UPPER SOUTH ISLAND RELIABILITY PROJECT

Graphic Supplement to accompany Landscape and Visual Assessment

March 2019



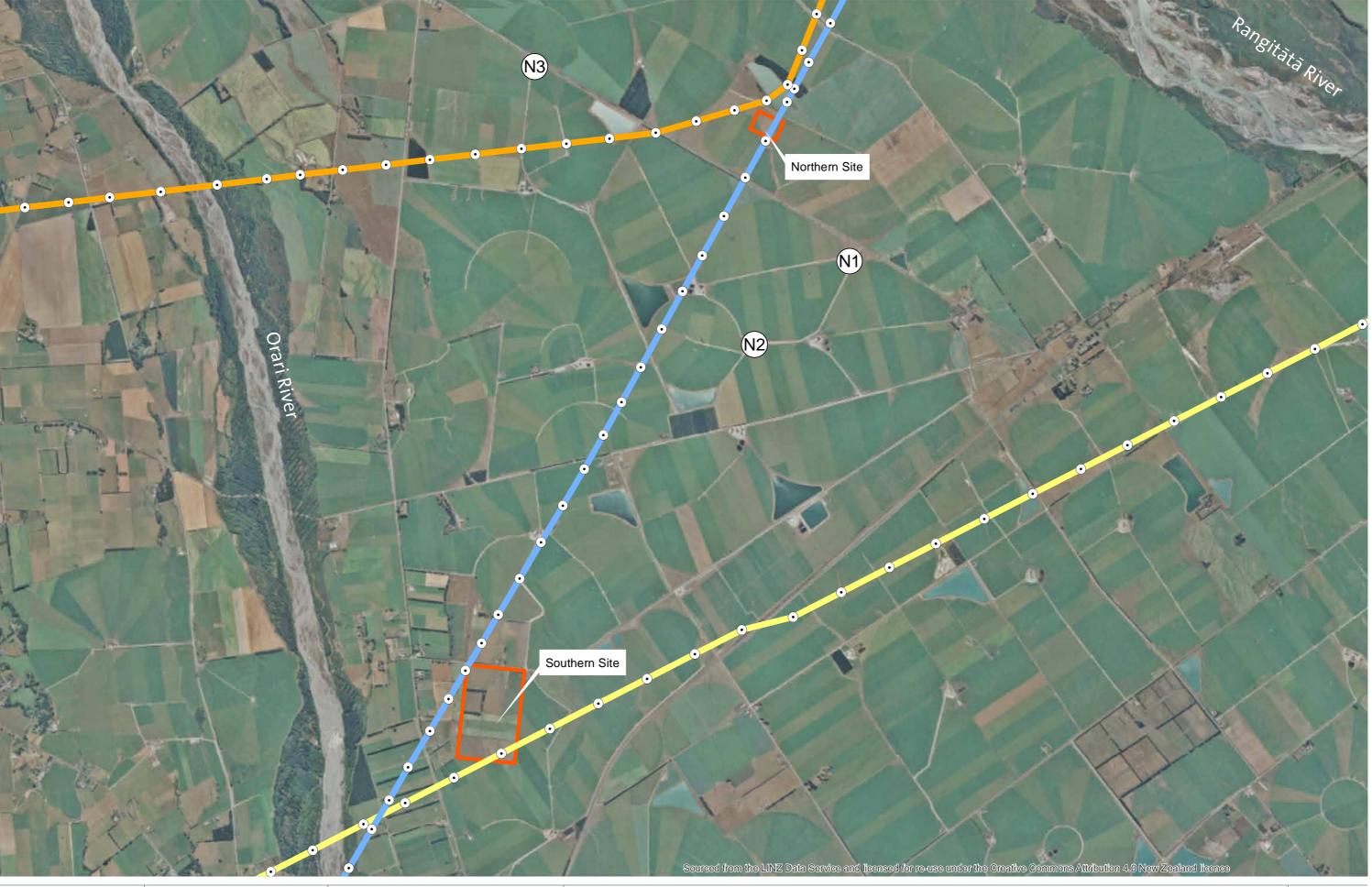
UPPER SOUTH ISLAND RELIABILITY PROJECT

Graphic Supplement to accompany Visual Assessment

March 2019

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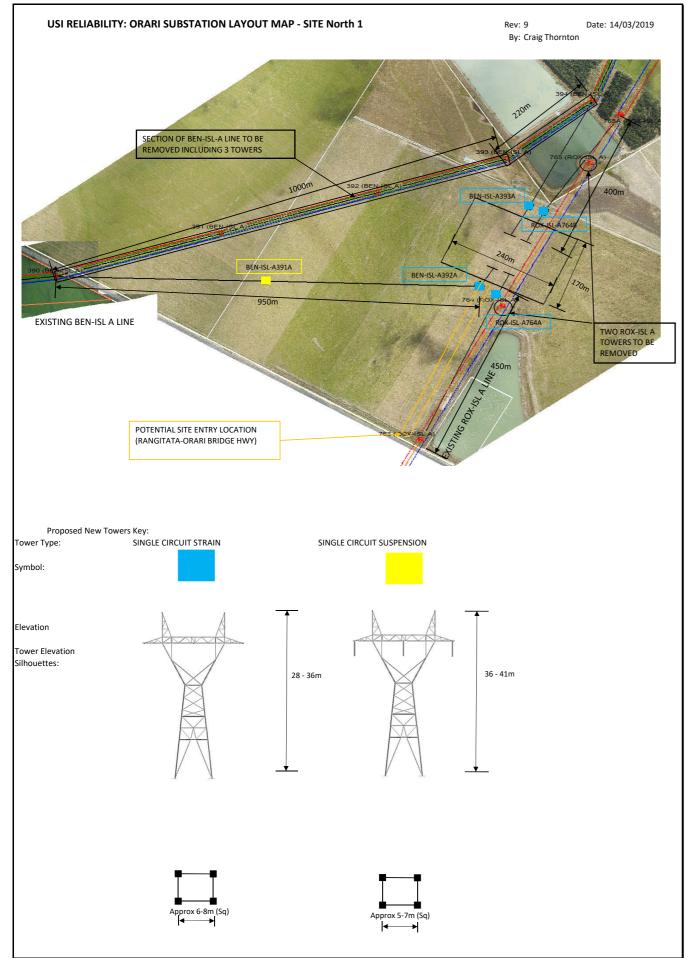


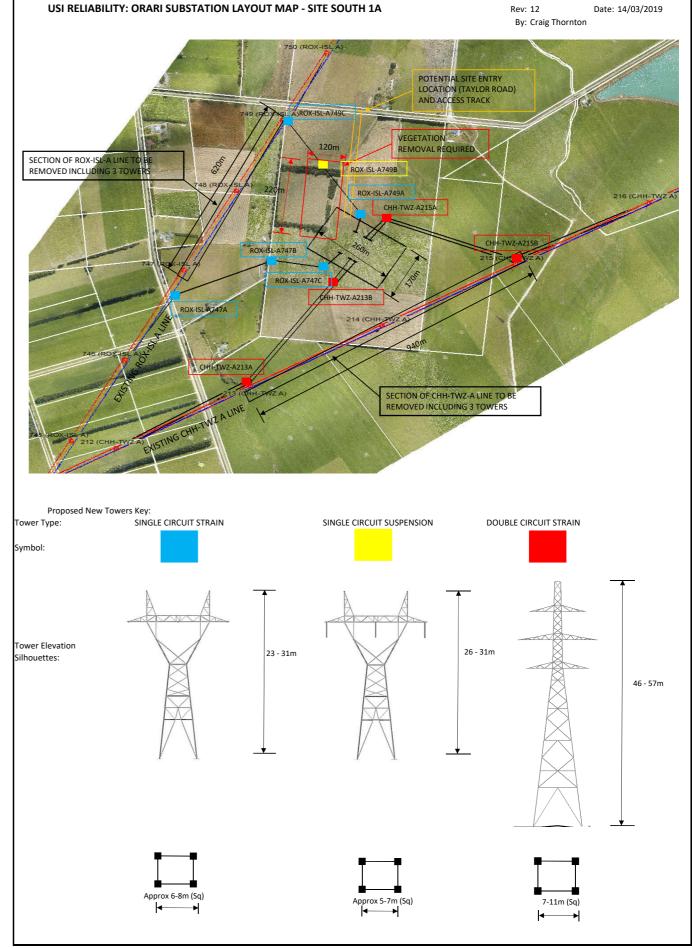


UPPER SOUTH ISLAND RELIABILITY PROJECT Figure 1: Site Location Plan

Date: March 2019 | Revision: 3

Plan prepared for Transpower by Boffa Miskell Limited Project Manager: robert.schofield@boffamiskell.co.nz | Drawn:CMu | Checked: JBe







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Figure 2: Substation Site Plans

Figure 2







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North Site

Cross-section lines (Northern XN-)

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

Date: March 2019 | Revision: 3

Plan prepared for Transpower by Boffa Miskell Limited Project Manager: robert.schofield@boffamiskell.co.nz | Drawn:CMu | Checked: JBe

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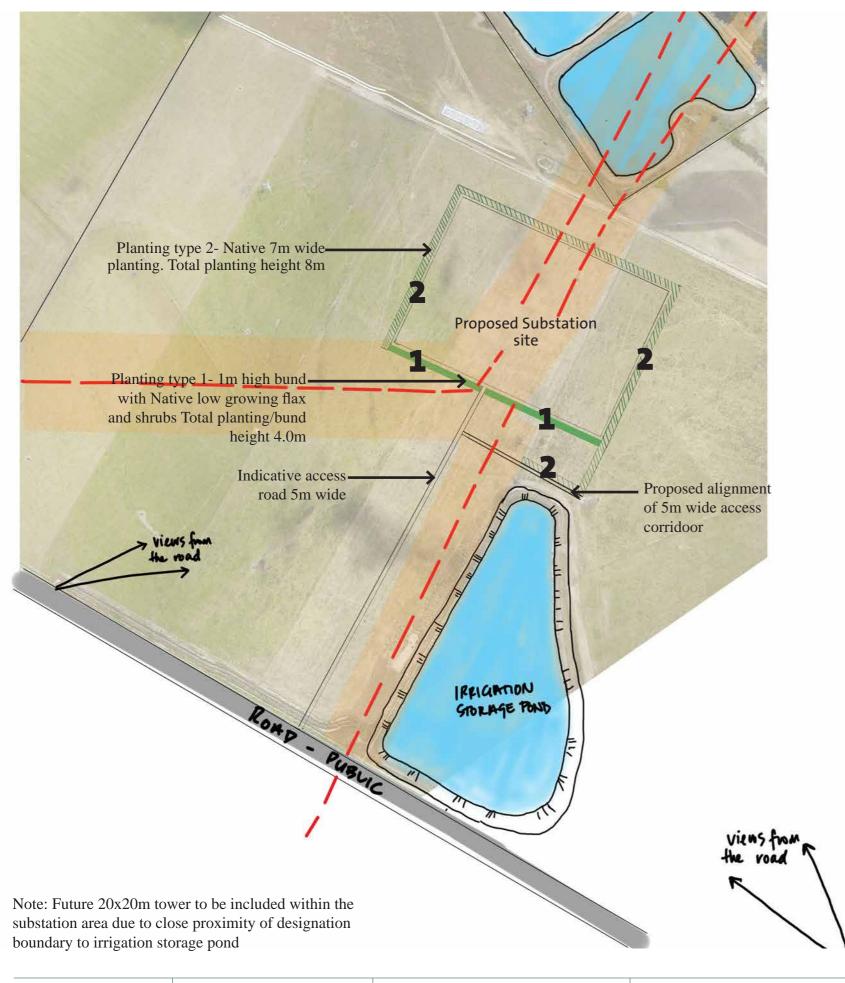


South Site

UPPER SOUTH ISLAND RELIABILITY PROJECT # photographic Viewpoint Figure 4: Southern Site: Photo location and X-section

Dwelling location Cross-section lines (Southern XS-)

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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	1 year after planting (m)	Indicative height at 10 years (m)	Indicative height at maturity (m)
Top of Bunds								
Planting type 1- 1m	Phormium tenax	harakeke	1.5L	1.2m	70%	1	3	3
high bund with	Coprosma propinqua	Mingimingi	1.5L	2.0m	10%	1	3	3
Native low growing	Corokia cotoneaster	korokio	1.5L	2.0m	10%	0.8	2.5	2.5
flax and shrubs Total	Hebe salicifolia	koromiko	1.5L	1.5m	10%	1.2	3	3
IIdx dilu Siliuus Tutdi								

Planting type Native 7m wi planting. Tot planting height

1

			Jubtotai	10070			
Mixed Informal Groups of Shrub	Species						
Aristotelia fruticosa	wineberry	1.5L	2.0m	5%	1	3	3
Austroderia richardii	South Island toetoe	1.5L	1.5m	2%	0.8	2	2
Carmichaelia australis	mākaka	1.5L	1.2m	2%	0.8	2	2
Coprosma crassifolia	thick leaved mikimiki	1.5L	1.2m	2%	0.5	4	4
Coprosma propingua	Mingimingi	1.5L	2.0m	5%	1	3	3
Coprosma robusta	karamu	1.5L	1.2m	5%	1	3	3
Coprosma virescens	mikimiki	1.5L	2.0m	5%	1	3.5	3.5
Corokia cotoneaster	korokio	1.5L	2.0m	5%	0.8	2.5	2.5
Hebe salicifolia	koromiko	1.5L	1.5m	5%	1.2	3	3
Lophomyrtus obcordata	rõhutu	1.5L	2.0m	5%	1	5	5
Muehlenbeckia astonii	shrub põhuehue	1.5L	1.2m	5%	1	3	3
Myrsine australis	mapou	1.5L	2.5m	5%	0.8	4	5
Olearia paniculata	ahkiraho	2.5L	2.0m	10%	1.2	4	4
Ozothamnus leptophylla	cottonwood	1.5L	2.0m	4%	0.8	1.5	1.5
Phormium tenax	harakeke	1.5L	2.0m	10%	1	3	3
Pittosporum tenuifolium	kohuhu	1.5L	2.0m	15%	0.8	5	5
			Subtotal	90%			
Specimen Tree weave			,	,			
Griselinia littoralis	kāpuka	2.5L	2.0m	50%	1	8	8
Melicytus ramiflorus	mahoe	2.5L	2.0m	50%	1	8	8
			Subtotal	100%			

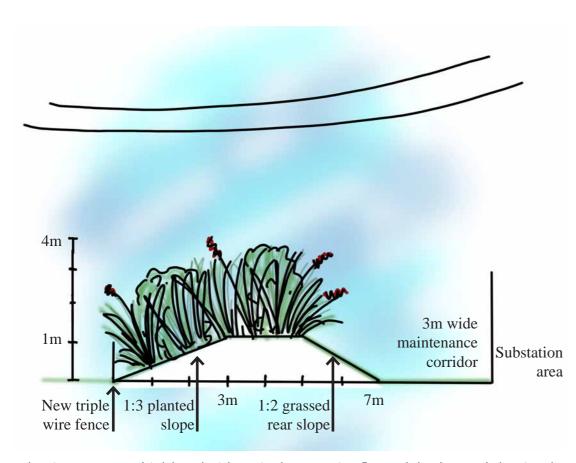
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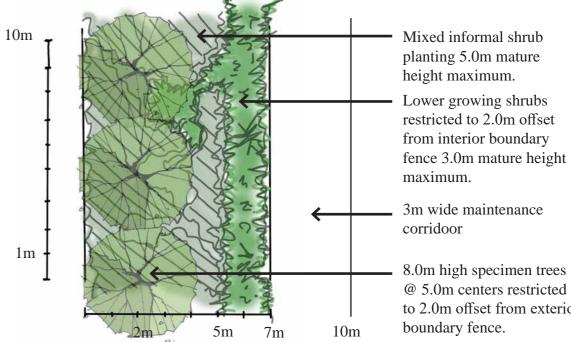
Data Sources: Data Sources: Original sketch underlay - 'Layout Map -North 1_Rev7.pdf' provided by Transpower 25/07/2018



Proposed Transpower line offset Typical 40m (as shown on 'Layout Map - North_Rev 7.pdf') Proposed line location

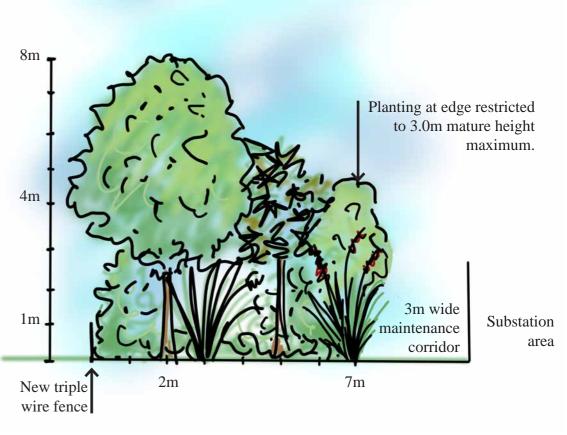


Planting type 1-1m high bund with Native low growing flax and shrubs. Total planting/bund height 4.0m (indicative heights shown at maturity)



Indicative plan layout of planting type 2

to 2.0m offset from exterior

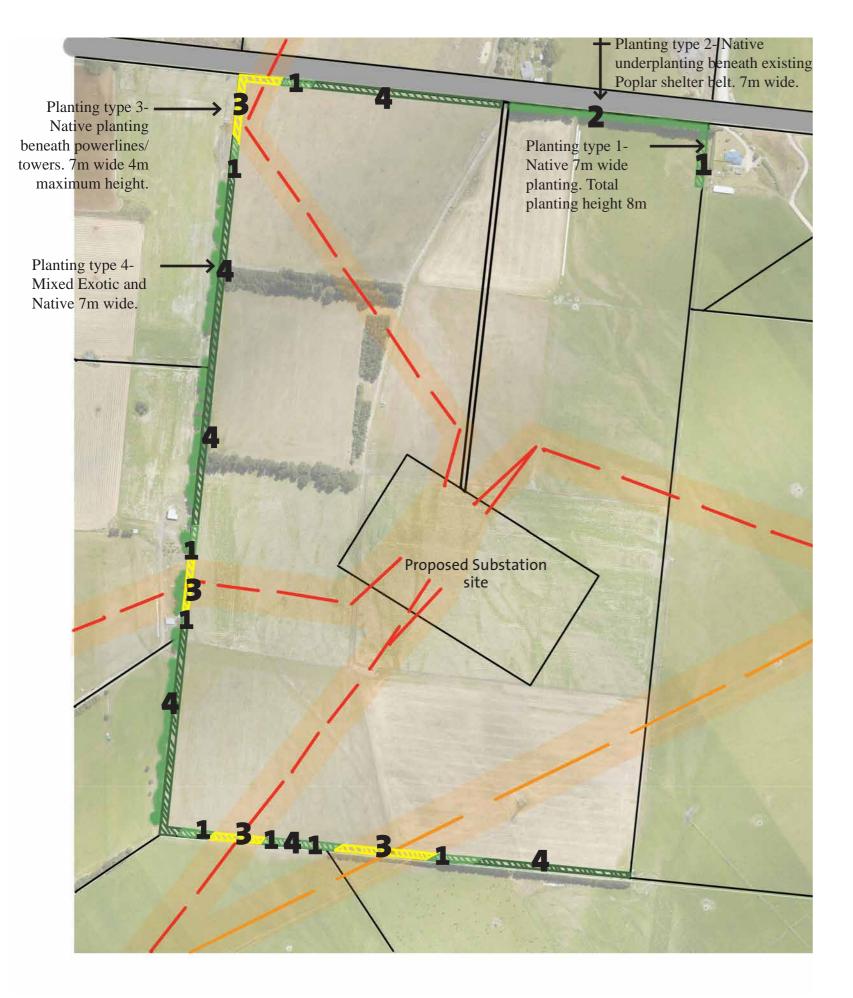


Planting type 2 Native 7m wide planting. Total planting height 8m (indicative heights shown at maturity)



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Figure 5b



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 he at maturity	
	Mixed Informal Groups of Shrub Species								
	Aristotelia fruticosa	wineberry	1.5L	2.0m	5%	1	3	3	
	Austroderia richardii	South Island toetoe	1.5L	1.5m	2%	0.8	2	2	
	Carmichaelia australis	mākaka	1.5L	1.2m	2%	0.8	2	2	
	Coprosma crassifolia	thick leaved mikimiki	1.5L	1.2m	2% 5%	0.5	3	4	
1	Coprosma propinqua Coprosma robusta	Mingimingi karamu	1.5L 1.5L	2.0m 1.2m	5%	1	3	3	
	Coprosma virescens	mikimiki	1.5L	2.0m	5%	1	3.5	3.5	
	Cordyline australis	tī kouka, cabbage tree	2.5L	1.2m	10%	0.8	6	8	
Planting type 1-	Corokia cotoneaster	korokio	1.5L	2.0m	5%	0.8	2.5	2.5	
Native 7m wide planting. Total	Hebe salicifolia Lophomyrtus obcordata	koromiko	1.5L 1.5L	1.5m	5% 5%	1.2	3 5	3	
planting height 8m	Muehlenbeckia astonii	rõhutu shrub põhuehue	1.5L	2.0m 1.2m	5%	1	3	5	
p	Myrsine australis	mapou	1.5L	2.5m	5%	0.8	4	5	
-	Olearia paniculata	ahkiraho	2.5L	2.0m	10%	1.2	4	4	
40.000	Ozothamnus leptophylla	cottonwood	1.5L	2.0m	4%	0.8	1.5	1.5	
	Phormium tenax	harakeke	1.5L	2.0m	10%	1	3	3	
	Pittosporum tenuifolium	kohuhu	1.5L	2.0m Subtotal	15% 100%	0.8	5	5	
	Specimen Tree weave			Jubitotal	100%				
	Griselinia littoralis	kāpuka	2.5L	2.0m	50%	1	8	8	
	Melicytus ramiflorus	mahoe	2.5L	2.0m	50%	1	8	8	
				Subtotal	100%	<u> </u>			
	Mixed Informal Groups of Shrub Species								
	Austroderia richardii	South Island toetoe	1.5L	1.5m	5%	0.8	2	2 4	
Planting type 2-	Coprosma crassifolia Coprosma propinqua	thick leaved mikimiki Mingimingi	1.5L 1.5L	1.2m 2.0m	5% 10%	0.5	3	3	
Native underplanting	Conservation and the contract of the contract	karamu	1.5L	1.2m	5%	1	3	3	
beneath existing	Coprosma virescens	mikimiki	1.5L	2.0m	10%	1	3.5	3.5	
Poplar shelter belt.	Corokia cotoneaster	korokio	1.5L	2.0m	5%	0.8	2.5	2.5	
7m wide.	Hebe salicifolia	koromiko	1.5L	1.5m	10%	1.2	3	3	
	Muehlenbeckia astonii Myrsine australis	shrub põhuehue	1.5L 1.5L	1.2m 2.5m	10% 10%	0.8	3 4	3 5	
	Olearia paniculata	mapou ahkiraho	2.5L	2.0m	20%	1.2	4	4	
	Phormium tenax	harakeke	1.5L	2.0m	10%	1	3	3	
				Subtotal	100%				
2	Mixed Informal Groups of Shrub Species								
9	Austroderia richardii	South Island toetoe	1.5L	1.5m	5%	0.8	2	2	
Planting type 3-	Coprosma crassifolia	thick leaved mikimiki	1.5L	1.2m	5%	0.5	4	4	
Native planting	Coprosma propinqua	Mingimingi	1.5L 1.5L	2.0m 1.2m	10% 5%	1	3	3	
beneath	Coprosma robusta Coprosma virescens	karamu mikimiki	1.5L	2.0m	10%	1	3.5	3.5	
powerlines/towers.	Corokia cotoneaster	korokio	1.5L	2.0m	5%	0.8	2.5	2.5	
7m wide 4m	Hebe salicifolia	koromiko	1.5L	1.5m	10%	1.2	3	3	
maximum height.	Muehlenbeckia astonii	shrub põhuehue	1.5L 1.5L	1.2m 2.5m	10% 10%	1 0.8	3 4	3 5	
	Myrsine australis Olearia paniculata	mapou ahkiraho	2.5L	2.0m	20%	1.2	4	4	
	Phormium tenax	harakeke	1.5L	2.0m	10%	1	3	3	
	Mixed Informal Groups of Shrub Species			Subtotal	100%				
	Aristotelia fruticosa	wineberry	1.5L	2.0m	5%	1	3	3	
	Austroderia richardii	South Island toetoe	1.5L	1.5m	2%	0.8	2	2	
	Carmichaelia australis	mākaka	1.5L	1.2m	2%	0.8	2	2	
	Cordyline australis	tī kouka, cabbage tree	2.5L	1.2m	10%	0.8	6	8	
	Coprosma crassifolia	thick leaved mikimiki	1.5L 1.5L	1.2m	2%	0.5	3	4	
	Coprosma propinqua Coprosma robusta	Mingimingi karamu	1.5L	2.0m 1.2m	5% 5%	1	3	3	
	Coprosma virescens	mikimiki	1.5L	2.0m	5%	1	3.5	3.5	
	Corokia cotoneaster	korokio	1.5L	2.0m	5%	0.8	2.5	2.5	
	Hebe salicifolia	koromiko	1.5L	1.5m	5%	1.2	3	3	
_	Lophomyrtus obcordata Muehlenbeckia astonii	rõhutu shrub põhuehue	1.5L 1.5L	2.0m 1.2m	5% 5%	1 1	5 3	5	
4	Olearia paniculata	ahkiraho	2.5L	2.0m	10%	1.2	4	4	
	Myrsine australis	mapou	1.5L	2.5m	5%	0.8	4	5	
Dianting	Ozothamnus leptophylla	cottonwood	1.5L	2.0m	4%	0.8	1.5	1.5	
Planting type 4- Mixed Exotic and	Phormium tenax	harakeke	1.5L	2.0m	10%	1	3	3	
Native 7m wide.	Pittosporum tenuifolium	kohuhu	1.5L	2.0m	15%	0.8	5	5	
	Specimen Tree weave			Subtotal	100%				
	Hoheria angustifolia	lacebark	2.5L	3.0m	12.5%	1.5	10	10	
THE STATE OF		kāpuka	1.5L	2.0m	12.5%	1	8	8	
TUIL	Griselinia littoralis	lana de	1.5L	2.5m	12.5%	0.8	12	12	
TITLE	Kunzea ericoides	kanuka	1.5L	2.0m	12.5%	1	8	8	
	Kunzea ericoides Melicytus ramiflorus	mahoe	4	2.0m	12.5%	1.2	12	12	
	Kunzea ericoides Melicytus ramiflorus Pittosporum eugenioides	mahoe tarata	1.5L	2 0	12 50/				
	Kunzea ericoides Melicytus ramiflorus Pittosporum eugenioides Plagianthus regius	mahoe tarata ribbonwood	2.5L	2.0m	12.5% 12.5%	1.5	12 8	12	
	Kunzea ericoides Melicytus ramiflorus Pittosporum eugenioides Plagianthus regius Pseudopanax crassifolius	mahoe tarata		2.0m 2.0m 3.0m	12.5% 12.5% 12.5%	1.5 1 1.5	12 8 12	12 12 12	
	Kunzea ericoides Melicytus ramiflorus Pittosporum eugenioides Plagianthus regius Pseudopanax crassifolius Sophora microphylla	mahoe tarata ribbonwood lancewood South Island kõwhai	2.5L 2.5L	2.0m	12.5%	1	8	12	
	Kunzea ericoides Melicytus ramiflorus Pittosporum eugenioides Plagianthus regius Pseudopanax crassifolius	mahoe tarata ribbonwood lancewood South Island kõwhai	2.5L 2.5L	2.0m 3.0m	12.5% 12.5%	1	8	12	
	Kunzea ericoides Melicytus ramiflorus Pittosporum eugenioides Plagianthus regius Pseudopanax crassifolius Sophora microphylla	mahoe tarata ribbonwood lancewood South Island kõwhai	2.5L 2.5L	2.0m 3.0m	12.5% 12.5%	1	8	12	
	Kunzea ericoides Melicytus ramiflorus Pittosporum eugenioides Plagianthus regius Pseudopanax crassifolius Sophora microphylla Shelterbelt (Planted in a weave of single	mahoe tarata ribbonwood lancewood South Island kõwhai	2.5L 2.5L 2.5L	2.0m 3.0m Subtotal	12.5% 12.5% 100%	1 1.5	8 12	12 12	



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Data Sources: Data Sources: Original sketch underlay - 'Layout Map -North 1_Rev7.pdf' provided by Transpower 25/07/2018



ProposedTranspower line offset as shown on 'USI Reliability - NOR Structure Info_Rev7 property edit w restricted planting lengths added V1.2'

Proposed line location

Existing line location implicating planting establishment

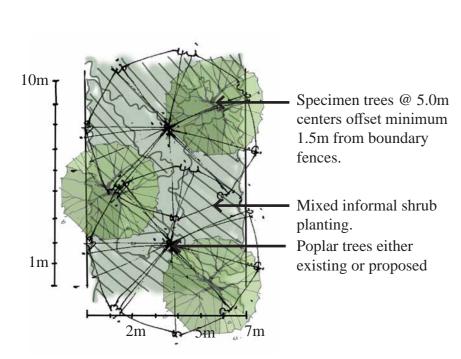
Existing shelter belt on neighboring property



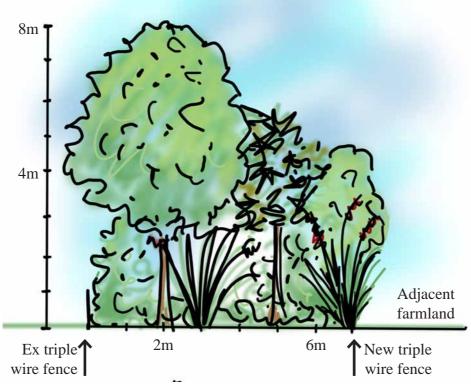
Figure 5c: Southern Site: Mitigation Concept

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

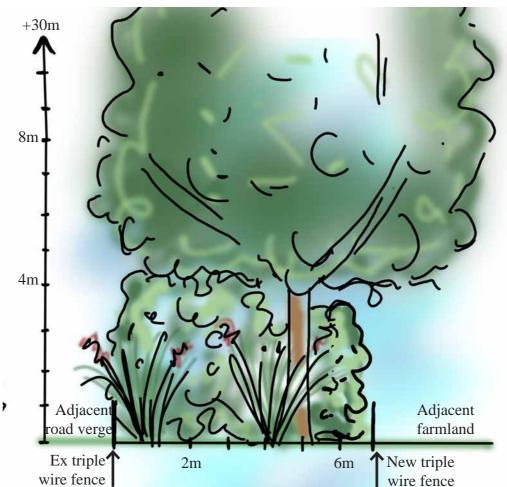
Indicative plan layout of planting type 1



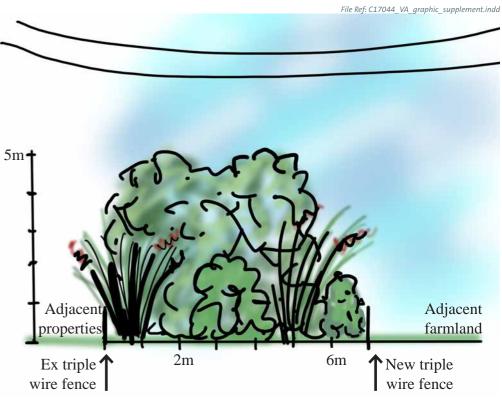
Indicative plan layout of planting types 2 and 4



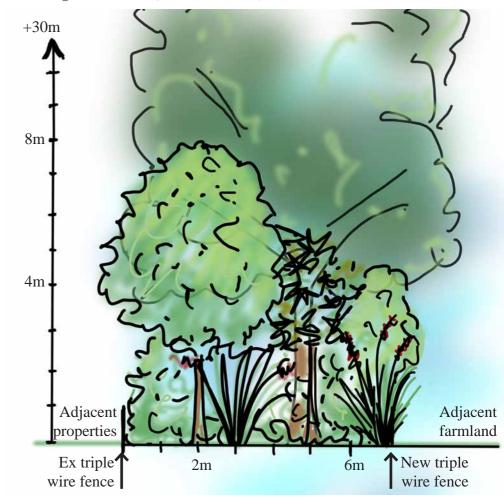
Planting type 1- Native 7m wide planting. Total planting height 8m (indicative heights shown at maturity)



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



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



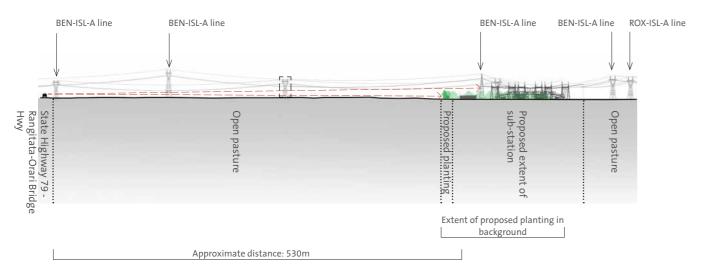
Planting type 4- Mixed Exotic and Native 7m wide. (indicative heights shown at maturity)

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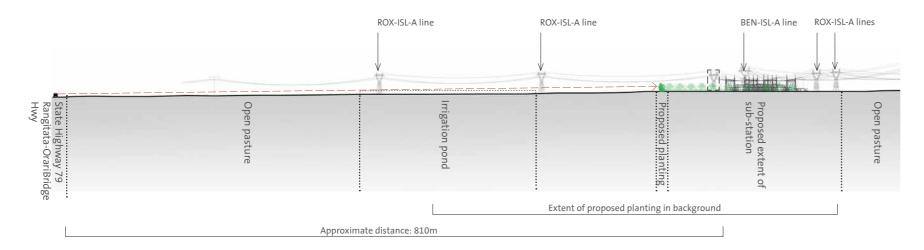
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Figure 5d: Southern Site: Planting Cross-sections

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



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)

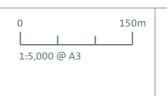


Proposed extent of substation

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

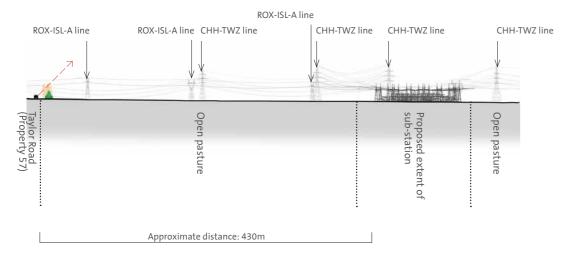


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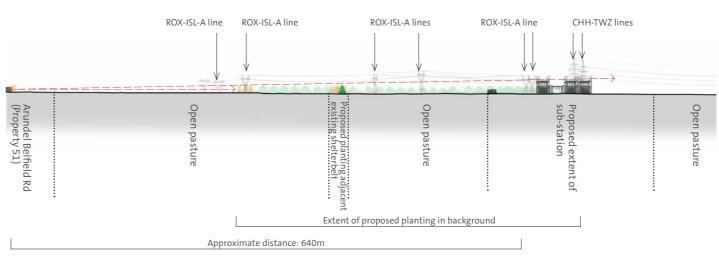


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Figure 6a: Landscape Cross-sections: Northern Site



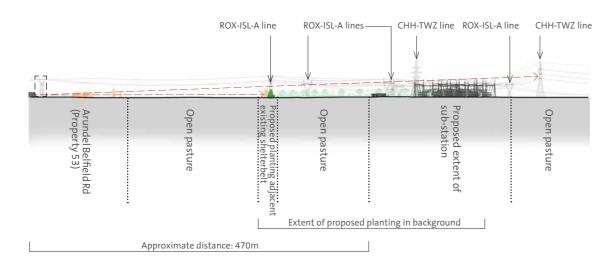
Cross Section S1-1



CHH-TWZ line ROX-ISL-A line

Cross Section S2-2

ROX-ISL-A line



Open pasture

Proposed extent of sub-station

Open pasture

Open pasture

Open pasture

Extent of proposed planting in background

Approximate distance: 450m

Approximate distance: 450m

Cross Section S3-3

Cross Section S4-4



ROX-ISL-A line



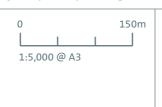
Note: For location of Cross-sections, refer to Figure 4. For Illustrative purposes Only. Proposed planting shown at 10 years of maturity

Approximate distance: 1km

CHH-TWZ line



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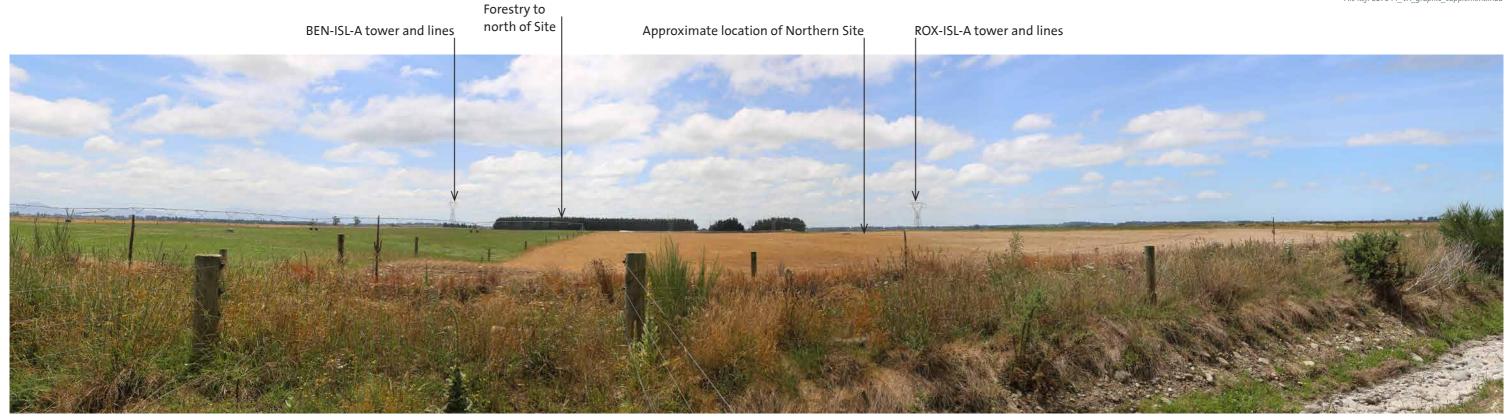
CHH-TWZ line

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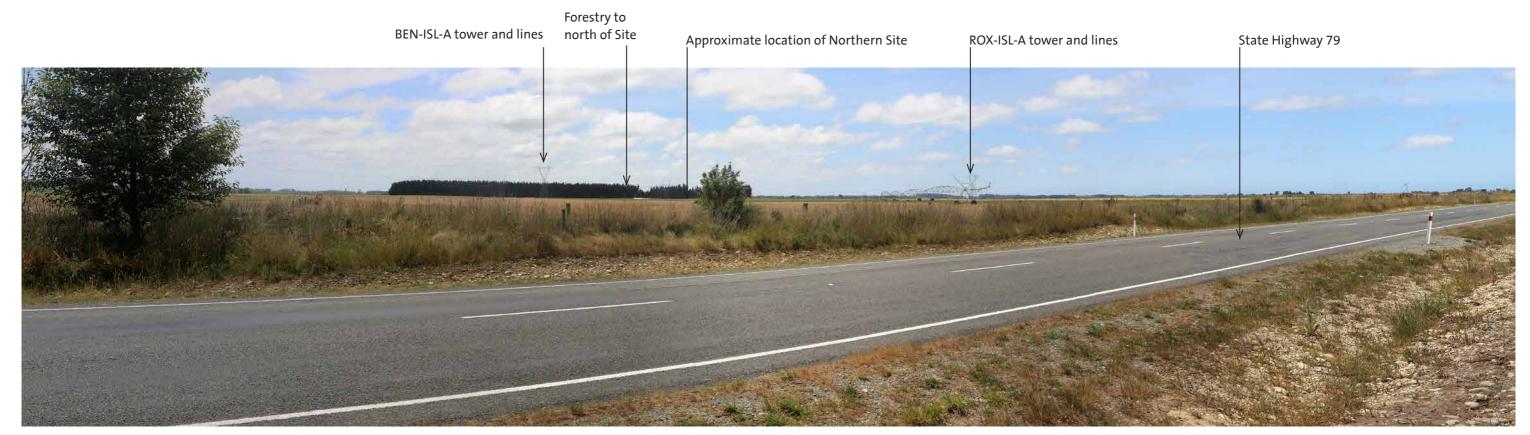
Figure 6b: Landscape Cross-sections: Southern Site

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

LEGEND



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.



 ${\tt Data\ Sources:\ Photographs\ taken\ by\ Boffa\ Miskell\ Ltd,\ January\ 2018.}$

Photograph representation: Panoramic photographs are comprised of multiple individual photographs stitched together and may contain some distortion. These are for illustrative purposes only.

UPPER SOUTH ISLAND RELIABILITY PROJECT Site Photographs A-B



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.



 ${\it Data Sources: Photographs\ taken\ by\ Boffa\ Miskell\ Ltd, January\ 2018.}$

Photograph representation: Panoramic photographs are comprised of multiple individual photographs stitched together and may contain some distortion. These are for illustrative purposes only.

UPPER SOUTH ISLAND RELIABILITY PROJECT Site Photographs C-D



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



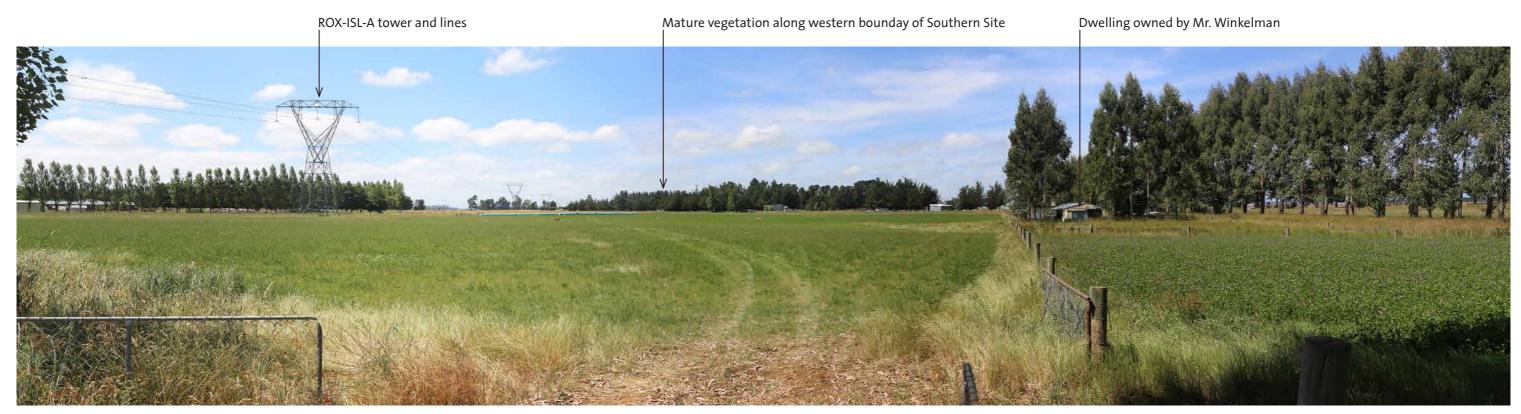
Site Photograph F: Photograph looking southeastwards adjacent to the northeastern boundary of the Southern Site, off Taylor Road.



Data Sources: Photographs taken by Boffa Miskell Ltd, January 2018.

Photograph representation: Panoramic photographs are comprised of multiple individual photographs stitched together and may contain some distortion. These are for illustrative purposes only.

UPPER SOUTH ISLAND RELIABILITY PROJECT Site Photographs E-F



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.



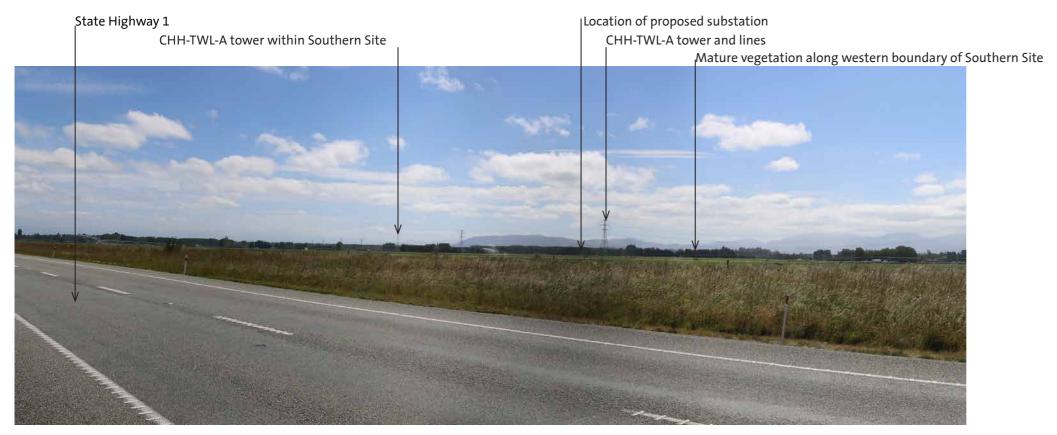
 ${\tt Data\ Sources:\ Photographs\ taken\ by\ Boffa\ Miskell\ Ltd,\ January\ 2018.}$

Photograph representation: Panoramic photographs are comprised of multiple individual photographs stitched together and may contain some distortion. These are for illustrative purposes only.

UPPER SOUTH ISLAND RELIABILITY PROJECT Site Photographs G-H



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.



 ${\tt Data\ Sources:\ Photographs\ taken\ by\ Boffa\ Miskell\ Ltd,\ January\ 2018.}$

Photograph representation: Panoramic photographs are comprised of multiple individual photographs stitched together and may contain some distortion. These are for illustrative purposes only.