2018-22
POWERLINK QUEENSLAND REVENUE PROPOSAL

Project Pack - PUBLIC

CP.01649
Callide A to Biloela 132kV Transmission Line Replacement

Delivering better value

ID&TS - Reset 2017/18 - 2021/22 Project Proposal for CP.01649 Callide A to Biloela 132kV Transmission Replacement

Document Approval		
	Name	Position
Prepared by		Project Manager
Reviewed by		Team Leader Projects
Approved by		Group Manager Infrastructure Delivery

Contents

1. Executive Summary

The 132kV transmission line between T022 Callide A substation and T026 Biloela (BS1157) substation was first established in 1963 to support the expansion of coal mining and the growing regional communities. The built section supports two 132kV feeder circuits F7109 / F7110.

The condition of the transmission line has deteriorated over time and has now reached its end of life. The need to maintain two 132kV circuits from T022 Callide A into the western area including township of Biloela, Moura, and Baralaba is firmly established.

Consideration to undertake a transmission line refit was assessed as not providing the required life extension to make it economically viable when compared to transmission line replacement in this instance. The objective of this project is to construct a new double circuit 132kV transmission by June 2021.

[redacted]

2. Project Definition

2.1 Project Scope

Briefly, the project consists of replacing the existing double circuit 132kV transmission line between T022 Callide A and T026 Biloela substations, decommission and recover the existing transmission line conductor, tower structures and transmission line fittings and hardware.

2.1.1 Transmission Line Works

Design, procure, construct and commission 18.7km of 132kV double circuit steel tower transmission line between T022 Callide A and T026 Biloela substations. [redacted]

- Required minimum summer emergency rating 135MVA per circuit. It is assumed that a design using single neon conductor will meet this condition;
- The transmission line is to include a single 48 fibre OPGW's and a suitably sized OHEW to share fault current evenly;
- Recover the existing 132 kV double circuit transmission line (approx 16 km) between Callide A and Biloela. This includes all towers, conductors and line hardware;
- Upgrade all transmission line landing spans from tower structures to substation landing beams for all feeders associated with these feeders;
- Rehabilitate each tower site to ensure long term stability;
- Rehabilitate the cleared corridor, where required, in a manner that suits the location and to ensure long term stability;

- For access tracks no longer required, rehabilitate to ensure long term stability.

2.1.2 T022 Callide A Substation Works

- Uprate landing span droppers and feeder bay hardware to match the transmission line feeder ratings; and
- Modify feeder protection setting as required.

2.1.3 T026 Biloela Substation Works

- Uprate landing span droppers and feeder bay hardware to match the transmission line feeder ratings; and
- Modify feeder protection setting as required.

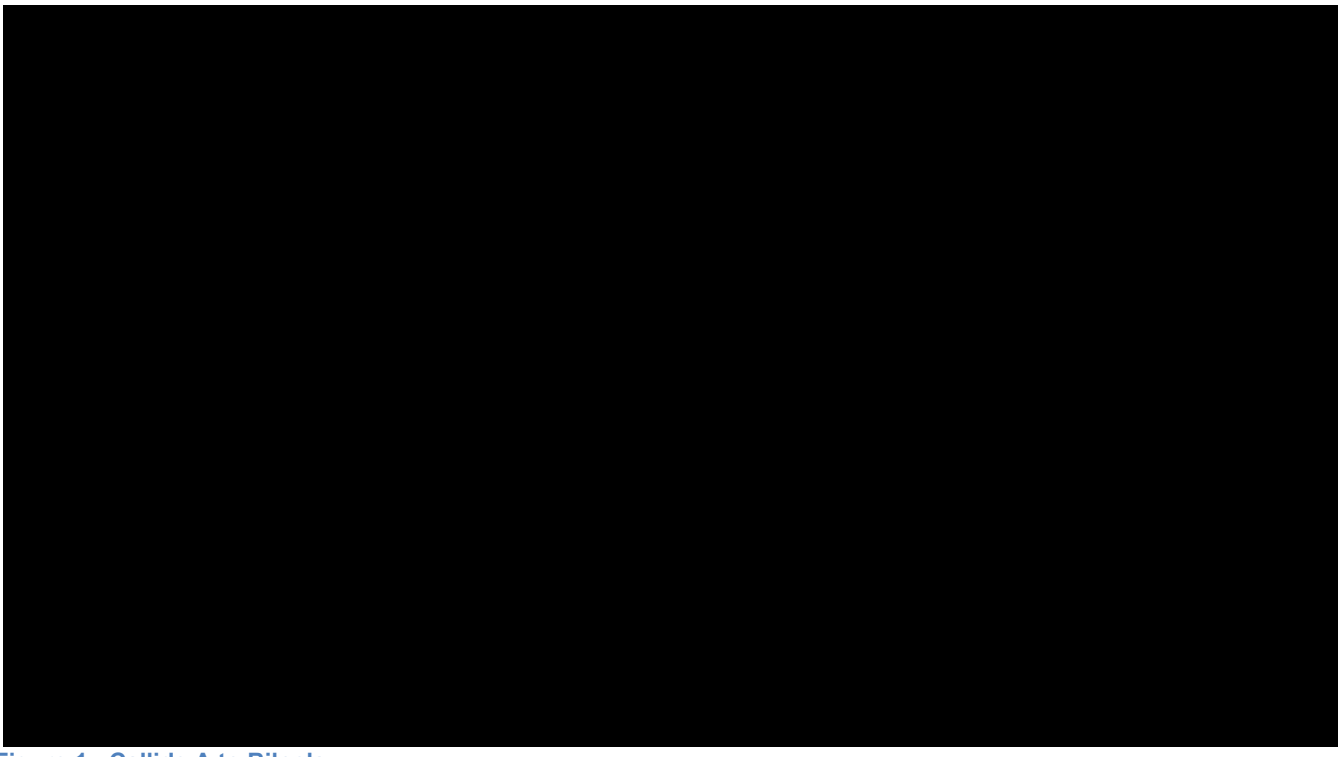

Figure 1 - Callide A to Biloela

2.2 Major Scope Assumptions

- [redacted]
- The new double circuit transmission line is based on E-Series 132kV cyclonic lattice steel structures with an assumed easement width of 60m. It was estimated that there will be 29 suspension structures and 18 strain structures with an average tower height of +9m. This is based on the assumption that the proposed easement will have 11 bend points, 1 train line

crossing, 1 highway crossing, 2 275kV line crossings, 5 Ergon LV crossings, 1 named creek crossing and an average span length of 400m.

- Tower structures are based on the use of Powerlink's E-Series tower design as Powerlink does not have a Neon conductor tower suite. It is expected that a Neon conductor tower design, having a lower capacity, would provide a cost saving of approximate $200,000 in construction although are far outweighed by development costs, expected to be in the order of $+3M. It is assumed that the E-Series towers will remain the current structure design for this project.

- The following constraints have been assumed for decommissioning of the existing line – 1 Train line crossing, 1 Highway crossing, 12 minor road crossings and 6 Ergon LV crossings.

- Based off PQ Maps it is assumed that three 66kv Ergon LV undercrossings and two smaller 11kV undercrossings will intersect the proposed transmission line route. It is assumed outages to these lines will be limited. Cradle blocking and/or undergrounding costs have been estimated at $800k.

- An additional two 66kv Ergon LV undercrossings and five smaller 11kV undercrossings are known to intersect the existing transmission line. It is assumed that the existing lines can be decommissioned under short outages.

- The proposed and existing lines also cross under two 275kV Calvale – Stanwell lines. It is assumed that proximity permits will be sufficient for stringing near these lines, and outages will not be required on these lines. It is assumed that adopting single span lifts where the lines intersect should negate the need for outages.

- Based on the high level advice received from network operations it has been assumed that F7109 / F7110 will be constrained to short-term single-circuit outages.

- It is assumed that the lack of available area for a new easement within 1km of Callide A means that a temporary pole arrangement will be required to allow for decommissioning and replacing of the first three towers. It is expected that three temporary poles would be constructed either side of the easement. Each circuit would then be transferred from the existing towers to the temporary poles. This would then allow the towers to be decommissioned and replaced. These works, as well as the associated switching costs have been allowed for.

- Detailed outage plans are not required to be submitted as part of this reset proposal.

- In the absence of geotechnical data the following foundation type spread has been assumed based on recent projects in the area.
    - 50% bored undercut
    - 50% bored socketed

- Any required modifications to Ergon assets will be performed within the required timeframes to avoid delaying Powerlink work.

- It is assumed that a fly in and fly out workforce would be used working a 3 & 1 week roster. It has been assumed that workers can be accommodated at the nearby towns such as Biloela, and that these costs are included in the contractor establishment rate.

- It is preferred that the Clearing and Access works is constructed separate to the lines contract under the direction of Powerlink. It is assumed the Clearing and Access contractor would commence prior to the transmission line contractor working progressively in advance.

- The existing and proposed project corridors are known to have significant weeds, which are widespread throughout the area. This includes Parthenium and Giant Rat's Tail which are known to be across the existing project corridor. A Pest Management Plan will be developed with the intention to minimise the spread of weeds along the project corridor. 5 major weed zones have been assumed for the construction and demolition of the transmission line for a combined cost of $350K. The establishment and operation of wash-down facilities are included as part of this estimate.

- It is assumed that geotechnical investigations would be carried out on every 10th transmission structure. It is also assumed that a specialist RPEQ engineer would be engaged to verify soil and rock classifications for foundation nominations during construction.

- It has been assumed that construction materials, such as water, gravel and rock can be obtained within 50kms from the construction work front.

2.3 Scope Exclusions

- [redacted]

- The proposed estimate is based on a nominated alignment route of 18.7km. Variances of km's (+/-) have not been allowed as part of this project pricing and should be adjusted accordingly after a detailed alignment selection process has been undertaken.

- Deviations caused from, cultural heritage, environmental, and other site specific constraints have been excluded from this estimate.

- No allowance for any mines EBA, IR agreements or workplace health and safety requirements above that which would be expected on normal Powerlink construction sites.

- No allowance for contributions to local government road use agreements and the associated road impacts cost have been allowed for in this estimate.

- Third Party wash-down requirements and or the establishment of biosecurity huts are excluded from this pricing.

- Increases to structure heights over Good Quality Agricultural Land, to maintain electrical clearances for the allowance of specific farming equipment has not been allowed and is excluded from this estimate.

- No allowances have been made for the increase of workforces to meet the requirements of the Queensland Government Building and Construction Training Policies. It is assumed the contractor workforce would have existing training and development programs in place meeting these requirements. An increase in labour workforce to meet the Queensland Government Building and Construction Training Policies requirements has been excluded from this pricing.

- No allowance has been made for unseasonable weather events. E.g. floods, cyclones, droughts.

3. Project Execution

3.1 Project Dependencies & Interactions

Project No.	Project Description	Planned Comm Date	Comment
Pre-requisite Projects			
[redacted]	[redacted]		
Co-requisite Projects			
CP.01647	Biloela – Moura 132kV Transmission Line Replacement	June 2021	There are potential savings that could be realised by combining CP.01647 and CP.01649 into a single project.
Other Related Projects			

3.2 Site Specific Issues

The proposed works are located within the Banana Shire councils. The nearest population centre is Biloela (pop 5808).

Overall the study area is of rural character, dominated by cattle grazing and some cropping. The topography of the study area is quite flat.

3.3 Project Delivery Strategy

- The overhead line work will be outsourced using either a Panel Agreement for Transmission Lines or will go to open tender
- Powerlink design will complete the design for Lines, Substation and Telecommunications work.
- Cut-ins, SAT, landing spans and dropper connections to line isolators will be performed by O&FS.
- Final system integration will be by O&FS in conjunction with the Powerlink Commissioning engineer.

Project Delivery Strategy Matrix		
Design	Earthworks Design	Powerlink
	Civil Design	Powerlink
	Electrical Design (Primary)	Powerlink
	Electrical Design (Secondary) – Protection	Powerlink
	Electrical Design (Secondary) – Automation	Powerlink
	Transmission Line Design	Powerlink
	Telecommunication Design	Powerlink
Construction	Earthworks Construction	N/A
	Civil Construction	N/A
	Electrical Construction / Installation	MSP
	Transmission Line Construction	PATL Contractor
Testing	Substation Testing – FAT	MSP
	Substation Testing – SAT	MSP
	Substation Testing – Cut-Over	MSP
	Telecommunication Testing	MSP

3.4 Proposed Sequence of Works

3.4.1 Project Schedule

To meet the required commissioning date of June 2021 full project approval will be required by April 2017.

High Level Schedule

- Project Approval : April 2017
- Design Complete : October 2019
- Site Access Date : April 2020
- T/L Construction : August 2020 – February 2021
- Staged reconfiguration/cut-in works : January - May 2021
- Commissioning : June 2021
- Final decommissioning/Tidy up : July - August 2021
- Project Completion : 30th August 2021

3.4.2 Project Staging

Major project stages of the project are considered to be:

Stage	Description/Tasks
1	Construct Double Circuit T/L including temporary poles near Callide A substation
2	Transfer both circuits between 1157-STR-0001 and 1157-STR-0003 onto temporary poles. Short-term outages of F7109 and F7110 required for these works.
3	Decommission and replace structures 1157-STR-0001 to 1157-STR-0003.
4	Simultaneously reconfigure section where line crosses Biloela to Moura feeder (F1110/3), and cut new line into Biloela substation. Short-term outages of F7109 and F7110 required for these works.
5	Re-string both circuits on new structures between Callide A substation and 1157-STR-0003. Short-term outages of F7109 and F7110 required for these works.
6	Decommission and remove 1157-STR-004 to 1157-STR-052 and temporary poles.

3.4.3 Network Impacts and Outage Planning

Preliminary outage advice from Network Operations has indicated that outages will be constrained to short-term outages on F1109 and F1110. In order to overcome this constraint the estimate is based on building the new transmission line on a new easement, and using a temporary pole arrangement near Callide A substation to limit outage durations.

3.5 Project Health & Safety

The implications of relevant workplace health & safety legislation in delivering the proposed solution have been considered in preparing this estimate. In particular, this estimate includes an allowance for typical safety related activities required in the delivery phase of the project.

This project will be undertaken in accordance with Powerlink's Workplace Health and Safety Specification. This project is expected to have typical safety issues involving Brownfield substation and Greenfield transmission line works.

3.6 Project Environmental Management

This project will be undertaken in accordance with Powerlink's Environmental specification. If approved, the construction works of this project will be subject to the requirements outlined in the project EIS and EMP. Allowances and risks have been included in this proposal.

4. Project Risk Management

CLIMATE

BOM data at the Biloela DPI station indicates that the region is likely to encounter approximately 20 days of weather for a rain event >10mm. Rain events such as these are considered and are allowed for as part of this estimate. In the case of unseasonal weather, rainfall quantities and its ongoing effects can be significantly more than those derived from BOM data. Also, at several stages during this project there will be short timeframes to complete works under outages. In the event that weather delays these works, significant costs could be incurred. An allowance for climate impacts has been included in the estimate.

DESIGN

Site conditions along the indicative alignment have been limited to desktop analysis. This was undertaken using PQ Constraint mapping data, PQ maps, topographic maps and information obtained from the Bureau of Meteorology. Data sources for the purpose of providing an estimate are considered high level. Potential deviations and design changes may occur on the due to cultural and heritage, environmental, landholder, topographical, geological constraints. An allowance for design risk has been included in the estimate.

CONTRUCTION

Site conditions along the indicative alignment have been limited to desktop analysis. This was undertaken using PQ Constraint mapping data, PQ maps, topographic maps and information obtained from the Bureau of Meteorology. Data sources for the purpose of providing an estimate are considered high level. Potential deviations and design changes may occur on the due to cultural and heritage, environmental, landholder, topographical, geological constraints. An allowance for construction risk has been included in the estimate.

5. Project Estimate

5.1 Estimate Summary

Quote Summary - CP.01649 BS1157 Callide A to Biloela132kV Transmission Line Replacement

The quotation at current cost levels and escalated for completion by 30 June 2021 at 4.1% per year, for CP.01649 BS 1157 Callide A to Biloela132kV Transmission Replacement is as follows

CP.01649 Quotation in $,000 AUD	Base Cost Levels	Escalated to Compln.	Comment (Costs @ Base Cost Levels)
Transm. Line #1 - Callide A to Biloela	[redacted]	[redacted]	132/110kV DCST/NC Neon OPGW (E Series) Assumptions: Total Line Length = 18.7Km Heavy Strain/Termination D1T70E+9 required: 4 Medium Strain D1T40E+9 required:14 Suspension D1S0E+9 required: 29 Average span assumed: 400m Average ground clearance assumed: 12m (for cultivation areas)
			Dismantle existing (17km)132kV transmission line (Demolition costs)
			Temporary Pole arrangement, Cut In works and Switching
			Geotech Investigations
			Line Allowances (Highway/Minor Roads, Distributions lines & Railway Crossings, Biosecurity and Wet weather delays)
Substation Works(T022 Callide A and T026 Biloela)			Protection settings changes
Telecomms Work			Telecomms work
Project Concept, Investment & Planning, Overall Project Mngt, Statutory Costs and Network Ops			Overheads
TOTAL QUOTE (EXCL RISKS)	**19,291**	**23,500**	
Risk Estimate	**956**	**956**	
TOTAL QUOTE (INCL RISKS)	**20,248**	**24,456**	

5.2 Asset Disposal Table

CP.01649 Asset disposal. Values current at 30th June 2016

Functional Loc.	Description	Asset	Subnumber	Book val.	% disposal	Total disposal	Currency
1157	Callide A to Biloela F7109_7110/1/2	102538	0	819,339.10	100%	819,339.10	AUD
					Total	819,339.10	AUD

6. References

Document name and hyperlink (as entered into Objective)	Version	Date
Project Scope Report	1	23/06/15
Estimate Detail	1	28/08/15