FURTHER INFORMATION RECEIVED ON THE 21ST OF OCTOBER 2024

Kim McCracken & Associates

Resource Management Planning Consultants

P O Box 2551
Christchurch

F: (03) 977 7714
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✉ office@rgmc.co.nz

21 October 2024

The Senior Planner
Waimakariri District Council
Private Bag
Rangiora

Attention: Nirosha Seeratane

Dear Nirosha,

RE: RC235259 – Upper Sefton Road

We refer to your email of the 16 September and in particular the outstanding RFI matters. We will try and respond in a manner that corresponds with the before mentioned email.

A. OUTSTANDING MATTERS – COUNCIL EMAIL 27 AUGUST 2024

Request	
3	**TRANSPOWER** – Advised
5.1	**STORMWATER** In response to the drip line/erosion concerns. A response from Davis Ogilvy is as follows (refer attachment 3) **ECAN CONSENT** Will be forwarded separately. Largely following on from the above the advice from PLANZ (doing the Ecan consent is as follows. Section 30 RMA – Functions of regional councils: • (1)(c) – control of the use of land for soil conservation and maintenance and enhancement of water quality

	• (1)(e) – control of diversions of water • (1)(f) – control of discharges of contaminants Section 31 RMA – Functions of district councils: • None of those things, specifically. • Though 31(1)(b) does refer to "the control of any actual or potential effects of the use, development, or protection of land." • Given regional councils have a specific function of managing stormwater and district councils do not, I think this needs to be left to ECan to manage. That's why discharge permits are needed, and there's no sense in doubling up. • (One possible exception is where district councils have a relevant function as a utility provider – but that is not relevant in this case) This plays out elsewhere in the Act E.g in that regional councils administer discharge permits and district councils do not. Sections 14 (water) and 15 (discharges) refer to regional plans for diversions and discharges, and not to district plans. Etc. As such it is agreed that the Ecan consent should address the stormwater matter.
6 6.1 6.2	**TRANSPORT** Identify all access points – one on Beattes Road – sheet 13/14 (RMM) With of crossing on Beatties Road 3.5m and 6m – sheet 19 (RMM) Grazing will continue long term in conjunction with Solar **VEHICLE CROSSING/CULVERT** The existing crossing is rocks in water. New crossing proposed – (Refer attach 3 including proposed condition). **UNDULATING LAND** 1. Landscape mitigation plan updated to include all of Jades comments 1-4 (Refer attachments 1 and 2 (sheet 13/19) 2. The landscape design associated with enhancing the water course within the contaminated land to be provided to Council within 6 months of consent (Refer attach 1) **<u>ADDITIONAL MATTERS</u>** **(3) PYLON** Now located on sheet 13/14 (Refer Attach 1) **(4) PLANTING – TRANS POWER** The landscape plan (sheet 13/14 - Attach 1) has been updated to ensure proposed vegetation within 12m of the transmission line centreline does not grow over 2m tall (needs condition). The plants and their location are in accordance with the Transpower requirements (Refer attach 13/14 updated to meet Transpower

	Standards - attached). **(5) ELECTROMAGNETIC** No adverse effects (Refer attach 4), report from Pattle Delamore Partners

B. INFORMATION SOUGHT – COUNCIL EMAIL 6 SEPTEMBER 2024

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1. **CONTAMINATED LAND**
   Contaminated land (PI Engeo) – Confirm Ecan advice that disturbance not in the contaminated areas, NES should not apply. Refer also RMM response to RFI – the landscaping and enhancing the water course within the contaminated land will be provided to Council 6 months following the grant of any consent (Refer Landscape Mitigation Planting Notes – refer sheet 15 RMM). The planting in these areas will consist of planting root trainer grade plants directly into the existing soil. Very little if any disturbance will result (can be conditioned). Depth of planting 75mm.

2. **NOISE** (refer updated memo Marshall Day)
   Refer Attachment 5. No adverse effects suggested and confirmed conditions – especially monitoring condition.

C. INFORMATION REQUESTED – COUNCIL EMAIL 16 SEPTEMBER 2024

---

1. **Volunteered Condition 12**
   Refer updated Landscape Plan (Attachment 2 - sheet 13) and notes covered off and meet all of Jades requirements.

2. **Landscape Mitigation Plan** (p. sheet 13 RMM Report)
   Updated – refer Attachments 1 and 2

ATTACHMENTS

ATTACHMENT 1	RMM written Response to RFI (24 September 2024)
ATTACHMENT 2	RMM revised report and plans – 24 September 2024
ATTACHMENT 3	Stormwater and Culvert crossing – Davis Ogilvy
ATTACHMENT 4	Memo PDP – Electromagnetic Effects
ATTACHMENT 5	Noise – Marshall Day
ATTACHMENT 6	Ecan application (being forwarded under separate cover)

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Mia

From: Paul Smith <paul@rmmla.co.nz>
Sent: Tuesday, 24 September 2024 12:57 p.m.
To: office@rgmc.co.nz
Subject: Ashley Solar Farm - Updates
Attachments: Transpower Review of Customer Solar Generation Project Resource Consents (1).docx

Follow Up Flag: Follow up
Flag Status: Completed

Morning Kim,

Please see below a link to the updated Graphic Attachment with all the updated plans.
https://www.dropbox.com/scl/fi/1ks30tzasbk2mt3f0mnpm/20240924_LAReportGA_ProposedSolarFarm_Ashley.pdf?rlkey=xluv9k9zlvl7tp6nbuidspu3h&dl=0

Below is a list of changes that have occurred to cover off Councils RFI points and General Comments.

RFI Email – 16 September 2024
The landscape mitigation plan has been updated to capture all of Mr Jade McFarlane's comment, a labelled 1 – 4 and annotated on the attached PDF.

RFI Email – 6 September 2024
The landscaping design associated with enhancing the water course within the identified contaminated land will be provided to Council 6 months following the granting of the resource consent. Refer to the Landscape Mitigation Planting Notes. The rehabilitation planting that will occur within these areas is likely to consist of planting root trainer grade plants directly into the existing soil. Therefore, whilst not yet designed, very little (if any) soil disturbance will occur.

RFI Email – 27 August 2024
Page 7 – Undulating Land. Two cross sections have been included in the Graphic Attachment to assist in illustrating the way in which the proposed boundary vegetation will visually screen the solar panels from the adjacent stretches of road.
Page 7 – Landscape Assessment. As per RFI response 16 September. Further updates have been made to cover off Mr Jade McFarlane's comments.

Page 9 – Additional Comment 1. The dark red line is the site boundary. This was a small graphic issue as the proposed planting covered half of the red line. This has been updated.
Page 9 – Additional Comment 2. Small graphic error as some of the labels were moved. This has been updated.
Page 10 - Additional Comment 3. The pylons and power lines have been illustrated on the plan.
Page 10 - Additional Comment 4. The landscape plan has been updated to ensure that proposed vegetation within 12m of the transmission lines centreline do not grow over 2m tall. The condition needs to be updated to reflect this. The plant and their locations are in accordance with the attached document that Transpower has prepared.

In addition to the above

Please update Conditions as follows / please make sure the wording aligns with the current condition:

GENERAL
Update the sheet numbers because the graphic attachment has been updated.

LANDSCAPING AND FENCING
The consent holder shall ensure that all landscape plantings and fencing are established for the solar farm (as set out on the Proposed Landscape Mitigation Plan – RMM (Sheets 13 - 19 Annexure D) are maintained with a minimum height of 6.0m from ground level along the sites northern boundary, and 4.0m from ground level along all other boundaries, once they have reached that height.

A landscape management plan shall be prepared outlining the plants long-term survival during the life-span of the solar farm and provided to Council for certification 20 working days prior to the planting being implemented on site to.

A Native Riparian Vegetation Planting Plan will be provided to Council within 6 months of obtaining Resource Consent. This planting plan will outline the native riparian vegetation that will be located up to 7m from the edge of the ephemeral watercourses as illustrated on the Landscape Mitigation Plan. This plan will include, but is not limited to illustrating the plant species, their size at planting, spacings and a maintenance schedule.

TRANSPOWER
40 – The power lines within the site are 66KV. So, this condition isn't relevant. Should it include 12m from a 66kv line?

VEGETATION
43 – Same as note for 40.

Ngā mihi / Regards

Paul Smith
(he/him)
Senior Landscape Architect | NZILA Registered

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RMM

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RMM

ROUGH MILNE MITCHELL
LANDSCAPE ARCHITECTS

Proposed Solar Farm - 87 Upper Sefton Road, Ashley, Canterbury
Graphic Attachment to Landscape Assessment Report

24 September 2024

Document Information

Project
Proposed Solar Farm

Address
87 Upper Sefton Road, Ashley

Client
Solar Bay Ltd

Document
Graphic Attachment to Landscape Assessment Report

Status
For Resource Consent

Revision		
1	For Resource Consent	11.10.2023
2	RFI Response	14.05.2024
3	RFI Response	08.08.2024
4	RFI Response	24.09.2024

Prepared By
Rough Milne Mitchell Landscape Architects Ltd
Project Number: 21322
Author: Zoe Cox and Paul Smith
Peer Reviewed: Nikki Smetham

Disclaimer
These plans and drawings have been produced as a result of information provided by the client and/or sourced by or provided to Rough Milne Mitchell Landscape Architects Limited (RMM) by a third party for the purposes of providing the services. No responsibility is taken by RMM for any liability or action arising from any incomplete or inaccurate information provided to RMM (whether from the client or a third party). These plans and drawings are provided to the client for the benefit and use by the client and for the purpose for which it is intended.

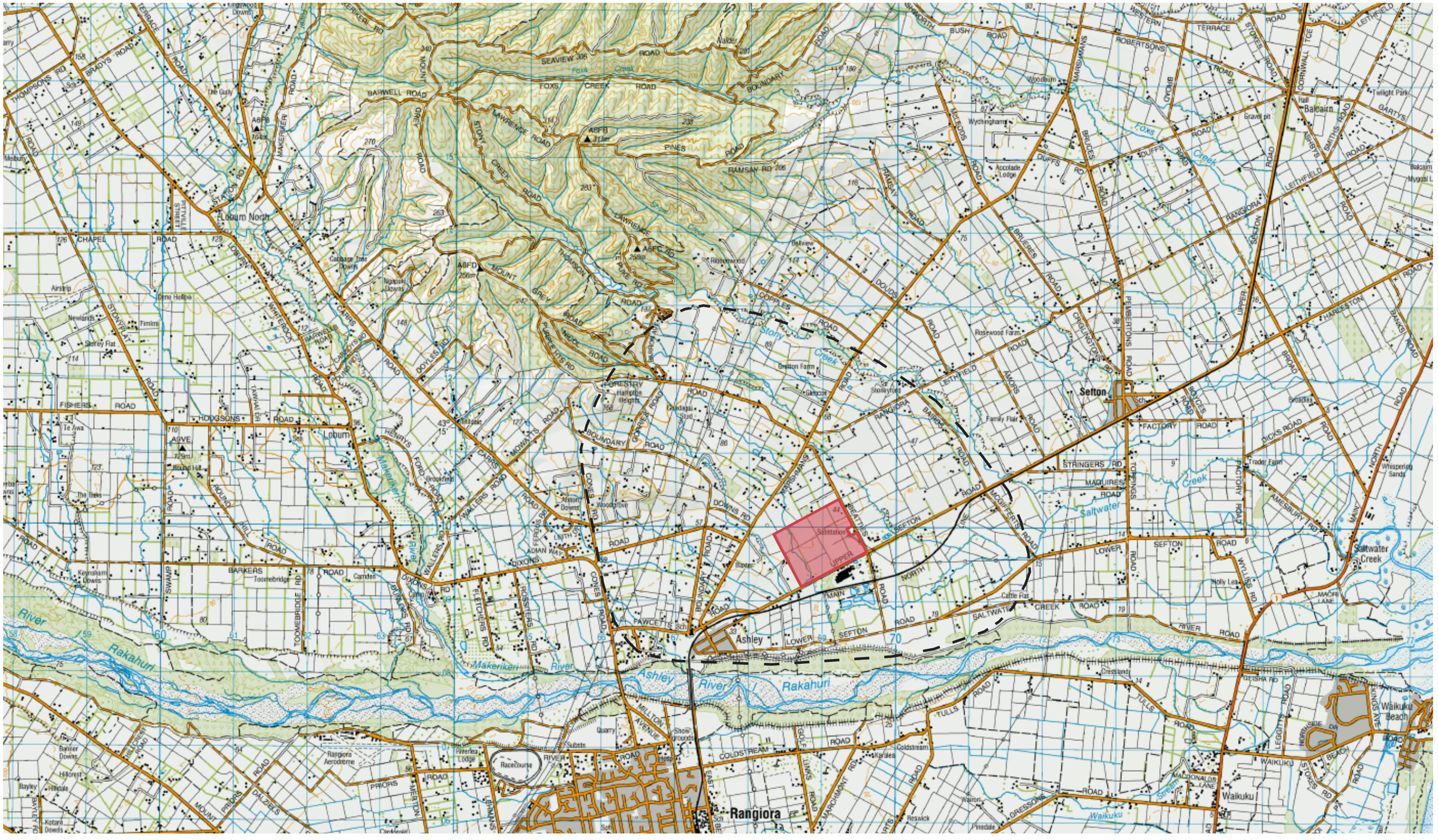
Contents

Receiving Environment Plan

Legend

	The Site
	The Receiving Environment

Not to Scale
Data Source: topomap.co.nz



Local Context Plan

Legend

The Site

Not to Scale
Data Source: grip.co.nz

Site Context Plan

Legend

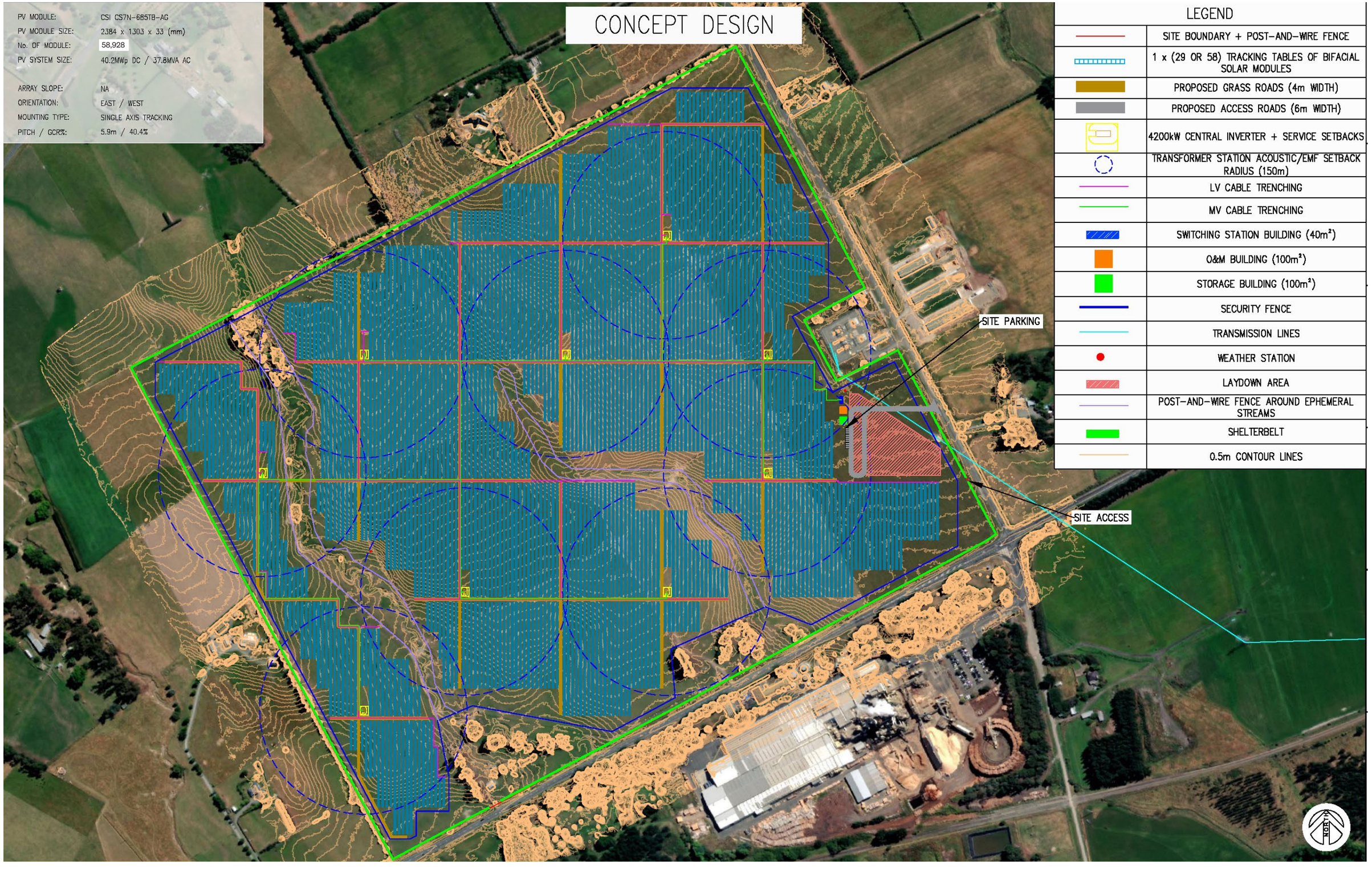
The Site

Scale 1:6,000
Data Source: grip.co.nz

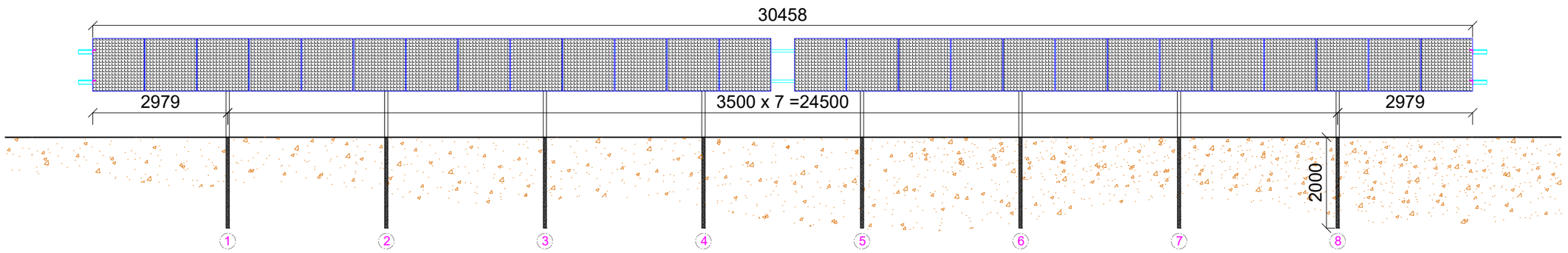
One Panel Tilting Solar Table - General Arrangement Plan

Not to Scale - To Fit Page

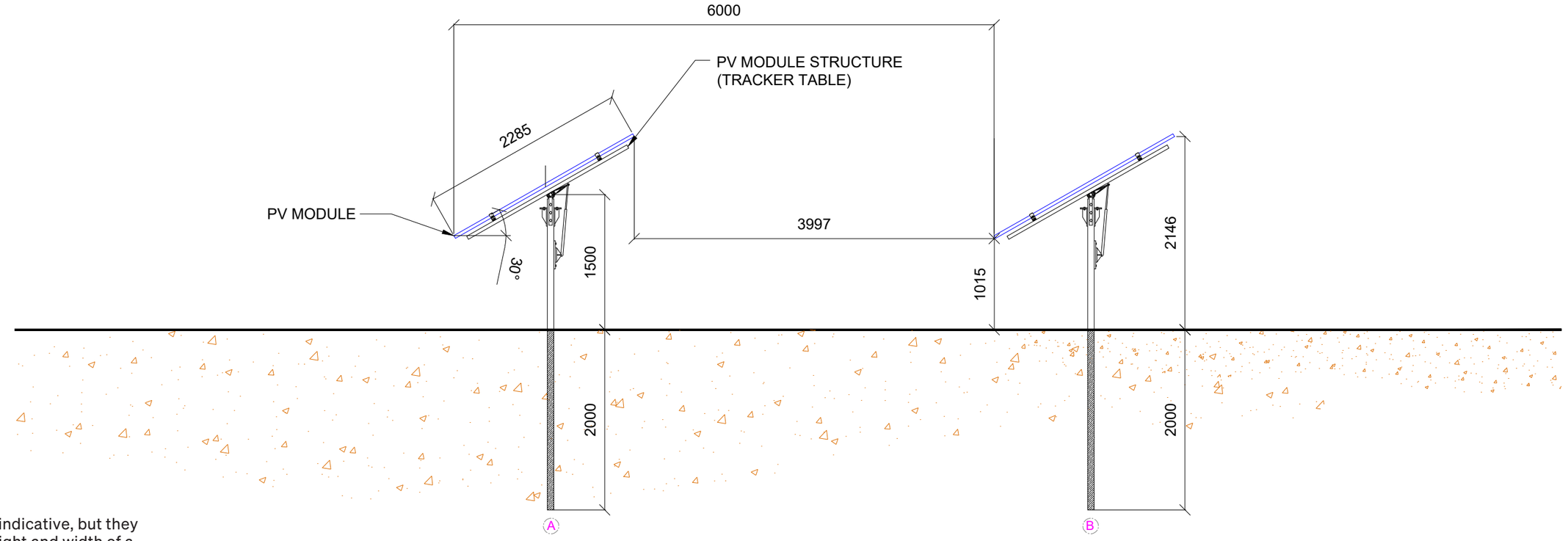
Data Source: Vector Powersmart



One Panel Tilting Solar Table - Indicative Cross Sections



Typical Cross Section Detail For Tracker Table (Front View)



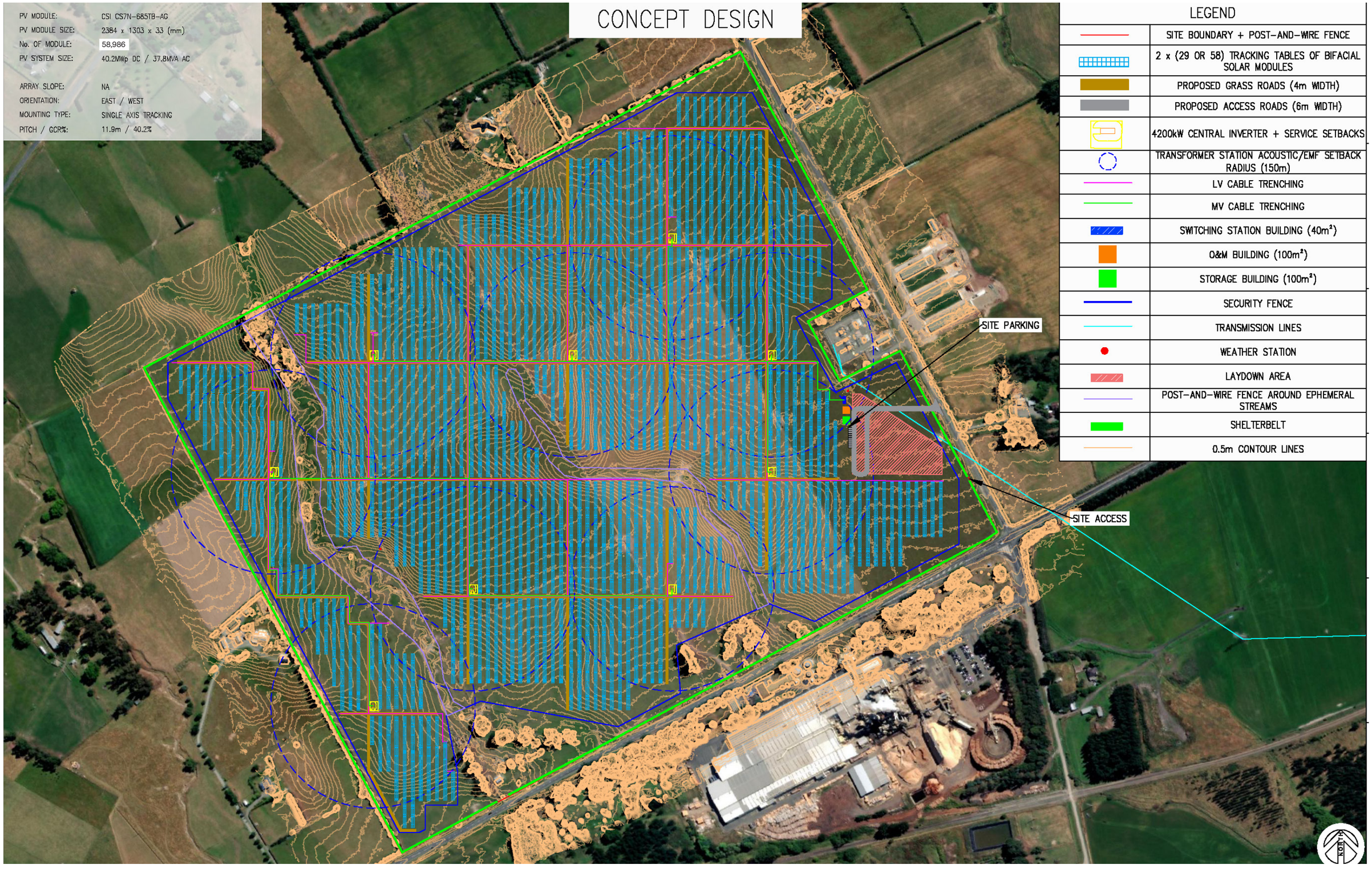
Typical Cross Section Detail for Tracker Table (Side View)

Note:
These cross sections are indicative, but they generally illustrate the height and width of a one panel single axis tracking solar table.

Not to Scale

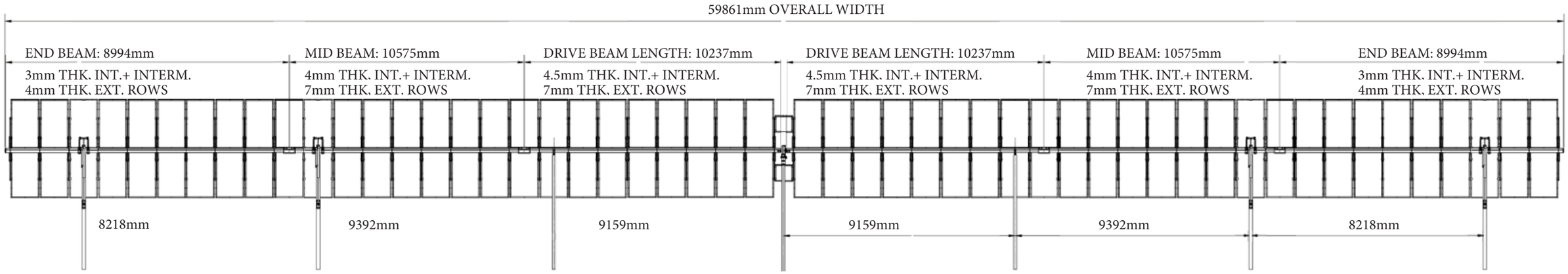
Data Source: Aquila Capital Renewables Asia Pte. Ltd.

Two Panel Tilting Solar Table - General Arrangement Plan

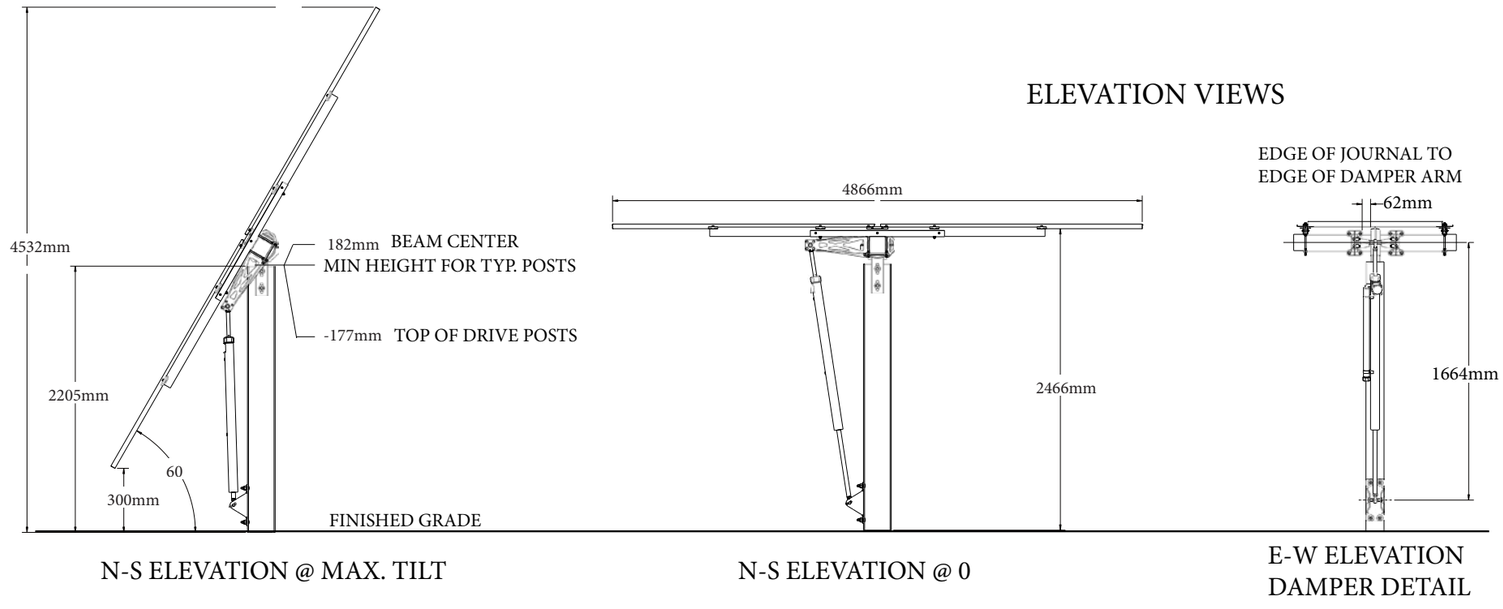


Two Panel Tilting Solar Table - Indicative Cross Sections

MECHANICAL LAYOUT



ELEVATION VIEWS



N-S ELEVATION @ MAX. TILT

N-S ELEVATION @ 0

E-W ELEVATION
DAMPER DETAIL

Example of a similar Solar Farm in Marlborough

Note:
These cross sections are indicative, but they generally illustrate the height and width of a two panel single axis tracking solar table.

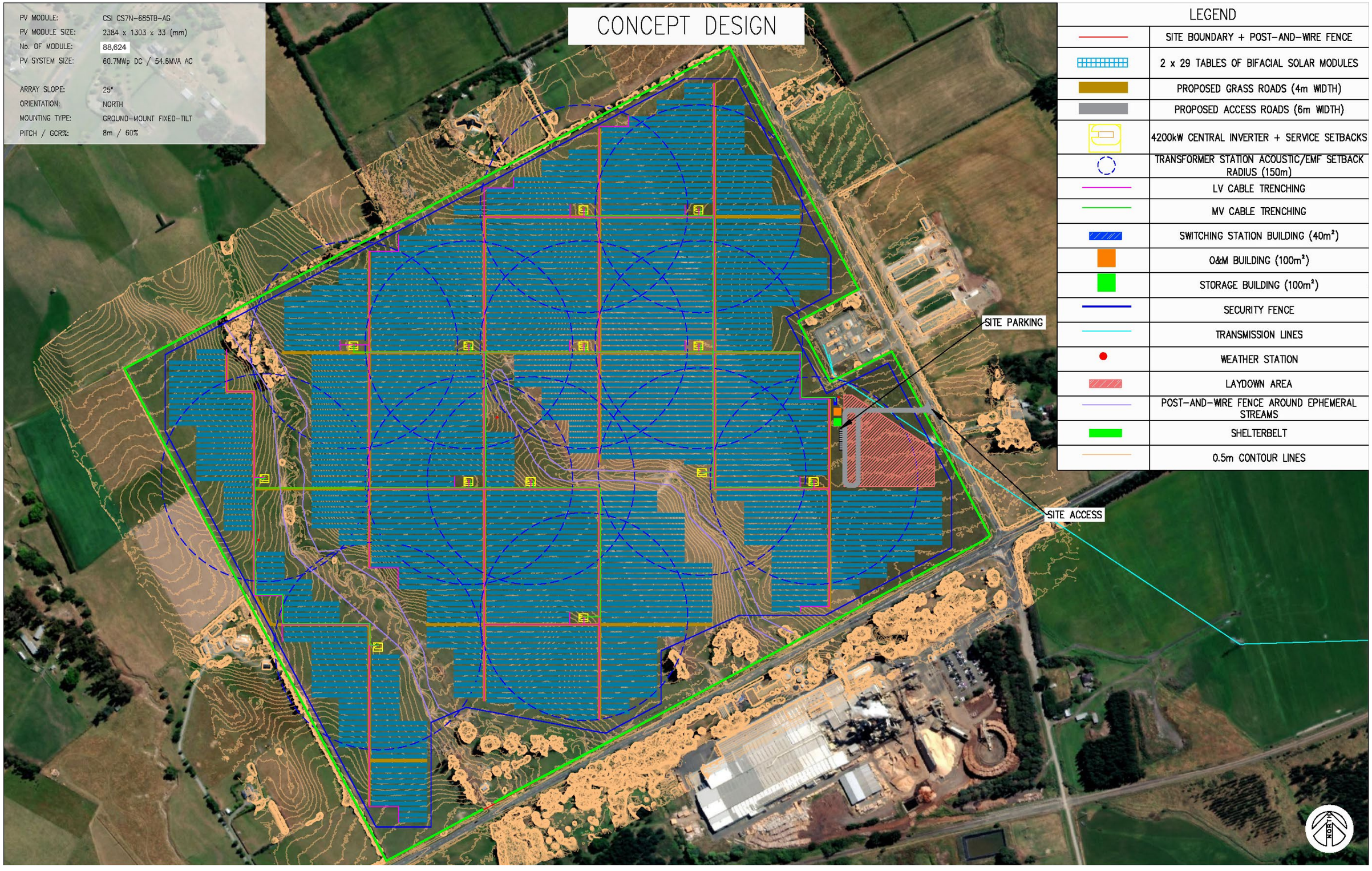
Not to Scale - To Fit Page

Data Source: Vector Powersmart Indicative Proposal

Fixed Solar Table - General Arrangement Plan

Not to Scale - To Fit Page

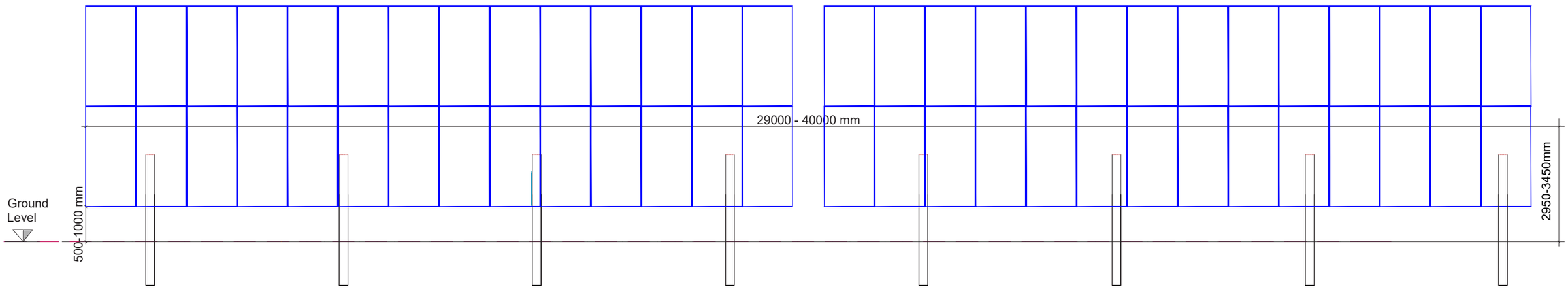
Data Source: Vector Powersmart



Fixed Solar Table - Indicative Cross Sections

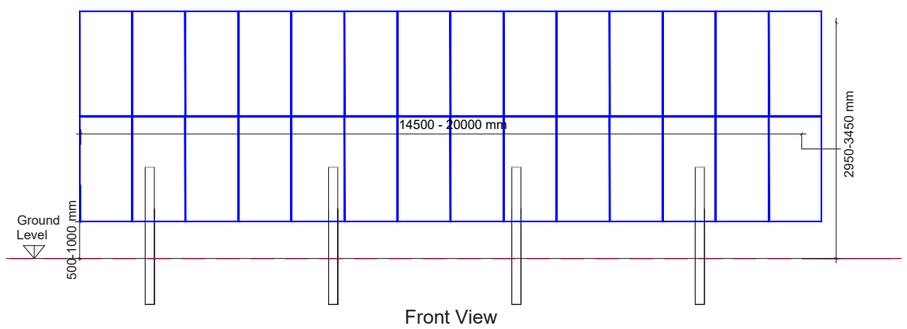
Technical Details - Mounting Structure

Example: 2P x 26 (full table) Mounting Structure



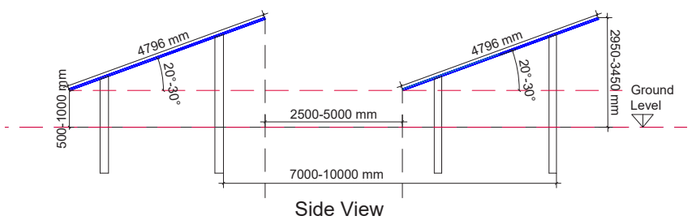
Front View

Example: 2P x 13 (half table) Mounting Structure



Front View

Example: 2P x 26 & 2P x 13 Mounting Structure



Side View

Example of a similar Solar Farm

Not to Scale - To Fit Page

Data Source: Solar Bay

Note:
These cross sections are indicative, but they generally illustrate the height and width of a fixed tilt solar table.

Solar Panel and Inverter Information

A Example of Solar Panels
B Mechanical Characteristics of Solar Panels
C Example of Inverter

Tiger Pro 7RL4-TV

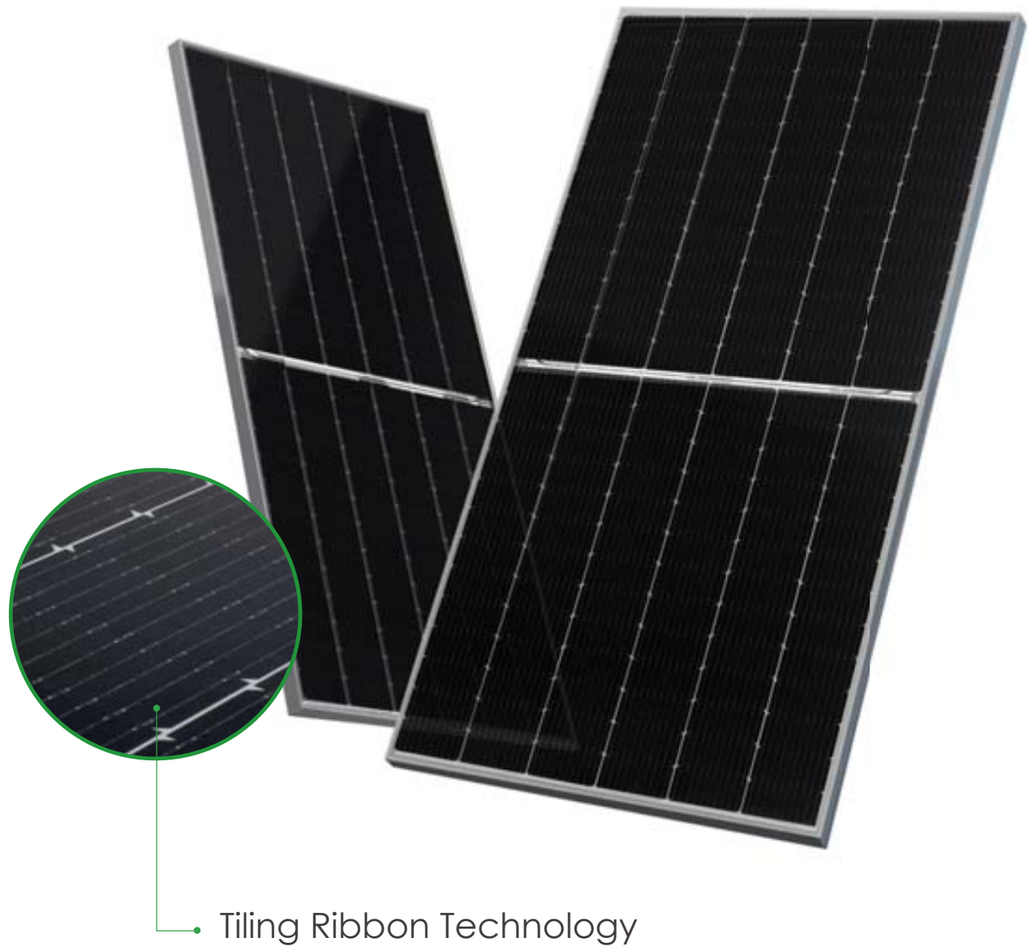
565-585 Watt

BIFACIAL MODULE
TILING RIBBON (TR)

P-Type

Solar JinKO

*Building **Your Trust** in Solar*



A.

Mechanical Characteristics

Cell Type	P type Mono-crystalline
No. of cells	156 (2×78)
Dimensions	2411×1134×35mm (94.92×44.65×1.38 inch)
Weight	30.6 kg (67.46 lbs)
Front Glass	3.2mm,Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68 Rated
Output Cables	TUV 1×4.0mm² (+): 400mm , (-): 200mm or Customized Length
Conector Fire Rating	JK03M/2B, genuine MC4 evo 2 Class C

B.

Dimensions 2.815m (W) x 2.318m (H) x 1.588m (D)

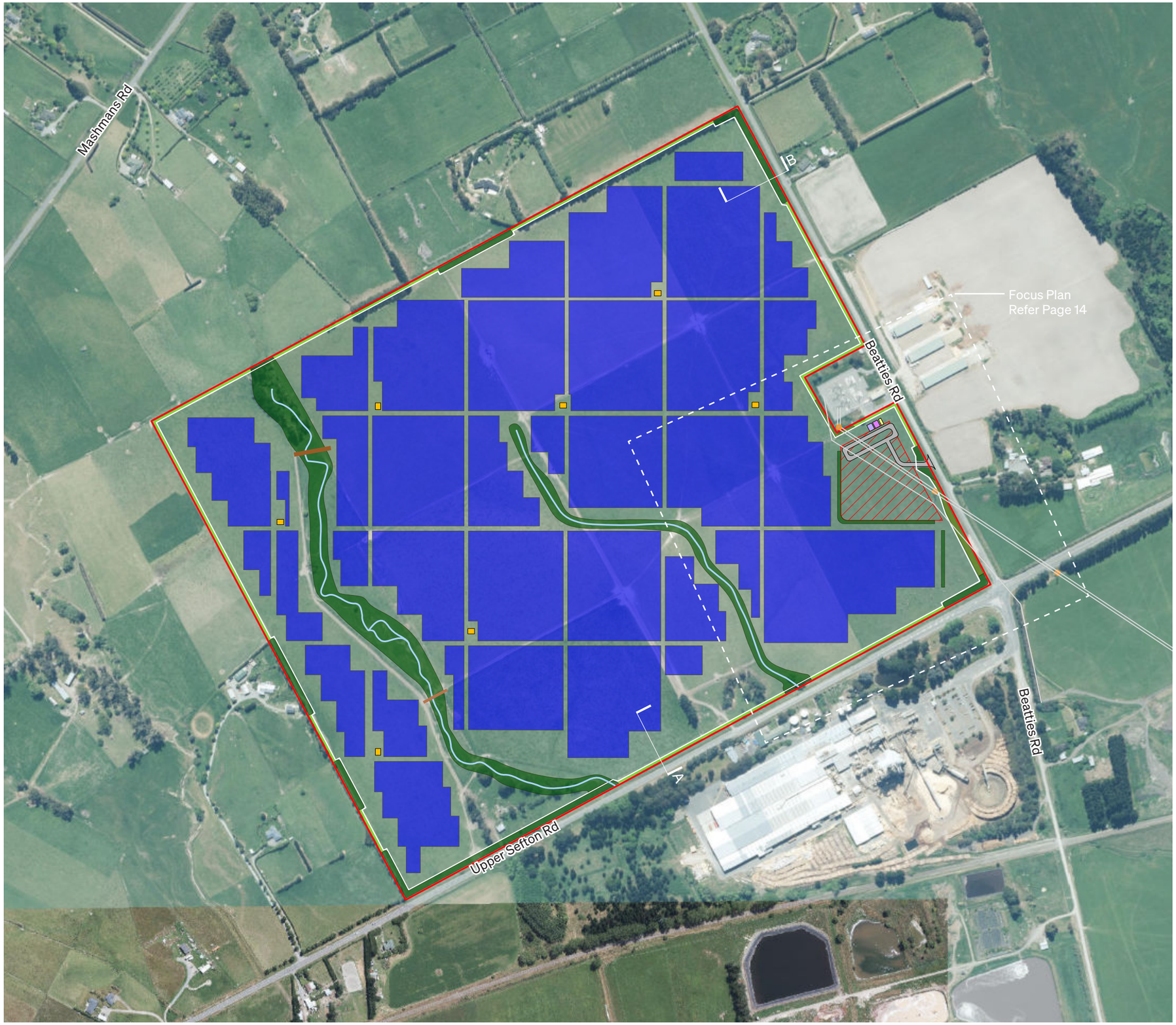
C.

Landscape Mitigation Plan

Legend

- The Site
- Proposed Shelterbelt
- Proposed Native Vegetation 4m tall
- Proposed Native Vegetation 2m tall
- Solar Panel Layout
- Inverters
- Accessway
- Security Fence
- Switching Station, O&M, Storage Buildings
- Laydown Area
- Extent of Waterways
- Existing Farm / Tractor Crossing
- Proposed Truck Crossing
- Transmission Lines and Pylons

Note
Solar panel layout based on two panel tilting solar table option.



Scale : 1:6,000 @ A3

0 60 130 200 M

Landscape Mitigation Plan - Focus Plan

Legend

- The Site
- Proposed Shelterbelt
- Proposed Native Vegetation 4m tall
- Proposed Native Vegetation 2m tall
- Solar Panel Layout
- Inverters
- Accessway
- Security Fence
- Switching Station, O&M, Storage Buildings
- Laydown Area
- Extent of Waterways
- Transmission Lines and Pylons

Note
Solar panel layout based on two panel tilting solar table option.

Scale : 1:2,000 @ A3

0 30 65 100 M

Landscape Mitigation Planting Notes and Plant Palette

Shelterbelt / Boundary Treatment Notes

1. Proposed exotic shelterbelts will consist of one row of *Cupressus x Leylandii* - Leyland Cypress 'Leighton Green'.
2. Proposed native boundary planting will consists of an 8m wide strip of Coprosma crassifolia, Coprosma propinqua, Coprosma robusta, Cordyline australis, Griselinia littoralis, Hebe salicifolia, Olearia adenocarpa, Olearia paniculata, Pittosporum tenuifolium, and Plagianthus regius.
3. Proposed internal native planting south and west of the laydown area will consists of two rows strip of Coprosma crassifolia, Coprosma propinqua, Coprosma robusta, Cordyline australis, Griselinia littoralis, Hebe salicifolia, Olearia adenocarpa, Olearia paniculata, Pittosporum tenuifolium, and Plagianthus regius
4. Plants will be planted within the first possible planting season once the resource consent is approved.
5. The individual plants will be planted at 1m spacings.
6. Plants will be implemented at a minimum height of 25cm tall.
7. All plants shall have individual pest protection sleeves installed to deter browsing pests and provide initial shelter and the plants will be fenced off so they will not be affected by stock grazing.
8. Mulch, wool and/or specific matting e.g. DagMat by Terralana or Jute Mat by Geofabrics will be placed around all plants to suppress weeds and retain moisture.
9. The shelterbelt will be irrigated via an automatic irrigiation system for the first 5 years following planting.
10. The shelterbelt and native vegetation along the sites northwest boundary will be maintained at a minimum height of 6m.
11. The shelterbelt and native vegetation along all other boundary lines and illustrated on the landscape mitigation plan will be maintained at a minimum height of 4m.
12. If any plant dies or becomes diseased, it will be replaced with a new plant at least 1m tall as listed on the planting palette.

Native Riparian Vegetation Notes

1. Native riparian vegetation will be located up to 7m from the edge of the ephemeral watercourse. The area shown on the Landscape Mitigation Plan indicates the approximate extent of where this vegetation will be located.
2. A planting plan that outlines the plant species, their size at planting, spacings and a maintenance schedule will be provided to Council within 6 months of obtaining Resource Consent.
3. All native vegetation will be implemented within 2 years of gaining Resource Consent, prior to the solar panels are installed.
4. Further detail of what this planting needs to achieve is included in the Resource Consent Conditions.

Native Mix

Coprosma crassifolia
Thick leaved Mikimiki
Height at 5 years: 4m
Height at 10 years: 4m

Coprosma propinqua
Mingimingi
Height at 5 years: 2m
Height at 10 years: 5m

Coprosma robusta
Karamū
Height at 5 years: 3m
Height at 10 years: 5m

Cordyline australis
Cabbage Tree
Height at 5 years: 4m
Height at 10 years: 10m

Griselinia littoralis
Broadleaf
Height at 5 years: 3m
Height at 10 years: 6m

Hebe salicifolia
Koromiko
Height at 5 years: 3m
Height at 10 years: 4m

Olearia adenocarpa
Canterbury shrub daisy
Height at 5 years: 1.2m
Height at 10 years: 2m

Olearia paniculata
Golden akeake
Height at 5 years: 3m
Height at 10 years: 4m

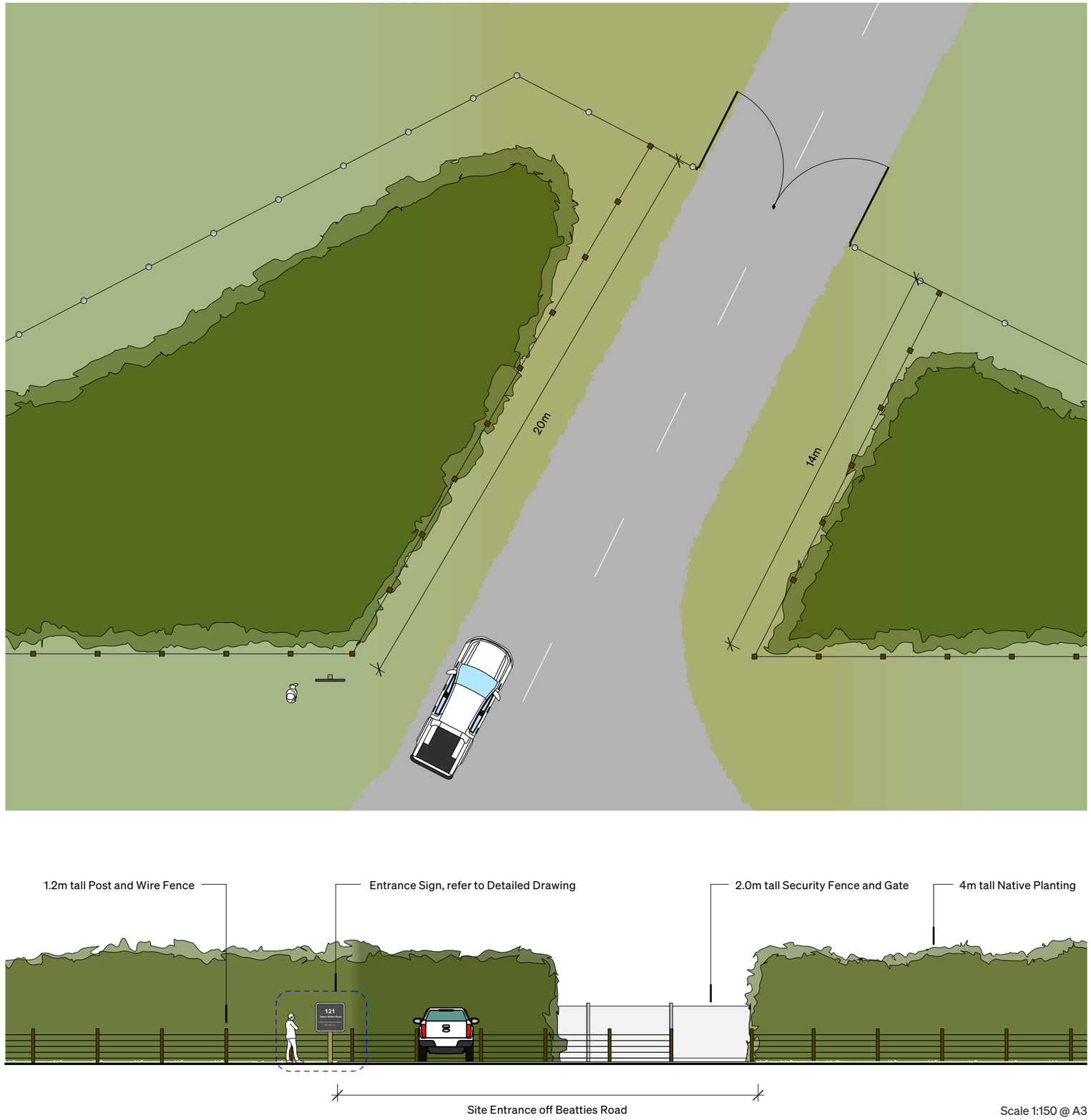
Pittosporum tenuifolium
Kōhūhū
Height at 5 years: 4m
Height at 10 years: 6m

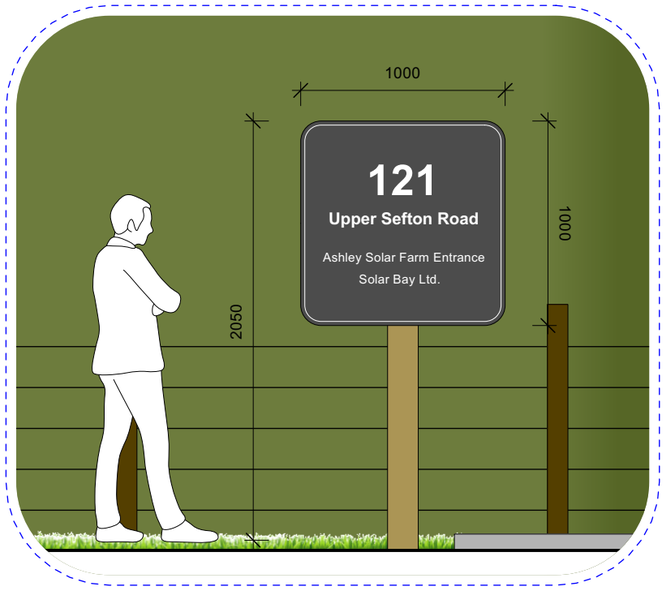
Plagianthus regius
Ribbonwood
Height at 5 years: 4m
Height at 10 years: 12m

Exotics

Cupressus x Leylandii
Leyland Cypress
Height at 5 years: 7m
Height at 10 years: 14m

Landscape Mitigation Plan - Site Entrance Detail

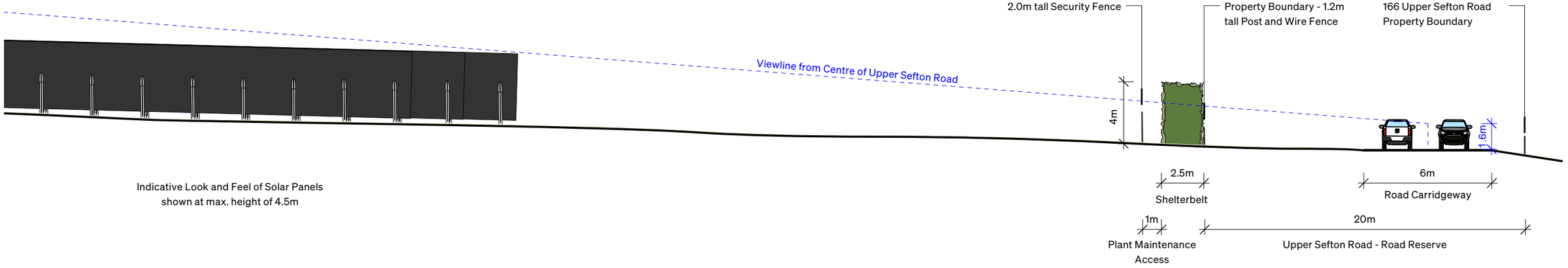




Entrance Sign - Detailed Drawing

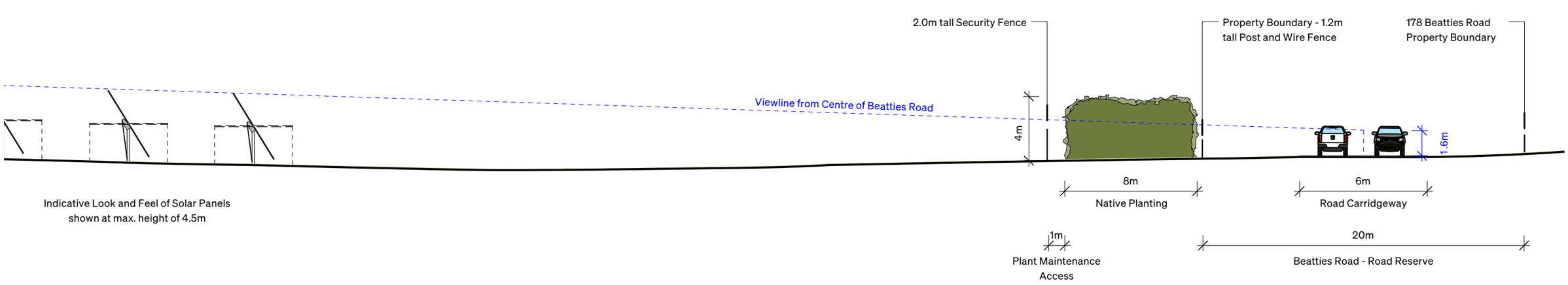
Scale 1:150 @ A3

Landscape Mitigation Plan - Cross Section A



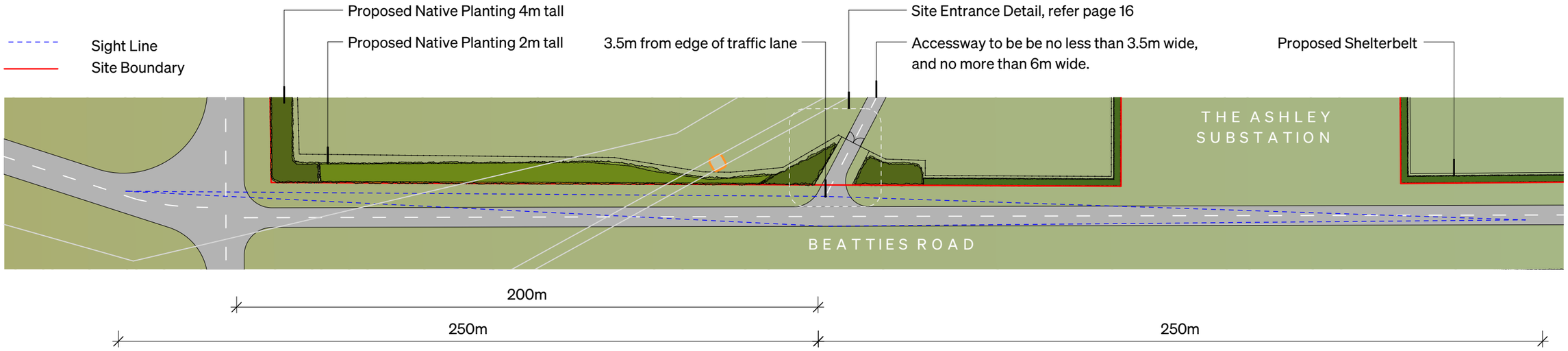
Scale 1:250 @ A3

Landscape Mitigation Plan - Cross Section B



Scale 1:250 @ A3

Landscape Mitigation Plan - Accessway Sight Lines



Beatties Road Accessway - Sight Distances and Sight Lines for Vehicles Crossings

Scale 1:1500 @ A3

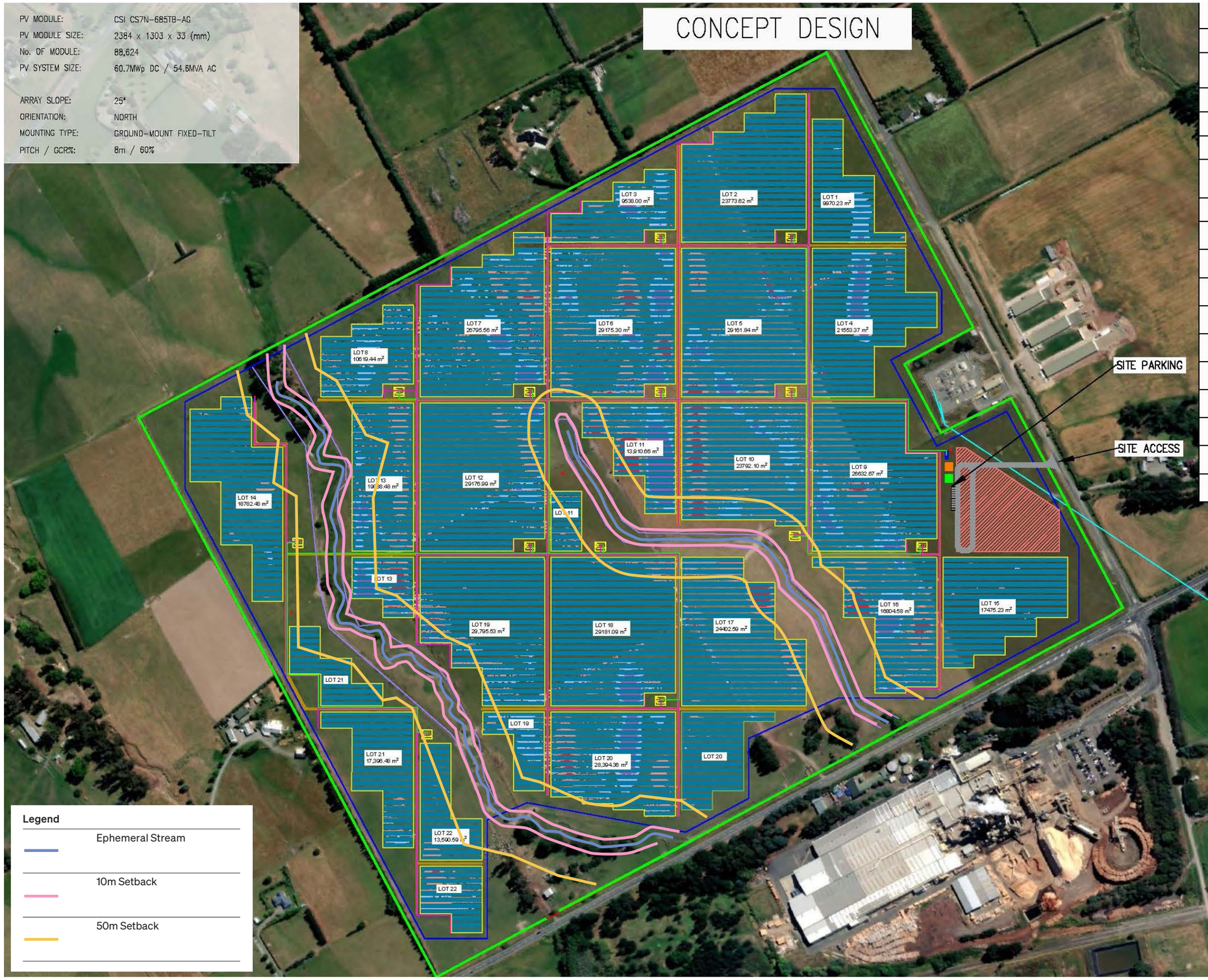
Earthworks and Setback Plan

Note:
Solar panel layout based on the fixed solar table option.

Not to Scale - To Fit Page

Data Source: Vector Powersmart

PV MODULE:	CSI CS7N-685TB-AG
PV MODULE SIZE:	2384 x 1303 x 33 (mm)
No. OF MODULE:	88,624
PV SYSTEM SIZE:	60.7MWp DC / 54.6MVA AC
ARRAY SLOPE:	25°
ORIENTATION:	NORTH
MOUNTING TYPE:	GROUND-MOUNT FIXED-TILT
PITCH / GCR%:	8m / 60%



LEGEND

	SITE BOUNDARY + POST-AND-WIRE FENCE
	LOTS OF BIFACIAL SOLAR MODULES
	2 x 29 TABLES OF BIFACIAL SOLAR MODULES
	PROPOSED GRAVEL ROADS (2.5m WIDTH)
	PROPOSED ACCESS ROADS (6m WIDTH)
	4200kW CENTRAL INVERTER + SERVICE SETBACKS
	LV CABLE TRENCHING
	MV CABLE TRENCHING
	SWITCHING STATION BUILDING (40m²)
	O&M BUILDING (100m²)
	STORAGE BUILDING (100m²)
	SECURITY FENCE
	TRANSMISSION LINES
	WEATHER STATION
	LAYDOWN AREA
	POST-AND-WIRE FENCE AROUND EPHEMERAL STREAMS
	SHELTERBELT

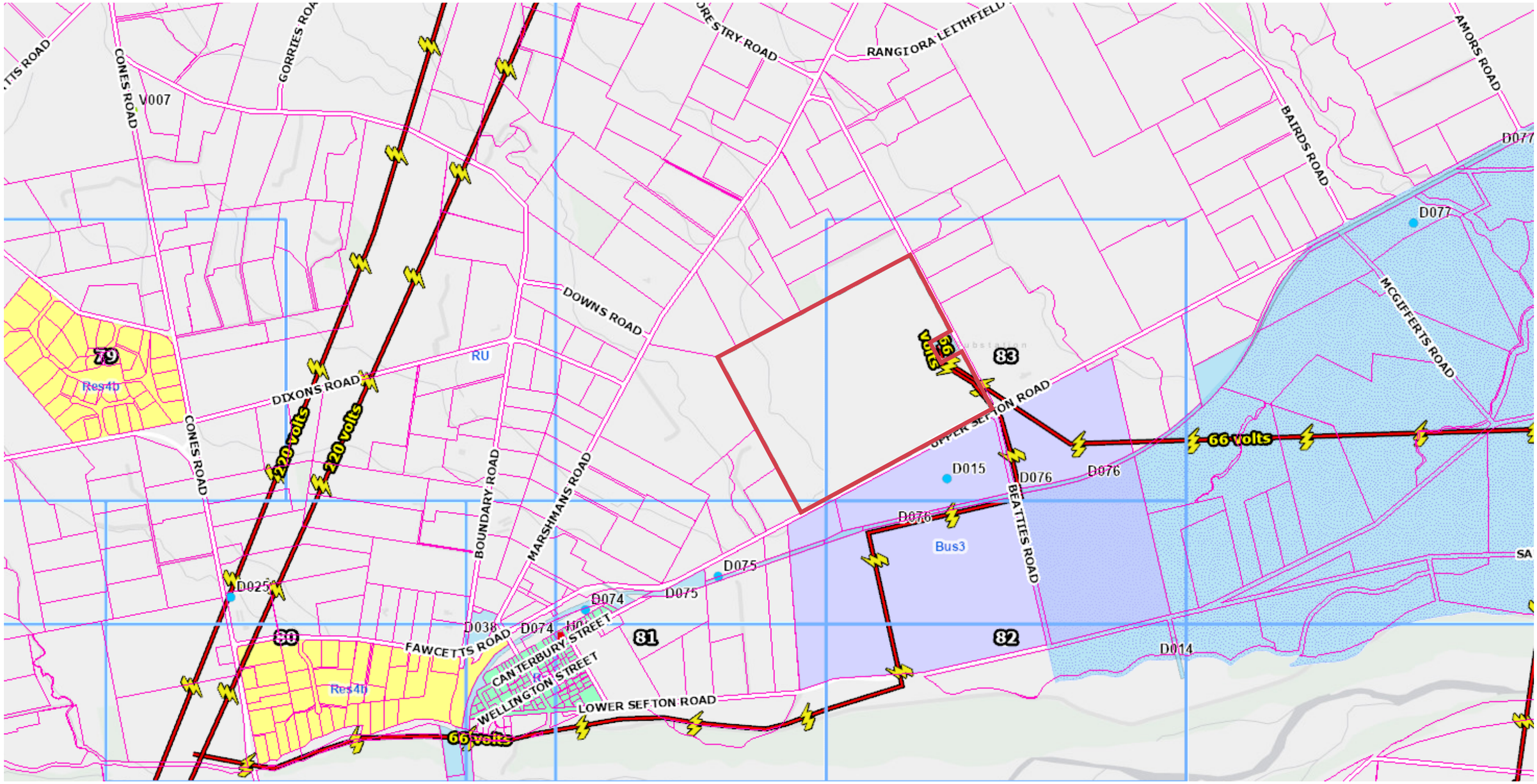
Waimakariri ODP GIS Planning Map

Legend

The Site	Business 3 Zone	D082 - Transpower NZ Ltd Electrial Substation
Rural Zone	Localised Flooding	D015 - Not listed in the District Plan
Residential 4b Zone	Residential 3 Zone	D074, 075, 076, 077 - New Zealand Railways

Not to Scale

https://waimakariri.isoplan.co.nz/eplan



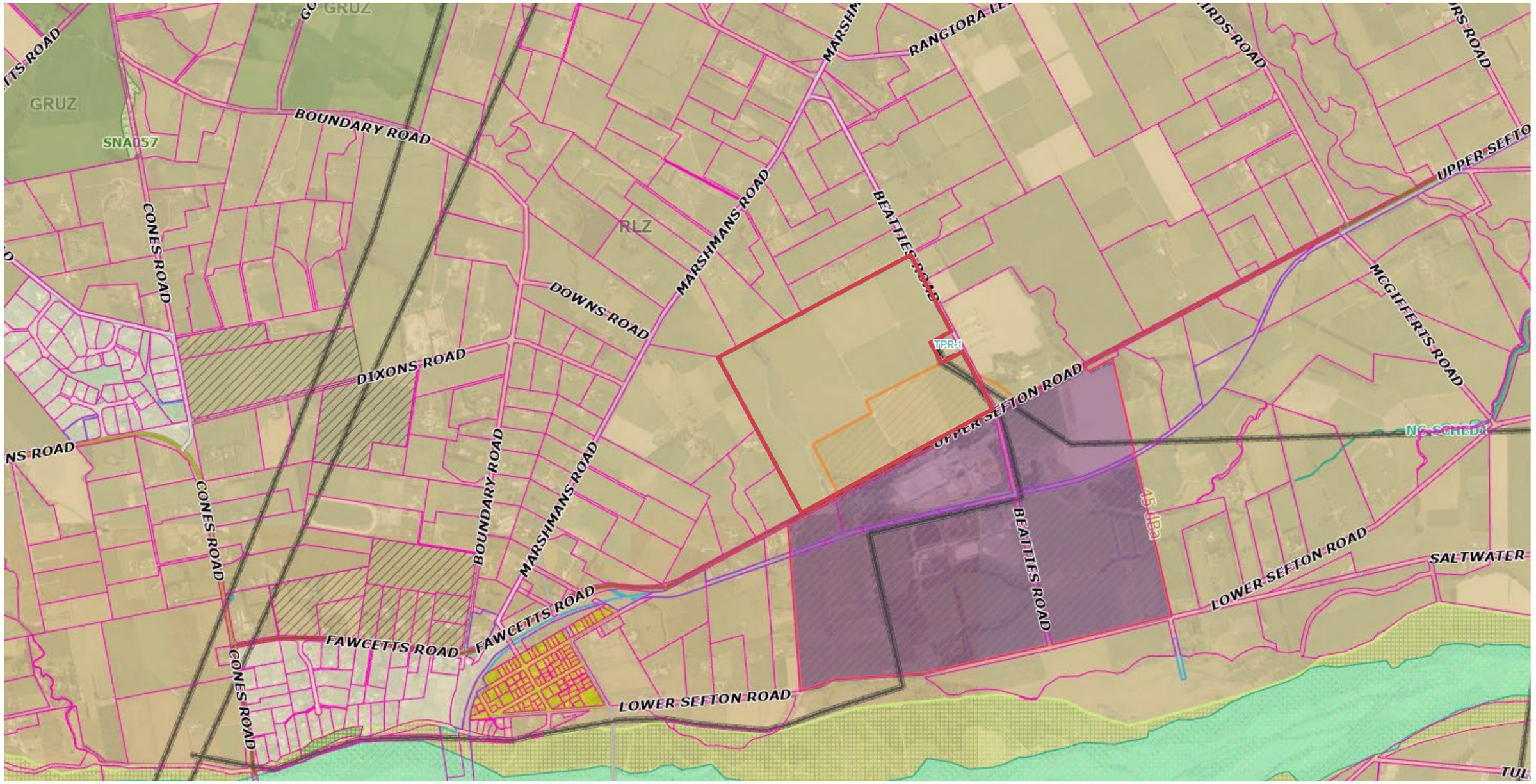
Waimakariri PDP GIS Planning Map

Legend

	The Site
	Rural Lifestyle Zone
	Heavy Industrial Zone
	General Rural Zone
	Large Lot Residential Zone
	Settlement Zone
	Noise Contour for Timber Processing Noise Level - 45 dba
	Nation Grid Transmission Lines
TPR-1	TPR-1 - Transpower NZ Ltd Electrial Substation

Not to Scale

https://waimakariri.isoplan.co.nz/eplan



Site Photograph Plan

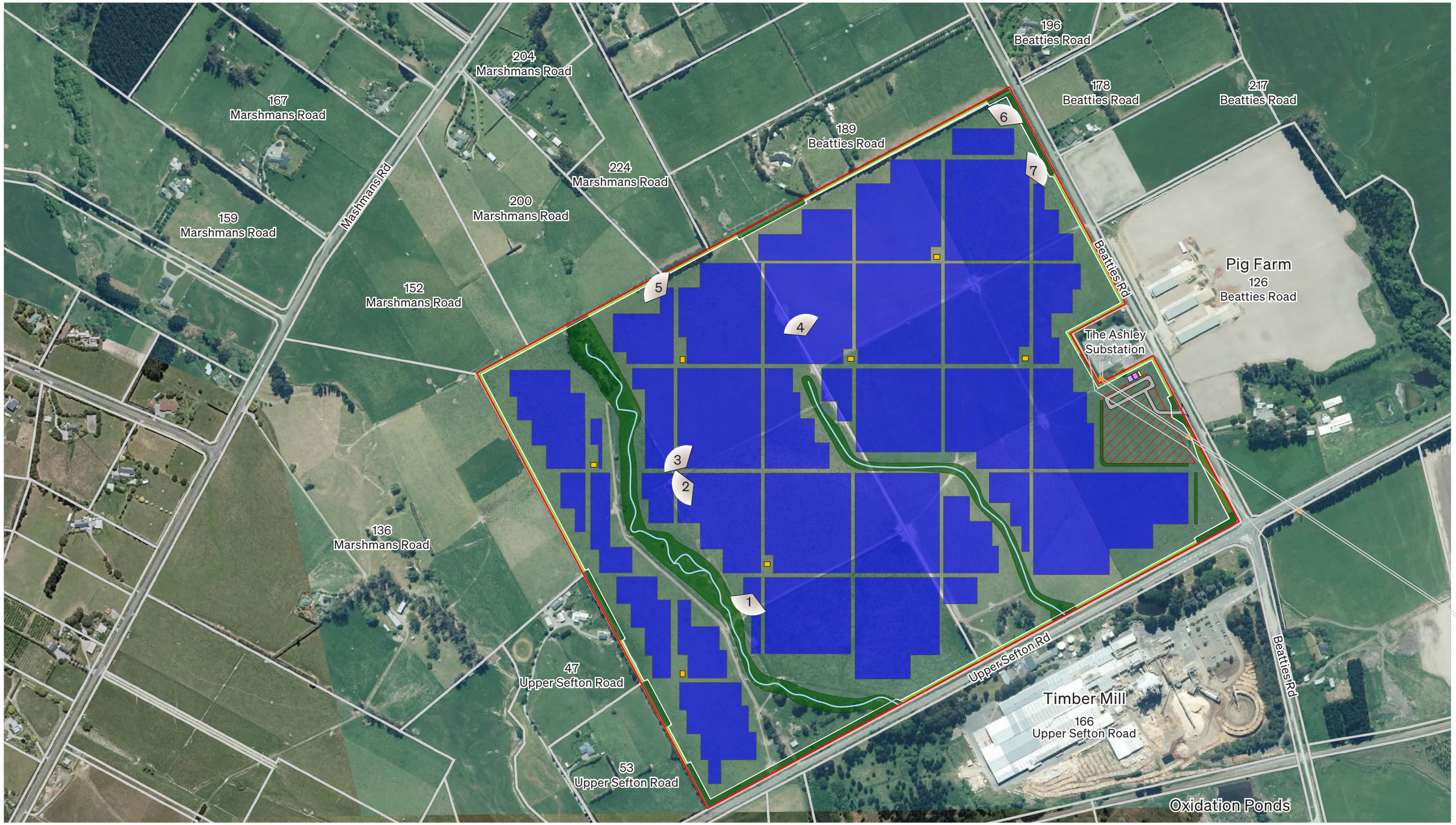
Legend

The Site

Viewpoint Locations

Scale 1:6,000

Data Source: canterburymaps.govtnz



Site Photographs

1 Located within the south western part of the site, east of the ephemeral watercourse. This photo illustrates the view to the south towards the shed within the site, Upper Sefton Road and a dwelling within 47 Upper Sefton Road. The dwelling within 53 Upper Sefton Road is screened by the vegetation within their property.

2 Located within the western half of the site, east of the ephemeral watercourse. This photo illustrates the view to the west towards a dwelling within 47 Upper Sefton Road and the rooflines of some distant dwellings northwest of Marshmans Road.

3 Located within the northwestern part of the site, east of the ephemeral watercourse. This photo illustrates the view to the north towards the dwelling within 200 Marshmans Road and the rooflines of some distant dwellings northwest of Marshmans Road.

1

2

3

Site Photographs

4 Located beside the water tank within the site. This photo illustrates the view to the north towards the dwelling within 189 Beatties Road.

5 Located alongside the sites northern boundary beside 200 Marshmans Road. This photo illustrates the view to the north towards the dwelling within this property.

6 Located at the sites northern corner. This photo illustrates the view to the north towards the entrance to 190 and the dwelling within 196 Beatties Road.

7 Located within the site, beside and facing east towards the dwelling within 178 Beatties Road.

4

5

6

7

Viewpoint Location Plan

Legend

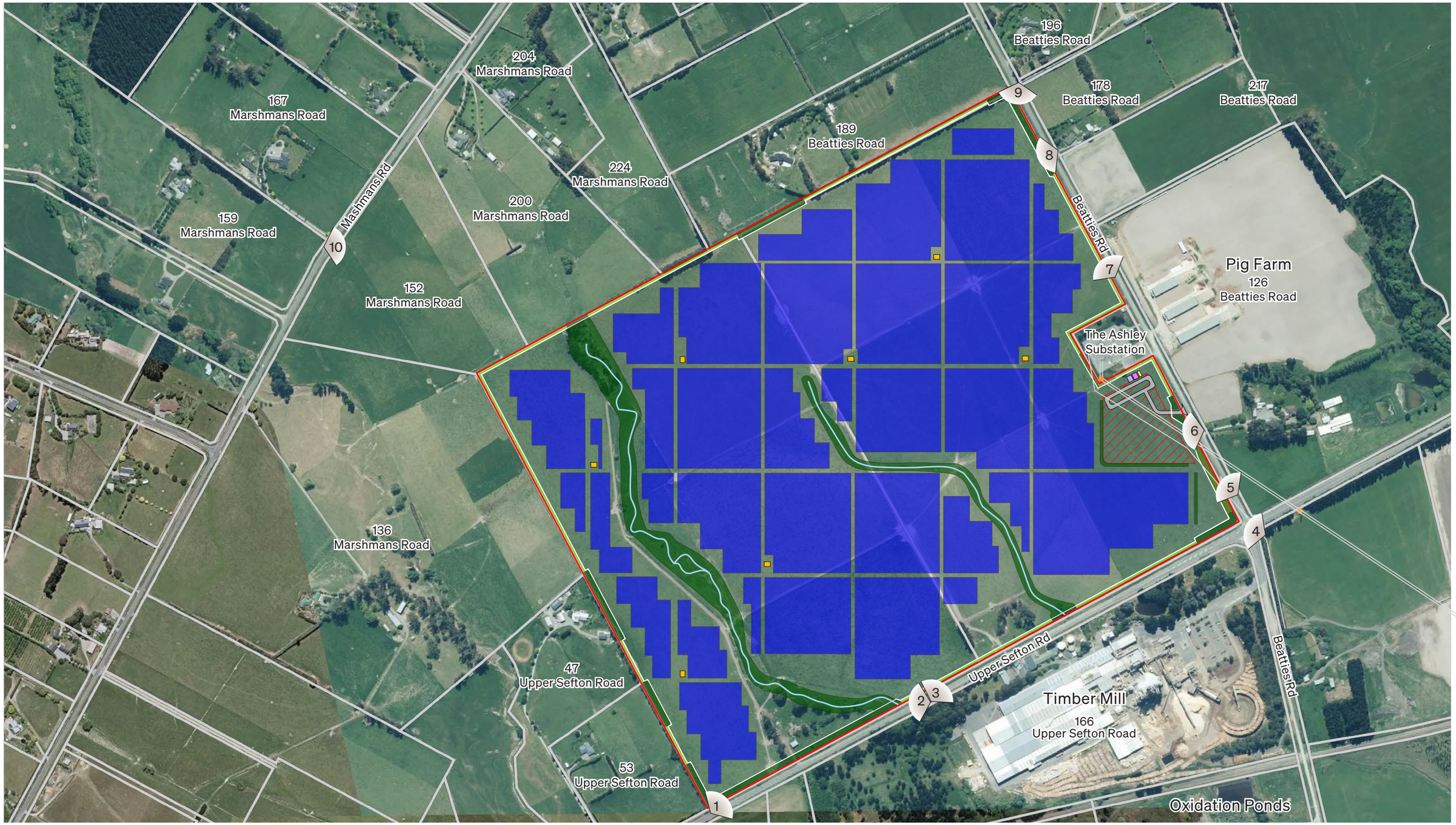
The Site

Viewpoint Locations

1

Scale 1:6,000

Data Source: canterburymaps.govtnz



Viewpoint Location Photographs

Viewpoint 1: Located along Upper Sefton Road, beside the site's boundary line with 53 Upper Seaton Road. This photo illustrates the view facing east along the road alignment, towards the site and its surrounds.

Note:
Viewpoint Photographs 1 - 9 were taken between 10:00am and 12:00noon on 9 June 2022.
Viewpoint Photograph 10 was taken at 10:15am on 13 September 2023.
Photos were captured on a Canon EOS 7D Mark II 50mm Focal Length.
Panorama photos have been created from seven or eight individual portraight photos.
Panorama photos were created in Adobe Photoshop, using the photomerge tool.

Viewpoint Location Photographs

Viewpoint 2: Located along Upper Sefton Road, east of the sheds within the site. This photo illustrates the view facing west along the road alignment and towards the site.

Viewpoint Location Photographs

Viewpoint 3: Located along Upper Sefton Road, east of the sheds within the site. This photo illustrates the view facing east along the road alignment and towards the site.

Viewpoint Location Photographs

Viewpoint 4: Located at the intersection of Upper Sefton Road and Beatties Road, near the eastern corner of the site. This photo illustrates the view facing northwest towards the site.

Viewpoint Location Photographs

Viewpoint 5: Located along Beatties Road, just north of its intersection with Upper Seften Road. This photo illustrates the view facing north along the road alignment, the Substation, the site and their surrounds.

Viewpoint Location Photographs

Viewpoint 6: Located along Beatties Road, beside the entrance to the dwelling within 126 Beatties Road. This photo illustrates the view facing west towards the site, the Substation and their surrounds.

Viewpoint Location Photographs

Viewpoint 7: Located along Beatties Road, north of the Substation. This photo illustrates the view facing north along the road alignment towards the site and its surrounds.

Viewpoint Location Photographs

Viewpoint 8: Located along Beatties Road, beside the entrance and the dwelling within 178 Beatties Road. This photo illustrates the view facing west towards the site and their surrounds.

Viewpoint Location Photographs

Viewpoint 9: Located along Beatties Road, beside the site's boundary line with 189 Beatties Road and the roadside hedge within 178 Beatties Road. This photo illustrates the view facing south along the road alignment, towards the site and its surrounds.

Viewpoint Location Photographs

Viewpoint 10: Located along Beatties Road, beside the site's boundary line with 189 Beatties Road and the roadside hedge within 178 Beatties Road. This photo illustrates the view facing south along the road alignment, towards the site and its surrounds.

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RMM

rmmla.co.nz

Mia

From: Gary Stevenson <gary@do.nz>
Sent: Wednesday, 2 October 2024 3:26 p.m.
To: office@rgmc.co.nz
Subject: RE: [#DO44795] RC235259 87 UPPER SEFTON ROAD STORM WATER DISCHARGE

Follow Up Flag: Follow up
Flag Status: Completed

Hi Kim,

Please see some commentary below to help with the RFI. Please feel free to call to discuss.

Culvert Design
Please find link below to a dual culvert design for the access across the drain. The sub-catchment area for the culvert is 128.5916 ha. Assuming a 50-year design life, RCP of 8.5 to 2081-2100 and a 10 year ARI, the worst rainfall event is 30 minutes which gives a maximum flow through the culvert of 6.225 m3/s.

https://www.dropbox.com/scl/fo/oomcx5cb2g5842w5raiua/AG0sa8C1iqfUvWaUlLeAz3Q?rlkey=msm2bahfu6nn7bjonptn09ftk&st=ngcpttd6&dl=0

Note that this design was chosen as there is a large embankment step up that we needed to build up to. There will be a road that will fill in some of the channel to the culvert. We have not shown the road. It is shown in the cross-section of the drawing.

An appropriate condition for the culvert could be:

1. *The consent holder shall install an access culvert across the Site drain at the approximate coordinates 5209870mN 1568561mE as shown on the approved plan (XXXX). The culvert shall pass a minimum flow derived from a 10-year ARI rainfall event to RCP 8.5, year 2081 to 2100.*

Soil Erosion Concerns
In response to Council's concerns regarding the drip line and the potential for erosion. Detailed design will assess and mitigate the concentration of stormwater flows throughout the Site. Stormwater controls may include:

- Construction in accordance with an Erosion and Sedimentation Control Plan
- Maintaining adequate vegetation cover
- The construction of clean water swales to capture and convey stormwater to existing outfalls,
- Low-level bunding, for example alongside access tracks to impound and slow stormwater flows
- Attenuation devices such as localised ponds or structures, if required, in specific locations, but located so as not to impede natural flow paths.

Appropriate conditions could be:

1. *Before grazing or the installation of solar panels onsite, the consent holder shall ensure that exposed surfaces under the solar tables are fully reestablished with grass. Areas established with grass can be grazed provided that areas of the site under construction are fenced to exclude stock.*

2. *The consent holder shall maintain adequate grass cover under all solar tables. If any grass area is disturbed exposing soil, then the grass shall be reestablished to prevent erosion.*

3. *To prevent soil erosion the consent holder shall establish and maintain dense grass cover under the solar table dripline whether the solar table is static or tilting,*

And as maintenance

- *The following applies 12 months after, and again 24 months after commissioning of the solar farm:*

a. *The Consent Holder shall provide to WDC a report prepared by a SQEP that assesses scour and erosion effects associated with the discharge of stormwater from the solar panels from monitoring undertaken over each 12-month period, and any mitigation measures proposed to address such effects.*
b. *Where mitigation measures are identified as being required within the report provided, the Consent Holder must implement the recommended mitigation measures proposed within six months of the date of the report to the satisfaction of WDC.*

Geotechnical (Not required for RFI response)
We have undertaken a limited investigation as previously provided to you. It showed silts at the approximate foundation levels. We have concerns regarding uplift forces in high winds lifting the panel stanchions up. Note that we can provide a more in-depth investigation to inform foundation design if required once consent is approved.

Note we have soil dispersivity tests being undertaken that will hopefully further reinforce that grass cover only is required. You may elect to send the above to Council first while we await results.

Ngā mihi / Kind regards,

GARY STEVENSON / Principal Civil Engineer / BE Nat. Res. (Hons), CPEng, CMEngNZ

DAVIS OGILVIE & PARTNERS LTD

gary@do.nz / 021 973 587 / 0800 999 333

Please note that my working days are Mon-Wed & Fri, 1/2 day Thu.

From: Mia <office@rgmc.co.nz>
Sent: Wednesday, 4 September 2024 10:35 am
To: Gary Stevenson <gary@do.nz>
Subject: FW: [#DO44795] RC235259 87 UPPER SEFTON ROAD STORM WATER DISCHARGE

Hi Gary,

Culvert – do your best. I'm sure location is fine. We have done a PSI (don't want to do DSI unless specifically told) – lizard survey etc being done.

Run-off – see engineer response below – does that deal with that matter? Do you need a 'small' report that deals with mitigation (run-off) during establishment – i.e. a draft condition?

I will try and ring you.

Regards,
Kim

From: Nirosha Seelaratne [mailto:nirosha.seelaratne@wmk.govt.nz]
Sent: Monday, 2 September 2024 4:36 p.m.
To: Mia
Subject: RC235259 87 UPPER SEFTON ROAD STORM WATER DISCHARGE

Hi Kim,
Please see our engineers response on Strom water discharge requirements below.

As Gary from DO explained in the meeting, I agree after further reading that the solar panels do not increase impervious percentage onsite. Below is a schematic from the decision at Ōpunake.

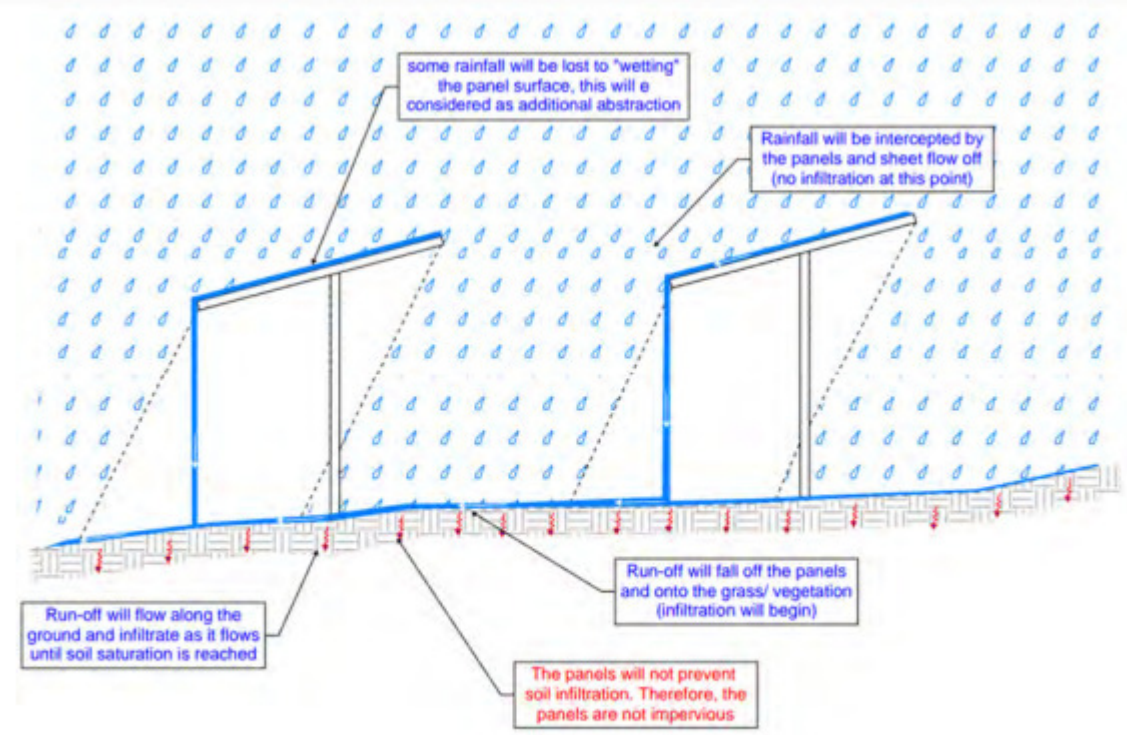


Figure 11a: Sketch of wind affected rainfall and the reduced effect of ground shielding

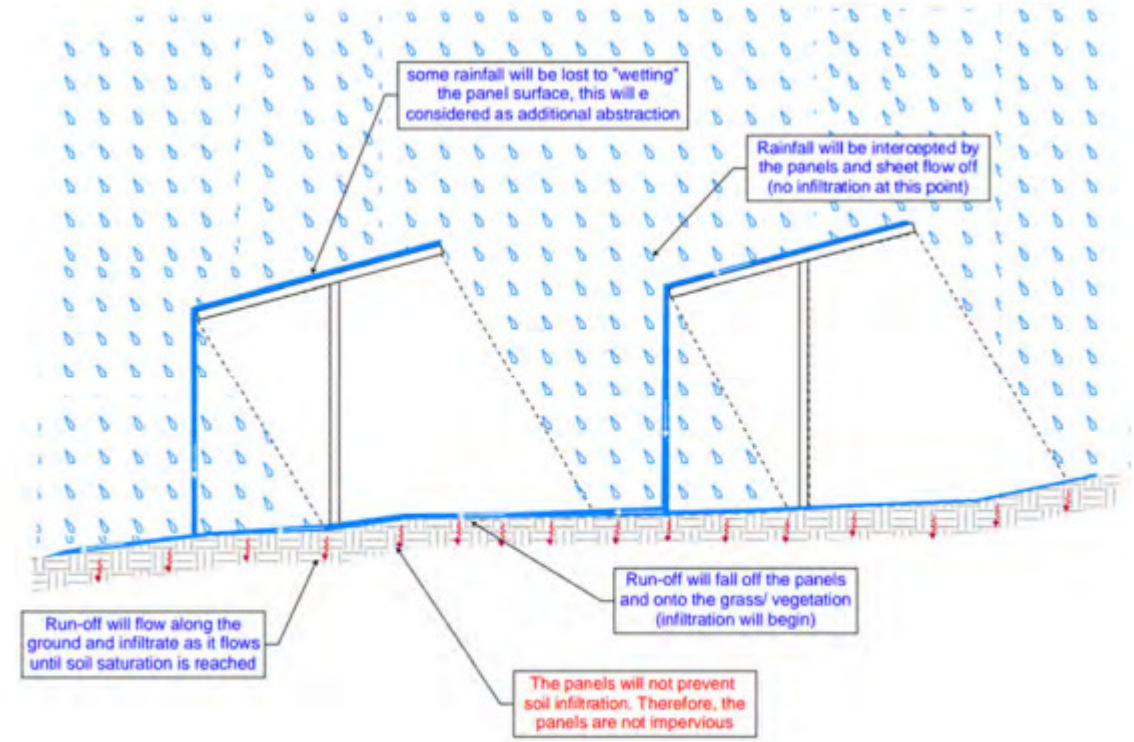


Figure 11b: Sketch of wind affected rainfall and the reduced effect of ground shielding

However, as shown above, the water will fall in the same location underneath the lower edge of the solar panel whenever it rains at the site, referred to as the dripline. The repetitive effect of water falling in the same spot may cause erosion directly under the solar panel edge. If this is left unaddressed soil material will be transported from the site, causing pollution within the watercourses. See below our concern:

Gary mentioned that onsite vegetation will reduce velocities of the runoff, however, directly after construction the site will require a period for vegetation establishment to allow time for the grass to grow. Monitoring for erosion and ground stabilisation may be required, especially under the lower edge of the solar panels.

What mitigation will be proposed for this solar farm during vegetation establishment? Some options from other solar farms approved in NZ:

- *Ruakākā - https://www.nrc.govt.nz/media/ozlbd33o/appendix-8-civil-design-report-beca.pdf - Dense fibre grass is proposed to be grown on the soil underneath all the solar panels as part of re-establishing vegetation post-construction. The grass will prevent erosion by intercepting, and cushioning the impact of, dripping water with the root structures binding the soil particles and stabilizing the soil.*
- *Rangitāiki- https://www.taupodc.govt.nz/repository/libraries/id:25026fn3317q9slqygym/hierarchy/our-services/planning-guidance-and-resource-consents/notified-consents/Todd%20Generation/Application%20documents/Appendix%20K%20-%20Stormwater%20Design%20Statement.pdf - If there is to be some erosion at the dripline on steeper areas, across the site, shallow flat 'bunded' areas may be utilised as velocity control, to allow sediment to fall out before entering the downstream environment.*

The panel drip lines should be monitored so in addition to the above, we would recommend monitoring conditions around this, similar to those imposed for Ōpunake (https://www.epa.govt.nz/assets/Uploads/Documents/Fast-track-consenting/Opunake-Solar-Farm/Opunake-Solar-Farm-final-decision.pdf):

- *The site shall be stabilised against erosion as soon as practicable and in a progressive manner as earthworks are finished over various areas of the site. The Consent Holder shall monitor and maintain the site until vegetation is established to such an extent that it prevents erosion and prevents sediment from entering any watercourse for a period of 24 months following the commissioning of the solar farm.*
- *The following applies 12 months after, and again 24 months after commissioning of the solar farm:*
    - *a. The Consent Holder shall provide to WDC a report prepared by a SQEP that assesses scour and erosion effects associated with the discharge of stormwater from the solar panels from monitoring undertaken over each 12-month period, and any mitigation measured proposed to address such effects.*
    - *b. Where mitigation measures are identified as being required within the report provided, the Consent Holder must implement the recommended mitigation measures proposed within six months of the date of the report to the satisfaction of WDC.*

Thank you,

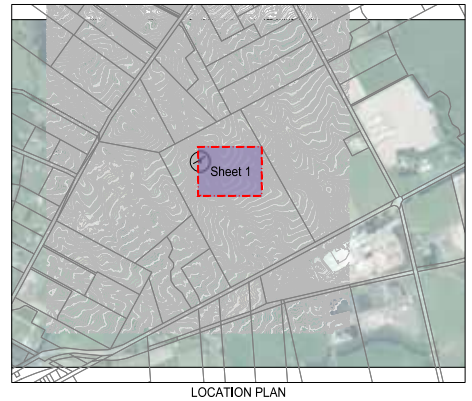
Nirosha Seelaratne | **Senior Resource Management Planner**
Plan Implementation Unit

Phone: 0800 965 468 (0800 WMK GOV)
Mobile: +64 27 292 8829

Contractor to locate all existing services & verify all dimensions before commencing work

Rev.	Date	Reason	Approved
A1	01/10/24	Issue to client for information	GS

FOR INFORMATION



LOCATION PLAN
Scale 1:20,000 (m)

GENERAL NOTES:

1. This drawing shall only be reproduced in full with approval from a Davis Ogilvie engineer.
2. Contractor to locate all existing services & verify all dimensions before commencing works.
3. Contractor is to have an approved Environmental Management Plan (EMP) and a Construction Traffic Management Plan (CTMP) from Waimakariri District Council prior to any works commence on site.
4. Plans are to be read in conjunction with the Specification, Schedule of Prices and any Waimakariri Code of Practice. Any conflicts are to be brought to the attention of the engineer prior to works proceeding. Engineer to advise contractor accordingly.
5. Prior to any works commencing, contractor is to engage a registered professional surveyor and/or licensed cadastral surveyor to supervise all set out & provide asbuilt plans for review.
6. Set out is not to be scaled off the plans. The engineer will provide electronic data for the contractor. Any variations are to be approved by the engineer.
7. All plan dimensions are in m. All detail dimensions are in mm.
8. All levels are in terms of the Lyttelton Vertical Datum 1937 (January 2018).

DRAWING NOTES:

1. All drainage work is to be carried out in accordance with Waimakariri District Council's Engineering Code of Practice: Section 5 & 6 & Davis Ogilvie's Specification.
2. Maximum depth of 1 m for all laterals at boundaries unless specifically stated otherwise.
3. Sewer laterals at all lots to be DN 100 uPVC SN16 laid at min grade of 1 in 80.
4. Stormwater laterals at all lots to be DN 100 uPVC SN16.
5. All stormwater laterals to kerb are to have kerb outlet.
6. All services such as power, telecom and water are to pass over all sewer and stormwater pipes where they cross unless stated otherwise.
7. Class of pipes as follows:
   DN 100 - DN 375 uPVC SN16
   DN 450 - DN 900 RCCRJ Concrete Class 4
   (Unless noted otherwise).
8. All uPVC pipes are to have min 0.75 m cover in roading areas and 0.75 m cover for construction traffic unless stated otherwise.
9. All RCCRJ concrete pipes to be of min. class 4 and to have minimum 0.44 cover for construction traffic.
10. All manholes for DN 600 pipes or larger to be DN 1500 min or 1200 x 1200 square min unless stated otherwise.
11. For angle of deviation of 0 - 60°, 10 mm minimum fall within manhole required. For angle of 60° - 90°, 20 mm minimum fall required.
12. Sumps have been designed 20 l/s and 40 l/s capacities for single sumps and double sumps respectively as per CCC IDS Part 5. NZS4404 allows 28 l/s for a single sump with back entry before blockage. This confirms that all sumps meet WDC 55/90 l/s capacity requirement.

CAD ref: T:\projects\44s\44795 - 87 Upper Sefton Road, Sefton\Civil\Dwg\Models & Aerials\44795.Concept

DAVIS OGILVIE
ENGINEERS / SURVEYORS / PLANNERS
0800 999 333
hello@do.nz
www.do.nz

PROPOSED CULVERT DESIGN
87 UPPER SEFTON ROAD, ASHLEY

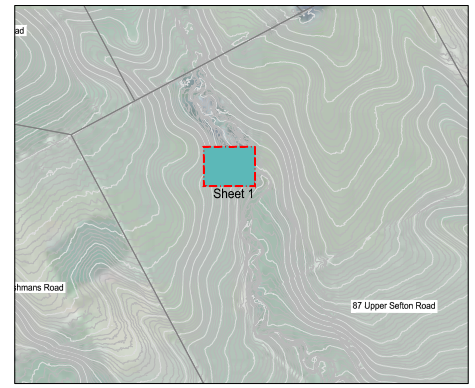
ENGINEERING DESIGN
SITE PLAN

Design	Drawn	QA Check	Dwg No.
AL	AL	RJ	C101
Scale @ A1	Date Started	Job No.	Rev.
1:2,500 (m)	10/24	44795	A1

Contractor to locate all existing services & verify all dimensions before commencing work

Rev.	Date	Reason	Approved
A1	01/10/24	Issue to client for information	GS

FOR INFORMATION



LOCATION PLAN
Scale 1:5,000 (m)

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   DN 100 - DN 375 uPVC SN16
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   (Unless noted otherwise).
8. All uPVC pipes are to have min 0.75 m cover in roading areas and 0.75 m cover for construction traffic unless stated otherwise.
9. All RCCRJ concrete pipes to be of min. class 4 and to have minimum 0.44 cover for construction traffic.
10. All manholes for DN 600 pipes or larger to be DN 1500 min or 1200 x 1200 square min unless stated otherwise.
11. For angle of deviation of 0 - 60°, 10 mm minimum fall within manhole required. For angle of 60° - 90°, 20 mm minimum fall required.
12. Sumps have been designed 20 l/s and 40 l/s capacities for single sumps and double sumps respectively as per CCC IDS Part 5. NZS4404 allows 28 l/s for a single sump with back entry before blockage. This confirms that all sumps meet WDC 55/90 l/s capacity requirement.

CAD ref: T:\projects\44s\44795 - 87 Upper Sefton Road, Sefton\Civil\Dwg\Models & Aerials\44795.Concept

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hello@do.nz
www.do.nz

PROPOSED CULVERT DESIGN
87 UPPER SEFTON ROAD, ASHLEY

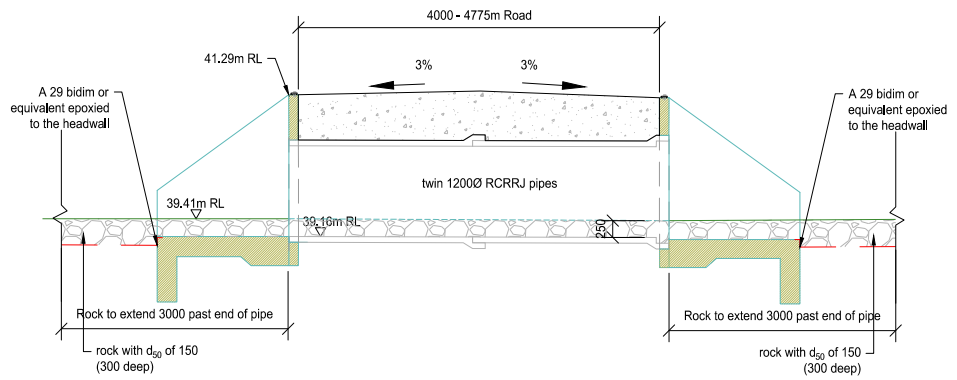
ENGINEERING DESIGN
PLAN VIEW OF PROPOSED CULVERT

Design	Drawn	QA Check	Dwg No.
AL	AL	RJ	C102
Scale @ A1	Date Started	Job No.	Rev.
1:100 (m)	10/24	44795	1

Contractor to locate all existing services & verify all dimensions before commencing work

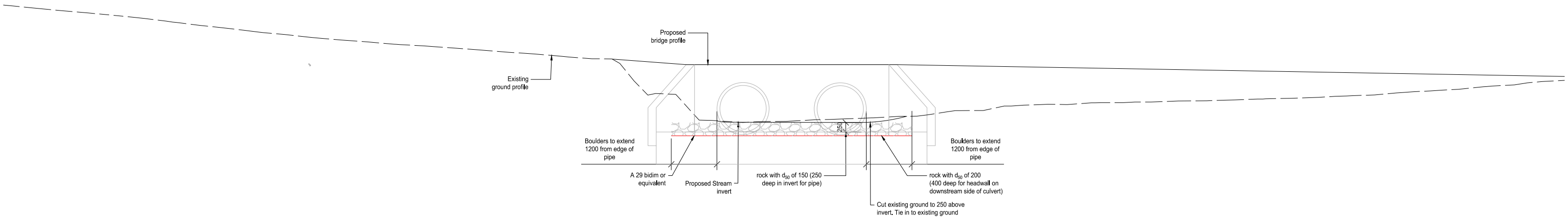
Rev.	Date	Reason	Approved
A1	01/10/24	Issue to client for information	GS

FOR INFORMATION



CROSS SECTION 87 UPPER SEFTON ROAD CULVERT

Scale: 1:50



CROSS SECTION 87 UPPER SEFTON ROAD CULVERT

Scale: 1:50

CAD ref: T:\projects\44s\44795 - 87 Upper Sefton Road, Sefton\Civil\Dwg\Models & Aerials\44795.Concept

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PROPOSED CULVERT DESIGN
87 UPPER SEFTON ROAD, ASHLEY

ENGINEERING DESGIN
CULVERT CROSS SECTION

Design	Drawn	QA Check	Dwg No.
AL	AL	RJ	C110
Scale @ A1	Date Started	Job No.	Rev.
1:50 (mm)	10/24	44795	1

Pattle Delamore Partners Limited

TECHNICAL MEMORANDUM

CLIENT	**Energy Bay Limited**	**PROJECT**	RMA s.92 request for information on low frequency electric and magnetic fields from a solar array.
CLIENT CONTACT	Kim McCracken (McCracken and Associates Limited)	**PROJECT NO**	C053270001
		DATE	7 October 2024
REVIEWED BY	Steve Pearce	**PREPARED BY**	Isobel Stout

Introduction

Pattle Delamore Partners Limited (PDP) has been engaged by Energy Bay Limited to undertake a public exposure to low frequency electromagnetic fields (EMFs) review of the application for a new solar array at 87 Upper Sefton Road, Ashley.

The scope of PDP's review included the following:

- Review of the application document with respect in particular to the location of inverters, transformers and power cables
- Review of measurements made at similar sites and comparison with ICNIRP[1] recommended limits 1998 and 2010.

This memorandum specifically relates to low frequency electric and magnetic field strengths.

Review Summary

The Waimakariri District Council included the following requests as part of a larger s.92 letter to the applicant.

5. Please provide an assessment or more information whether the levels of following (sic) will have less than minor effects on neighbours and wider environment and whether the proposed solar panels will generate any radiation levels which will be harmful for human health.

- *Electro Magnetic Fields (EMF) radiation from solar panels*
- *Electromagnetic/radiofrequency fields' radiation from underground cables, Transformers and PV inverters and battery energy storage systems.*

Findings

The Ashley solar array is expected to make an indiscernible difference to EMF levels outside the site.

On this basis, EMFs from the Ashley solar array will not adversely affect the health of the public.

[1] The International Commission on Non-Ionizing Radiation Protection.

TECHNICAL MEMORANDUM

Specialist Review Comments

Strictly speaking EMFs are not electromagnetic radiation. "Radiation" is a very broad term, but generally refers to the propagation of energy away from some source, such as light from a light bulb. True electromagnetic radiation is composed of linked electric and magnetic fields that bear a fixed relationship to each other. The EMFs created by the solar array do not travel away from whatever is producing them, but are fixed in place, and do not transport energy away from the solar array. The electric and magnetic fields are independent of each other.

The proposed array is surrounded by open farmland on two sides and Upper Sefton and Beatties Roads on the other two sides. On the other side of Upper Sefton Road is a fibre board manufacturing facility. On Beattie Road is an electrical substation.

The proposed site at Ashley is made up of 58,928 solar panels arranged in rows. Nine inverters are spaced out across the site, and these collect the direct current (DC) generated from the panels and convert it to alternating current (AC). Specific transformers are not noted on the landscape plans but may be coupled to the inverters or more likely, form part of the switching station drawn on the plan near the existing substation. The transformer alters the voltage to meet and match what the electricity network provider needs at the substation situated on Beatties Road. No battery storage is indicated.

The solar panels will produce a very small electric field and only when the sunlight is strong enough. Similarly, the inverters will produce small and localised fields during sunlight hours.

Cables from the inverters take the power to the switching station. Low frequency field strengths are not affected by being underground or overhead.

The largest field strengths will be found around transformers. There will already be transformers within the substation, whether this array will connect directly to them or to new ones either within the substation compound or within the array land is not substantive to this review. The key factor for public exposure is distance from the transformers.

Field strength drops rapidly with distance. Measurements taken of a similar inverter/collector system within a solar array found field strengths well below ICNIRP standards for public exposure at 1m from the installation.[2]

None of the fields surrounding the infrastructure on the plans would be discernible beyond the site boundary.

As this is the case, there is no electromagnetic field risk to public health.

[2] Evidence presented at Selwyn District Council for RC235464.

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17 October 2024

Solar Bay
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Australia

Attention: Tom Guthrie

RC235259 – ASHLEY SOLAR FARM: RFI RESPONSE

Dear Tom

We understand that Waimakariri District Council (**WDC**) has requested the following further information in relation to our noise assessment report for the project, dated 8 September 2023.

> *There are some aspects on the plans and Marshall Day noise report that we would like to better understand.*
>
> *a. Marshall day report identifies that : "The tables will have a fixed-tilt design, meaning that the panels are mounted in a static position and do not move to track the sun's movement. There is therefore no additional noise from any tracker motors or similar systems (although tracker motors typically emit low levels of noise regardless)"*
>
> *Because the application proposes both fixed and tracing panels ,can you please get a confirmation from Marshall Day whether the recommendation in their report remains the same of will be different if tilted panels are considered.*
>
> *b. The concept design plans indicate Transformer Station acoustic /EMF setback radius (150m). Some of these areas go beyond the application site. Can you please clarify what these buffers represent and whether there are any effects on the neighbours?*

We address each of these points in turn below.

Tracker Motors

We understand that there are two potential layout options for the site, one with static panels and another with tilting panels and associated tracker motors.

While our report only assessed the former option, we have also considered the implications of the alternative, moving-panel design.

The tracker motors themselves are a relatively low source of noise, as indicated in the excerpt above. The sound power level of each unit, which is essentially just a small DC motor, is typically around 76 dB L_{WA}.

For the tracking module layout option, there would be 943 motors required. This gives a total sound power of 106 dB L_{WA}, but this is evenly distributed across the site. In addition, they only operate infrequently – we estimate for approximately 66 seconds every 15 minutes – so some correction is required to adjust for that. We note that they may not register when measured on an L_{A10} basis (as per the operative Waimakariri District Plan), but we have conservatively assumed that they are included and treat the L_{Aeq} and L_{A10} levels as being the same for the purpose of this analysis.

We have included the tracker motors in our noise model and find that:

- For most receivers, the contribution from the tracker motors alone is around 18 dB L_{A10} on average, well below the average predicted noise level of around 25 dB L_{A10}

- The dwelling at 47 Upper Sefton Road would receive noise from the tracker motors at 35 dB L_{A10}, which would increase the predicted 'full load' value from 40 to 41 dB L_{A10} (including the SAC correction).

We do not expect that adding noise from the tracker motors alone would add more than 1 dB at any receiver, compared with the scenario presented in our report.

We also note that the tracker motors are unlikely to operate for much of the sunlit 'night-time' period in the District Plan (i.e. either side of 0700 or 1900 hrs). The panels are likely to be at the full extent of their east/west tilt at dawn and dusk and therefore peak tracker motor operation would be confined to the daytime period.

However, a further issue is raised in that the locations of the inverters and transformers differ between the two site layout options. This is addressed further in relation to the proceeding point.

Inverter/Transformer Setback Radius

Both of the concept layout plans (*2933 - GA20* for the fixed option; *2933 - GA21* for the tracking option) have the inverter stations shown in different places to one another, but both show a 150 metre *'Acoustic/EMF'* setback radius.

For clarity, these setbacks were shown in the original plans we were given and did not come from our recommendations.

However, the 150 metre radius is useful as a guide to where noise levels at any dwelling would exceed the 40 dB L_{A10} night-time noise limit when operated in the worst-case configuration.

Given that there appears to be some uncertainty over the final layout of the inverter stations, we note that proposed Condition 35 requires that an acoustic design review be undertaken prior to construction. We consider this to be an appropriate point in which to consider the optimal inverter station layout and this analysis can factor in whether the tracker motors are included in the final design or not.

Essentially, we are confident that the site can be designed to comply, but note the potential for a non-compliance if an alternative layout were used and the acoustic design review did not occur.

As a guide for further design, we expect that the following setback distances are required as a minimum:

- 150 metres from any dwelling for the fixed tilt option
- 170 metres from any dwelling for the tracker motor option.

We trust this information is satisfactory. If you have any further questions, please do not hesitate to contact us.

Yours faithfully

MARSHALL DAY ACOUSTICS LTD

Gary Walton
Senior Consultant