



T R A N S P O W E R

NORTH ISLAND GRID UPGRADE PROJECT

AMENDED PROPOSAL

ATTACHMENT C

PROJECT DELIVERY RISK

**Assessment of the Timetable Delivery Risk
for the Alternative Projects**

October 2006

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Executive Summary

This report assesses the timetable delivery risk of three options for the North Island Grid Upgrade Project. The options considered are:

Option 1

A 220kV twin Chukar transmission line from Whakamaru to the vicinity of Ormiston Road, with cables to a new 220kV GIS substation at Pakuranga. Cables in later years will be installed to Otahuhu.

Option 2

A new 400kV line initially operated at 220kV from Whakamaru to a cable termination station in South Auckland, with cables initially to a new GIS substation at Pakuranga, followed by cables to Otahuhu, with further works to build a 400/220kV substation in South Auckland and at Whakamaru and the conversion of the line to 400kV operation.

Option 3

Duplexing of the existing OTA-WKM A&B 220kV transmission lines to a cable transition station South of Auckland in the vicinity of their crossing of Redoubt Road¹, with initially cables to a new 220kV GIS substation at Pakuranga, followed by cables to Otahuhu in the future.

The principal delivery risks reviewed are;

- the environmental consenting process timelines;
- the property acquisition process timelines;
- construction times;
- procurement lead times, and
- outage availability for some projects.

For each project, most combinations of the above risks were varied to determine the earliest completion date, the latest completion date and the distribution of other intermediate completion dates for each project.

¹ Redoubt Road is used as a location for pricing purposes, no work has been undertaken to assess the feasibility of this site, or any alternatives.

1 Details of Risks

Consenting Risk

As a requiring authority, Transpower is entitled to serve a Notice of Requirement for a designation for transmission activities to be inserted in a District Plan. Once this is achieved, Transpower need not apply for resource consents to the District Council in respect of the activity for which the designation is made.

The consenting risk was modelled by assuming a period of 265 days, post lodgement of the Notice of Requirement, for the councils to complete all the work necessary to reach a recommendation, with the risk being the extent of the Environment Court and High Court process that might follow Transpower's decision. The various assumptions trialled were:-

1. An urgent hearing in the Environment Court, with an assumed time to initiate and complete within 6 months.
2. A medium assumption is a period of 12 months to obtain and complete an Environment Court hearing.
3. A longer path through the Environment Court process of 18 months, with No Appeal.
4. An Environment Court process of 12 months followed by a High Court Appeal, with a total time of 2 years.

Recent case examples through the RMA process are listed in Table 1. It is clear from this set of cases that the RMA process can be protracted. Transpower has recognised this possibility, and managed the risks that might lead to the sort of blowouts in the timetable observed in Table 1.

Specifically:-

- the risk of extensions through forced options reassessment has been managed by the development of documentation supporting the Needs and Alternatives, and the development and implementation of the ACRE² model, a process for identifying and securing the most appropriate route for the proposed line. The ACRE process is designed to meet the information, analytical and consultation requirements of the RMA.
- linear, as opposed to single site projects, tend to take longer through the RMA processes, and have greater complexities in terms of other consenting processes - eg the Inner City Bypass. This risk has been managed through (under Local Government NZ) the formation of an Officers Forum to guide the processing of the Notice of Requirement. The Officers Forum have appointed a dedicated project manager and Environment Waikato as the lead administration authority.

² ACRE = the acronym standing for **A**rea, **C**orridor, **R**oute, **E**asement

Table 1.0 – Environmental Consenting Cases		
Case	Process	Timetable
Auckland Women's Prison and The Springhill Correctional facility	Both involved Environment Court hearings, but no High Court appeals	Both approximately 2 years from the time of lodgement with consent authorities to the time of the Environment Court decisions
The Kapiti Western Link Rd	Three Environment Court hearings (one full hearing over a period of weeks with approximately 30 witnesses and two others of 1 day each) and two High Court appeals	6 and half years from lodgement with the consent authority to final disposal by the Environment Court with amended conditions. The time frame spread out for a variety of reasons apart from the two High Court appeals, including an options reassessment process after the consent authority decision and the need to separately negotiate conditions with a number of parties
Mana Section SHI Upgrade	One main Environment Court hearing, but with a quite considerable delay in getting to a hearing before the Environment Court as Transit went through an options reappraisal process.	Approximately 6 years from lodgement to final decision of Environment Court
Inner City Bypass designation	Environment Court hearing, followed by a lengthy approval process under Historic Places Trust Act.	3 years from lodgement to the final Environment Court decision, plus subsequent time through HPT Act.

Given the management strategies in place, it is reasonable to assume that the shortest timetable would be 6 months and the longest might be two years, though there is a possibility this might extend to three years or beyond if the risk management strategies fail.

Property Risk

For a new line, or where the works on an existing line are deemed to create an injurious affection, new property rights must be obtained before the works are undertaken, and the landowners are entitled to compensation, which is assessed using the principals and provisions of the Public Works Act 1981.

To secure the necessary property rights, Transpower as a network utility operator and as an already approved Requiring Authority under section 167 of the Resource Management Act 1991, can use its rights to apply to the Minister of Lands and compulsory acquire the necessary property rights it requires.

This process is outlined in the Public Works Act 1981 and Transpower is obliged to adhere to use this already established process.

This process goes through a variety of stages, and at each stage provides an opportunity for Transpower and the landowner to reach agreement. This process is shown in Appendix A. For the purposes of this assessment, a variety of points at which landowners could agree are studied. The options and the timescales are described in Table 2 below.

Table 2.0 – Property Acquisition Process.			
Option	Process	Time span	
1	Transpower reaches agreement through good faith negotiation	6 months good faith negotiation plus 6 months finalisation of easements.	52 weeks
2	Transpower fails to reach agreement and initiates Compulsory Acquisition process, drafting of a Notice of Desire , Minister approves commencement of acquisition, signed Notice of Desire served, followed by successful negotiations with the owner.	6 months good faith negotiation plus 25 weeks negotiations, plus 12 weeks finalisation	63 weeks
3	As Option 2, with negotiations failing, a subsequent issuing of a Notice of Intention to Take , Ministerial Approval of this notice, publication of the Notice of Intention to Take , no landowner objection to this notice, Proclamation prepared with Ministerial and Governor General approval, publication and easement vested in Transpower.	6 months good faith negotiation plus 25 weeks negotiations, plus 43 weeks through Notice of Intention to Take process to finalisation.	94 weeks
4	As Option 3, except Landowner objects when the Notice of Intention to Take is published, Environment Court hearing is scheduled and heard, Environment Court rules in favour of the Minister, no High Court appeal to that decision, Proclamation prepared with Ministerial and Governor General approval, publication and easement vested in Transpower.	6 months good faith negotiation plus 25 weeks negotiations, plus 26 weeks in the Environment Court and 43 weeks to schedule hearing, time for decision, and to finalise.	120 weeks
5	As Option 4, except a High Court Appeal is initiated, the High Court rules in favour of the Minister, Proclamation prepared with Ministerial and Governor General approval, publication and easement vested in Transpower.	6 months good faith negotiation plus 25 weeks negotiations, plus 26 weeks in the Environment Court, plus 26 weeks in the High Court, and 47 weeks to schedule the Environment Court and High Court hearings, time for decisions and to finalise.	150 weeks

Property risk was modelled by looking at the timing of Land Owners decisions to sell through the Compulsory Acquisition process. The three assumptions trialled were:-

1. All Property Rights obtained in 94 weeks.
Short path through property process, where compulsory acquisition is started and landowners object but do not go as far as the Environment Court (Option3)
2. All Property Rights obtained in 120 weeks.
Medium path through, where property owners object and some go to the Environment Court (Option 4)
3. All Property Rights obtained in 150 weeks
Long path through, where property owners object, go to the Environment Court and appeal to High Court (Option 5)

2 Line Construction

Transmission line construction is the longest and most complex of the construction paths.

Transpower has assumed a 30 month construction timetable, and has not varied this, but it is possible with a significant increase in the number of line gangs a 24 month program might be achieved. There is concern this level of transmission line resource would not be available in the Asia Pacific region. For the purposes of this study, 30 months has been used and not varied.

3 Cable delivery

Cable delivery times are increasingly uncertain as demand for cables increases worldwide. This is compounded by the recent history in the cable industry. In the early 90's there was significant overcapacity in the power cables market. Important utility markets across Europe reduced their demand for both underground cable and overhead power lines. As a result there was a considerable amount of consolidation within the industry and the removal of manufacturing capacity, with the number of significant manufacturers halved, as an example the 6 companies in Japan became 3.

Now cable demand is increasing, whilst manufacturing facilities are limited, cable delivery times are extending across all the EHV cable industry (220kV and 400kV). Transpower has had a number of informal contacts with the industry and in addition sought international consultant's opinions on the market situation, and they have provided examples of existing cable projects, their affect on the market, and likely delivery times-

- In Scotland (which has a comparable population to New Zealand), one significant company's supply and installation order book has increased and is now in excess of £30M (~NZ\$90m). This is only a small part of the UK market and one company only; the others are reported to be similarly busy.

- In Qatar, a country with a population of c860,000, they have embarked upon a major expansion of the power system, with the issuance of design build type tenders requiring 87.3km of 400kV (Transpower's original 400kV cable total requirement was approximately 54km) and 433.5km of 220kV cable (Transpower's current immediate needs are 56km) This one country will be able to keep a significant portion of the world's EHV extrusion lines busy for up to two years, not to mention the services of the specialist jointing and other project staff.
- The other contributor to demand is the USA where the various known projects require some 83.3km of 345kV cable. This is an area of dramatic increase, from having virtually no EHV XLPE cable in the ground the US has gone into a high demand position, this as evidenced by the recent issuance of a further tender for a 24 mile double circuit i.e. 230km of such cable.
- There are no large fluid filled projects on the horizon, the move to XLPE is accelerating.
- Offshore windfarms are increasingly popular in Europe and a conservative estimate is that 1000 core km of cable will be required in the next 2-3 years, and as the extrusion process is common to both land based and submarine cables, this will also affect delivery.
- The increasing workload is also affecting availability of trained cable jointers.

Transpower has also direct feedback from major suppliers who state they had experienced a marked increase in tender activity recently and the earliest available deliveries being offered from their European plants now have lead times of 18 months.

These projects identified above, along with the commitments such as those needed in London for the Olympics are either firm or being tendered, unlike the situation here in New Zealand, which means the Transpower project has yet to get into the order books, and is subject to increasing delays.

Given the level of demand the cable companies are experiencing, Transpower is concerned that our substantially smaller order may not be attractive to major manufacturers. This is likely to lead to delivery delays which Transpower has modelled as a variety of lead times on the manufacturing process.

The advice Transpower has received from cable consultants is that delivery times from time of placing an order to delivery of 2 years should be expected. At present Transpower has assumed a likely 18 month delivery, constituting a 6 month lead time and a 12 month manufacturing time. The noted increase in cable demand worldwide has meant heavy cable factory bookings, and total delivery times of up to 2.5 years are possible.

To model this, it has been assumed the manufacturing time remains constant at 12 months and the lead times are varied, as follows:-

1. short lead time = 6 months
2. medium lead time = 1 year
3. Long lead time = 18months

4 Procurement Risk

The present Transpower program assumes that major plant procurement can be committed to after Electricity Commission final approval. However, there is some risk if procurement proceeds ahead of the designation being granted.

Until the designation is granted, there is no project certainty, and committing to major procurement ahead of this certainty may result in substantial variation or cancellation payments.

It is possible this risk could be managed through the contract strategy, and consequently not necessarily have any time impact, but the consequences of managing this risk through delaying procurement until after the designation are modelled by assuming that procurement does not start until after:-

1. the longest designation path, and short lead time for cables
2. the longest designation path and long lead times for cables

5 EC Approval

All options assume Electricity Commission Interim approval by late December 2006 and Final approval in March 2007

6 Results

6.1 Option 2 – Transpower 220kV / 400kV Proposal

Varying the stated risks, the following delivery dates for the Transpower proposal are obtained:-

Earliest completion is October 2011

This option, shortest of the property options (Option 1), assumes a 30 months line construction, short cable lead times and the shortest consenting processes. There are some significant strategies around property acquisition and line construction that could result in completion in May 2011. Whilst these are being vigorously progressed, they have not been assumed in this draft analysis.

Latest completion is April 2014

This option assumes the longest path through the Environment Court process (Option 4), the long property process (Option 3), 30 month line construction, and the longest cable lead time and manage procurement risks.

Likely Completion is mid 2012.

Various combinations of the risks were varied with and the options distribute as follows:

Completion Date	Number of Scenarios that complete in this period
2011	1
Jan Feb 2012	1
8 central months 2012	6

Nov-Dec 2012	1
2013	2
2014	1

The most likely completion date, taking the most likely path through the environment and property process, and with presently advised cable lead times, a 30 month construction period and management of procurement risk through contract strategy rather than time is mid 2012.

6.2 Option 3 – Duplexing the OTA-WKM A&B Lines

The significant feature of this option is the availability of outages on the OTA-WKM A&B line. It was generally assumed that 2-3 month outages are available in summer, but that an option exists to purchase a longer outage in summer. Further it was assumed that once the first circuit was duplexed a 6 month outage on the second circuit could be realised. However, the OTA-WKM A&B line upgrade must be completed, and the line outage availability is complicated by generation outages.

Earliest completion is Jan 2012.

This assumes that: consents are processed non notified; there are no property issues; a short cable delivery program; and 6 month outage for the first stringing work (probably by paying for generation) is available.

Latest completion is June 2016.

This assumes all consents and property rights appealed to High Court, with worst case outages.

Likely Completion is May 2013

This assumes that we need consents, which are publicly notified and appealed to the Environment Court, and property rights under the Public Works Act, and subsequent appeals to the Environment Court. Transpower moves any generator outages that block duplexing outages, and we have the medium cable delivery windows (as this is likely).

6.3 Option 1 – Twin Chukar 220kV Line

This option is inherently the same as Option 2. The earliest completion dates for the 220kV are hence the same as the 400kV option.

However, it is considered that Transpower will need to review the ACRE process (route selection process) in light of a 220kV option. It is considered that a 220kV option will require further investigation (re-engineering) and consultation on the overhead line route (new technology), and new Notice of Requirement documentation, which may add a further 9 months to the process.

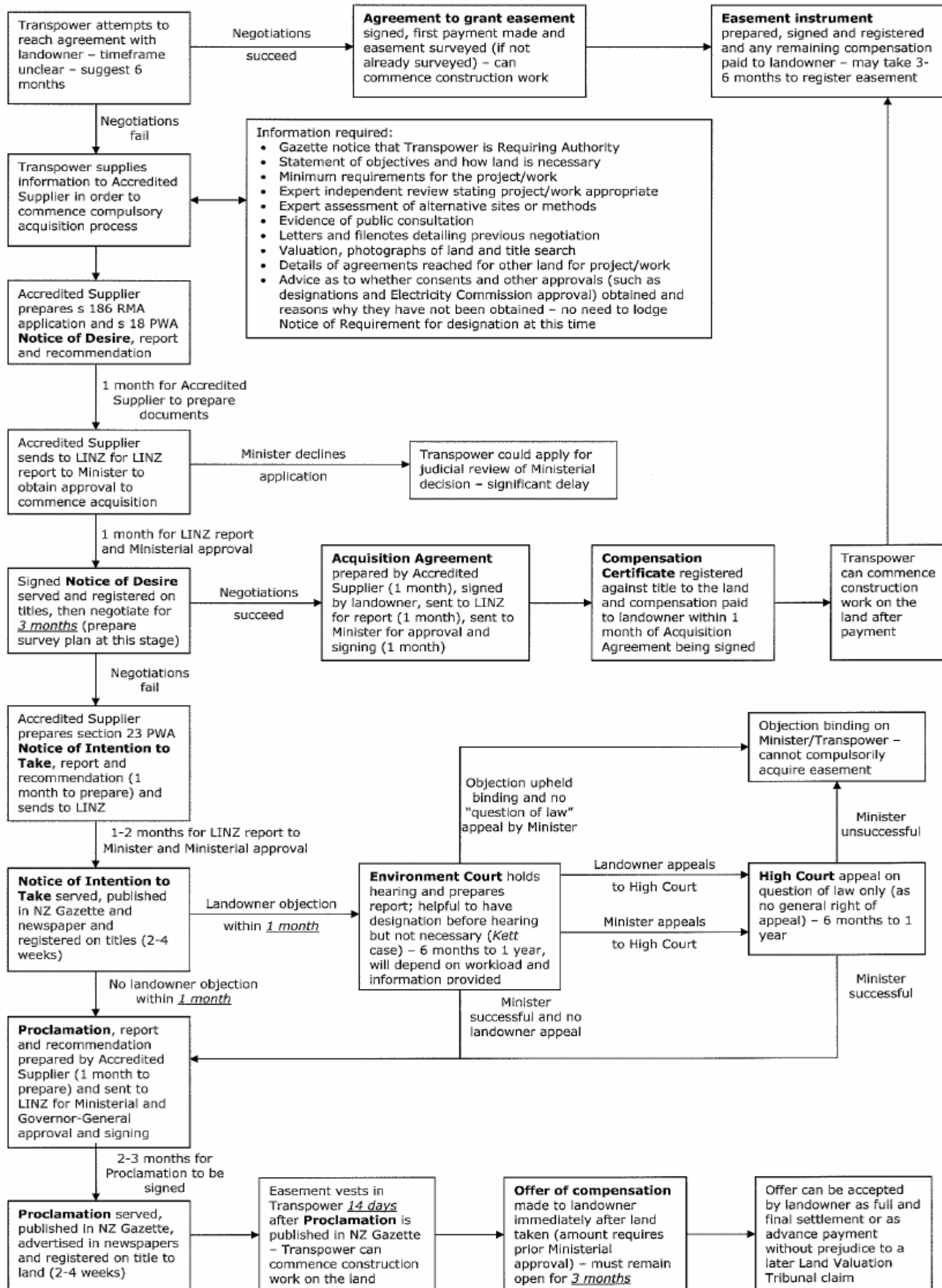
Earliest completion is October 2011

Latest completion is April 2014

Likely Completion is mid 2012.

7 Appendix A – Compulsory acquisition flowchart

SIMPLIFIED FLOWCHART FOR COMPULSORY ACQUISITION OF LAND UNDER PUBLIC WORKS ACT 1981 (BASED ON LINZ ACCREDITED SUPPLIER STANDARDS 1, 2 & 7) – “GREENFIELDS” TRANSMISSION LINE



Note: Dates in *italics and underlined* identify statutory timeframes

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