remain on site for the construction phase..													



Phase 1B - Site Preparation & Piling				Morning Peak Hour					Evening Peak Hour				
Description	Vehicle Type	Daily Two-way Vehicle Trips	Proportion of Trips in Each Peak Hour	% In	Trips In	% Out	Trips Out	Total Trips	% In	Trips In	% Out	Trips Out	Total Trips
Workers	Passenger	19	90%	100%	18	0%	0	18	0%	0	100%	18	18
Water Truck	HRV	7	100%	50%	4	50%	4	8	50%	4	50%	4	8
Flatbed Truck	HRV	2	100%	100%	2	0%	0	2	0%	0	100%	2	2
Module Delivery	AV	4	100%	90%	4	10%	1	5	10%	1	90%	4	5
Tracker Delivery	AV	5	100%	90%	5	10%	1	6	10%	1	90%	5	6
Foundation Pile Delivery	AV	4	100%	90%	4	10%	1	5	10%	1	90%	4	5
Gravel Truck	HRV	0	0%	50%	0	50%	0	0	50%	0	50%	0	0
Total		41			37		7	44		7		37	44
% Light Vehicles								41%					41%
Notes:													
1. 20% of Workers are Assumed to Carpool													
2. Average Labour Force has been Considerd													
3. Concrete deliveries will be spread across the working day													
4. Major Construction plant for lifting and access will be delivered at the start of the project and remain on site for the construction phase..													



Phase 2B - System Installation & Substation				Morning Peak Hour					Evening Peak Hour				
Description	Vehicle Type	Daily Two-way Vehicle Trips	Proportion of Trips in Each Peak Hour	% In	Trips In	% Out	Trips Out	Total Trips	% In	Trips In	% Out	Trips Out	Total Trips
Workers	Passenger	23	90%	100%	21	0%	0	21	0%	0	100%	21	21
Water Truck	HRV	7	100%	50%	4	50%	4	8	50%	4	50%	4	8
Flatbed Truck	HRV	5	90%	100%	5	0%	0	5	0%	0	100%	5	5
Module Delivery	AV	4	100%	90%	4	10%	1	5	10%	1	90%	4	5
Tracker Delivery	AV	5	100%	90%	5	10%	1	6	10%	1	90%	5	6
Concrete Truck	HRV	1	0%	50%	0	50%	0	0	50%	0	50%	0	0
Total		45			39		6	45		6		39	45
% Light Vehicles								47%					47%

Notes:

1. 20% of Workers are Assumed to Carpool
2. Average Labour Force has been Considerd
3. Concrete deliveries will be spread across the working day
4. Major Construction plant for lifting and access will be delivered at the start of the project and remain on site for the construction phase..



Trip Generation Summary		
Phase	Morning Peak	Afternoon Peak
1A	91	91
1A & 2A Overlap	196	196
2A	105	105
1B	44	44
1B & 2B Overlap	89	89
2B	45	45



Appendix C – Vehicle Swept Paths

PROJECT TEAM

Consulting Engineer:



i³ consulting pty ltd
 engineering consultants
 innovation, ingenuity, inspiration
 LV2, 39 Sherwood Rd PO Box 878
 Toowong, Qld 4066 Toowong, Qld 4066
 www.icubed.com.au mail@icubed.com.au
 ABN 89 106 675 156 ACN 106 675 156
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1 LOCALITY PLAN
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A	FOR APPROVAL	17.01.2017	R.J.R.
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Status

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NOT TO BE USED FOR CONSTRUCTION

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CLERMONT SOLAR FARM

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Title
INTERSECTION

Drawn	Date	Chkd	Date
R.J.R.	05.12.2016	M.B.	
Design	Date	Apprd	Date
R.J.R.			
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PROJECT TEAM

Consulting Engineer:

i³ consulting pty ltd
 engineering consultants
 innovation, ingenuity, inspiration
 LV2, 39 Sherwood Rd PO Box 878
 Toowong, Qld 4066 Toowong, Qld 4066
 www.icubed.com.au mail@icubed.com.au
 ABN 89 106 675 156 ACN 106 675 156
 p 07 3870 8888

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Status
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Title
**INTERSECTION CLERMONT
 ALPHA RD AND ALPHA BYPASS
 RD - OVER SIZED**

Drawn	Date	Chkd	Date
R.J.R.	05.12.2016	M.B.	
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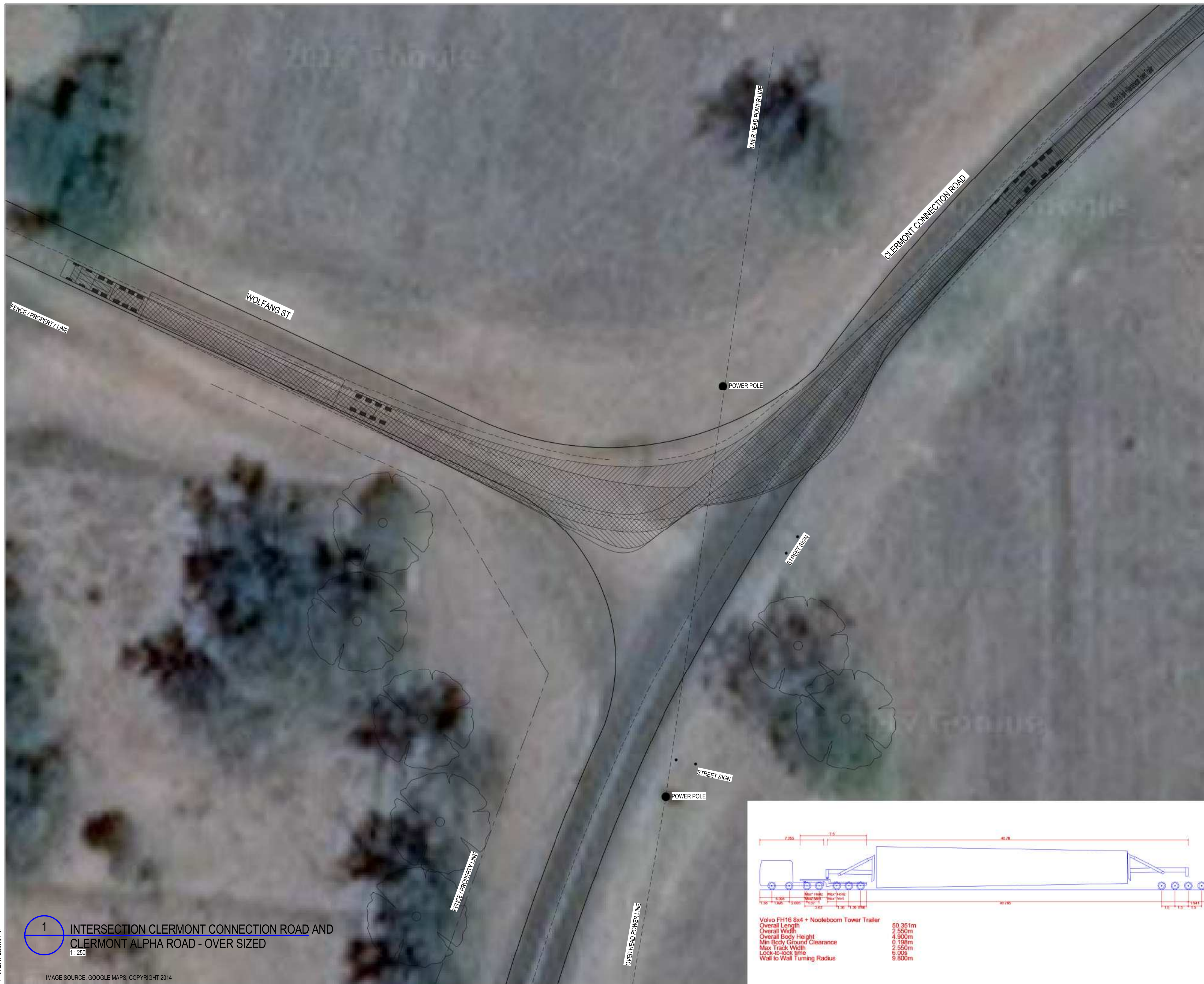
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Consulting Engineer:



i³ consulting pty ltd
 engineering consultants
 innovation, ingenuity, inspiration
 LV2, 39 Sherwood Rd PO Box 878
 Toowoong, Qld 4066 Toowoong, Qld 4066
 www.icubed.com.au mail@icubed.com.au
 ABN 89 106 675 156 ACN 106 675 156
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PROJECT TEAM

Consulting Engineer:



i³ consulting pty ltd
 engineering consultants
 innovation, ingenuity, inspiration
 LV2, 39 Sherwood Rd PO Box 878
 Toowong, Qld 4066 Toowong, Qld 4066
 www.icubed.com.au mail@icubed.com.au
 ABN 89 106 675 156 ACN 106 675 156
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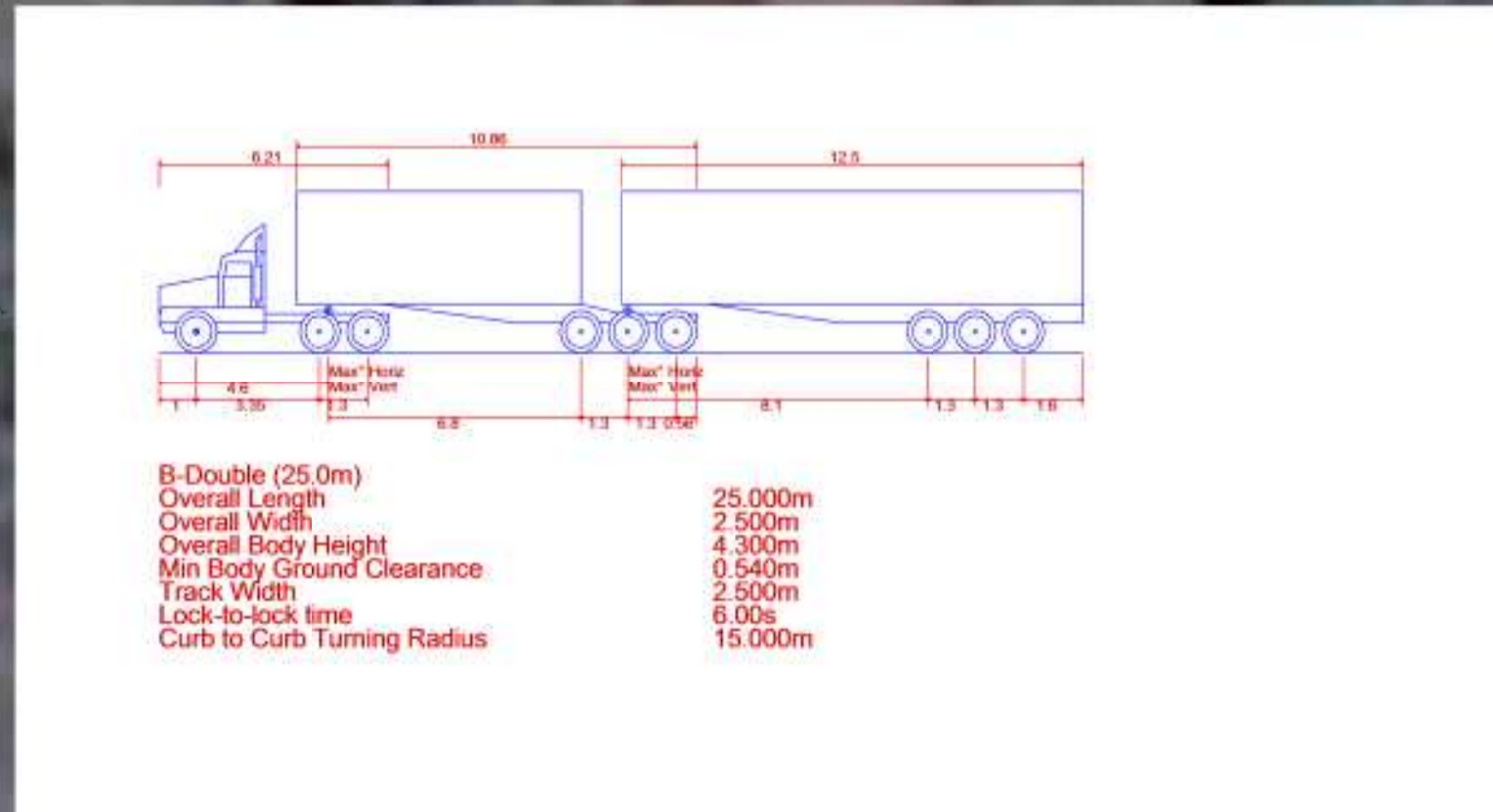
EPURON

REV	DESCRIPTION	DATE	BY
A	FOR APPROVAL	17.01.2017	R.J.R.

FOR APPROVAL
 NOT TO BE USED FOR CONSTRUCTION
 Project
CLERMONT SOLAR FARM
 for
 Epuron

Title
INTERSECTION CLERMONT ALPHA RD AND ALPHA BYPASS RD - B-DOUBLE

Drawn	Date	Chkd	Date
R.J.R.	05.12.2016	M.B.	
Design	Date	Apprd	Date
R.J.R.			
Scale	A1	Certif	Date
As indicated			
Project No.	Dwg. No.	Rev	
16-076	C004	A	

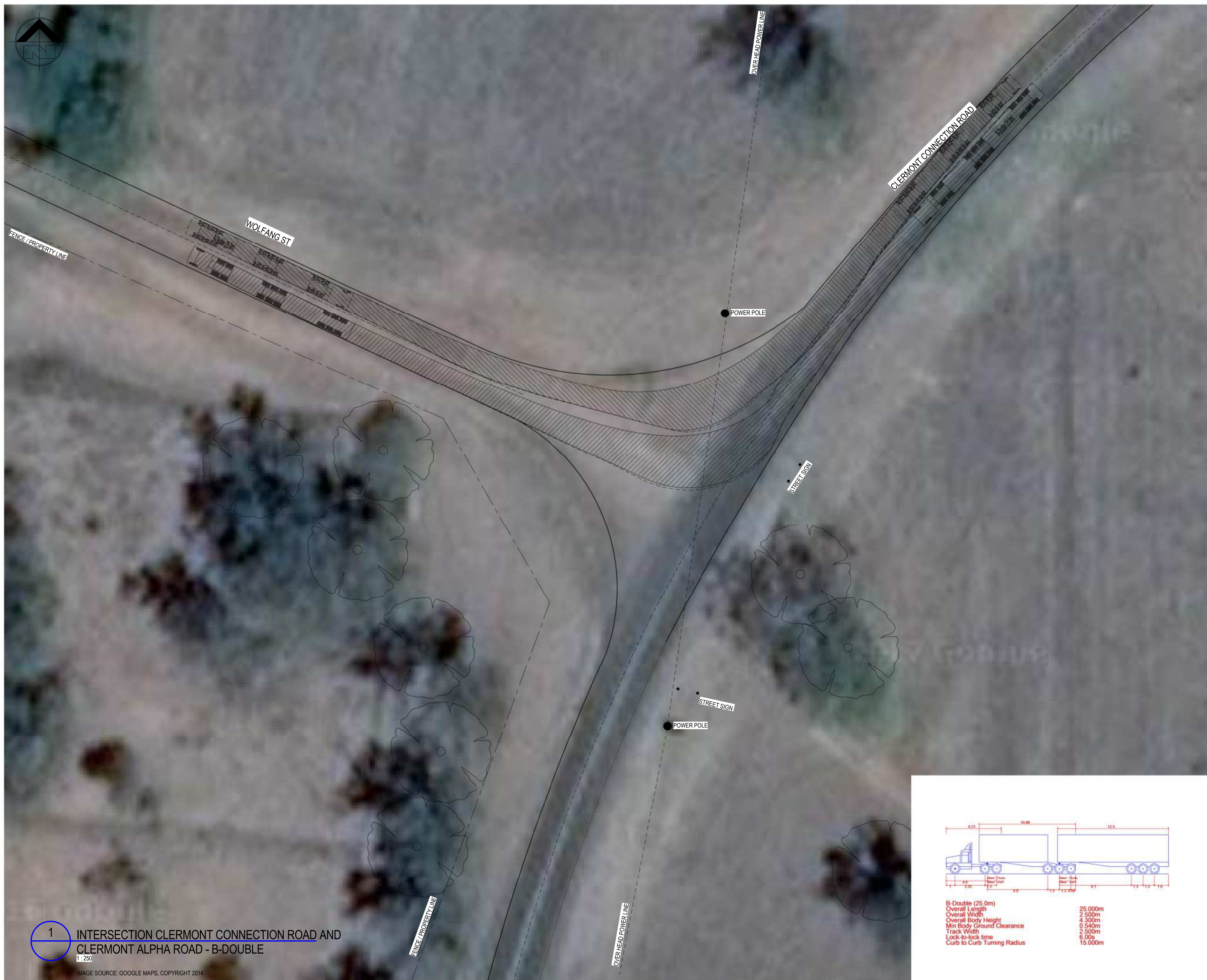


1 INTERSECTION CLERMONT ALPHA ROAD AND ALPHA BYPASS ROAD - B-DOUBLE
 1:250

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IMAGE SOURCE: GOOGLE MAPS, COPYRIGHT 2014

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PROJECT TEAM

Consulting Engineer:

i³ consulting pty ltd
 engineering consultants
 innovation, ingenuity, inspiration
 LV2, 39 Sherwood Rd PO Box 878
 Toowong, Qld 4066 Toowong, Qld 4066
 www.icubed.com.au mail@icubed.com.au
 ABN 89 106 675 156 ACN 106 675 156
 p 07 3870 8888

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REV	DESCRIPTION	DATE	BY
A	FOR APPROVAL	17.01.2017	R.J.R.

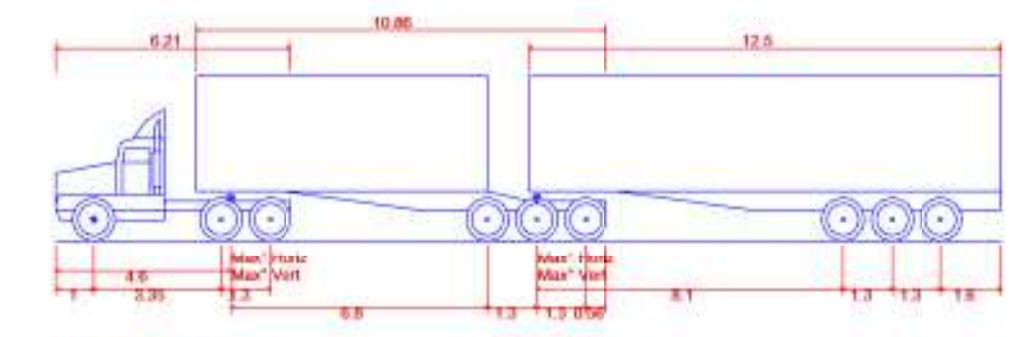
Status
FOR APPROVAL
 NOT TO BE USED FOR CONSTRUCTION

Project
CLERMONT SOLAR FARM

for
 Epuron

Title
INTERSECTION CLERMONT CONNECTION RD AND CLERMONT ALPHA RD - B-DOUBLE

Drawn	Date	Chkd	Date
R.J.R.	05.12.2016	M.B.	
Design	Date	Apprd	Date
R.J.R.			
Scale	A1	Certif	Date
As indicated			
Project No.	Dwg. No.	Rev	
16-076	C005	A	



B-Double (25.0m)
 Overall Length 25.00m
 Overall Width 4.30m
 Overall Body Height 4.30m
 Min Body Ground Clearance 0.54m
 Track Width 2.50m
 Lock-to-lock time 6.00s
 Curb to Curb Turning Radius 15.000m

1 INTERSECTION CLERMONT CONNECTION ROAD AND CLERMONT ALPHA ROAD - B-DOUBLE
 1:250

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