

2018-22

POWERLINK QUEENSLAND REVISED REVENUE PROPOSAL

APPENDIX 3.02 – PUBLIC

Project Proposal for Increase Design Temperature
Bouldercombe to Raglan and Larcom Creek to
Calliope River 275kV Transmission Lines

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Project Proposal for Increase Design Temperature Bouldercombe to Raglan and Larcom Creek to Calliope River 275kV transmission lines

Document Approval

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1. Executive Summary

BS1120 / BS1515 between Bouldercombe – Raglan – Larcom Creek - Calliope River form part of a transmission corridor enabling power flows between Central West and Gladstone. The utilisation of this corridor is expected to increase with a proportion of increases in [REDACTED] and reduced [REDACTED]. Under these scenarios the corridor generally becomes the limiting section in preparation of and during outages of Calvale – Wurdong or Bouldercombe – Calliope River.

BS1120 F811 is a single circuit 275kV transmission line running between H010 Bouldercombe and H073 Raglan. It is 44 km in length and was first established in 1977, the built section consists of 109 balanced strain structures and 8 tension towers.

BS1515 F8859 is a single circuit 275kV transmission line running between H058 Larcom Creek and H067 Calliope River, it is some 11km in length and was constructed in 1977. The built section has 21 structures with 10 tension and 11 suspension structures.

Undertaking works to increase ground clearance on 14 spans between H010 Bouldercombe and H067 Calliope River increases the summer emergency cyclic rating from 541MVA to 593MVA providing a closer match to the real time rating of the southern sections and additional dispatch flexibility.

The objective of the project is to increase the design temperature of 14 spans on the two built sections BS1120//BS1515 from the existing design temperature of 82°C to 90°C by June 2019.

2. Project Definition

2.1 Project Scope

Briefly, the project consists of improving the design temperature / ground clearance of 14 spans that limit the summer emergency cyclic rating of the feeder to 541MVA. By increasing the ground clearance of the 14 spans from 82°C to 90°C this increases the Summer Emergency cyclic rating of the feeders to 593MVA.

2.1.1 Transmission Line Works

The affected spans require line reconfiguration, or earth moving work to increase the clearance, (distance), between conductors and ground. There are generally four options that can be applied to achieve this required outcome, as listed below, (in order of preference):

Option 1 - Earthworks – This option involves removal and relocation of soil within the affected span, effectively reducing ground height and improving conductor ground clearance,

Option 2 - Removal of Hanger Brackets – If the suspension assembly utilises hanger brackets, this option involves removing these brackets, effectively lifting the conductors and improving ground clearances. (It is unknown whether these feeders have hanger brackets),

Option 3 - Shift and Cut – This option involves the removal of a small section of conductor and insert mid span joint, which in turn increases conductor height, improving ground clearances,

and,

Option 4 - Balanced Strain – This option involves converting a standard suspension assembly to a balanced strain, effectively increasing the height of the attachment location and improving ground clearances.



Below is a list of the affected spans, as well as the violation details and proposed Option to alleviate the violations across the three built sections:

Span		Conductor	Violation:Distance	Proposed Option
1120-STR-0154	1120-STR-0155	LHS	0.13m : 23m	Option 4 (1120-STR-0155)
		MID	0.29m : 55m	
		RHS	0.28m : 47m	
1120-STR-0155	1120-STR-0156	LHS		
		MID	0.25m : 39m	
		RHS	0.17m : 36m	
1120-STR-0157	1120-STR-0158	LHS	0.09m : 20m	Option 1
		MID	0.09m : 29m	
		RHS	0.09m : 12m	
1120-STR-0164	1120-STR-0165	LHS	0.21m : 35m	Option 4 (1120-STR-0165)
		MID	0.23m : 26m	
		RHS	0.09m : 7m	
1120-STR-0165	1120-STR-0166	LHS	0.24m : 22m	
		MID	0.17m : 15m	
		RHS	0.24m : 44m	
1120-STR-0173	1120-STR-0174	LHS	0.20m : 26m	Option 1
		MID	0.16m : 28m	
		RHS	0.13m : 13m	
1120-STR-0176	1120-STR-0177	LHS	0.21m : 38m	Option 4 (1120-STR-0177)
		MID	0.27m : 42m	
		RHS	0.12m : 14m	
1120-STR-0177	1120-STR-0178	LHS	0.04m : 5m	
		MID	0.15m : 22m	
		RHS		
1120-STR-0180	1120-STR-0181	LHS	0.08m : 19m	Option 1
		MID	0.06m : 11m	
		RHS		
1120-STR-0188	1120-STR-0189	LHS	0.16m : 24m	Option 1
		MID		
		RHS		
1120-STR-0195	1120-STR-0196	LHS		Option 1
		MID	0.40m : 5m	
		RHS	0.18m : 1m	
1515-STR-0022	1515-STR-0023	LHS	0.02m : 1m	Option 1
		MID		
		RHS	0.37m : 15m	
1515-STR-0023	1515-STR-0024	LHS		Option 1
		MID		
		RHS	0.03m : 5m	
1515-STR-0030	1515-STR-0031	LHS		Option 1
		MID		
		RHS	0.42m : 5m	

Table 1

2.2 Major Scope Assumptions

- It is assumed site access (SAD) will be available at approval date. Latest date for project approval/site access is July 2018, to allow scoping and design works as required.
- From a review of the built sections within PQ Maps, it appears there may be a small number of undercrossings encountered adjacent some of the affected spans. These undercrossings may need to be de-energised depending on the adopted option for each span. For the purpose of this estimate, it is assumed there are only two impacted undercrossings, and, it is assumed these will be able to be de-energised as required.

2.3 Scope Exclusions

- Obtaining easements or permits for the new transmission alignment, this work is to be carried out by others.
- Any substation upgrade or reconfiguration works.

3. Project Execution

3.1 Project Dependencies & Interactions

Project No.	Project Description	Planned Comm Date	Comment
Pre-requisite Projects			
N/A			
Co-requisite Projects			
N/A			
Other Related Projects			
N/A			

3.2 Site Specific Issues

A review of nearby rainfall data indicates there is little evidence heavy rainfall or a 'traditional wet season' in the region, rather, sporadic rainfall events throughout the year. Rainfall data (in mm) for nearby location for the past 3 years as per the table below:

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	325.4	51.0	46.0		88.6	1.0	6.4	0.0	0.0	27.0	45.0	28.0
2014		96.4	72.0	37.0	13.2	24.0	1.0	21.0	100.4	0.0	51.2	182.0
2015	173.0		11.0	0.0	47.0							

The site is considered semi-remote, and as such, accommodation close to work locations may be scarce. However, considering the short time frame for individual site works, it is not expected there shall be any problems sourcing suitable accommodation for work crews.

All site locations appear very accessible, on generally relatively flat terrain. Access for heavy vehicles such as elevated works platforms and/or cranes also appears possible at all work locations.



3.3 Project Delivery Strategy

It is expected that the project will be delivered utilising an earth moving Contractor for Option 1, whilst Options 2, 3 and 4 will be delivered utilising a Maintenance Service Provider, (MSP). Powerlink is expected to perform the design with the Maintenance Service Provider performing the switching works as required.

Project Delivery Strategy Matrix		
Design	Earthworks Design	Powerlink
	Civil Design	N/A
	Electrical Design (Primary)	N/A
	Electrical Design (Secondary) – Protection	N/A
	Electrical Design (Secondary) – Automation	N/A
	Transmission Line Design	Powerlink
	Telecommunication Design	N/A
Construction	Earthworks Construction	N/A
	Civil Construction	N/A
	Electrical Construction / Installation	N/A
	Transmission Line Construction	Option 1 – Contractor, Options 2-4 – MSP (Ergon/O&FS)
Testing	Substation Testing – FAT	N/A
	Substation Testing – SAT	N/A
	Substation Testing – Cut-Over	N/A
	Telecommunication Testing	N/A



3.4 Proposed Sequence of Works

3.4.1 Project Schedule

To meet the required commissioning date of June 2019 full project approval will be required by July 2018.

High Level Schedule

- Project Approval : July 2018
- Scoping/Design Complete : Sept 2018
- MSP engagement complete : Dec 2018
- Contractor engagement : Dec 2018
- T/Line works (Contractor/MSP) : April - June 2019
- Project Final Commissioning : June 2019

3.4.2 Project Staging

Major project stages of the project are considered to be:

Stage	Description/Tasks
1	Undertake ground clearance improvement works to the affected 14 spans as designed.

3.4.3 Network Impacts and Outage Planning

To mitigate network risks, works requiring feeder outages shall be scheduled outside of summer peak periods, i.e. May through September.

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.

3.6 Project Environmental Management

No specific environmental management implications for the delivery of this project have been identified.

Any ground disturbance works (Option 1) will require site specific environmental and cultural heritage survey/assessment prior to being undertaken.

4. Project Risk Management

Some allowances have been allowed in the estimate. Please see estimate for details. Please refer to the assumptions and exclusion as these items have implications for the overall project risk.



5. Project Estimate

5.1 Estimate Summary

The estimate has been updated based on the review of Powerlink’s work practices to implement the project. This has resulted in an increase in the number of phase changes required for option 4-Balance Strain from 9 phase changes to 16 phase changes as listed in table 1.

Current estimate 18/10/16

Quote Summary

The quotation at current base level and escalated for completion by 30/6/19 at 2.5% CPI plus labour rate variation per year, for OR.NCIPAP-010 Increase Design Temperature Bouldercombe – Raglan – Larcom Creek - Calliope River 275kV is as follows:

Quotation in \$ AUD	Base Levels	Escalated to Compln.	Comment (Costs @ Base Levels)
Line 1 - Earthworks Method (Option 1)			Increase Design Temperature to 9 Sites
BS1120 F811 Bouldercombe Raglan - Earthworks			5 Sites at a cost per site of:
BS1532 F8875 Raglan Larcom Creek - Earthworks			1 Sites at a cost per site of:
BS1515 F8859 Larcom Creek Calliope River - Earthworks			3 Sites at a cost per site of:
Total Line 1			
Line 2 - Balanced Strain Method (Option 4)			Increase Design Temperature to 3 Sites
BS1120 F811 Bouldercombe Raglan - Balanced Strain			16 Phases at a cost per phase of:
Total Line 2			included O&FS pricing plus
Line 3 -Line Design, Access & Compliance			
Design and Survey			
Access & Compliance			
Total Line3			
Total Line Work			
Wet Weather Allowance			
Project Management			
Qleave			
Other Costs			Project Concept/ Investment & Plan
TOTAL QUOTE (EXCL RISKS AND OFFSETS)			
Offsets Estimate			
TOTAL QUOTE (INCL OFFSETS)			
Climate			
Construction			
Design			
Total Risk Estimate			
TOTAL QUOTE (INCL RISKS AND OFFSETS)	606,109	637,426	

5.2 Asset Disposal Table

Not applicable.



6. References

Document name and hyperlink (as entered into Objective)	Version	Date
Project Scope Report	2	12/11/2015
Estimate Detail	3	26/10/2016