Powerco CPP – Portfolio Overview Document

Portfolio Name	Kopu—Tairua 66 kV Sub-transmission Upgrade
Expenditure Class	Capex
Expenditure Category	Growth & Security
As at Date	12 June 2017

Expenditure Forecast[1,2]	Pre CPP	FY19	FY20	FY21	FY22	FY23	Post CPP	CPP Period Total	Project Total
Pre-Internal Cost Capitalisation and Efficiency Adjustments[3] *(2016 Constant NZ$(M))*	$0.6	$3.5	$2.9	$1.5	$0.0	$0.0	$0.0	$7.9	$8.5
Post-Internal Cost Capitalisation and Efficiency Adjustments *(2016 Constant NZ$(M))*	$0.6	$3.8	$3.2	$1.6	$0.0	$0.0	$0.0	$8.6	$9.2

Description

Project need overview	The 66 kV subtransmission network that supplies Tairua, Whitianga and Coromandel during contingency situations cannot meet Powerco security of supply standards due to capacity constraints during high load periods. Low voltages at these substations occur during this situation as well.

Proposed solution

Project solution overview	Powerco propose to reconductor the existing 33 km long 66 kV Kopu – Tairua overhead line with higher capacity conductors. The upgrade will give the line additional thermal capacity and improved voltage performance. In order to support the new heavier conductors, many structures carrying the line will be replaced with high-strength poles to provide the required clearances particularly over long spans. The project would accommodate Powerco's ongoing future strategy to strengthen the network from Kopu GXP to Whitianga and would remove

[1] Forecast expenditure is based on Powerco's financial year (i.e. FY19 is for the period April 2018 through March 2019). Expenditures do not consider general price level changes over time (i.e. are in real or constant terms) and do not include AMG costs.
[2] Only includes Growth & Security Expenditure. Some projects discuss and rely on the replacement of assets that are at "end of life". However, the replacement cost for these assets is accounted for in the Replacement Expenditure category.
[3] All other forecast expenditure / cost estimates in this POD are pre-internal cost capitalisation and efficiency adjustments, consistent with this forecast.

	the existing voltage and thermal constraints on the Kopu to Tairua leg, thereby enhancing quality of supply to the region in the process.

Need Identification

Background	Powerco's Coromandel Area encompasses the Coromandel Peninsula[4] and north-eastern section of the Hauraki Plains. The sub-transmission network consists of a 66kV network of lines/cables that supplies six zone substations (Kerepehi, Matatoki, Thames, Coromandel, Whitianga and Tairua) (refer to Figure 1 & Figure 3). The sub-transmission network is supplied from the Kopu 110/66kV GXP (located to the south of the Thames township). The area is characterised by rugged, bush-covered terrain, making line access difficult and seasonal weather extremes and cyclones impact heavily on line security. The population is highly seasonal and the demand profile is very peaky. The demand on most zone substations peaks in summer, when the temperatures are higher and lines are lower. The largest individual consumers are located in the Thames area; namely A & G Price (≈3.2MW), Thames Toyota (≈0.4MW), Thames Timber (≈1.8MW) and CHH-Kopu (≈1MW).
Drivers and Investment Triggers	The Coromandel Area has a number of constraints which include the following: 1. The combined 2015 peak demand on the Coromandel, Whitianga & Tairua substations was 28.4MW. During a contingent event on the 66kV line between Kopu and Whitianga, the alternative supply 66kV line between Kopu and Tairua would be overloaded—supporting Coromandel, Whitianga and Tairua substations—during peak loading conditions at these sites. This project focuses on the line section that runs between the Kopu GXP and Tairua (≈33 km of Raccoon-conductored line) which, becomes overloaded in this situation supplying all three substations. The existing supply network to the three substations does not meet the requirements of Powerco's Security-of-Supply Standard, which recommends a (N-1), no break supply network, security class AAA[5] for the combined load of Whitianga/Tairua. 2. Supplying the combined Coromandel, Whitianga and Tairua loads via the 66 kV Kopu—Tairua line results in unacceptable poor voltages at the sub-transmission level at these three sites. At peak load, the voltage drop across the Kopu—Tairua 66 kV section alone is approximately 10%. As the Raccoon conductor itself is predominantly resistive in nature, reactive compensation—with shunt capacitors at the remote end—will not be very effective in addressing the voltage constraint. In addition to the above constraints the sub-transmission network in the Coromandel Area has a long history of poor reliability performance due to the long overhead lines that traverse across rugged terrain coupled with the existing meshed configuration that involves a number of 66kV tee connections. More specifically, the Coromandel Area's sub-transmission network is Powerco's worst performing area in terms of SAIDI. A particular issue is the fact that the Coromandel substation is supplied via a 66kV line that tees off the Tairua-Whitianga 66kV line. The implementation of a robust electrical protection system on this three terminal network has been found to be difficult and a number of significant trips/events have meant that Powerco has been reluctant to operate the Kopu-

[4] A rugged, forested, coastal peninsula, with five towns that have a combined population around 15,000. The economy is mostly based on tourism with little heavy industry.
[5] AAA – Supply is uninterrupted in the event of the outage of one major element of the sub-transmission network. Load can be transferred to other substations without interruption by switching on the network if necessary to avoid exceeding ratings (Powerco - Standard 310S001 – Security of Supply Classification – Zone Substations).

	Whitianga-Tairua-Kopu 66kV lines in a closed ring configuration. The simplification of the existing sub-transmission network—through the separate POD-G14—such that the ring can be operated closed is expected to deliver significant benefits to the consumers in the Coromandel Area and result in a reduction of Powerco's SAIDI. Note that the above list is not a complete list of the network constraints within the Coromandel Area and Powerco has additional PoDs/plans/projects to address these other constraints. In particular refer to items 8 & 9 in section titled Reference Documents.
Timing of the need	The proposed upgrade to the Kopu to Tairua 66 kV line is presently required. Detailed design of the line is currently underway. Once line design is completed by the end of FY17, discussions with affected landowners will then start to secure new easement agreements in FY18 through to FY19 with construction commencing then. Based on these estimates, targeted completion of the project is by the end of FY21.

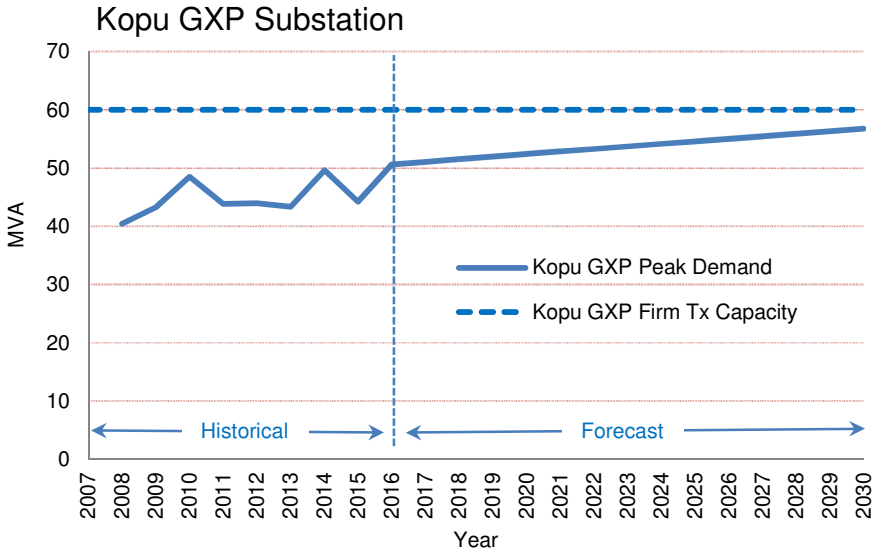
Demand Forecast | Coromandel Area

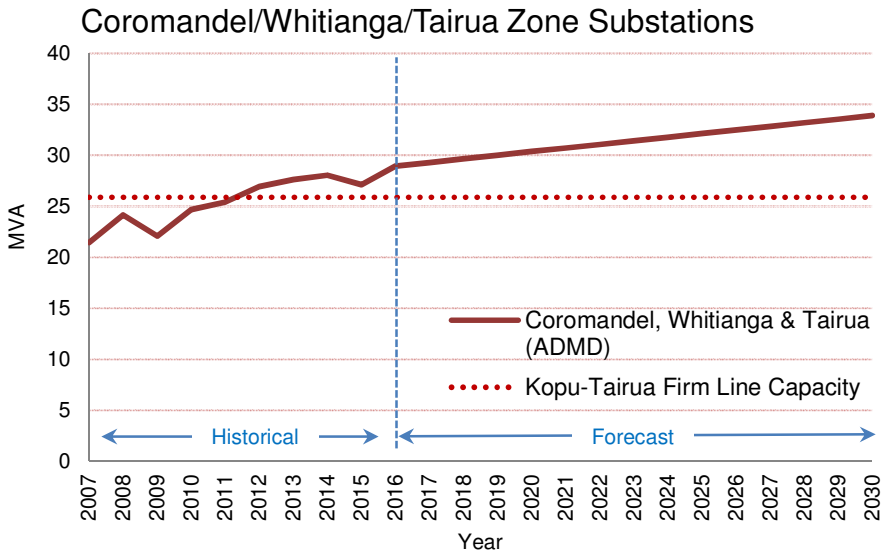
COROMANDEL AREA SUBSTATIONS			FORECAST MAXIMUM DEMAND [MVA]						
SUBSTATION	CLASS CAPACITY	GROWTH	2016	2017	2018	2019	2020	2025	2030
Coromandel	0.0	0.9%	4.7	4.8	4.8	4.8	4.9	5.1	5.3
Kerepehi	0.0	0.7%	10.1	10.2	10.3	10.3	10.4	10.8	11.2
Matatoki	0.0	0.9%	5.6	5.7	5.7	5.8	5.8	6.1	6.4
Tairua	7.5	0.7%	8.6	8.7	8.7	8.8	8.8	9.1	9.4
Thames T1 & T2	0.0	0.3%	13.4	13.5	13.5	13.5	13.6	13.8	13.9
Thames T3	6.9	0.0%	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Whitianga	0.0	1.6%	17.2	17.4	17.7	18.0	18.3	19.6	21.0

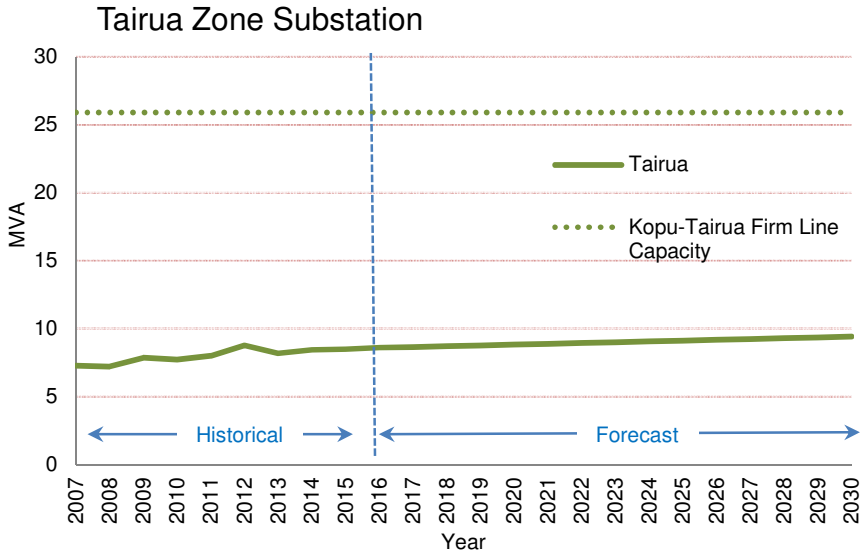
COROMANDEL AREA SUBSTATIONS			FORECAST MAXIMUM DEMAND [MVA]						
SUBSTATION	TX CAPACITY	GROWTH	2016	2017	2018	2019	2020	2025	2030
Kopu GXP	60.0	0.9%	50.6	51.1	51.5	52.0	52.4	54.6	56.8

Notes:

1. Class capacity is similar to Firm Capacity and represents the capacity that can be delivered following the first outage of any major equipment. Unlike Firm Capacity it considers the long term deliverable capacity in the context of switching and network reconfiguration (11kV & 66kV) post-fault conditions.
2. All maximum demand values are in MVA.
3. Purple shaded cells indicate that the substation's Class Capacity has been exceeded and network enhancements should be considered.


Kopu GXP Substation
MVA
Year
Kopu GXP Peak Demand
Kopu GXP Firm Tx Capacity
Historical
Forecast


Coromandel/Whitianga/Tairua Zone Substations
MVA
Year
Coromandel, Whitianga & Tairua (ADMD)
Kopu-Tairua Firm Line Capacity
Historical
Forecast


Tairua Zone Substation
MVA
Year
Tairua
Kopu-Tairua Firm Line Capacity
Historical
Forecast

Options Analysis | Long List of Project Options | High Level Assessment	
Assessment Process	A wide range of potential options are available for the resolution of electrical network constraints. However, depending on local conditions many of the options can have fatal flaws. On this basis a two tier Options Analysis is followed. In the first instance all potential options are considered against a set of high level criteria. Those options that are identified as having significant challenges and not favourable are not considered further. A significant issue that Powerco often faces is the reality of trying to secure landowner easements and or public support for projects that the local community or landowners are opposed to. For this reason the costs associated with easements/consents are often difficult to estimate and the consenting/land-acquisition stage of a project can take a significant period. Given this fact Powerco assesses the risk / likelihood of securing development rights for individual projects (within a realistic timeframe) during the high level assessment stage.
Long List of Options	The following table contains a list of the high level project options that are potentially available to resolve the specific network constraints that have been identified within the Coromandel Area. The four non-network options (Nos. 2, 3, 4 & 5) are not shortlisted on the following basis: • Fossil fuelled generation (i.e. diesel generation) is technically viable but not shortlisted due to the cost and environmental/consenting challenges. Under network contingencies there would be shortfall of ≈5MW[6] today that would need to be "made up" using stand-by generation. The capital cost of a 5MW[6] standby diesel generation plant is estimated to range from $7.5M to $15M[7,8] excluding running costs. Future growth means the 5 MW capacity will need to increase to maintain its viability. • Powerco has not identified any viable renewable generation options that would provide the required security of supply[9]. • Fuel switching and demand side response (DSR) are considered to be deferment strategies. Their viability is not considered to be certain given the growth rates that the Coromandel Area has experienced and the fact that the network security levels are already well exceeded. The volume of small consumers (and lack of large consumers) further complicates the possibilities associated with fuel switching and DSR. • Powerco currently uses a mains-borne ripple control system to manage significant amounts of hot water cylinder load in the Coromandel Area. During peak loading periods most hot water cylinders are turned off. • Energy storage is potentially viable but the costs are expected to be significant. For example, an emerging technology that could be employed is storage batteries installed in domestic premises. However, the capital costs associated with 5MW[6] of domestic backup batteries are estimated to be >$7.5M[10]. An additional factor is that the current application of battery storage technology to power networks is very limited and it would be wise to undertake a trial before committing to a significant installation.

[6] This is the present shortfall and this amount is predicted to increase in the future.
[7] Excludes the ongoing maintenance and operational costs.
[8] Diesel generation plant is estimated to range from $1,500/kW to $2,000/kW, depending on whether it is high, medium or low speed plant.
[9] Typical plant might involve wind turbines or photovoltaic arrays. Both of these generators have an intermittent output which cannot be relied upon unless there was significant penetration and diversity.
[10] The installed costs of domestic battery storage systems are expected to be >NZ$1,500/kW (vendors indicate equipment costs of ≈US$3.5k for a 7kW system).

	Five network reinforcement options were identified (Nos. 6 to 10) as potential solutions to the network constraints and issues. Option 10 was not shortlisted as the existing line is already capable of 75C operation and further thermal uprating will not resolve the voltage constraint issue anyway. Option 6 was not shortlisted because the existing lines—from Kopu to Tairua and from Tairua to Coroglen—are strung with Raccoon conductors hence the benefits of reactive compensation will not be fully recognised because of the lines' resistive nature. The remaining four network reinforcement options (Nos. 7, 8 & 9) were shortlisted on the basis that they can feasibly resolve the relevant constraints. Note that the Kopu-Whitianga-Tairua-Kopu 66kV ring has a number of other constraints and Powerco is planning two other significant projects on the 66kV ring (refer to items 8 & 9 in the section titled Reference Documents).

Long List of Options | High Level Assessment

Kopu - Tairua Project		*Long list of projects and high level assessment*	*Assessment Criteria*						
PROJECT FOCUS	**No.**	**PROJECT**	Safety	Fit	Feasible	Practical	GEIP	Security	Cost	**Short-list**
Do Nothing	1	Allow the electrical demand & risk of consumer non-supply to inc	✓	✗	✗	✗	✗	✗	✓	✗
Non-network	2	Distributed Generation (DG) including peak lopping generation	✓	✗	✗	✓	✓	✓	✗	✗
	3	Fuel switching to reduce electrical demand	✓	✓	✗	✗	✓	✓	✗	✗
	4	Demand Side Response (DSR)	✓	✓	✗	✗	✓	✓	✗	✗
	5	Energy storage	✓	✓	✓	✓	✗	✓	✗	✗
Network Reinforcement	6	Reactive Support	✓	✗	✗	✓	✓	✗	✓	✗
	7	Reconductor Kopu - Tairua 66 kV line	✓	✓	✓	✓	✓	✓	✓	✓
	8	Duplexed Raccoon Kopu - Tairua 66 kV line	✓	✗	✓	✗	✓	✓	✓	✓
	9	Second Kopu - Tairua 66 kV line	✓	✓	✓	✗	✓	✓	✗	✓
	10	Thermal upgrade Kopu - Tairua 66 kV line	✓	✗	✗	✗	✗	✓	✓	✗

Key:

Safety	Health and Safety: Any significant implications in terms of Safety or Health - new products or compounds or practices, or requires difficult live line access etc.
Fit	Fit for Purpose: Does the option address the need appropriately and does it fit with other developments in the vicinity.
Feasible	Technically Feasible: Consider the complexity, future adaptability, and whether it aligns with company standards, strategies and policies.
Practicality	Practical to Implement: Are there potential environmental or property issues which may be insurmountable. Can it be achieved in the required time frame.
GEIP	Good Electricity Industry Practice (GEIP): Good practice (technically and environmentally) and in terms of AM practice (capacity, age, technological, safety)
Security	Security and Reliability: Does the option provide adequate levels of security and appropriate reliability considering the demand, load type and future growth.
Cost	Some options will intuitively be known to be far more expensive than other options, and this may preclude them.

Options Analysis | Short List of Options

Option	Capital Costs[11]	Description
Option 7: ***Reconductor Kopu—Tairua 66 kV Overhead Line***	**$8.5M**	This option involves the replacement (reconductoring) of the existing 66 kV Kopu—Tairua overhead line with higher capacity conductors offering lower series impedance characteristics. The line is to be capable of operation at 70C. Initial electrical studies identified the Neon AAAC (all aluminion alloy conductor) as the preferred conductor type for the line in terms of P-V performance, which is superior compared to the smaller Krypton AAAC and the existing Raccoon ACSR. With the line traversing over complex and rugged terrain, long spans are unavoidable. At some sites, it is expected that existing pole structures will need to be replaced with taller steel poles, giving increased capability to satisfy line sag requirements. Once the proposed project and the proposed reconductoring of the Tairua—Coroglen line in future are completed, then the full benefits of putting in reactive compensation to provide voltage support can be realised. The Kopu-Whitianga-Tairua-Kopu 66kV ring would be capable of operation in a closed configuration when coupled with additional communications upgrade (PLC or fibre) to facilitate fast protection schemes and—combined with other proposed major projects in the region—would enhance security of supply for the Whitianga and Tairua substations to AAA[5] level.
Option 8: ***Duplexed Raccoon Kopu—Tairua 66 kV Overhead Line***	**$9.7M**	In this option, the existing line is upgraded with the addition of another three-phase set of Raccoon conductors, to give the line a duplexed (two cores per phase) arrangement. This technique is often used on overhead lines at transmission voltage levels to deal with corona effects and seldom seen at voltages below 220 kV. Duplexing reduces the overall series impedance of the line while increasing its capacitance to earth at the same time. The line shall be designed and constructed for 70C capability. Due to the added weight of the extra set of conductors, it is expected that many existing pole structures will need to be replaced with stronger and taller structures to meet the clearance requirements. Specialist line crew are going to be required to carry out the installation of spacers and line dampers. Similar to Option 7, the proposed project would contribute to the long term objective of enabling Whitianga and Tairua to be secured in a closed ring network. Once the Tairua—Coroglen 66 kV line is upgraded in future, full benefits of reactive compensation to support voltage can subsequently be realised.
Option 9: ***Second Kopu—Tairua 66kV Overhead Line***	**$15.6M**	This option involves the construction of a new 66kV 70C-capable overhead circuit from Kopu to Tairua that will give two supply circuits to Tairua, securing the load at AAA as a result. The line will traverse very rugged and challenging terrain between Kopu and Tairua. Approaching Tairua, there is an area of ecologically-sensitive wetlands that the line is expected to cross and this can pose challenges to Powerco securing new easement rights. Besides securing new easements for the proposed line, other additional requirements are: • The new line must not be in close proximity to the existing Kopu—Tairua to mitigate the risk of a N-2 network failure event. • New access tracks will be required in mountainous terrain for field crew to gain access to the line to carry out maintenance/repair

[11] Project capital costs in 2016 NZ Dollars. The values are not economic costs and do not factor in the "time value of money" or consider the costs of electrical loss reduction, reliability improvement, cost-of-non-supply or any other relevant factors. These other issues are considered in Powerco's options analysis. Costs also exclude AMG and IDC components.

		work on the line. • Extension of the 66 kV bus at Kopu GXP is required to accommodate the new circuit—preferably—on the western side of the switchyard. This requires the supply feeder arrangement of the Kopu—Kauaeranga line (POD-G7) to be modified because its proposed layout blocks off future expansion of the 66 kV bus in the westward direction. Agreement for these works needs to be sought with Transpower. • Minor works required at Tairua to accommodate a new 66 kV circuit breaker for the new line.

Option Analysis | Advantages vs Disadvantages

The following sections summarise the advantages/disadvantages associated with the short listed options. The intention being to also capture project risks and inter-dependencies.

Option	Advantages	Disadvantages
Option 7: ***Reconductor Kopu—Tairua 66 kV Overhead Line***	• Improves voltage levels during system normal operation and post contingency situations in the Tairua, Whitianga and Coromandel areas. • Resolves the Kopu—Tairua section's thermal overloading issue when supplying the combined loads of Tairua, Whitianga and Coromandel substations. • Replaces aged assets (Raccoon conductors from circa 1972) with new ones suitable for the environmentally harsh conditions of the area.	• New taller pole structures are expected compared to the existing ones. Potentially increased risk of lightning strike and worsens visual impact. • Some property and consenting risks. • Extensive helicopter work during construction due to the mountainous terrain and lack of road access in some places. Difficult to price accurately.
Option 8: ***Duplexed Raccoon Kopu—Tairua 66 kV Overhead Line***	• Improves voltage levels during system normal operation and post contingency situations in the Tairua, Whitianga and Coromandel areas. • Resolves the Kopu—Tairua section's thermal overloading issue when supplying the combined loads of Tairua, Whitianga and Coromandel substations.	• New taller pole structures are expected compared to the existing ones. Potentially increased risk of lightning strike and worsens visual impact. • Increased property and consenting risks with the addition of a three-phase set of conductors to create the duplexed arrangement. • Extensive helicopter work during construction due to the mountainous terrain and lack of road access in some places. Difficult to price accurately. • There will be a mix of old and new assets on the line (old Raccoon conductors from circa 1972 and brand new Raccoon conductors).

Option 9: ***Second Kopu—Tairua 66kV Overhead Line***	• Provides twin diverse supply circuits to Tairua, improving security of supply to Tairua in the process. Security class at Tairua becomes AAA-capable. • A loss of a Kopu—Tairua circuit does not overload the parallel Kopu—Whitianga line since the second Kopu—Tairua line is in service. Furthermore, there is no time pressure on field crew to repair the faulted Kopu—Tairua line. • Improves voltage levels during System Normal operation and post contingency situations in the Tairua, Whitianga and Coromandel areas. • Resolves the Kopu—Tairua section's thermal overloading issue when supplying the combined loads of Tairua, Whitianga and Coromandel substations.	• Significant landowner/public opposition is expected (i.e. significant property & consenting risk) to the creation of a new 66 kV line. • Most expensive among all considered options. • Tall pole structures required, which will create a visual impact from the road into Whitianga. • Expansion at Kopu GXP 66 kV is required to fit a new outdoor bay, buswork extension and switchgear. New 66 kV switchgear is required at Tairua. • Extensive helicopter work during construction due to the mountainous terrain and lack of road access in some places. Difficult to price accurately.
Shared Features	• Utilise known technology and proven designs. • Improves network reliability to the Coromandel, Whitianga and Tairua areas.	• Sensitive wetlands area near Tairua needs to be carefully negotiated in terms of obtaining access to do the required works as well as future maintenance activities.

Recommendation	
Preferred Option	**Option 7 – Reconductor Kopu—Tairua 66 kV Overhead Line**
Reasons for choosing Option	The cost of building Option 9 is significantly much higher compared to the other options so it drops out being the most uneconomical option, leaving only Option 7 and Option 8. Between these two remaining options, Option 7 is preferred for the following reasons: • The risks associated with land/public opposition are the smallest as it retains the same three-phase (one conductor per phase) arrangement. • Line design follows standard Powerco Line Design methods. On the other hand, special consideration would have been required to carry out the duplex line design. • Lower capital expenditure is anticipated. • Does not result in a mix of old and new assets, i.e. new Raccoon conductors together with old Raccoon conductors, on the same structures.

	In the net benefit test, Option 7 proves to be the most economic network-based option to resolve the identified network needs and fits in with Powerco's longer term strategy for the region.

Option 7| Detailed Costs[12]

Item	Description	Actual Cost	Projected Cost
A	Property & Consent Costs		
A.1	Consenting/Easements	-	$972,000
B	Investigation and Reporting Costs		
B.1	Line Design/Consultants/Investigations	$200,000	
C	Substation Costs		
C.1	None required		
D	Line and Cable Costs		
D.1	Upgrade 0.8km double cct & 31.67km single cct 66kV Line	-	$7,372,175

E	Committed/Historical Costs (A+B+C+D)	$200,000	
F	Future Projected Costs (A+B+C+D)		$8,344,175
G	Anticipated Final Cost (E+F)		**$8,544,175**

[12] Excludes Powerco's internal/overhead costs (AMG and IDC)

Option 7| Implementation Plan				
Project or Action	**Start Year[1]**	**End Year[1]**	**NZ $'000[1]**	**Details / Comments**
Project costs to date	FY16	FY16	$200	Costs that have already occurred on Preliminary designs/Concept Costings
Consenting/Design Modifications	FY18	FY19	$972	Costs associated with easements, compensation, designations and designs to modify existing lines & erect new poles
Upgrade 0.8km double cct & 31.67km single cct 66kV Line	FY19	FY21	$7,372	Costs associated with the reconductoring of Kopu--Tairua 66kV line
Total Project Costs ➔	**FY16**	**FY21**	**$8,544**	Includes Only Growth & Security Expenditure.

Supporting Documents and Models	
Planning documents ***Standards | Policies*** ***Reviews and Consultant reports*** ***Concept Designs | Estimates***	1. Kopu—Tairua Subtransmission Upgrade – Options Analysis, dated 24/09/2014. 2. Kopu—Tairua 66 kV Upgrade, CCE, VH00012-RPT-EEE-015, revised 18th Sept 2015. 3. Powerco's 2016 Asset Management Plan (AMP). 4. Transpower's 2015 Annual Planning Report (APR). 5. "*310S001 Security-of-Supply Classifications – Zone Substations*", Powerco Standard. 6. "*393S041 Zone Substation Transformer Ratings*", Powerco Standard. 7. "*393S035 Electrical Network Conductor Rating Standard*", Powerco Standard. 8. POD-G7 Kopu-Kauaeranga Project. 9. POD-G14 Kaimarama—Whitianga Sub-transmission Enhancement.

Notes/Assumptions	
Generic assumptions in relation to Options Costs	• Costs are expressed in 2016 (real) dollars. • The capital costs fall within the Growth and Security expenditure categories only. • The capital costs only include Powerco's capital expenditure (not Transpower or other parties). • The costs include all costs associated with the proposed projects (or alternate options) regardless of whether those costs fall within the CPP period or not.
Specific assumptions in relation to Options Costs	• Cost estimation for the options has initially been achieved via a desktop study using Powerco's standard building block unit costs. The costs have then been refined by further investigations. • Property and consenting costs are usually a high risk area involving considerable uncertainty. • Construction costs over mountainous terrain is difficult to estimate accurately due to the various unknowns, such as weather and access. Hence, some costs to cover project-related risks have been included to account for these unknowns.

Figure 1: Existing Kopu GXP Sub-transmission Network: Geographic Diagram

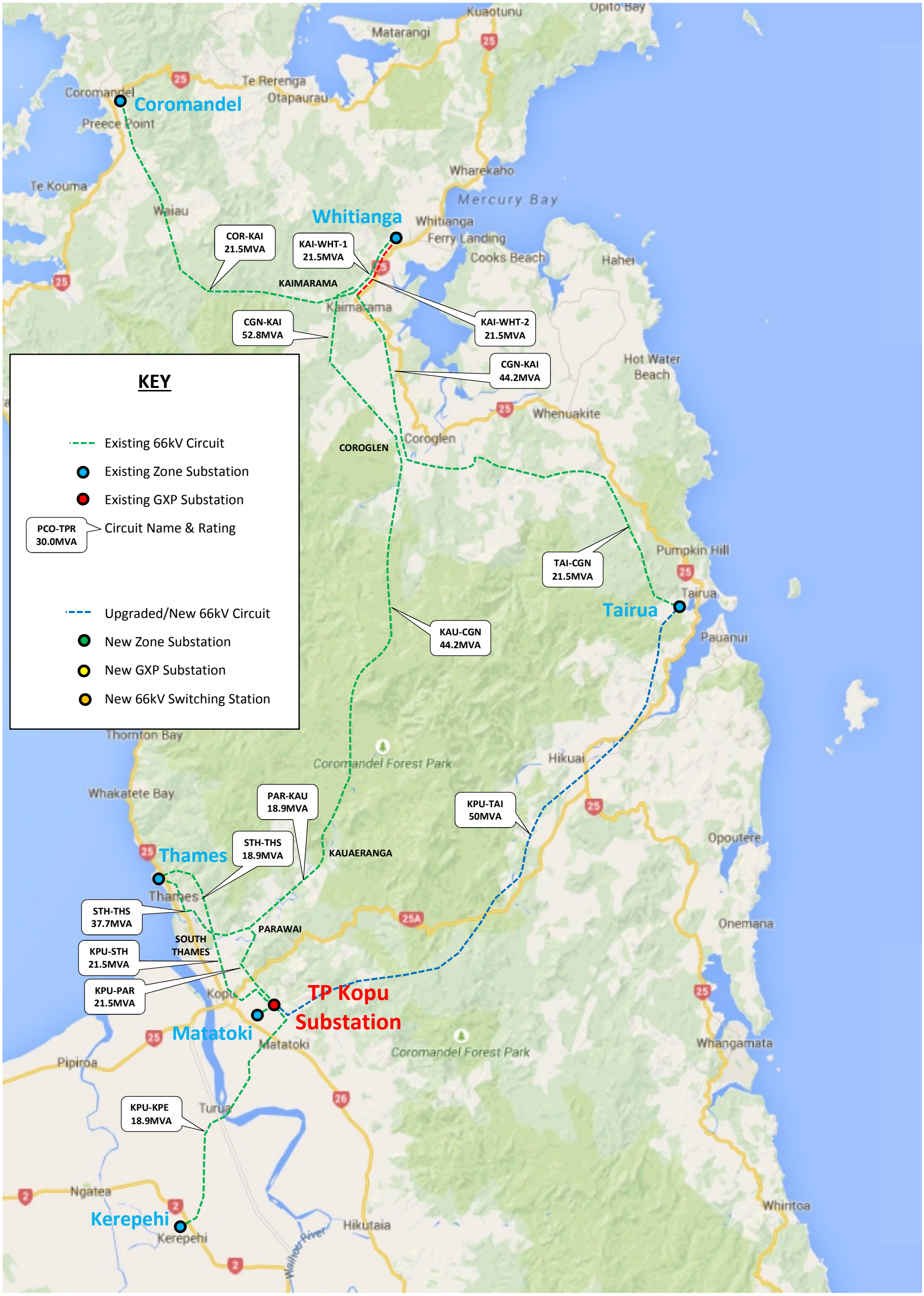


Figure 2: Option 7 – Kopu—Tairua 66 kV Overhead Line Reconductoring: Geographic Diagram

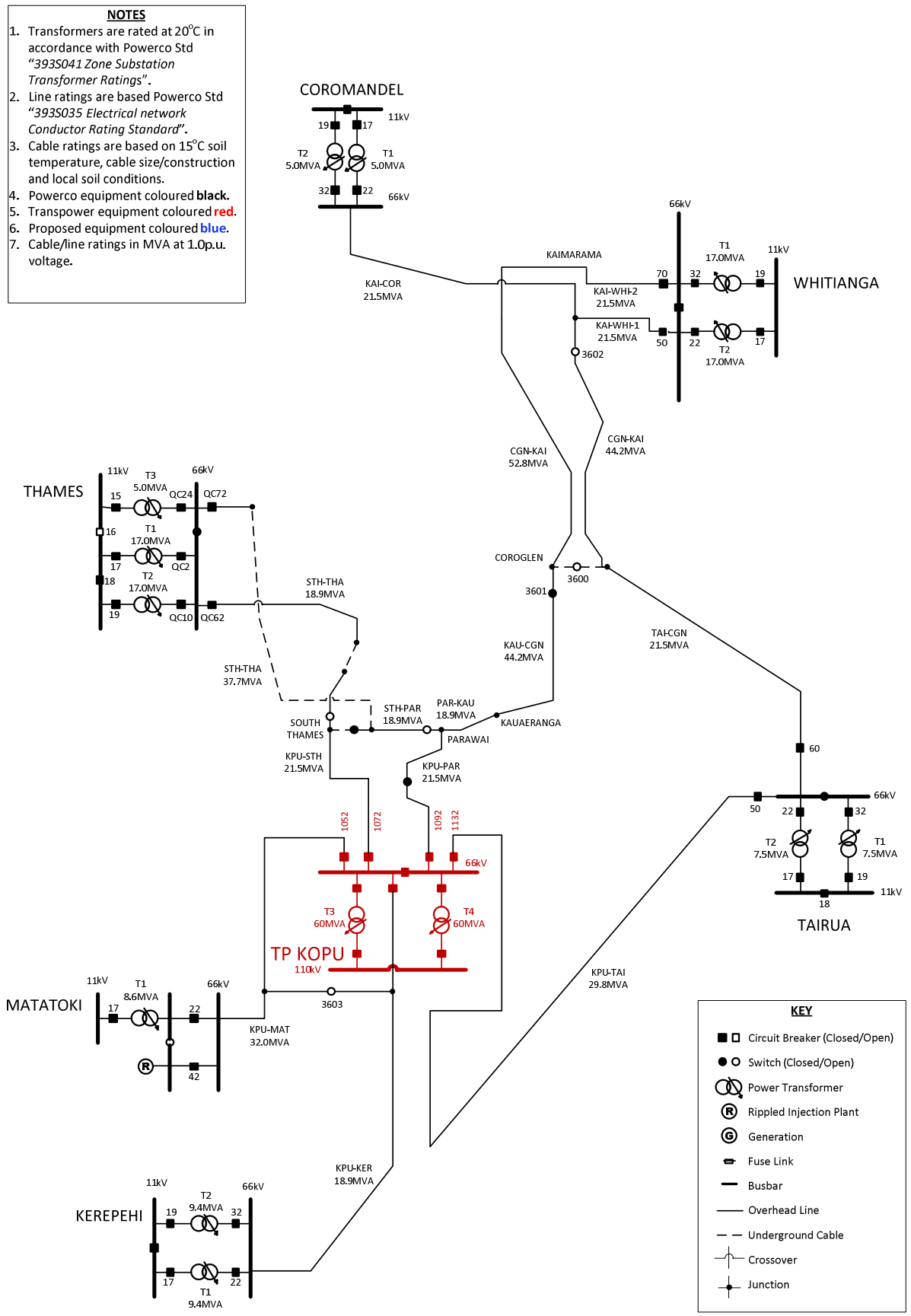


Figure 3: Existing Kopu GXP Sub-transmission Network: One-Line Diagram

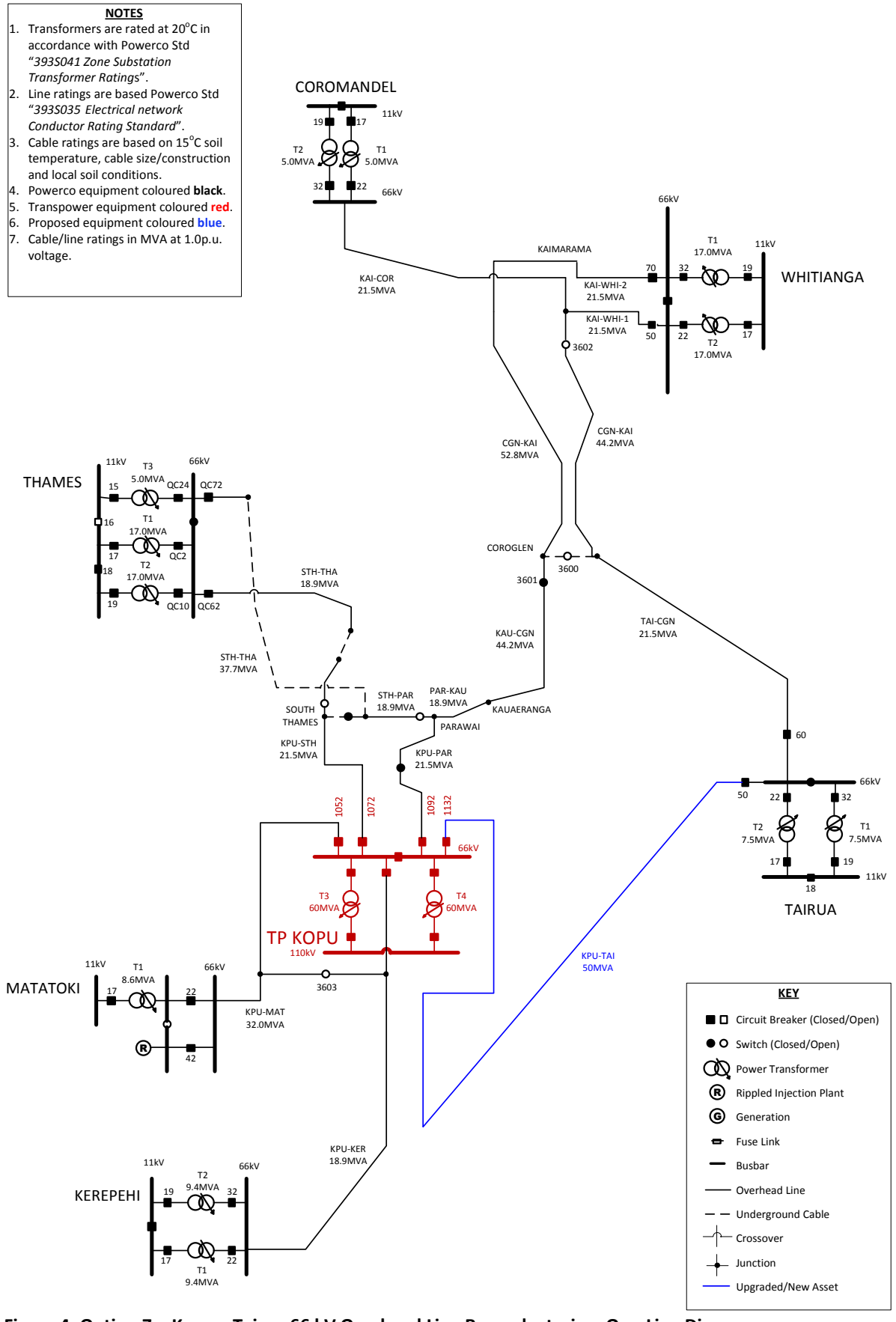


Figure 4: Option 7 - Kopu—Tairua 66 kV Overhead Line Reconductoring: One-Line Diagram