

2018-22

POWERLINK QUEENSLAND REVENUE PROPOSAL

Project Pack - PUBLIC

CP.02565

Karana Downs to South Pine TL Refit

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ID&TS – Reset 2017/18-2021/22 Project Proposal for CP.02565 Karana Downs to South Pine TL Refit

Document Approval

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1. Executive Summary

The Karana Tee – South Pine 275kV transmission line (built section 1047) was first established in 1970. It is approximately 32km long and consists of 33 tension towers and 45 suspension towers through a range of rural and residential areas.

The transmission line is an essential component of the transmission network supplying the Brisbane metropolitan area and has an electrical capacity which meets long term requirements. The transmission line has deteriorated due to natural ageing and corrosion, and the condition of the line needs to be addressed to ensure its long term safety and reliability.

The objective of this project is to address the safety and reliability of the transmission line asset by carrying out life extension refit works by 31 October 2020.

2. Project Definition

2.1 Project Scope

The following scope presents a functional overview of the desired outcomes of the project. The proposed solution presented in the estimate must be developed with reference to the remaining sections of this Project Scope Report, in particular *Section 1.7 Matters to Consider*.

Briefly, the project consists of member replacement, surface treatment and painting of approximately 32km (78 structures) of double circuit transmission line.

2.1.1 Transmission Line Works

The following shall be addressed within the scope of work:

- Access track suitability for contractor works
- Site establishment
- Surface preparation and painting of 78 towers as per current Powerlink standards.

Note: containment of materials used - surface treatment of structures located near residential or environmentally sensitive areas may require the construction of scaffold and plastic sheeting to protect residences and capture water and residue.

- Review all tower leg / stub members and encapsulate where the concrete to steel interface is showing signs of corrosion.
- Replacement of 5% of all tower nuts and bolts.
- Replacement of 1% of steel members per tower.
- Replacement of:
 - Insulators.
 - Conductor hardware.
 - Vibration dampers.
 - Tower accessories including signs and anti-climbing barrier.
 - All step bolts.
- Review of drainage and clearing of all growth around tower foundations.
- Review of the electrical design to confirm electrical clearances and insulation levels.

- Review and documentation of the structural capacity of the structures.
- Tower earthing to be upgraded to the current standard
- Update SAP records and drawings

2.2 Major Scope Assumptions

- Preliminary advice from NetOps suggests that single circuit outages will be possible. However, outages will not be possible during the Summer load period (October to March). It is assumed that long term outages will be possible from April to September.
- Advice from NetOps also notes that there is risk of requiring a return to service. It is assumed that O&FS will be able to comply with a contingency plan to allow a 3hr return to service in the event that it is required.
- Rocklea – West Darra – Goodna feeders, Algester – Richlands feeders and Belmont substation can remain intact during these outages.
- Approximate quantities of bolts, nuts and members as well as the surface area of each tower type provided by TLD were used for the estimate.
- All insulators will be replaced.
- Conductor hardware and vibration dampers to be replaced on an as-needed basis.
- All step bolts and fall arrest brackets will be replaced.
- It is assumed that 40% of anti-climbing barriers will require replacement or repair.
- It is assumed that 10% of foundations will require minor works such as concrete encapsulation at the leg-concrete column interface.
- It is assumed 20% of towers will require additional earthing to be upgraded to the current standard.
- Garnet blasting will be the surface preparation method used. Drop sheets and fencing will be used to contain the blasting media. This will be an important control as the easement runs through residential areas.
- The painting system assumed for this project is a two coat application of metallic zinc to achieve a dry film thickness of 120 microns in two coats.
- Insulator assembly lengths will not vary, avoiding any potential electrical clearances issues. Clearance drawings shall be produced during project execution.
- It is assumed that the access tracks originally formed for construction of the transmission line are mostly intact, and sufficient for 4wd access. An allowance has been made in the estimate for minor access tracks upgrades.
- It is assumed that minor benching will be required on a considerable portion of the tower sites to allow for EWP set up. An allowance has been included in the estimate for this.
- Minimum vegetation clearing and restoration works would be required to facilitate works.



2.3 Scope Exclusions

- Any increase in scope after detailed condition assessments have been conducted.
- Any foundation works other than minor repairs to the leg / concrete column interface.
- No allowance has been included for erection of scaffolding.
- No environmental offsets have been included in this estimate.
- Installation of any additional structural members to bring the structures up to current design standards.
- No allowance has been included for delays due to an unexpected feeder return to service.
- No allowance has been made for unseasonable weather events. E.G floods, cyclones etc.

3. Project Execution

3.1 Project Dependencies & Interactions

As it is expected that the insulator/hardware replacement works will be undertaken by O&FS, completion of these works is dependent on availability of resources. Any concurrent projects requiring O&FS's lines resources will impact this project.

3.2 Site Specific Issues

Based on a desktop study, most towers appear to be within a short distance of bitumen roads, and easily accessible by a 4WD vehicle in the dry season, but access could be limited after wet weather in low lying areas around nearby rivers and creeks. The line traverses a range of flat to hilly terrain, residential areas and forested areas.

3.3 Project Delivery Strategy

- The design of suitable replacement members would be performed by Refit Panel Contractor;
- The Refit Panel Contractor will supply and fit replacement bolts, nuts and steel members and carryout other related Refit works such as replacing anti-climbing barriers, signage etc;
- The Refit Panel Contractor will paint the towers;
- O&FS will replace the insulators and line hardware; and
- Switching for outages will be performed by O&FS.

3.4 Proposed Sequence of Works

3.4.1 Project Schedule

To meet the required commissioning date of 31st October 2020 full project approval will be required by 1st April 2019.

High Level Schedule

- Project Approval : 1st April 2019
- Detailed Condition Assessments : June 2019
- Refit works : January 2020 – September 2020
- Insulator/Hardware Replacement : April 2020 – September 2020
- Project Completion : 31st October 2020

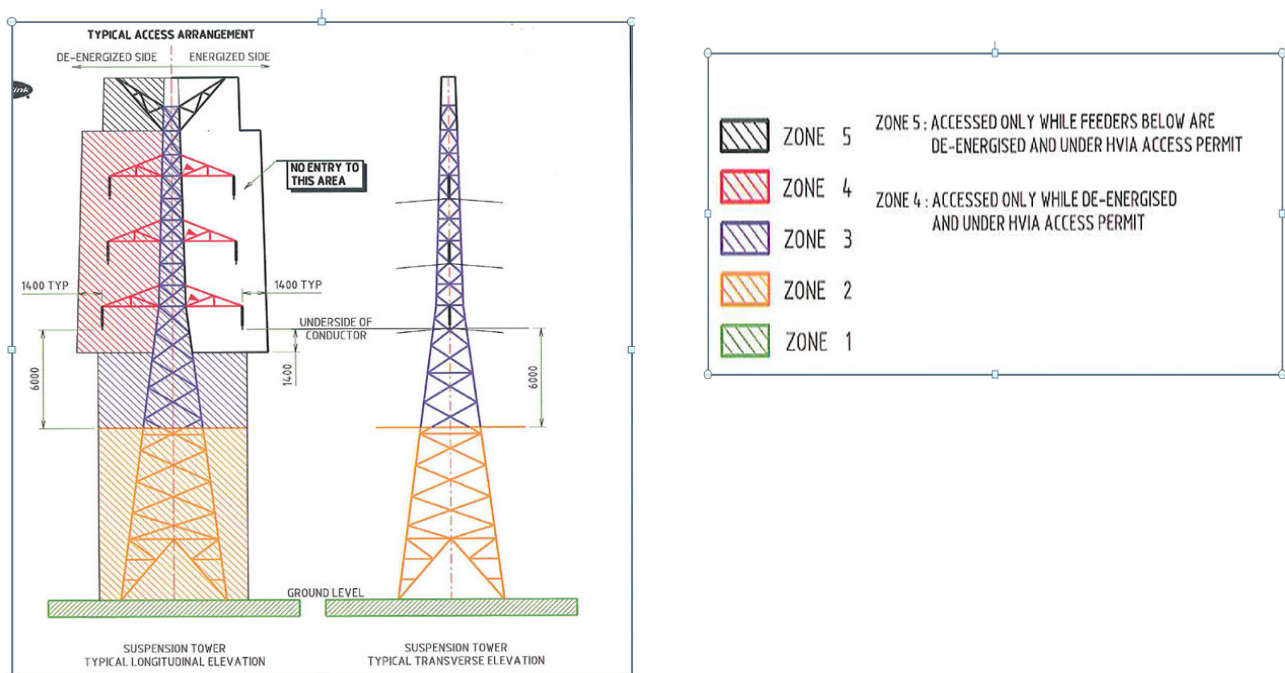
3.4.2 Project Staging

The timing for access to sections of the line will be alternated between the Refit Contractor and O&FS so that all works requiring outages can be completed within one season between April and September.

3.4.3 Network Impacts and Outage Planning

Preliminary outage advice from NetOps has indicated that single circuit outages will be possible. However, outages will not be possible during the Summer load period (October to March). It was also stipulated that a fast restoration plan is required, as any outage would be high risk with the potential of market impact.

It is expected that all surface preparation, painting and structural member replacement works will be undertaken by a Principal Contractor working under a SAHVEA Access Permit (As shown on the figure below an Access Permit is required in Zones 4 and 5. Access permits are not required in other Zones) and single circuit outage conditions. The OPGW and OHEW fitted to the line will remain connected and the fibre paths will remain in service.





3.5 Project Health & Safety

The nominated Principal Contractor shall manage work and safety in accordance with Powerlink and WH&S legislative requirements. Principal Contractor WHS documentation such as WHS Management Plan (WHSMP), High Risk Construction Work Safe Work Method Statement (SWMS) are to be received 14 days prior to work commencing and must be reviewed by Powerlink ID&TS Safety Team.

3.6 Project Environmental Management

The project will be undertaken in accordance with Powerlink Environmental specification. If approved the construction works of this project will be subject to the requirements outlined in the project Environmental Management Plan. Prior to undertaking these works the following key environmental considerations should be considered:

- Wildlife - Impacts on Avifauna nesting sites and other habitat features. Insulator replacement may require bird nest removal and/or replacement. Standard EMP, EWP, and SMP control measures should be followed.
- Biosecurity - Spread of noxious flora from construction works within the easement is a likely possibility. Ensure weed hygiene protocols are followed and wash down facilities are clearly identified.
- Hazardous substances – Contamination of areas nearby to the easement from blasting or painting media is possible. Appropriate controls will need to be in place to manage the risk of environmental harm from these substances.

4. Project Risk Management

CLIMATE

BOM data at Archerfield indicates that the region is likely to encounter approximately 28 days of rain >10mm per year, and 9 days of rain >10mm between April and September when the majority of the work is planned. 9 days of wet weather delays have been 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. An allowance of 1% risk of the overall estimate has been determined and allowed for as part of this project.

DESIGN

Until a detailed design review can be completed the ability for the Refit Contractor or O&FS to undertake their work is uncertain. An allowance of 1% risk of the overall estimate has been determined and allowed for as part of this project.

CONSTRUCTION

The estimate is based on an assumed level of deterioration. Until detailed condition assessments have been completed, there exists a risk that this level of deterioration has been underestimated. Potential delays may occur due to environmental, landholder, and access constraints. There is also the risk of an unexpected return to service delaying all refit works for an indeterminate length of time. A combined allowance of 4% risk of the overall estimate has been determined and allowed for as part of this project.



5. Project Estimate

5.1 Estimate Summary

Quote Summary :CP.02565 Karana Downs – South Pine TL Refit

The quotation at current cost levels and escalated for completion by 31 October 2020 at 4.1% per year, for CP.02565 Karana Downs – South Pine 275kV TL Refit is as follows:

CP.02565 Quotation in \$,000 AUD	Base Cost Levels	Escalated to Compln.	Comment (Costs @ Base Cost Levels)
Transm. Line #1 Karana Downs – South Pine 275kV transmission line (built section 1047) 32km long and consists of 33 tension towers and 45 suspension towers			Karana Downs – South Pine TL Refit (78 towers - structure bolt/member replacement,insulators, conductor hardware,step bolts, vibration dampers, tower accessories replacement and painting)
			Project Management
			Site Establishment and Running costs
			Prepare condition assessment report for Life Extension
			Procurement
			Bolt Replacement
			Other replacement Items(step bolts, fall arrest, ACD and Signs)
			Structural replacement (Primary and Secondary member replacement)
			Surface preparation and Painting
			Foundation and Stub Repair
			Contractor Establishment for life extension
			Access Track Upgrade
			Replace Insulators on existing structure
			Switching Costs
			Wet weather allowance
Project Concept/Investment & Planning, Statutory Costs and O&FS -Network Ops			Overheads
TOTAL QUOTE (EXCL RISKS)	15,834	18,613	
Risk Estimate	977	977	
TOTAL QUOTE (INCL RISKS)	16,811	19,590	

5.2 Asset Disposal Table

No asset disposal is required for these works.



6. References

Document name and hyperlink (as entered into Objective)	Version	Date
Project Scope Report	1	4/9/15
Estimate Detail	1	25/9/15