

# UPPER SOUTH ISLAND RELIABILITY PROJECT

Graphic Supplement to accompany Landscape and Visual Assessment

March 2019



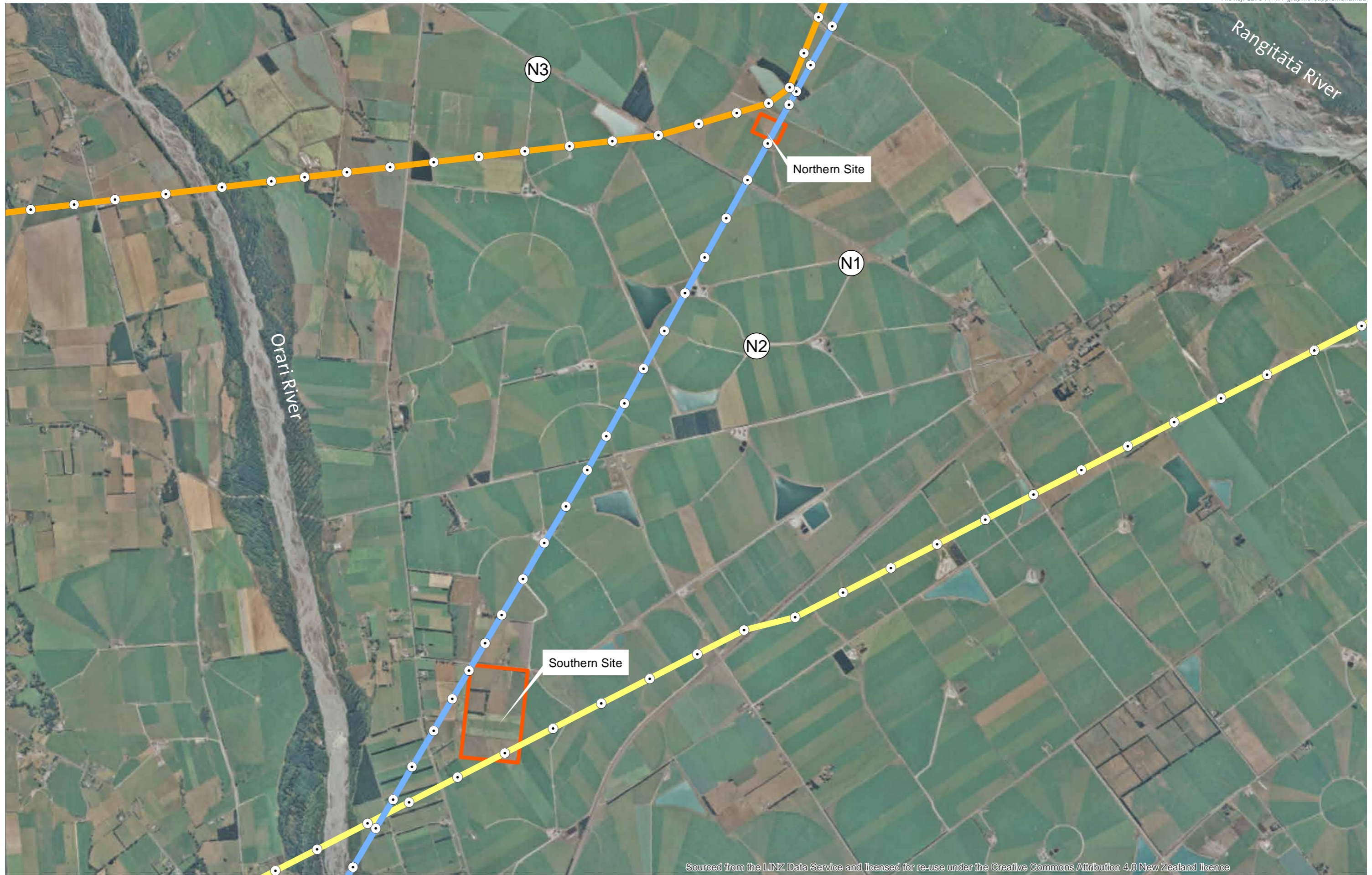
# UPPER SOUTH ISLAND RELIABILITY PROJECT

Graphic Supplement to accompany Visual Assessment

March 2019

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Legend

- Existing Transmission Lines
- BEN-ISL-A
- CHH-TWL-A
- ROX-ISL-A
- # Dwelling location
- Transpower Support Structures

- Site locations
- # Dwelling location

UPPER SOUTH ISLAND RELIABILITY PROJECT

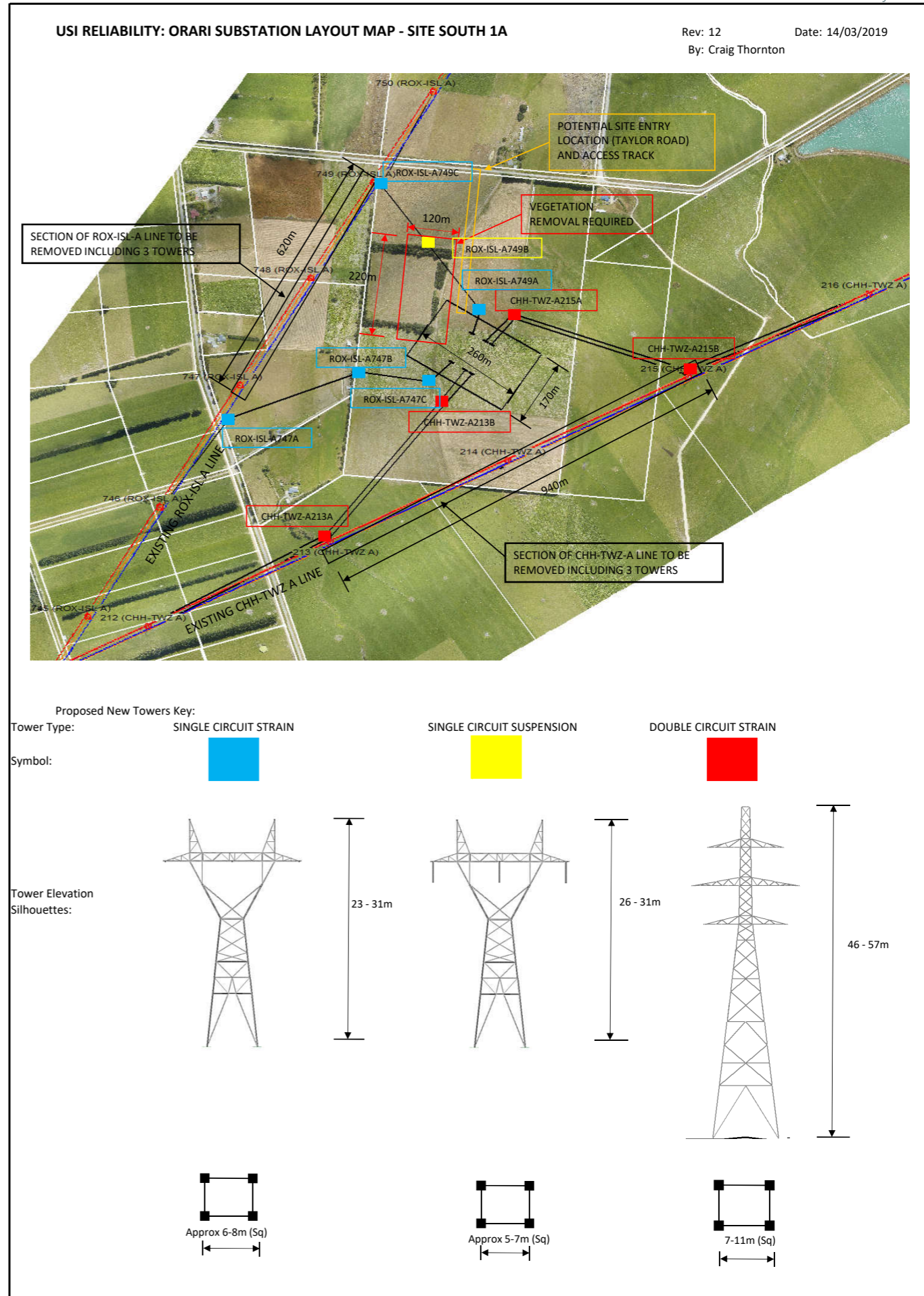
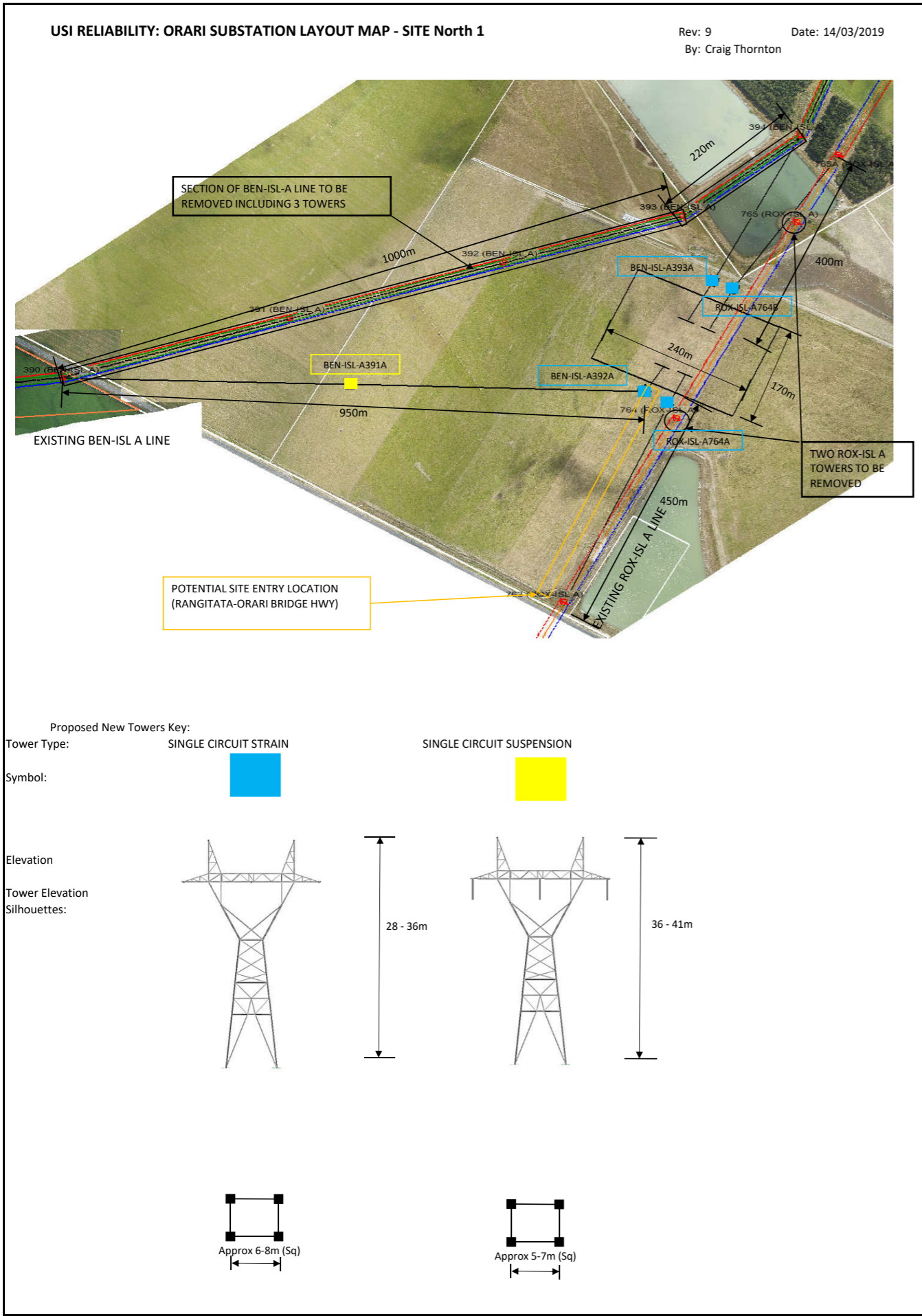
Figure 1: Site Location Plan

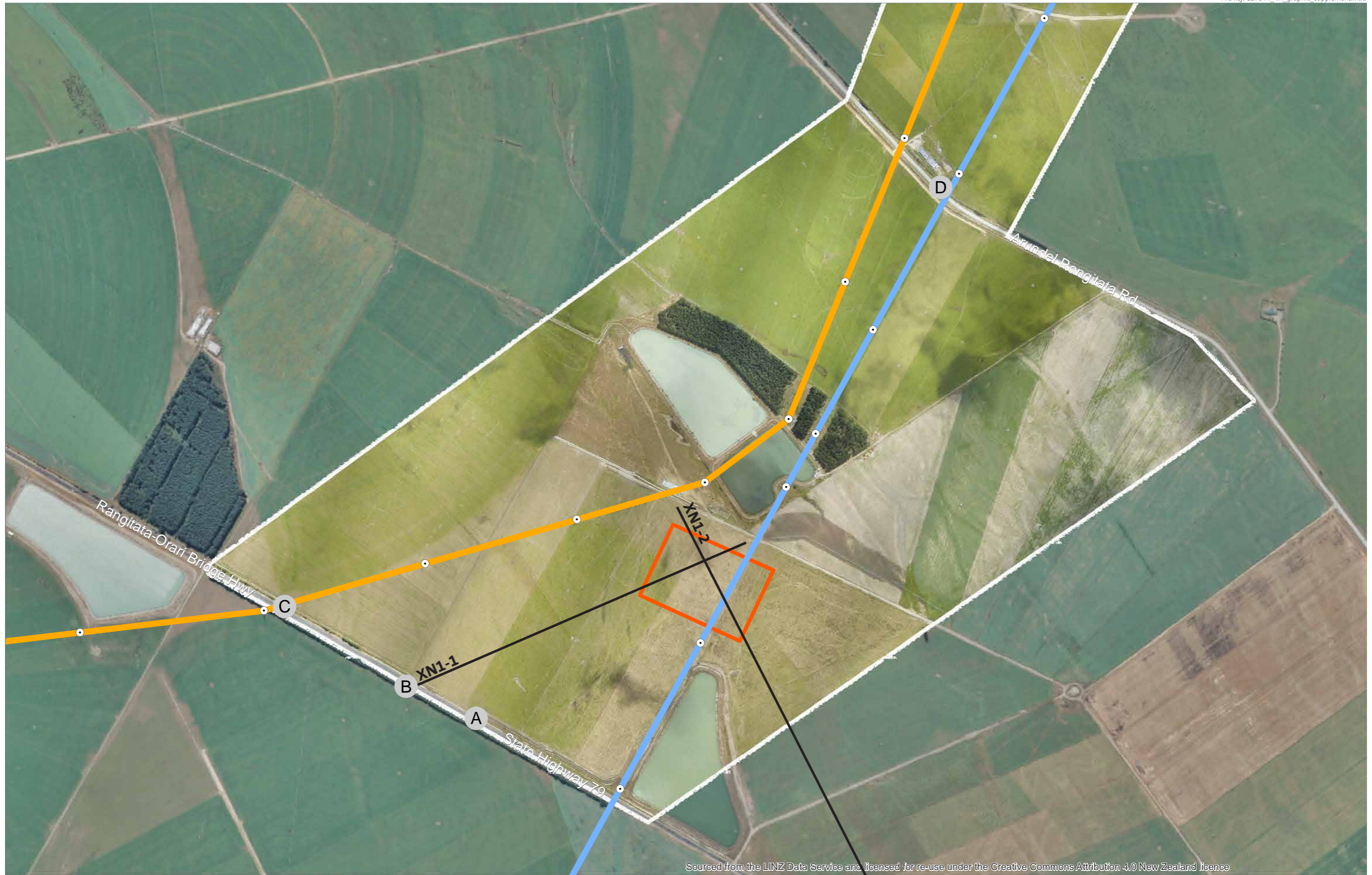
Date: March 2019 | Revision: 3

Plan prepared for Transpower by Boffa Miskell Limited

Project Manager: robert.schofield@boffamiskell.co.nz | Drawn: CMu | Checked: JBe

Figure 1





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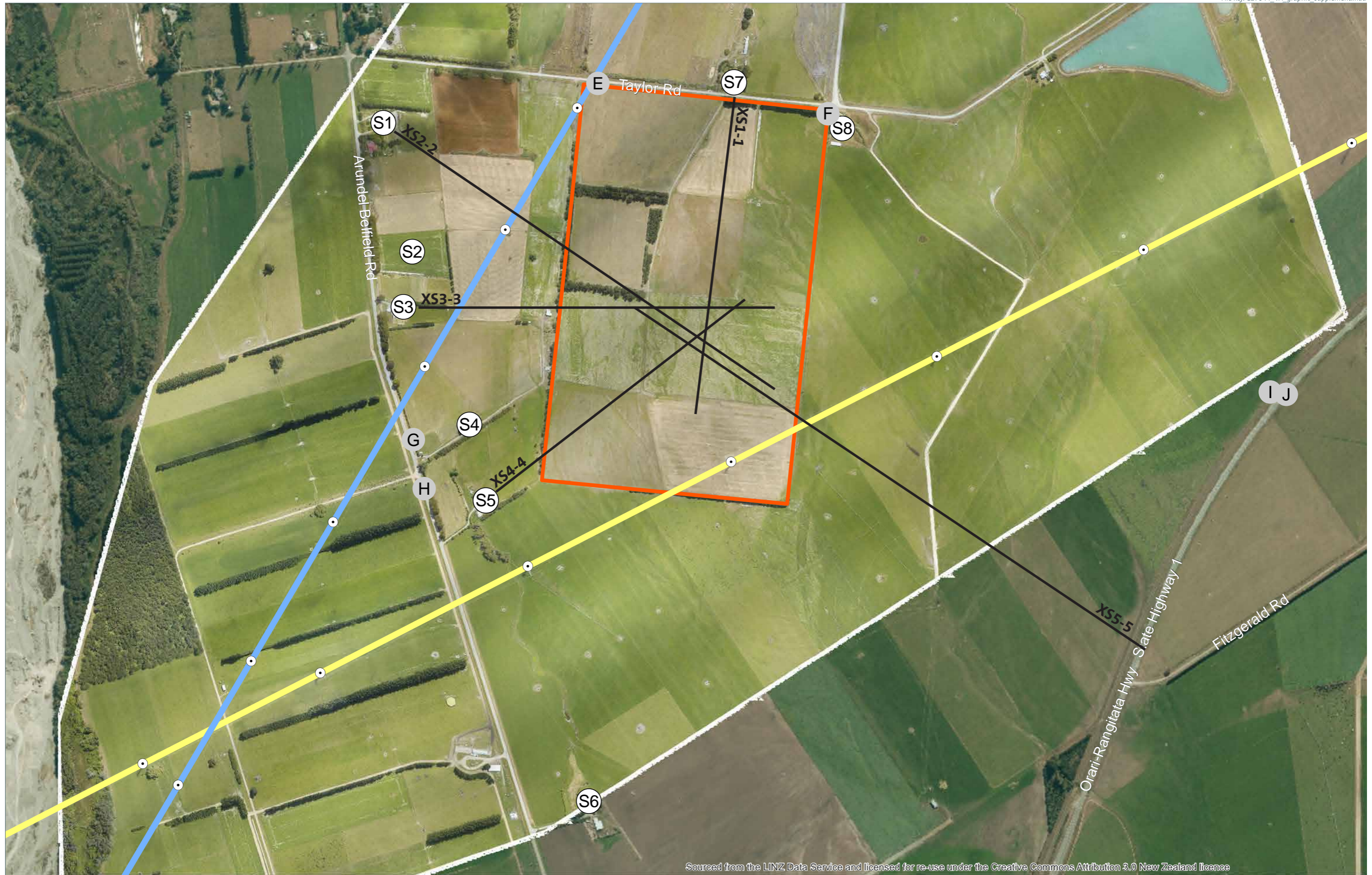


Legend

- Existing Transmission Lines
- BEN-ISL-A
- ROX-ISL-A
- Transpower Support Structures
- North Site
- # photographic Viewpoint
- Cross-section lines (Northern XN-)

Figure 3: Northern Site: Photo location and X-section

Figure 3



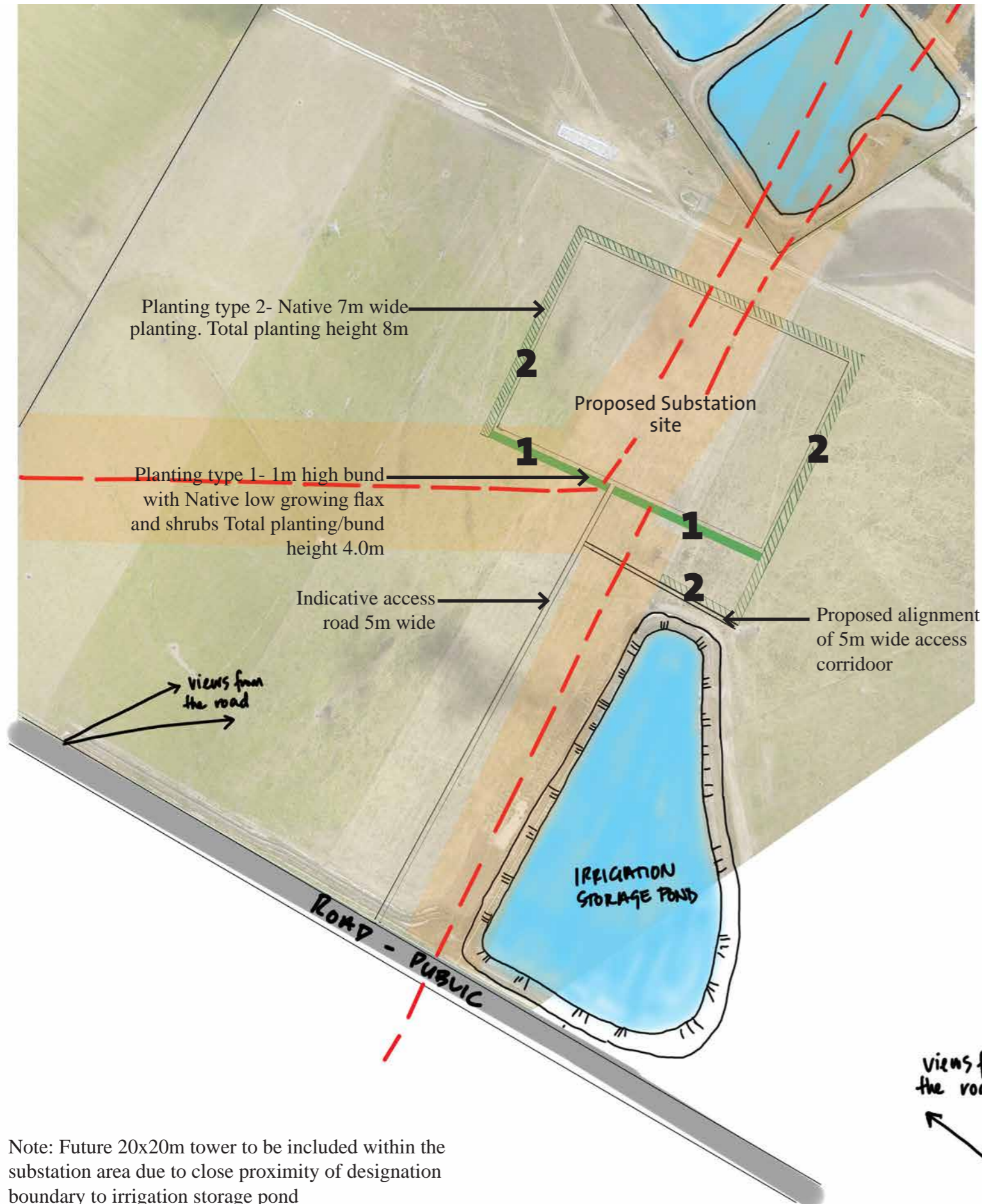
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- Legend**
- Existing Transmission Lines
  - CHH-TWL-A
  - ROX-ISL-A
  - Transpower Support Structures
  - South Site
  - photographic Viewpoint
  - Dwelling location
  - Cross-section lines (Southern XS-)

Figure 4: Southern Site: Photo location and X-section

Figure 4



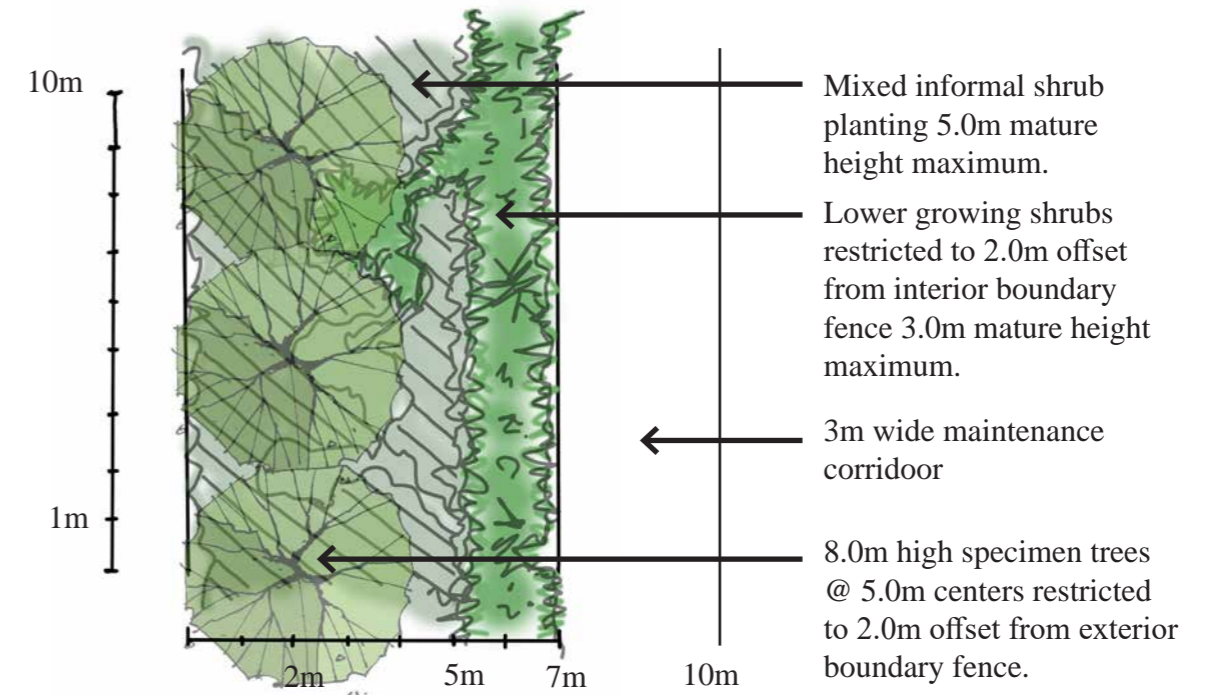
Note: Future 20x20m tower to be included within the substation area due to close proximity of designation boundary to irrigation storage pond

**Northern Site - Substation Mitigation Planting - Proposed Plant Species List (For Discussion)**

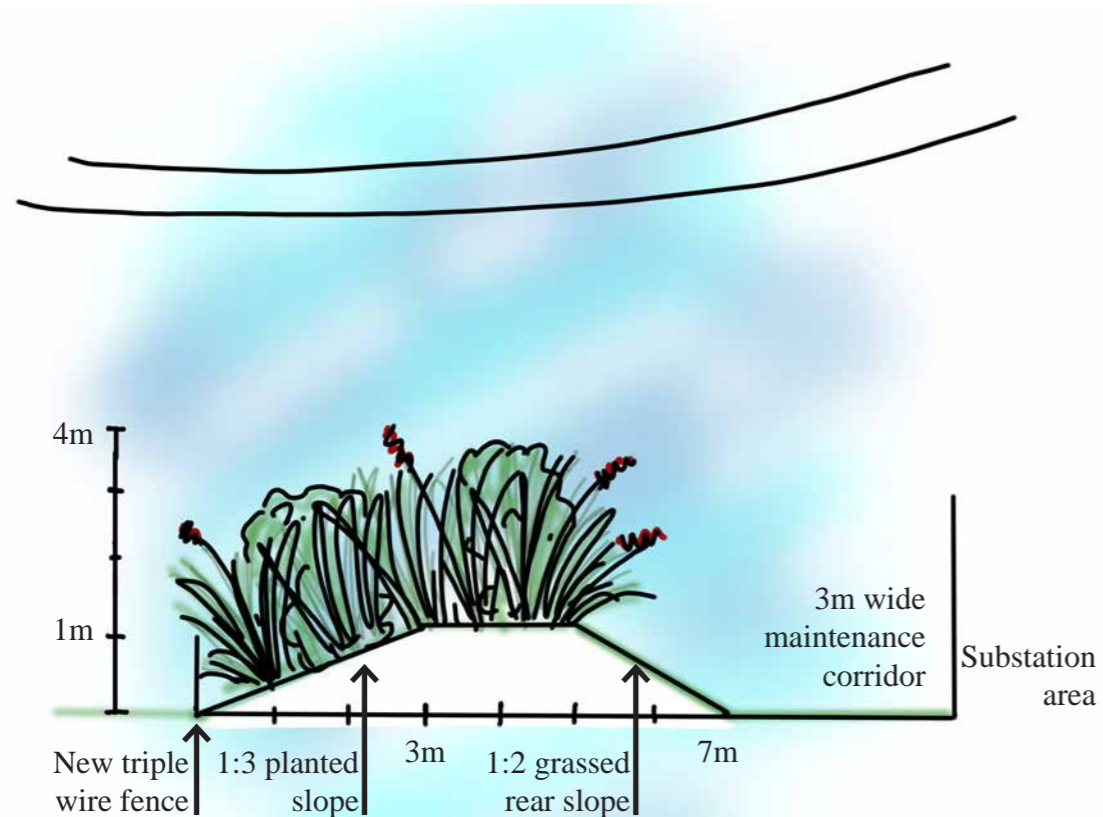
Assumptions which contribute to indicative growth rates: Drip irrigation to all plantings, fertiliser tab included at time of planting, 100mm mulch.

Location	Species	Common/Maori Name	Grade (L)	Spacing (m)	Indicative % Mix	Indicative height 1 year after planting (m)	Indicative height at 10 years (m)	Indicative height at maturity (m)
<b>Top of Bunds</b>								
1	<i>Phormium tenax</i>	harakeke	1.5L	1.2m	70%	1	3	3
	<i>Coprosma propinqua</i>	Mingimingi	1.5L	2.0m	10%	1	3	3
	<i>Corokia cotoneaster</i>	korokio	1.5L	2.0m	10%	0.8	2.5	2.5
	<i>Hebe salicifolia</i>	koromiko	1.5L	1.5m	10%	1.2	3	3
Native low growing flax and shrubs Total planting/bund height								
					Subtotal	100%		
<b>Mixed Informal Groups of Shrub Species</b>								
2	<i>Aristotelia fruticosa</i>	wineberry	1.5L	2.0m	5%	1	3	3
	<i>Austraderia richardii</i>	South Island toetoe	1.5L	1.5m	2%	0.8	2	2
	<i>Carmichaelia australis</i>	mākaka	1.5L	1.2m	2%	0.8	2	2
	<i>Coprosma crassifolia</i>	thick leaved mikimiki	1.5L	1.2m	2%	0.5	4	4
	<i>Coprosma propinqua</i>	Mingimingi	1.5L	2.0m	5%	1	3	3
	<i>Coprosma robusta</i>	karamu	1.5L	1.2m	5%	1	3	3
	<i>Coprosma virescens</i>	mikimiki	1.5L	2.0m	5%	1	3.5	3.5
	<i>Corokia cotoneaster</i>	korokio	1.5L	2.0m	5%	0.8	2.5	2.5
	<i>Hebe salicifolia</i>	koromiko	1.5L	1.5m	5%	1.2	3	3
	<i>Lophomyrtus obcordata</i>	rōhutu	1.5L	2.0m	5%	1	5	5
	<i>Muehlenbeckia astonii</i>	shrub pōhuehue	1.5L	1.2m	5%	1	3	3
	<i>Myrsine australis</i>	mapou	1.5L	2.5m	5%	0.8	4	5
	<i>Olearia paniculata</i>	ahkiraho	2.5L	2.0m	10%	1.2	4	4
	<i>Ozothamnus leptophylla</i>	cottonwood	1.5L	2.0m	4%	0.8	1.5	1.5
	<i>Phormium tenax</i>	harakeke	1.5L	2.0m	10%	1	3	3
	<i>Pittosporum tenuifolium</i>	kohuhu	1.5L	2.0m	15%	0.8	5	5
					Subtotal	90%		
<b>Specimen Tree weave</b>								
	<i>Griselinia littoralis</i>	kāpuka	2.5L	2.0m	50%	1	8	8
	<i>Melicytus ramiflorus</i>	mahoe	2.5L	2.0m	50%	1	8	8
					Subtotal	100%		

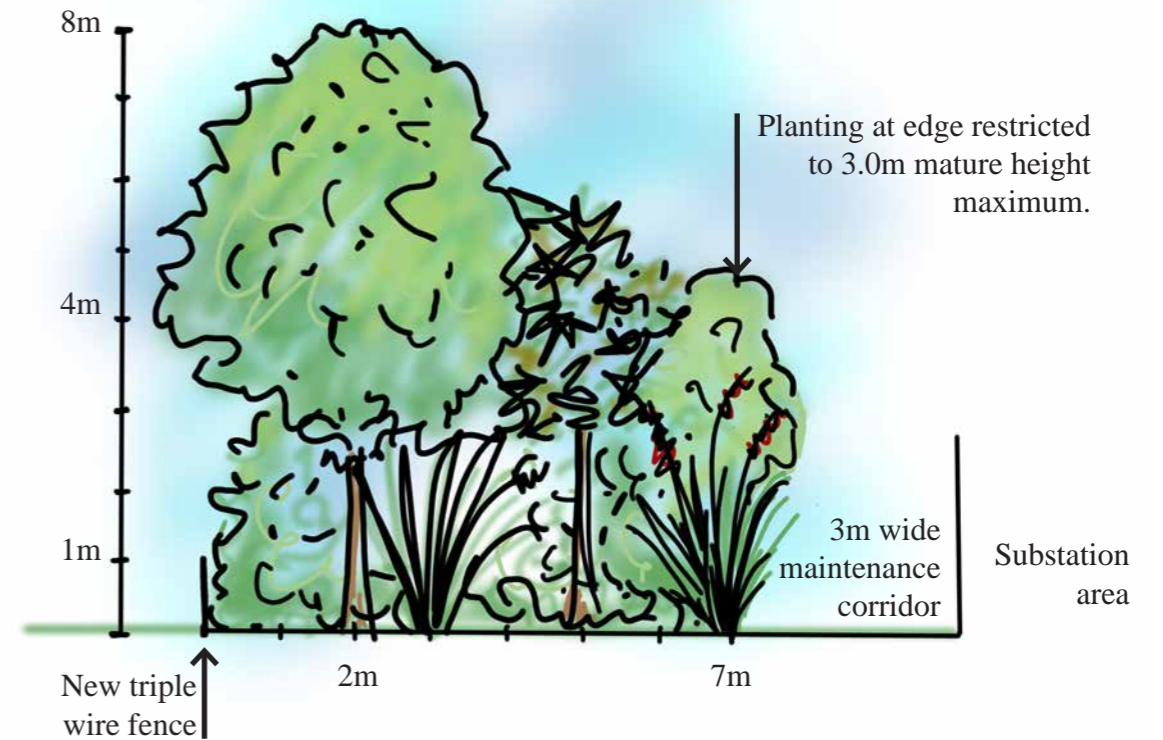
Note: All species to be locally eco-sourced from the Lower Plains Canterbury Ecological District. Percentage mix of each species to be determined.



Indicative plan layout of planting type 2

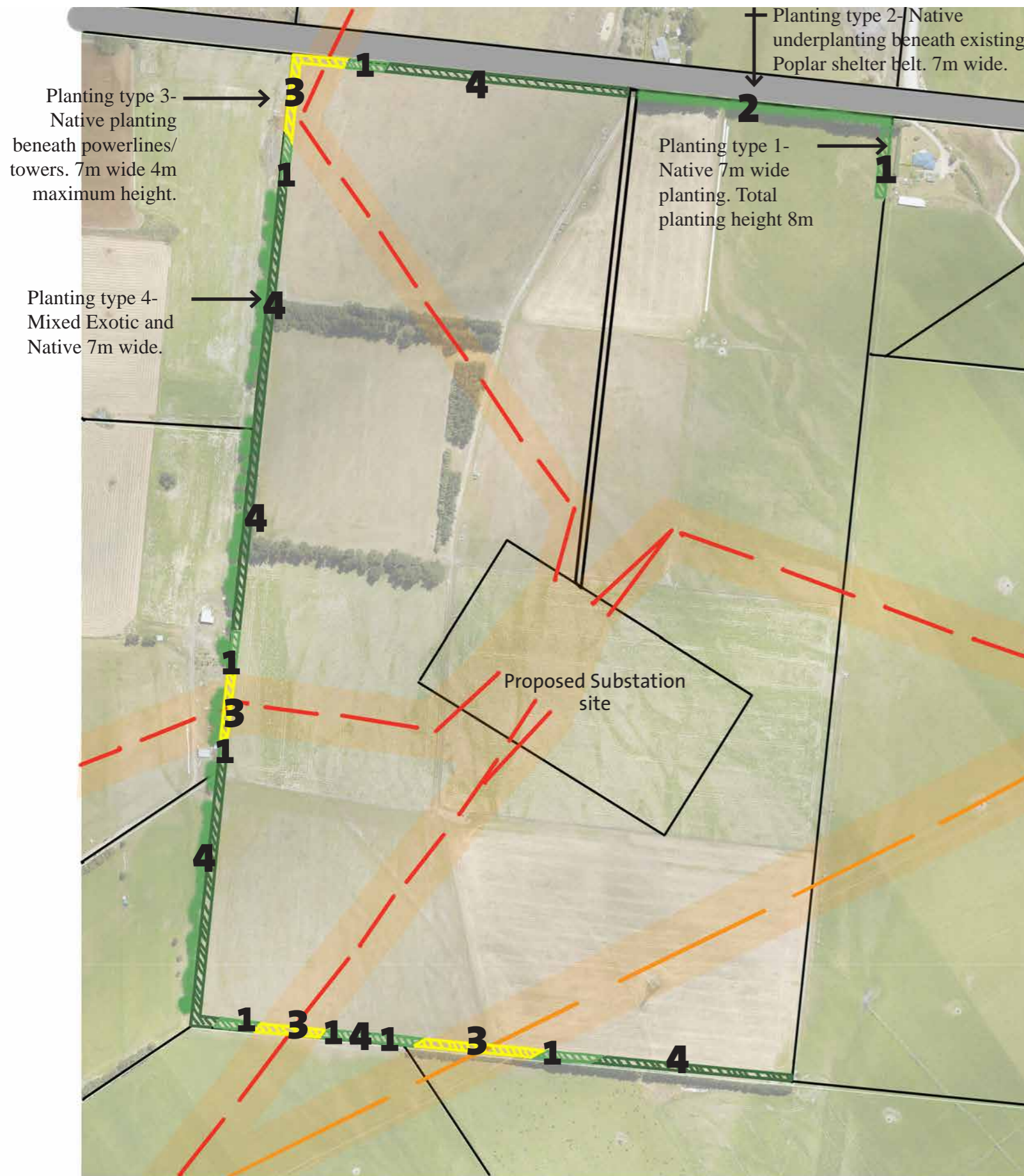


Planting type 1-1m high bund with Native low growing flax and shrubs. Total planting/bund height 4.0m (indicative heights shown at maturity)



Planting type 2 Native 7m wide planting. Total planting height 8m (indicative heights shown at maturity)





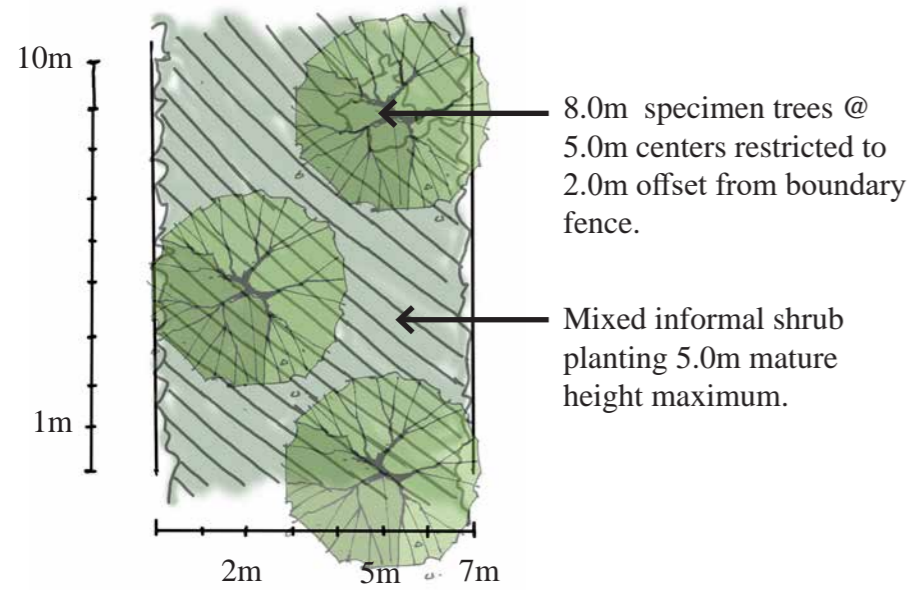
**Southern Site - Substation Mitigation Planting - Proposed Plant Species List (For Discussion)**

Assumptions which contribute to indicative growth rates: Drip irrigation to all plantings, fertiliser tab included at time of planting, 100mm mulch.

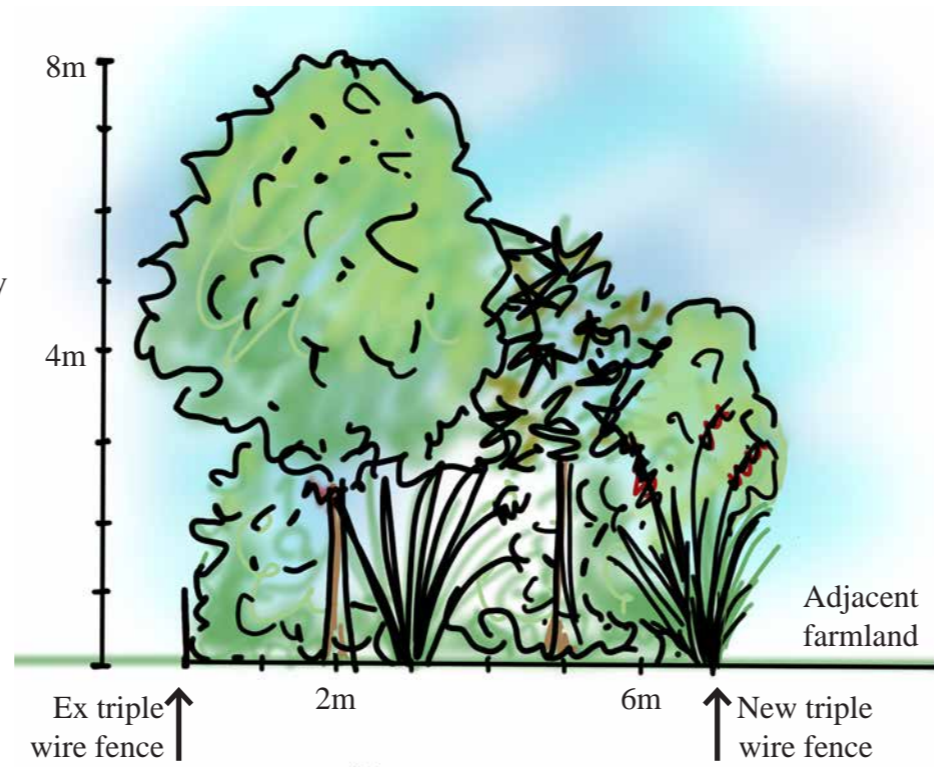
Location	Species	Common/Maori Name	Grade (L)	Spacing (m)	Indicative % Mix	Indicative height 1 year after planting (m)	Indicative height at 10 years (m)	Indicative height at maturity (m)	
<b>1</b> Planting type 1- Native 7m wide planting. Total planting height 8m	<b>Mixed Informal Groups of Shrub Species</b>								
	<i>Aristotelia fruticosa</i>	wineberry	1.5L	2.0m	5%	1	3	3	
	<i>Austroderia richardii</i>	South Island toetoe	1.5L	1.5m	2%	0.8	2	2	
	<i>Carmichaelia australis</i>	mākaka	1.5L	1.2m	2%	0.8	2	2	
	<i>Coprosma crassifolia</i>	thick leaved mikimiki	1.5L	1.2m	2%	0.5	4	4	
	<i>Coprosma propinqua</i>	Mingimingi	1.5L	2.0m	5%	1	3	3	
	<i>Coprosma robusta</i>	karamu	1.5L	1.2m	5%	1	3	3	
	<i>Coprosma virescens</i>	mikimiki	1.5L	2.0m	5%	1	3.5	3.5	
	<i>Coralyne australis</i>	ti kouka, cabbage tree	2.5L	1.2m	10%	0.8	6	8	
	<i>Corakia cotoneaster</i>	korakia	1.5L	2.0m	5%	0.8	2.5	2.5	
	<i>Hebe salicifolia</i>	koromiko	1.5L	1.5m	5%	1.2	3	3	
	<i>Lophomyrtus obcordata</i>	röhutu	1.5L	2.0m	5%	1	5	5	
	<i>Muehlenbeckia astonii</i>	shrub pōhuehue	1.5L	1.2m	5%	1	3	3	
	<i>Myrsine australis</i>	mapou	1.5L	2.5m	5%	0.8	4	5	
	<i>Olearia paniculata</i>	ahkiraho	2.5L	2.0m	10%	1.2	4	4	
	<i>Ozothamnus leptophylla</i>	cottonwood	1.5L	2.0m	4%	0.8	1.5	1.5	
	<i>Phormium tenax</i>	harakeke	1.5L	2.0m	10%	1	3	3	
	<i>Pittosporum tenuifolium</i>	kohuhu	1.5L	2.0m	15%	0.8	5	5	
	Subtotal			100%					
<b>Specimen Tree weave</b>	<i>Grisebinia littoralis</i>	kāpuka	2.5L	2.0m	50%	1	8	8	
	<i>Meliccytus ramiflorus</i>	mahoe	2.5L	2.0m	50%	1	8	8	
	Subtotal			100%					
<b>2</b> Planting type 2- Native underplanting beneath existing Poplar shelter belt. 7m wide.	<b>Mixed Informal Groups of Shrub Species</b>								
	<i>Austroderia richardii</i>	South Island toetoe	1.5L	1.5m	5%	0.8	2	2	
	<i>Coprosma crassifolia</i>	thick leaved mikimiki	1.5L	1.2m	5%	0.5	4	4	
	<i>Coprosma propinqua</i>	Mingimingi	1.5L	2.0m	10%	1	3	3	
	<i>Coprosma robusta</i>	karamu	1.5L	1.2m	5%	1	3	3	
	<i>Coprosma virescens</i>	mikimiki	1.5L	2.0m	10%	1	3.5	3.5	
	<i>Corakia cotoneaster</i>	korakia	1.5L	2.0m	5%	0.8	2.5	2.5	
	<i>Hebe salicifolia</i>	koromiko	1.5L	1.5m	10%	1.2	3	3	
	<i>Muehlenbeckia astonii</i>	shrub pōhuehue	1.5L	1.2m	10%	1	3	3	
	<i>Myrsine australis</i>	mapou	1.5L	2.5m	10%	0.8	4	5	
	<i>Olearia paniculata</i>	ahkiraho	2.5L	2.0m	20%	1.2	4	4	
	<i>Phormium tenax</i>	harakeke	1.5L	2.0m	10%	1	3	3	
	Subtotal			100%					
<b>3</b> Planting type 3- Native planting beneath powerlines/towers. 7m wide 4m maximum height.	<b>Mixed Informal Groups of Shrub Species</b>								
	<i>Austroderia richardii</i>	South Island toetoe	1.5L	1.5m	5%	0.8	2	2	
	<i>Coprosma crassifolia</i>	thick leaved mikimiki	1.5L	1.2m	5%	0.5	4	4	
	<i>Coprosma propinqua</i>	Mingimingi	1.5L	2.0m	10%	1	3	3	
	<i>Coprosma robusta</i>	karamu	1.5L	1.2m	5%	1	3	3	
	<i>Coprosma virescens</i>	mikimiki	1.5L	2.0m	10%	1	3.5	3.5	
	<i>Corakia cotoneaster</i>	korakia	1.5L	2.0m	5%	0.8	2.5	2.5	
	<i>Hebe salicifolia</i>	koromiko	1.5L	1.5m	10%	1.2	3	3	
<i>Muehlenbeckia astonii</i>	shrub pōhuehue	1.5L	1.2m	10%	1	3	3		
<i>Myrsine australis</i>	mapou	1.5L	2.5m	10%	0.8	4	5		
<i>Olearia paniculata</i>	ahkiraho	2.5L	2.0m	20%	1.2	4	4		
<i>Phormium tenax</i>	harakeke	1.5L	2.0m	10%	1	3	3		
	Subtotal			100%					
<b>4</b> Planting type 4- Mixed Exotic and Native 7m wide.	<b>Mixed Informal Groups of Shrub Species</b>								
	<i>Aristotelia fruticosa</i>	wineberry	1.5L	2.0m	5%	1	3	3	
	<i>Austroderia richardii</i>	South Island toetoe	1.5L	1.5m	2%	0.8	2	2	
	<i>Carmichaelia australis</i>	mākaka	1.5L	1.2m	2%	0.8	2	2	
	<i>Coralyne australis</i>	ti kouka, cabbage tree	2.5L	1.2m	10%	0.8	6	8	
	<i>Coprosma crassifolia</i>	thick leaved mikimiki	1.5L	1.2m	2%	0.5	4	4	
	<i>Coprosma propinqua</i>	Mingimingi	1.5L	2.0m	5%	1	3	3	
	<i>Coprosma robusta</i>	karamu	1.5L	1.2m	5%	1	3	3	
	<i>Coprosma virescens</i>	mikimiki	1.5L	2.0m	5%	1	3.5	3.5	
	<i>Corakia cotoneaster</i>	korakia	1.5L	2.0m	5%	0.8	2.5	2.5	
	<i>Hebe salicifolia</i>	koromiko	1.5L	1.5m	5%	1.2	3	3	
	<i>Lophomyrtus obcordata</i>	röhutu	1.5L	2.0m	5%	1	5	5	
	<i>Muehlenbeckia astonii</i>	shrub pōhuehue	1.5L	1.2m	5%	1	3	3	
	<i>Olearia paniculata</i>	ahkiraho	2.5L	2.0m	10%	1.2	4	4	
	<i>Myrsine australis</i>	mapou	1.5L	2.5m	5%	0.8	4	5	
	<i>Ozothamnus leptophylla</i>	cottonwood	1.5L	2.0m	4%	0.8	1.5	1.5	
	<i>Phormium tenax</i>	harakeke	1.5L	2.0m	10%	1	3	3	
	<i>Pittosporum tenuifolium</i>	kohuhu	1.5L	2.0m	15%	0.8	5	5	
	Subtotal			100%					
<b>Specimen Tree weave</b>									
<i>Hoheria angustifolia</i>	lacebark	2.5L	3.0m	12.5%	1.5	10	10		
<i>Grisebinia littoralis</i>	kāpuka	1.5L	2.0m	12.5%	1	8	8		
<i>Kunzea ericoides</i>	kanuka	1.5L	2.5m	12.5%	0.8	12	12		
<i>Meliccytus ramiflorus</i>	mahoe	1.5L	2.0m	12.5%	1	8	8		
<i>Pittosporum eugenioides</i>	tarata	1.5L	2.0m	12.5%	1.2	12	12		
<i>Plagianthus regius</i>	ribbonwood	2.5L	2.0m	12.5%	1.5	12	12		
<i>Pseudopanax crassifolius</i>	lanewood	2.5L	2.0m	12.5%	1	8	12		
<i>Sophora microphylla</i>	South Island kōwhai	2.5L	3.0m	12.5%	1.5	12	12		
	Subtotal			100%					
<b>Shelterbelt (Planted in a weave of single species)</b>									
<i>Populus deltoides</i> x <i>yunnanensis</i> 'Kawa'		pole		10	100%	2m	30	30	
				Subtotal	100%				

Note: All species to be locally eco-sourced from the Lower Plains Canterbury Ecological District. Percentage mix of each species to be determined.

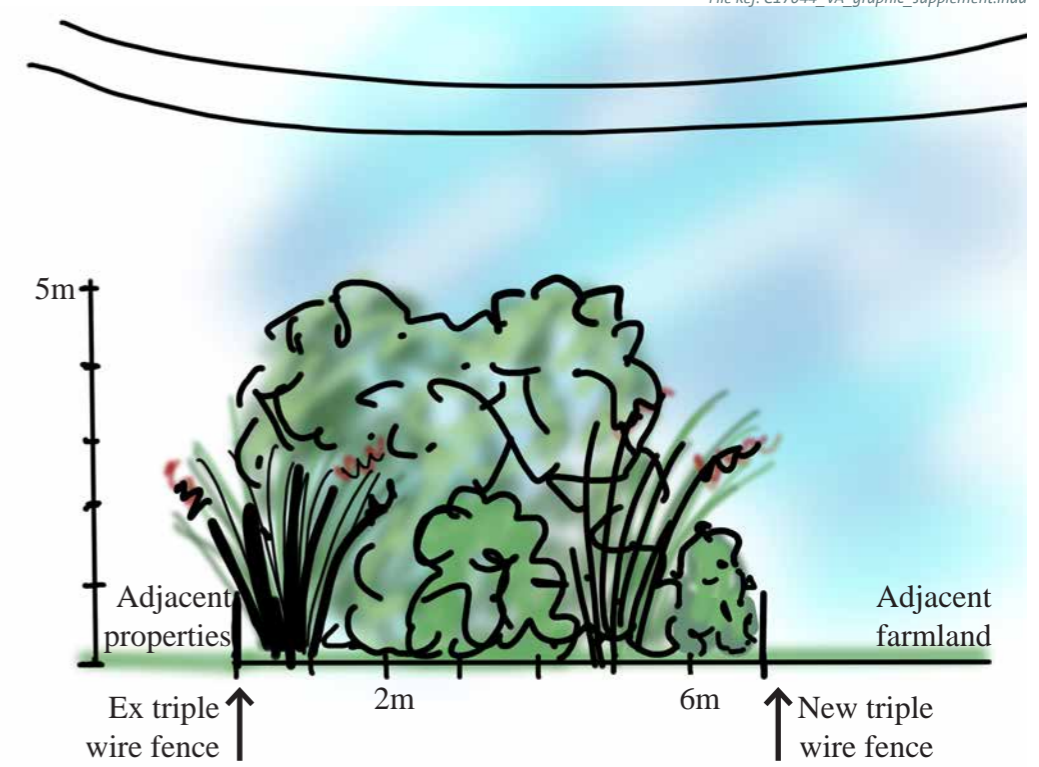




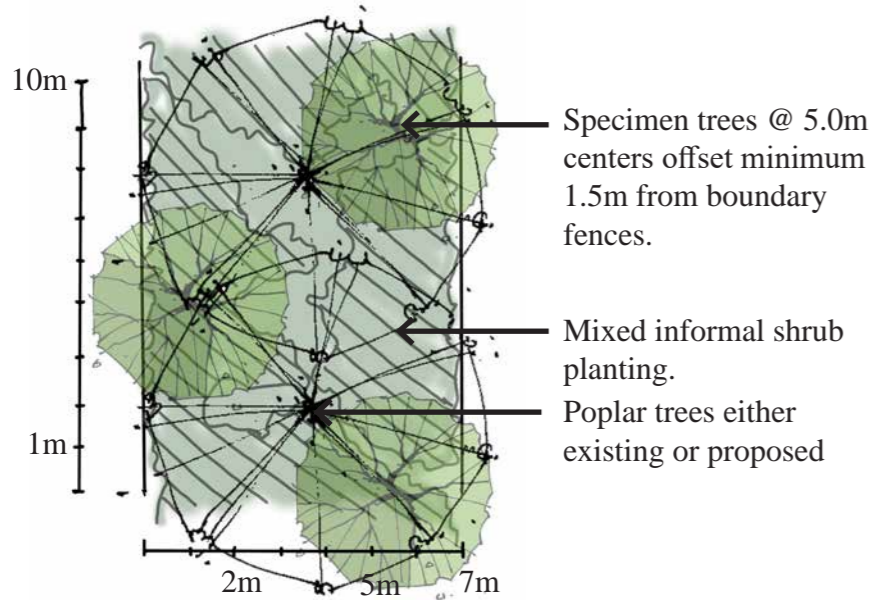
Indicative plan layout of planting type 1



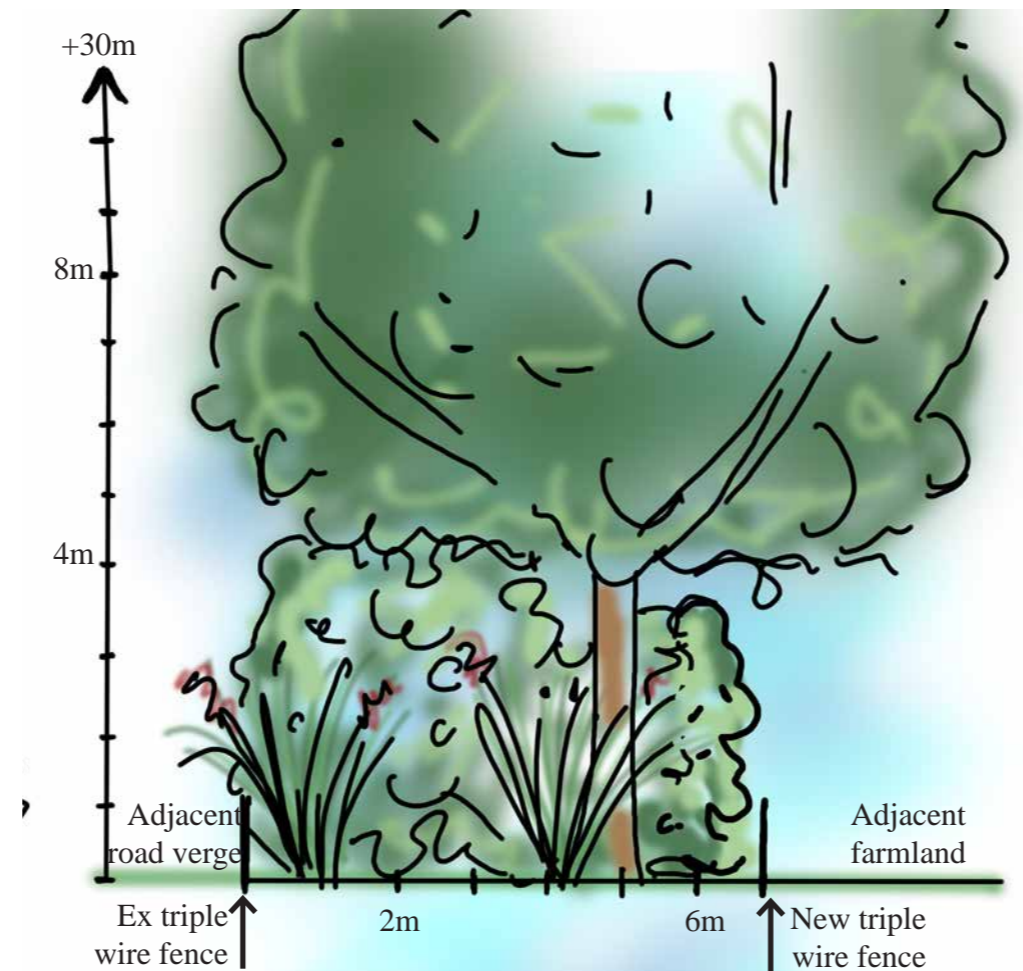
Planting type 1- Native 7m wide planting. Total planting height 8m (indicative heights shown at maturity)



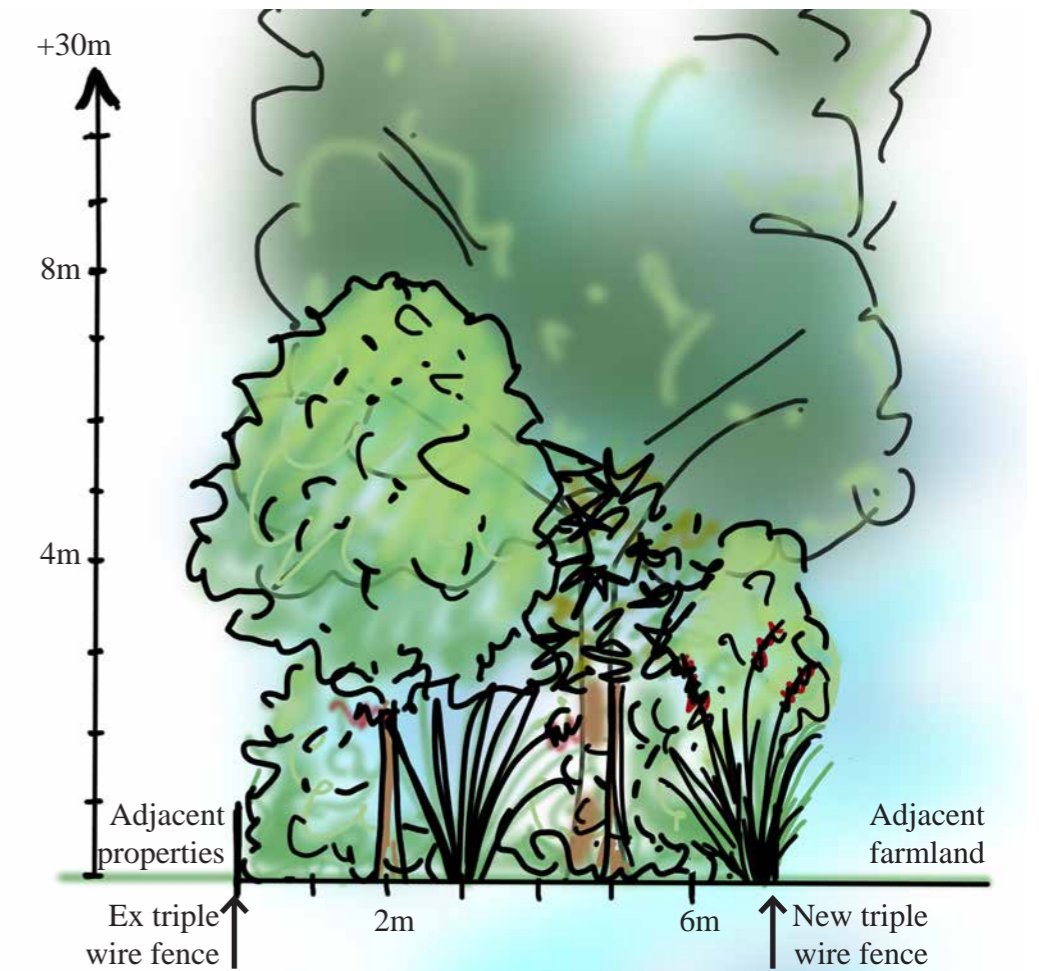
Planting type 3- Native planting beneath power lines/towers. 7m wide 4m maximum height. (indicative heights shown at maturity)



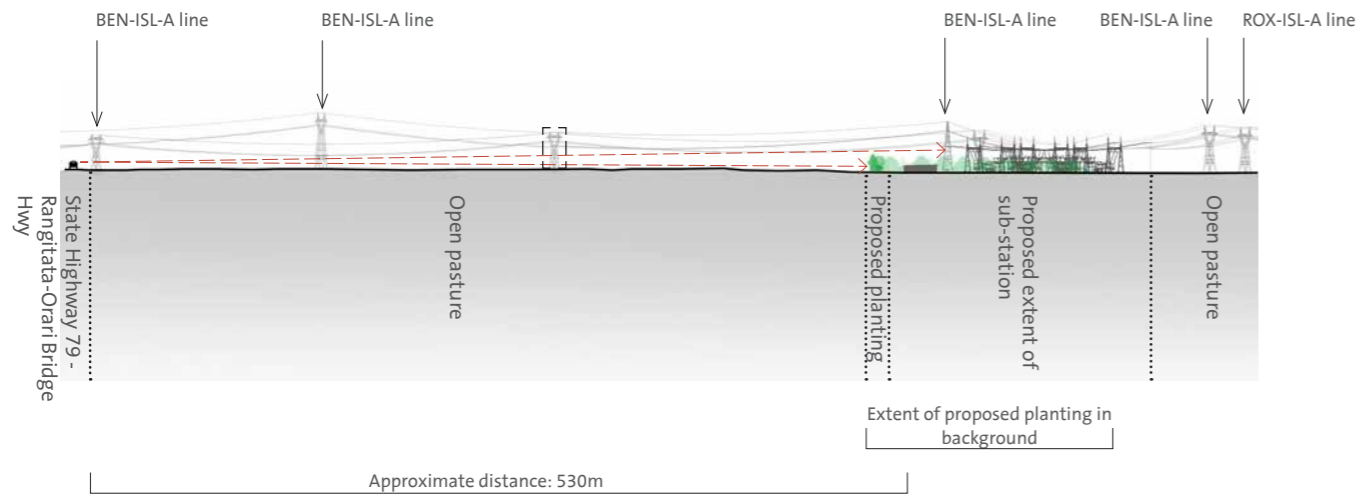
Indicative plan layout of planting types 2 and 4



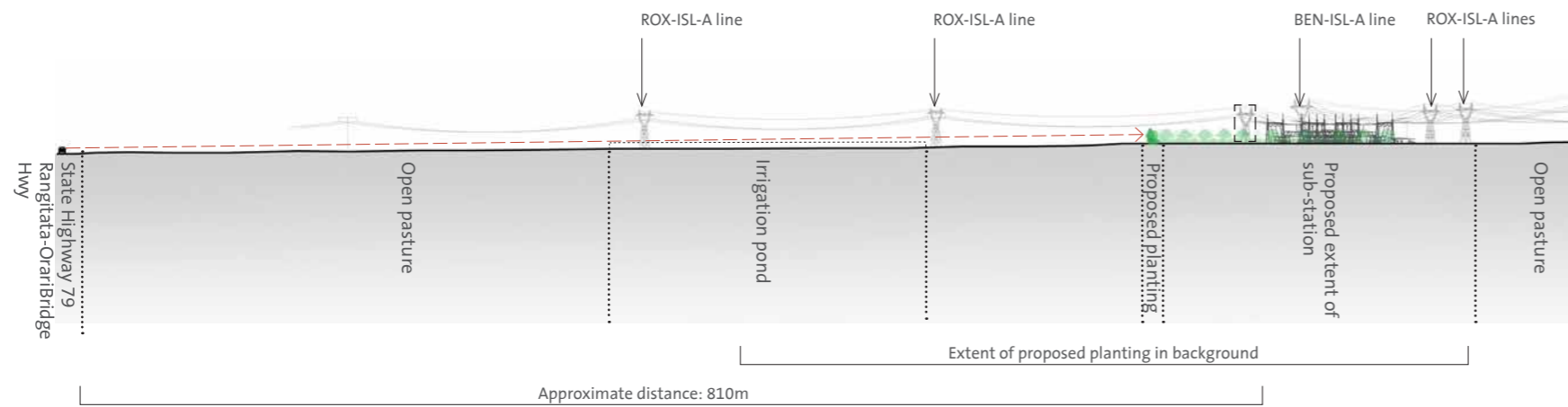
Planting type 2- Native underplanting beneath existing Poplar shelter belt. 7m wide new planting. (indicative heights shown at maturity)



Planting type 4- Mixed Exotic and Native 7m wide. (indicative heights shown at maturity)









Cross Section N1-1

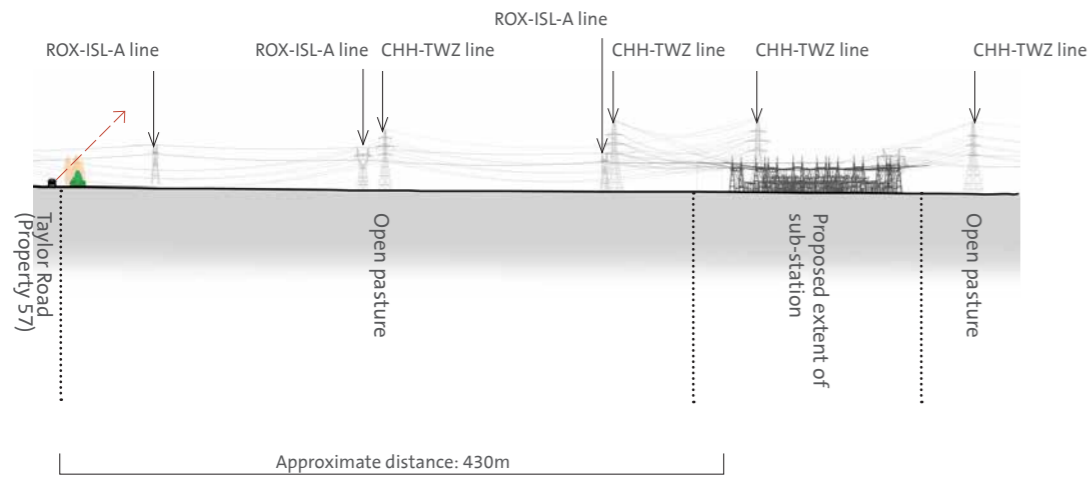


Cross Section N2-2

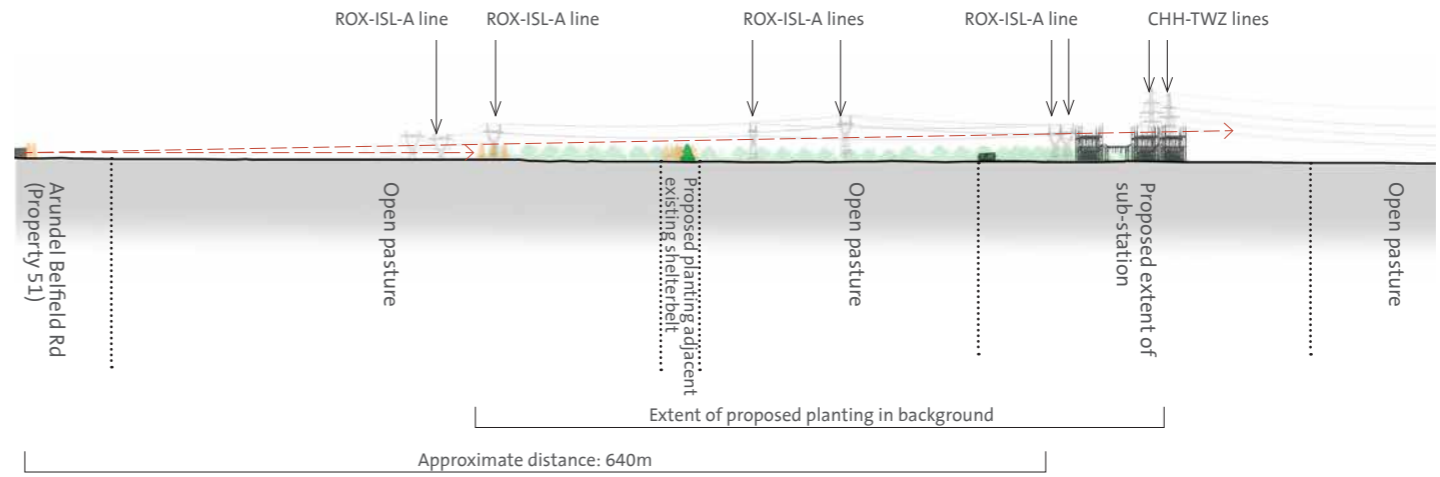
LEGEND

-  Visible Viewshed
-  Proposed Planting (along section line)
-  Existing Vegetation
-  Existing transmission towers to be removed
-  Existing transmission towers to be retained and proposed transmission towers (within close proximity of the section line)
-  Proposed extent of substation

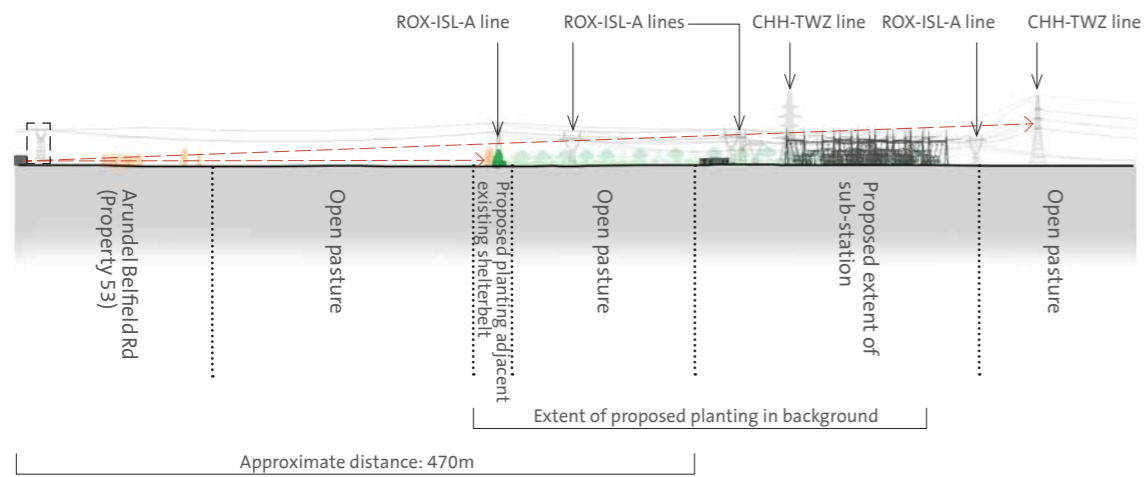
Note: For location of Cross-sections, refer to Figure 3. For Illustrative purposes Only. Proposed planting shown at 10 years of maturity



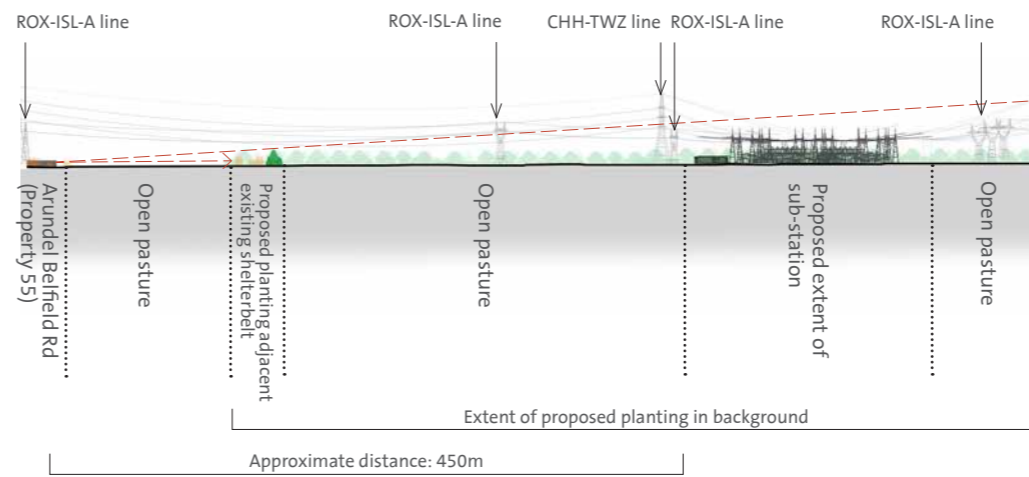
Cross Section S1-1



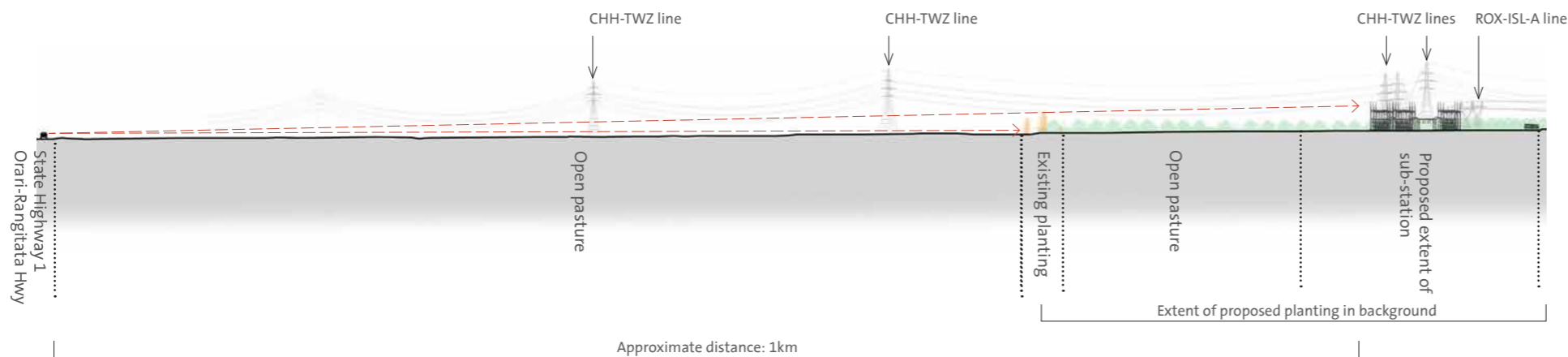
Cross Section S2-2



Cross Section S3-3









Cross Section S4-4



Cross Section S5-5

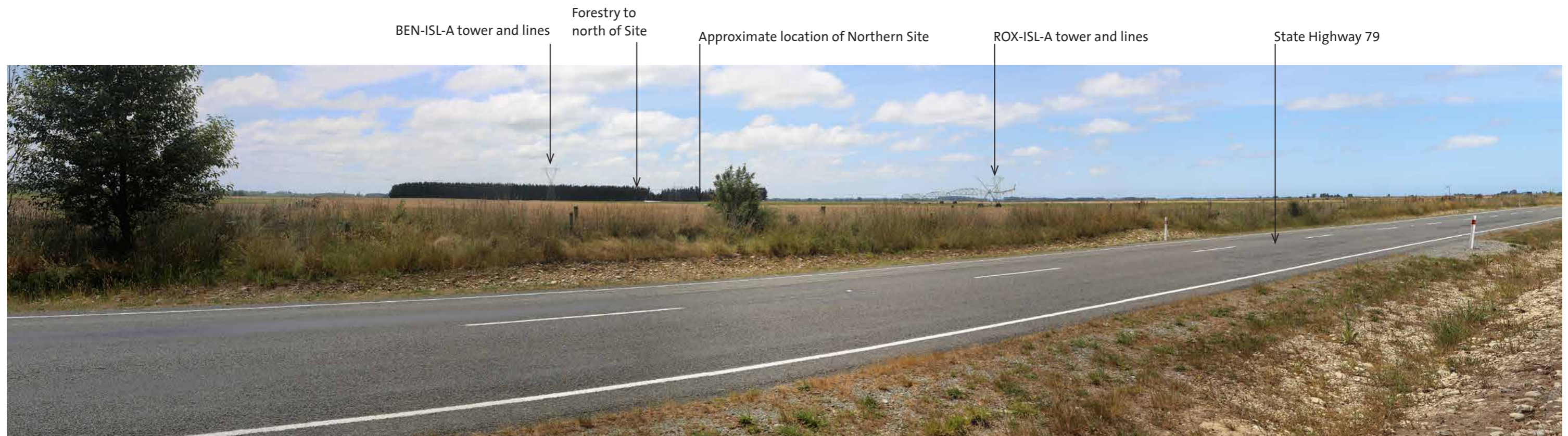
LEGEND

-  Visible Viewshed
-  Proposed Planting (along section line)
-  Existing Vegetation
-  Existing transmission towers to be removed
-  Existing transmission towers to be retained and proposed transmission towers (within close proximity of the section line)
-  Proposed extent of substation

Note: For location of Cross-sections, refer to Figure 4. For Illustrative purposes Only. Proposed planting shown at 10 years of maturity



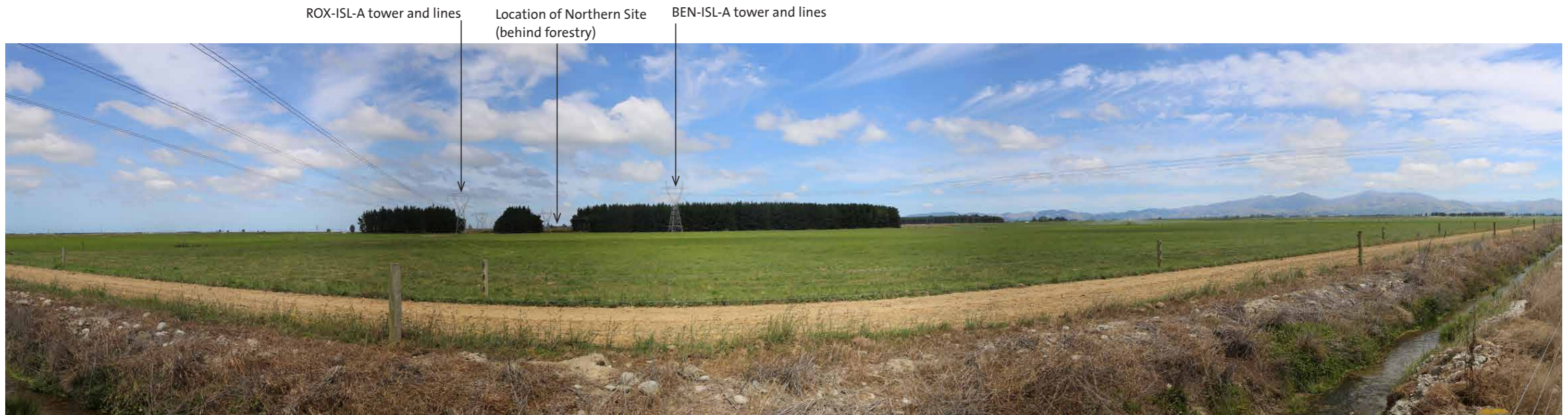
Site Photograph A: Photograph looking northwest from State Highway 79 towards the Northern Site.



Site Photograph B: Photograph looking northwest from State Highway 79 towards the Northern Site.



Site Photograph C: Photograph looking west from State Highway 79 towards the Northern Site.



Site Photograph D: Photograph looking south from Arundel Rangitātā Road towards the Northern Site.



Site Photograph E: Photograph looking south from Taylor Road across the northern part of the Southern Site.



Site Photograph F: Photograph looking southeastwards adjacent to the northeastern boundary of the Southern Site, off Taylor Road.



Site Photograph G: Photograph looking northeast from Arundel Belfield Road across the Southern Site.

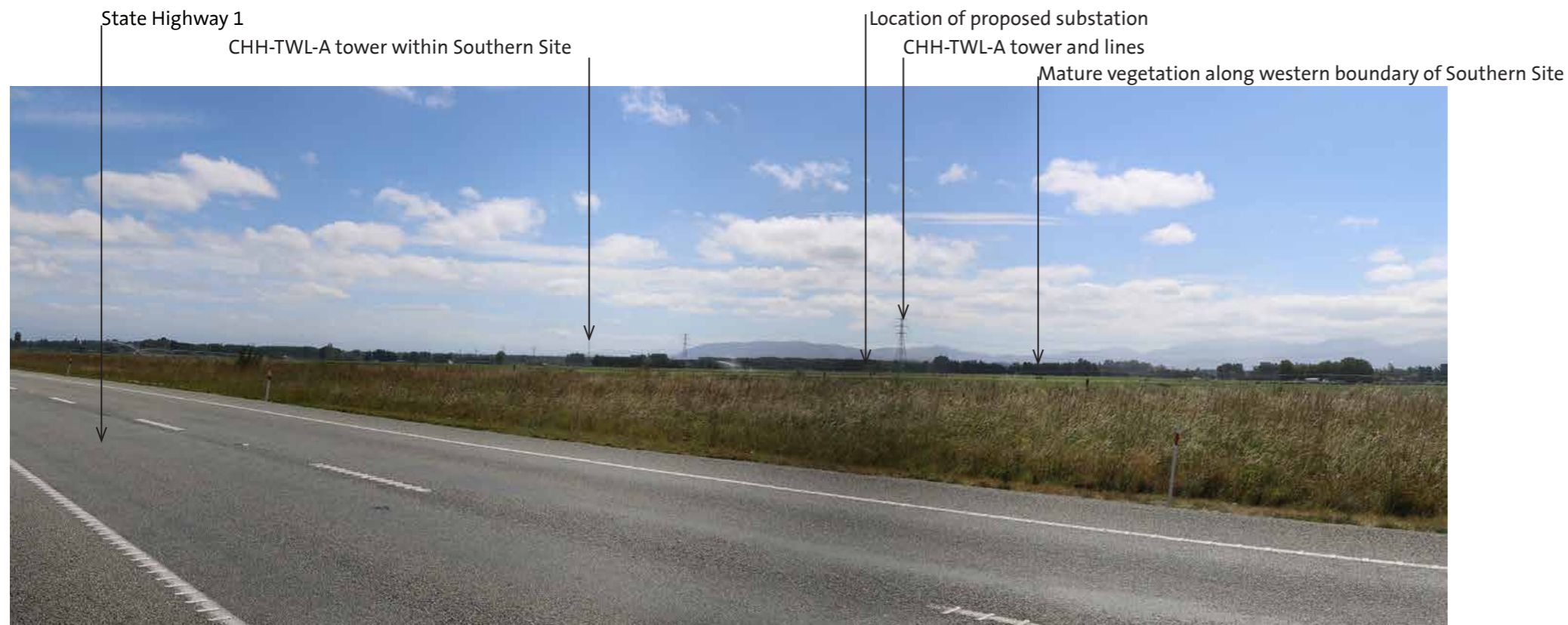


Site Photograph H: Site Photograph G: Photograph looking northeast from Arundel-Belfield Road across the Southern Site.





Site Photograph I: Photograph looking west from a location close to the Main South Line towards the Southern Site.



Site Photograph J: Photograph looking west from State Highway 1 towards the Southern Site.