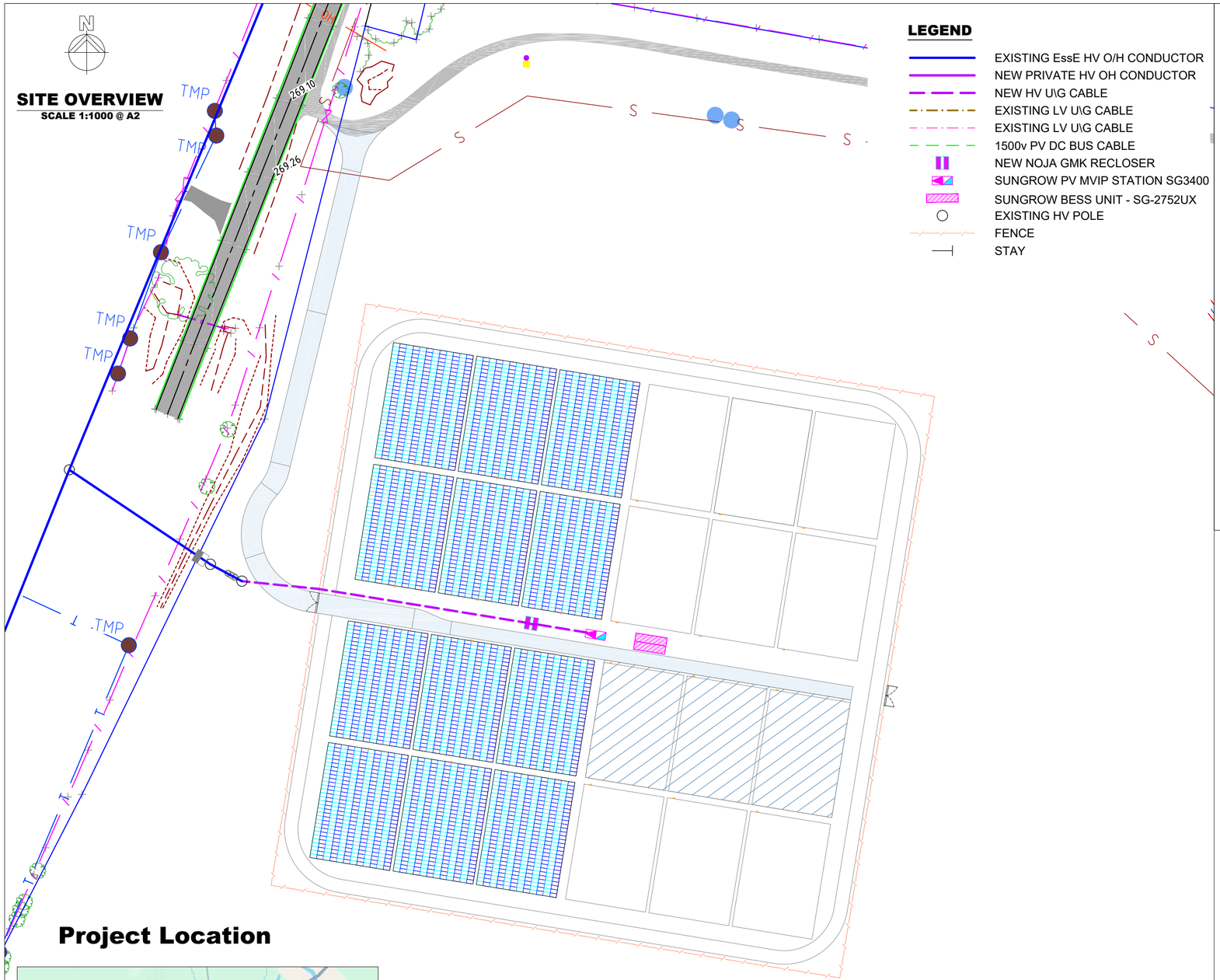
SITE OVERVIEW
SCALE 1:1000 @ A2



LEGEND

- EXISTING EssE HV O/H CONDUCTOR
- NEW PRIVATE HV OH CONDUCTOR
- NEW HV U\G CABLE
- EXISTING LV U\G CABLE
- EXISTING LV U\G CABLE
- 1500v PV DC BUS CABLE
- NEW NOJA GMK RECLOSER
- SUNGROW PV MVIP STATION SG3400
- SUNGROW BESS UNIT - SG-2752UX
- EXISTING HV POLE
- FENCE
- STAY

Project Location

EUGOWRA STAGE 1 PV ARRAY SUMMARY

- PV Module : TONGWEI TWMNH-54HD500 BI-FACIAL (500W)
- Module Dimensions - 1961mm L x 1134mm W x 30 H
- Installation Method - Jurchen Technology E/W 8° Peg System
- Inverter : Sungrow SG3400-HV
- Total no. of arrays: 2
- No. of sub-arrays: 12
- Total no. of strings: 144
- String length : 30 modules
- No. of Solar Panel Modules : 4320
- Total Nominal array DC power produced: 2,160,000W(2.16MW) under STC Conditions
- Orientation - E/W - Azimuth Rotated Approximately 9.7° West

1. Total Stage 1 installed DC Capacity to be 2.16MW DC - DC Design allows for the capacity of the solar farm to be increased by a further 2.16MW DC maximum - Shown in grey.
2.

EUGOWRA STAGE 1 BATTERY SYSTEM

- BESS : 2 x Sungrow ST-2752UX

PROJECT NOTES

1. It is the constructors responsibility to ensure that the installation as constructed complies with relevant Australian Standards including but not limited to AS/NZ 3000, AS/NZ 5033, AS/NZ 4777, AS/NZ3008, AS/NZ2067, AS1725, AS1940 AS3600
2. Constructor and/or earthworks contractor MUST carry out a "Before You Dig Australia" (BYDA) search prior to earthworks and to locate existing and any new assets.
3. A construction certificate must be obtained before any construction work begins. All Development Application (DA) conditions must be adhered to during the construction phase. Please refer to the DA for specific details.
4. All Cables to be labeled at each termination with either destination or string name.
5. Minimum spacing between solar panels and boundary security fence to be finalised after consultation between Client, Council, Firefighting requirements. SED have maintained 10m clearance as a basic requirement.
6. Contractors to Verify Cable lengths onsite.
7. SED does not bare any responsibility of the correctness of specification for Sungrow equipment & installation. Sungrow final documentation has not been released before the final release of this design package.

CAD DRAWING
DO NOT MANUALLY AMEND

AMENDMENTS

Rev.	Date:	By:	Changes:
0.1	19/12/2024	APT	PRELIMINARY RELEASE 0.1
0.2	28/01/2025	APT	Release for Council Comment on access roads and fencing.
0.3	18/03/2025	APT	Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

WORK AS EXECUTED

COMPANY:

WORK COMPLETED:
NAME (Block Letters)

SIGNED:

DATE COMPLETED:

Sustainable Energy Design P/L
Ph: (02) 6361 7567
Email: projects@sed.net.au
Postal Address: PO Box 2129 ORANGE NSW 2800
Office Site: 1/10 HAWTHORN PL ORANGE NSW 2800
ASP Accreditation No: 2659

Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

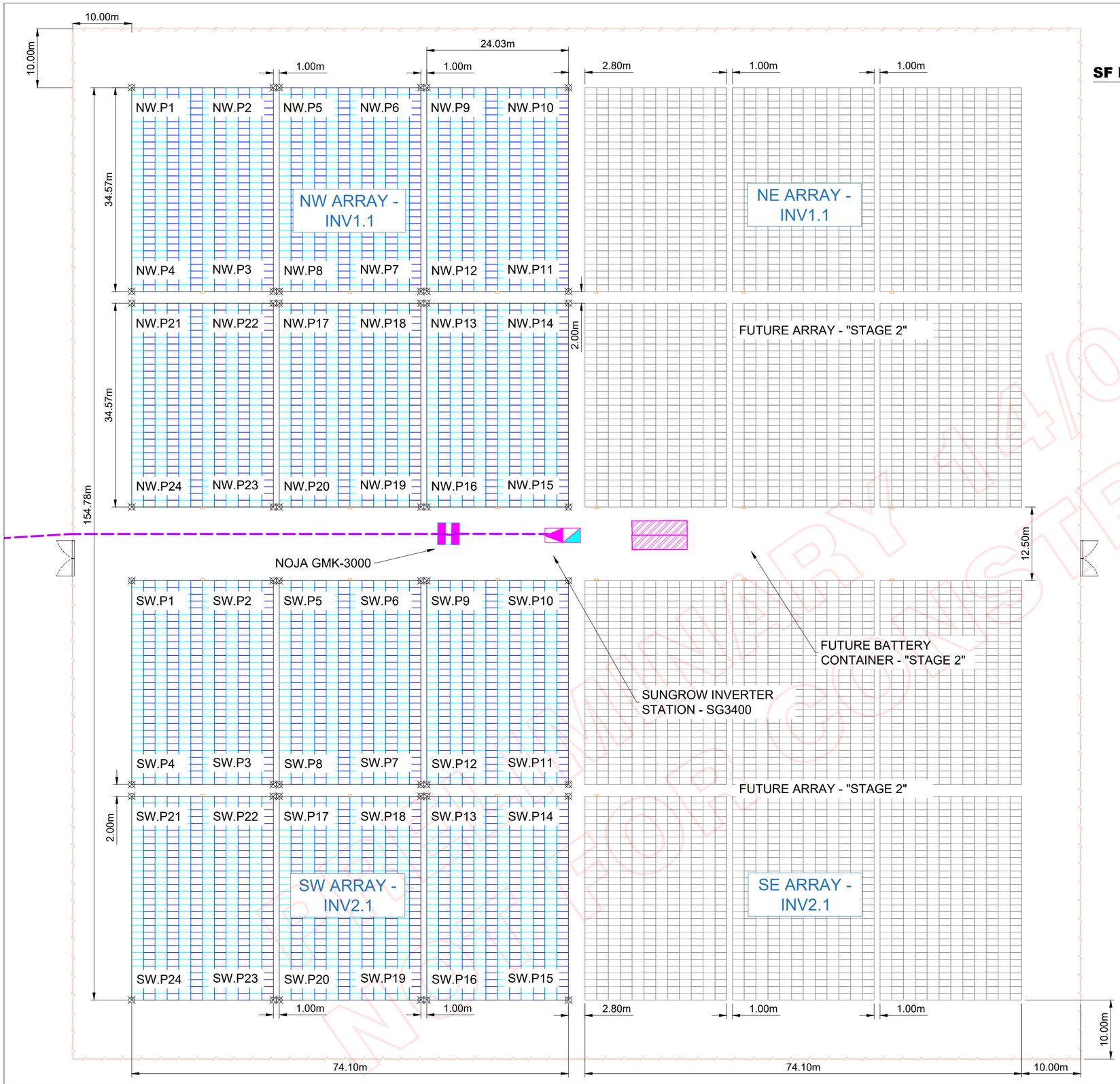
CABONNE COUNCIL

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: Site Overview

Site Address: Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	1:1000
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 1 OF 14	
Sheet Reference: S2456-DC-01	A2



SF PV ARRAY LAYOUT

SCALE 1:500 @ A2

Key

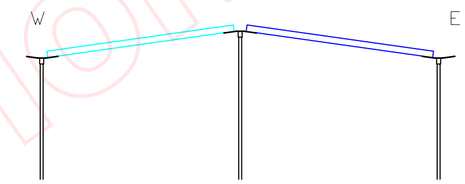
- Module Structure (West Side Module)
- Module Structure (East Side Module)
- Module Structure (Future)

Project Data

Construction Area	- 2.96 Ha
PV Area (Stage 1)	- 1.105 Ha
PV Area (Stage 2 - Future)	- 1.105 Ha
Module Orientation	- PORTRAIT
Number of Structure (12EWx30NS)	- 12
Number of Modules	- 4,320
Type of Module/Power	- TONGWEI TWMNH-54HD500 BI-FACIAL(500W)

Construction and Parameter

Construction Series JURCHEN - PEG system 8° - E/W



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PEG #	DESCRIPTION	X	Y
NW.P1	NW.01 SUB-ARRAY CORNERS	626677.65	6298059.18
NW.P2		626701.37	6298055.32
NW.P3		626695.92	6298021.79
NW.P4		626672.10	6298025.06
NW.P5	NW.02 SUB-ARRAY CORNERS	626702.36	6298055.16
NW.P6		626726.08	6298051.30
NW.P7		626720.53	6298017.18
NW.P8		626696.81	6298021.04
NW.P9	NW.03 SUB-ARRAY CORNERS	626727.07	6298051.14
NW.P10		626750.79	6298047.28
NW.P11		626745.24	6298013.16
NW.P12		626721.51	6298017.02
NW.P13	NW.04 SUB-ARRAY CORNERS	626721.19	6298015.05
NW.P14		626744.91	6298011.19
NW.P15		626739.36	6297977.07
NW.P16		626715.64	6297980.93
NW.P17	NW.05 SUB-ARRAY CORNERS	626696.49	6298019.07
NW.P18		626720.21	6298015.21
NW.P19		626714.65	6297981.09
NW.P20		626690.93	6297984.95
NW.P21	NW.06 SUB-ARRAY CORNERS	626671.78	6298023.09
NW.P22		626695.50	6298019.23
NW.P23		626689.95	6297985.11
NW.P24		626666.22	6297988.97
SOUTH WESTERN ARRAY			
SW.P1	SW.01 SUB-ARRAY CORNERS	626664.22	6297976.63
SW.P2		626687.94	6297972.77
SW.P3		626682.39	6297938.65
SW.P4		626658.66	6297942.51
SW.P5	SW.02 SUB-ARRAY CORNERS	626688.93	6297972.61
SW.P6		626712.65	6297968.75
SW.P7		626707.09	6297934.63
SW.P8		626683.37	6297938.49
SW.P9	SW.03 SUB-ARRAY CORNERS	626713.63	6297968.59
SW.P10		626737.35	6297964.73
SW.P11		626731.80	6297930.61
SW.P12		626708.08	6297934.47
SW.P13	SW.04 SUB-ARRAY CORNERS	626707.66	6297931.90
SW.P14		626731.48	6297928.63
SW.P15		626725.93	6297894.51
SW.P16		626702.21	6297898.37
SW.P17	SW.05 SUB-ARRAY CORNERS	626683.05	6297936.51
SW.P18		626706.77	6297932.65
SW.P19		626701.22	6297898.53
SW.P20		626677.50	6297902.39
SW.P21	SW.06 SUB-ARRAY CORNERS	626658.34	6297940.53
SW.P22		626682.07	6297936.67
SW.P23		626676.51	6297902.55
SW.P24		626652.79	6297906.41

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0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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NAME (Block Letters)

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Email: projects@sed.net.au
Postal Address: PO Box 2129 ORANGE NSW 2800
Office Site: 1/10 HAWTHORN PL ORANGE NSW 2800
ASP Accreditation No: 2659

Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

CABONNE COUNCIL

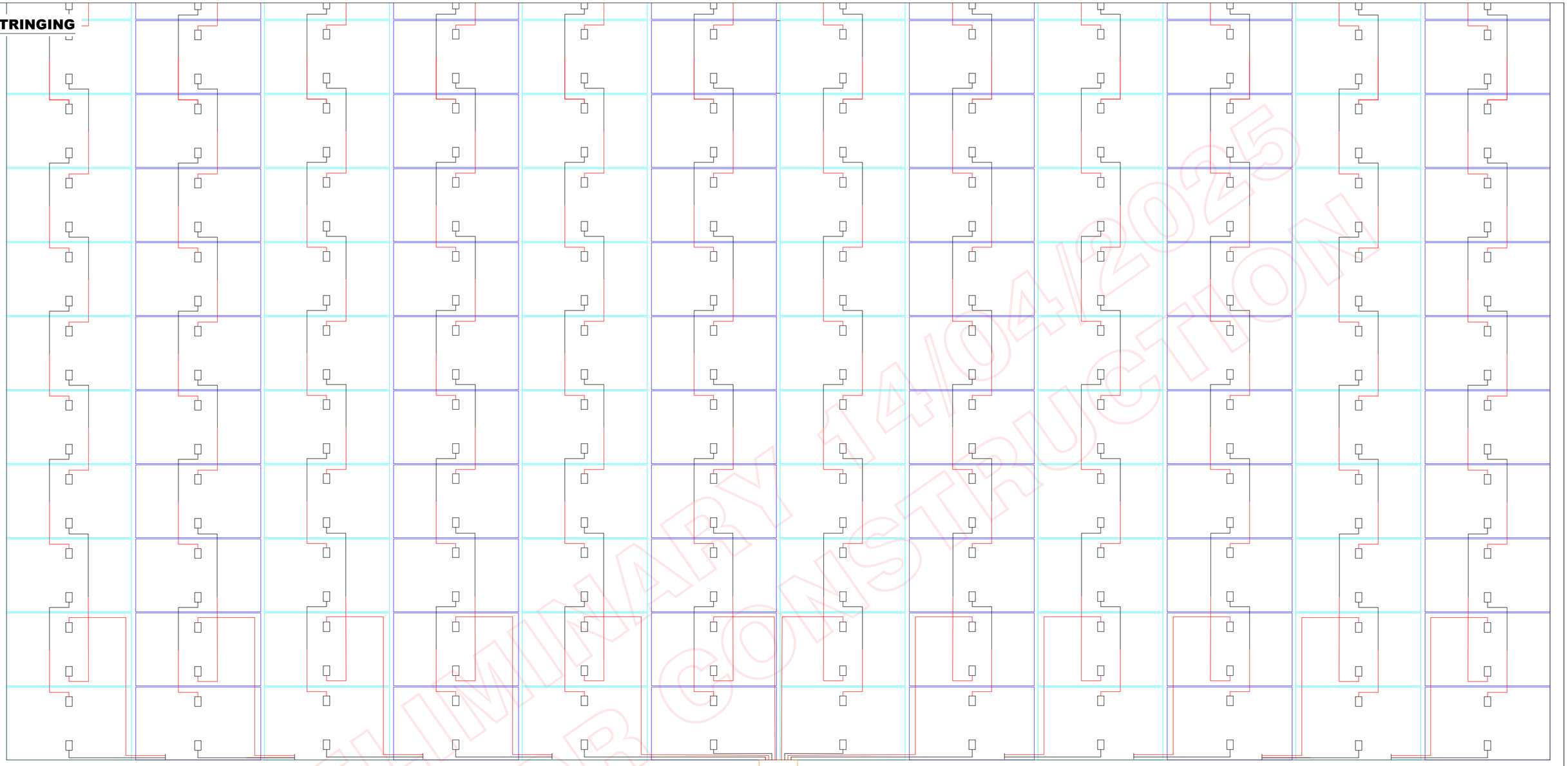
Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: PV Array Layout Detail

Site Address: Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	1:500
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 2 OF 14	
Sheet Reference:	S2456-DC-02 A2

PV STRINGING



NOTES

1. Each DC pair is to be laid together in flat formation touching so Inductive loops should be minimised. When laid in proximity to other cables, 1D spacing if laid horizontally or 4D spacing if laid in vertical groups must be maintained, as per AS/NZS3008.
2. Stringing Cables to meet IEC 62930.
3. Combiner Boxes to meet AS/NZS61439
4. All Equipment is to be bonded to inverter earth
5. Cables are to be adequately supported in a neat & tidy arrangement.

CAD DRAWING
DO NOT MANUALLY AMEND

AMENDMENTS

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Postal Address: PO Box 2129
ORANGE NSW 2800
Office Site: 1/10 HAWTHORN PL
ORANGE NSW 2800
ASP Accreditation No: 2659

Client:
Cabonne Council
99-101 Bank St
Molong NSW 2866

CABONNE COUNCIL

Job Title:
EUGOWRA SOLAR FARM
DC DESIGN

Sheet Title:
PV DC Stringing

Site Address:
Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	1:NTS
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 3 OF 14	
Sheet Reference: S2456-DC-03	A2

NORTH WEST ARRAY DC CABLING

DC Combiner NW.01

DC Combiner NW.02

DC Combiner NW.03

DC Combiner NW.06

DC Combiner NW.05

DC Combiner NW.04

2.00m

1.00m

1.00m

2.80m

All 240mm² Al Bus Cables to be shaded from sun when installed between array blocks. Cable ladder with lids is sufficient. Cable ladder should be installed so as not to restrict the thermal expansion of the array blocks. Cable ladder MUST be bonded to earth/array block metal work with bonding straps or minimum 35mm² Cu Earth Cable.

Installation should minimise restriction to access by technicians. We advise a ground based cable ladder installation using 100mm of crusher dust with weed matt underlay for vegetation control.

2 x 1.5/1.5kV 240mm² Al XLPE DC Bus Cable per Combiner Box. Cable to be installed and fixed under panels to peg system ensuring that cables are shaded. Cable cleats/brackets or cable tray acceptable.

Each DC pair is to be laid together in flat formation touching so Inductive loops should be minimised. When laid in proximity to other cables, 1D spacing if laid horizontally or 4D spacing if laid in vertical groups must be maintained, as per AS/NZS3008.

2 x 1.5/1.5kV 240mm² Al XLPE DC Bus Cable per Combiner Box. Cable to be installed and fixed under panels to peg system ensuring that cables are shaded. Cable cleats/brackets or cable tray acceptable.

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Cables to be direct buried with thermal sand bedding with a 0.8K.m/W rating minimum.

Cables to be direct buried with

HVSS-1

PVIPS-1

DCFI CAB1

LC1000

DCFI A2

COMMS

A

B

C

C

LEGEND

- 1500v DC Bus Cable
- Insulated 35mm² Earth Cable
- Insulated 70mm² Earth Cable

CAD DRAWING DO NOT MANUALLY AMEND

AMENDMENTS

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0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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NAME (Block Letters)

SIGNED:

DATE COMPLETED:

Sustainable Energy Design P/L
Ph: (02) 6361 7567
Email: projects@sed.net.au
Postal Address: PO Box 2129 ORANGE NSW 2800
Office Site: 1/10 HAWTHORN PL ORANGE NSW 2800
ASP Accreditation No: 2659

Client: Cabonne Council 99-101 Bank St Molong NSW 2866

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: DC Cable Bus NW Array

Site Address: Eugowra Sewerage Treatment Plant 255 Casuarina Drive Eugowra NSW 2866

Scale	1:125
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**

SHEET 4 OF 14

Sheet Reference: S2456-DC-04

A2

SOUTH WEST ARRAY
DC CABLING

DC Combiner SW.07

DC Combiner SW.08

DC Combiner SW.09

DC Combiner SW.12

DC Combiner SW.11

DC Combiner SW.10

PVIPS-1

DCFI CAB2

ST_COMMS

A

B

C

D

Cables to be direct buried with thermal sand bedding with a 0.8K.m/W rating minimum.

All 240mm² Al Bus Cables to be shaded from sun when installed between array blocks. Cable ladder with lids is sufficient. Cable ladder should be installed so as not to restrict the thermal expansion of the array blocks. Cable ladder MUST be bonded to earth/array block metal work with bonding straps or minimum 35mm² Cu Earth Cable.

2 x 1.5/1.5kV 240mm² Al XLPE DC Bus Cable per Combiner Box. Cable to be installed and fixed under panels to peg system ensuring that cables are shaded. Cable cleats/brackets or cable tray acceptable.

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Installation should minimise restriction to access by technicians. We advise a ground based cable ladder installation using 100mm of crusher dust with weed matt underlay for vegetation control.

LEGEND

- 1500v DC Bus Cable
- Insulated 35mm² Earth Cable
- Insulated 70mm² Earth Cable

CAD DRAWING DO NOT MANUALLY AMEND

AMENDMENTS

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0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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Email: projects@sed.net.au
Postal Address: PO Box 2129 ORANGE NSW 2800
Office Site: 1/10 HAWTHORN PL ORANGE NSW 2800
ASP Accreditation No: 2659

Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

CABONNE COUNCIL

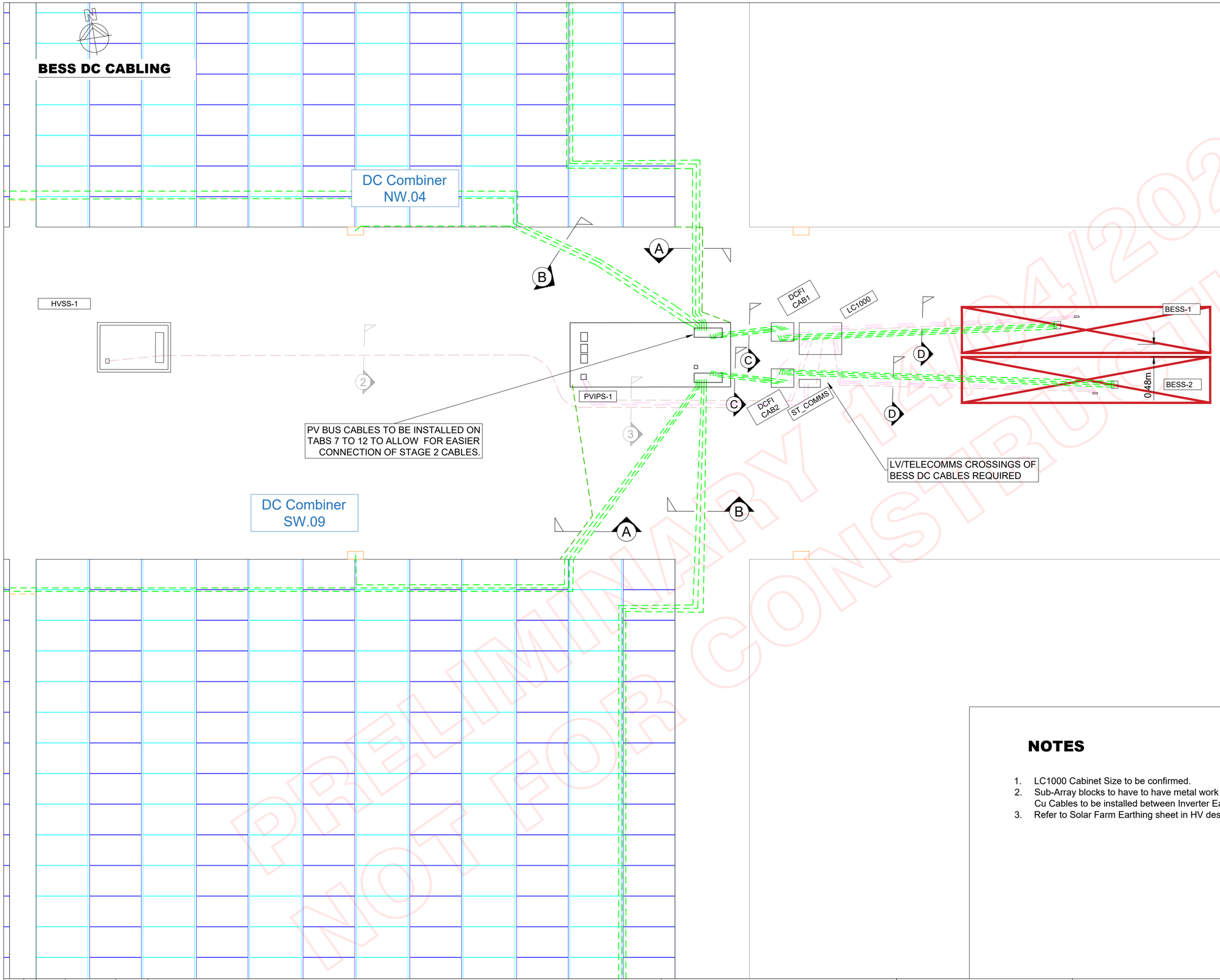
Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: DC Cable Bus SW Array

Site Address: Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	1:125
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 5 OF 14	
Sheet Reference: S2456-DC-05	A2

BESS DC CABLING



LEGEND

- 1500v DC Bus Cable
- Insulated 35mm² Earth Cable
- Insulated 70mm² Earth Cable
- LV Cable/Conduit
- Telecomms Cable/Conduit

NOTES

1. LC1000 Cabinet Size to be confirmed.
2. Sub-Array blocks to have to have metal work earthed between arrays using 35mm² Cu insulated earth cable. 70mm² Cu Cables to be installed between Inverter Earth point and first Sub-array connected.
3. Refer to Solar Farm Earthing sheet in HV design for full Earthing details.

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0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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WORK COMPLETED:_____
NAME (Block Letters)

SIGNED:_____

DATE COMPLETED:_____

Sustainable Energy Design P/L
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Email: projects@sed.net.au
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Office Site: 1/10 HAWTHORN PL ORANGE NSW 2800
ASP Accreditation No: 2659

Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

CABONNE COUNCIL

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: DC Cable - BESS

Site Address: Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

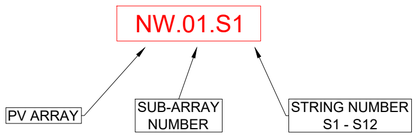
Scale	1:100
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**

SHEET 6 OF 14

Sheet Reference: S2456-DC-06

A2

SOLAR FARM LABELLING SCHEME:



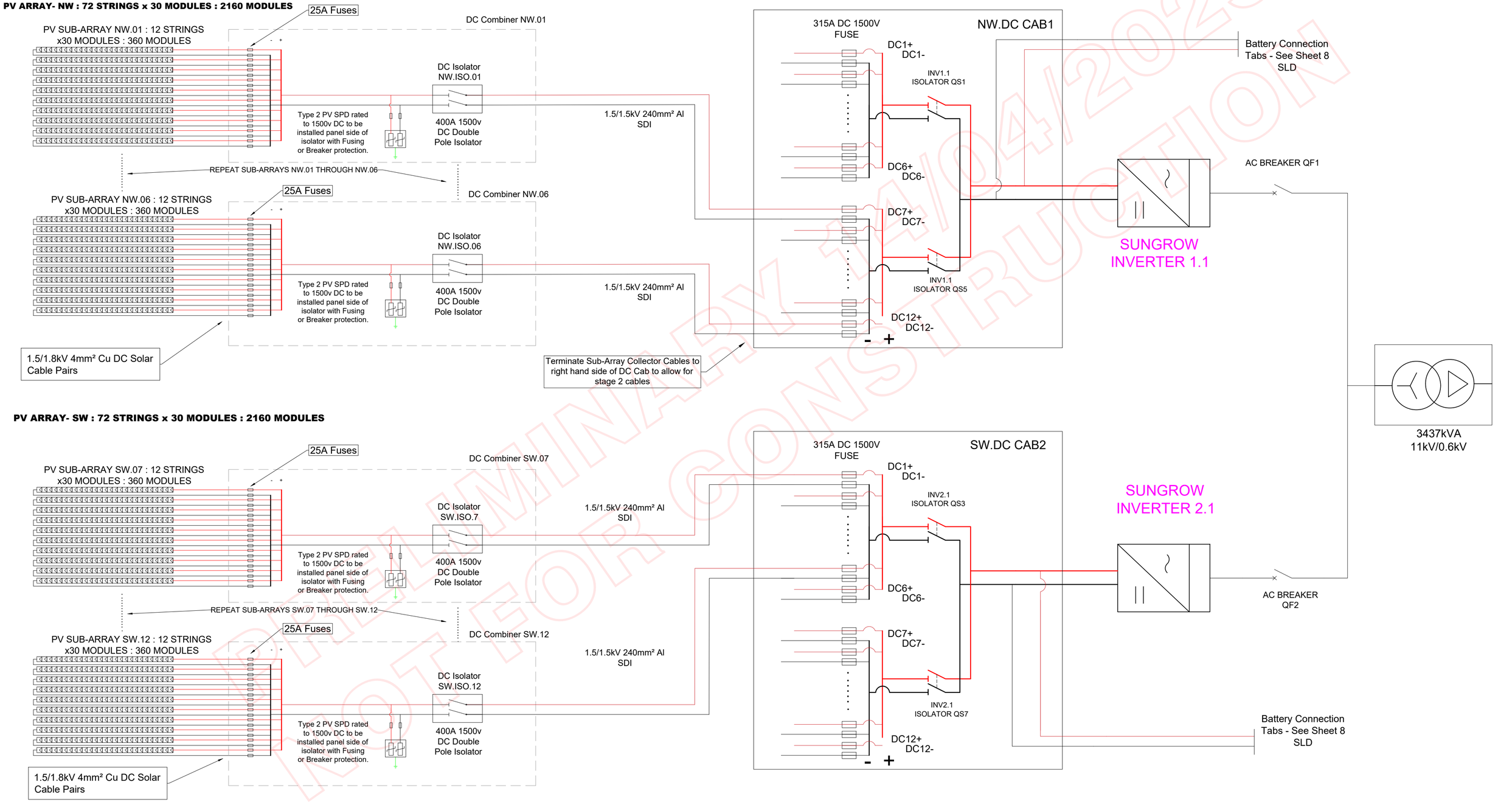
WARNING: MULTIPLE SOURCES OF SUPPLY

OPENING ISOLATORS MAY NOT ISOLATE ALL SOURCES OF ELECTRICITY & CABLES CAN STILL BE LIVE EVEN AFTER SWITCHING.

NOTES

1. All PV String Cables to be labeled as per naming scheme in SLD.
2. Fuses holders to have string labels fixed above to be correctly identified.
3. DC Bus cables to have destination + terminal labels on cable tags attached.
4. ARC flash study has not been conducted on Equipment & Switchgear - The Arc flash incident energy should be determined and appropriate Archflash PPE specified for switching & work on and near live Electrical cables/terminals. PPE to be worn as specified to AS4836, NENS09, IEEE1584.
5. Prior to construction - contractor to confirm that all designs are finalised with principle.

PV ARRAY- NW : 72 STRINGS x 30 MODULES : 2160 MODULES



PV ARRAY- SW : 72 STRINGS x 30 MODULES : 2160 MODULES

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DATE COMPLETED:

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Office Site: 1/10 HAWTHORN PL ORANGE NSW 2800
ASP Accreditation No: 2659

Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

CABONNE COUNCIL

Job Title:
EUGOWRA SOLAR FARM
DC DESIGN

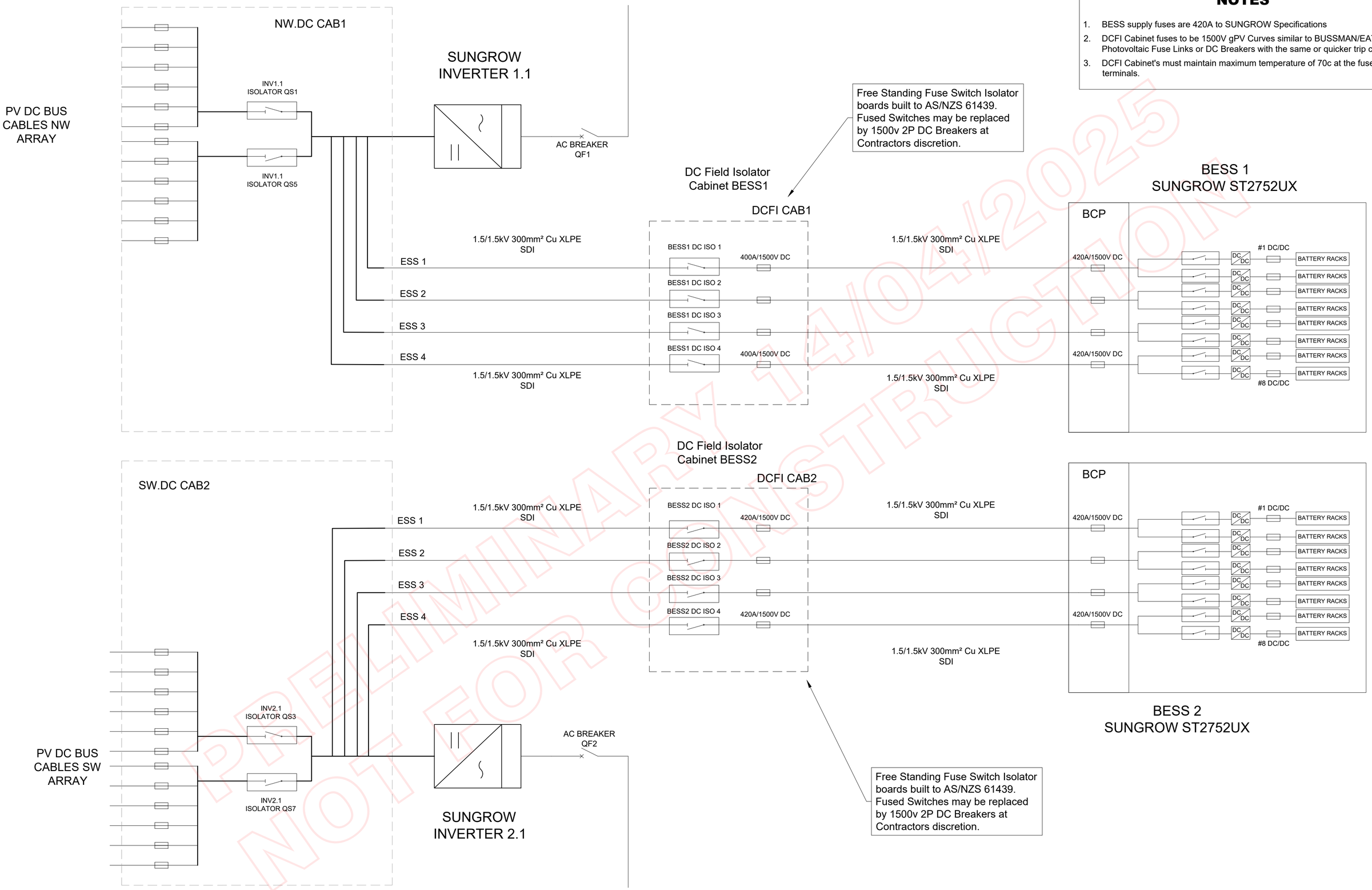
Sheet Title:
PV DC STRINGING SLD

Site Address:
Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 7 OF 14	
Sheet Reference:	A2
S2456-DC-07	

NOTES

1. BESS supply fuses are 420A to SUNGROW Specifications
2. DCFI Cabinet fuses to be 1500V gPV Curves similar to BUSSMAN/EATON Photovoltaic Fuse Links or DC Breakers with the same or quicker trip curves.
3. DCFI Cabinet's must maintain maximum temperature of 70c at the fuse terminals.



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Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: BESS DC SLD

Site Address: Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 8 OF 14	
Sheet Reference:	S2456-DC-08
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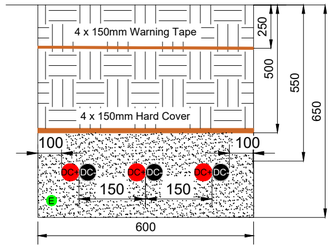
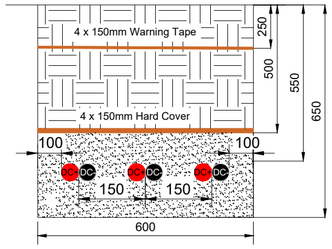
A



6 x 1C SDI (3 Pairs) 1500V DC 240mm^2 AL XLPE (Direct Buried)
1 x 1C 70mm² Cu Yellow/Green Covered PVC Earth Cable

Cables to be bed in thermal sand - Minimum 50mm surrounded in all directions

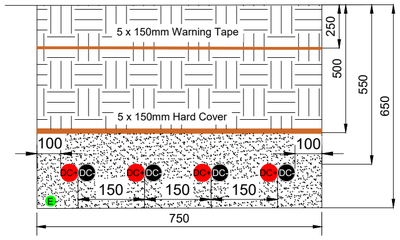
B



6 x 1C SDI (3 Pairs) 1500V DC 240mm^2 AL XLPE (Direct Buried)

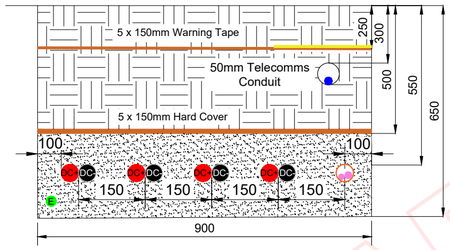
Cables to be bed in thermal Sand - Minimum 50mm surrounded in all directions

C



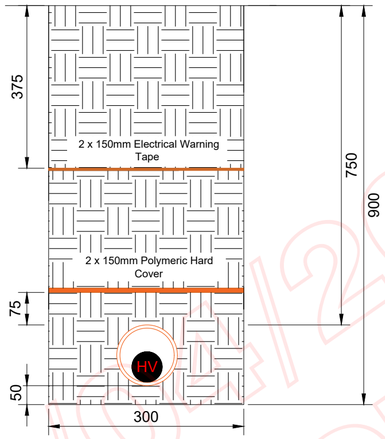
4 x 1C SDI (6 Pairs) 1500V DC 300mm^2 Cu XLPE (Direct Buried)
1 x 1C 70mm2 Cu Yellow/Green Covered PVC Earth Cable

D



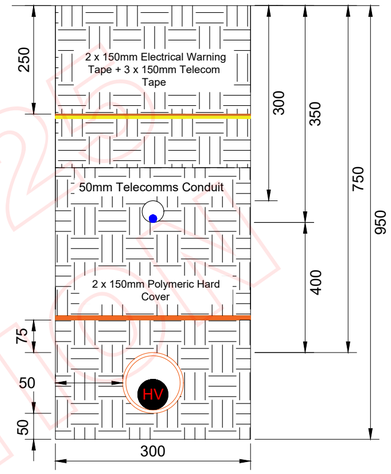
4 x 1C SDI (6 Pairs) 1500V DC 300mm^2 Cu XLPE (Direct Buried)
1 x 1C 70mm2 Cu Yellow/Green Covered PVC Earth Cable
1 x 4C+E 25mm² Cu 600/1000v Cable In Conduit (TBC)
1 x 2C+E 2.5mm² Cu 600/1000v Cable in Conduit (TBC)
1 x 50mm Orange HD Electrical Conduit
1 x 50mm White Telecomms Conduit

HV Only Trench Section 1



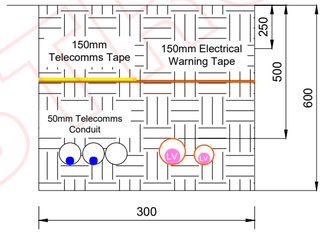
1 x 125mm LD Orange PVC Conduit (HV)
1 x 240mm² AL XLPE 11kV Cable

HV & Communication Shared Trench Section 2



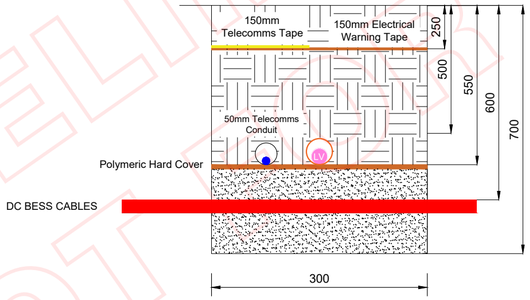
1 x 50mm White Telecommunications Conduit
1 x 125mm LD Orange PVC Conduit
1 x 240mm² AL XLPE 11kV Cable
1 x Cat 5e (MIN) STP Cable

Trench Section 3



3 x 50mm White Telecommunications Conduit
1 x 50mm HD Orange PVC Conduit
1 x 25mm² Cu 4C+E 600/1000v XLPE Cable In Conduit
1 x 32mm HD Orange PVC Conduit
1 x 2.5mm² Cu 2c+E 600/1000v Cable In Conduit

TYPICAL LV/1500V DC Cable Crossing



LV Cable to be in HD PVC Conduit for CATEGORY A Wiring System.

Minimum Depth of Cover for Telecomms Conduit to be 300mm

Minimum 50mm Clearance to DC 1500V Cables

TRENCH LEGEND

- EARTH BACKFILL
- THERMAL SAND 0.8K.m/W SPECIFICATION
- ROAD SURFACE
- ROAD BASE

NOTES

1. Electrical warning tape to extend the full width of the trench
2. 50mm Minimum separation between Cables crossing 1500V DC Cables with hardcover protection for the DC Cables.
3. Minimum depth for Telecommunications Conduits is 300mm.

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AMENDMENTS

Rev.	Date:	By:	Changes:
0.1	19/12/2024	APT	PRELIMINARY RELEASE 0.1
0.2	28/01/2025	APT	Release for Council Comment on access roads and fencing.
0.3	18/03/2025	APT	Added HV Cable Trench Sections & Thermal Sand requirements for backfill. Added Sections B & C
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

WORK AS EXECUTED

COMPANY:

WORK COMPLETED:
NAME (Block Letters)

SIGNED:

DATE COMPLETED:

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ASP Accreditation No: 2659

Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

CABONNE COUNCIL

Job Title:
EUGOWRA SOLAR FARM
DC DESIGN

Sheet Title: Trench Sections - DC Design

Site Address:
Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**

SHEET 9 OF 14

Sheet Reference: S2456-DC-09

A2

Configuration List SG3400HV-MV

Items	Item Name	Specification
SG3400HV-MV (Must meet AS/NZS Standards)		
Inverter Electrical Specifications	Number of MPPTs	Two
	IP Protection Level	Outdoor IP65
	Corrosivity Category(Enclosure)	C5
	Number of DC Inputs	24
	Negative Grounding or Floating	Floating
	DC Load Break Switches	4 OF 2-Pole 1500V DC load-break switches with 2500A
	DC Fuse Sizes	315A Fuses + 8 * Spares (56 in Total)
	Fuse fixed	Bolted
	DC SPD Type	Type I+II - Surge Protection devices to be protected by appropriate sized fuse
	Grid Forming Inverter / Grid Following Inverter	Grid Following Inverter
	Positive Fuse or Negative Fuse	Positive and Negative Fuse
	PID Solution	Yes
	PV Inverter AC Breaker	Two of 690V 2000A 3 Pole AC Breaker (With Shunt Trip Option)
	AC Insulation Monitoring	Yes
	Q at Night	Yes
	AC SPD Type	Type I+II - Surge Protection devices to be protected by appropriate sized fuse
	DC Coupled Storage Interface	Yes
	DC Ground Fault Protection	Yes
Enclosure/SKID/Container Mechanical Specifications	Protection Level	Outdoor IP54
	Corrosivity Category	C5M
	Cable Entry	Bottom entry rectangle metallic cover
	Color	RAL7035
	Dimension	Standard 20ft HC container
	Inverter Station LV Interlock	Interlocking between the switchgear and the rotary switch of LV circuit breaker.
	Inverter Station MV Interlock	Interlocking between the MV RMU Switchgear and the MV Cable Covers on all legs of RMU
	Oil Leakage Tray	Yes - Standard 110% capacity（with oil-water separator）
	L-shaped fixation plate	Yes
	Emergency Stop	Additional Emergency stop button tripping MV breaker and inverter DC/AC switch, Conservator with Bladder
MV Transformer	Description	Oil immersed, Inverter duty, Conservator type, Dy11, RAL 7035, KNAN
	Capacity	Rated 3437kVA @ 45°C Ambient
	Efficiency/Loss	99% @Pn&Upf
	Oil Type	K-Type Bio-Degradeable Oil High Temperature/Performance Insulating Oil, Suitable for Conservator Type Tx, Cargil FR3
	IP protection	IP68 for Oil tank, other parts IP54
	Corrosivity Category	C5M
	Basic Protective Devices	Oil Temperature, Oil Level, Pressure Relief
	Oil temperature display	Yes
	Gas/Buchholz Relay	Yes
	Winding-temperature Indicator	Yes
	Altitude	≤1000m
	Medium Voltage	11kV
	Frequency	50Hz
	Winding Material	Al
	Design Ambient Temperature	50°C
	TX MAX Temperature Rise (Winding Temp/Oil Temp)	60°C/50°C
RMU	Model/Type Descriptions	24kV SF6
	Frequency	50Hz
	RMU panel description	RMU CONFIGURATION Manufacturer - ABB SAFERING CCV Configuration 1st Leg = Load Break Switch + Interlocked Cable Earth Switch 2nd Leg = Load Break Switch + Interlocked Cable Earth Switch 3rd Leg = HV Load Break Switch + Interlocked Cable Earth Switch & Circuit Breaker with Interlock between CB and Isolator.
	Protective Relay	ABB REF615D with Relay Functions - ANSI 50, 50N, 51, 51N, 68
	Motor operation	Only for Vacuum Circuit Breaker
	Short circuit withstand current	20kA/3s
	Internal Arc	IAC AFL 20kA/1s
	Surge Arrester	None
	Input Cable Runs/Sets for Single Cabinet	2 sets (cover 1 cable/phase situation)
	RMU internal Interlock	HV Cable Load Break Switch interlocked with Cable Earth Switches HV Isolator Switches to be Interlocked with Cable Earth Switch HV Breaker to be Interlocked to HV Isolator to prevent operation of HV Isolator under Load
	Quantity of insulation cap for the last transformer in a ring network	Yes (THREE OF/ ONE SET)
	SF6 low pressure signal	Yes
	VCB, SD, LBS and earthing switch status signal	Yes
Auxiliary power panel	Aux. Transformer	Dry 30kVA 3phase
	Aux. Transformer voltage	Secondary Side Output Voltage to be 400v P-P / 230V P-N
	Socket Type	None
	RCD(MCB)	4 pcs 1P+N MCBs with 30mA RCD Protection Total 1 x 10A 1P+N RCBO (30mA Earth Leakage Protection) 2 OF 4P MCBs without RCD(main switch)
	Ethernet Switch	1 Ethernet switch with 2 Fiber ports and 6 Ethernet ports
	Splice Box	4-input and 12-ouput
	Power meter/ MFM	None
	UPS	2kVA with 100W 2 hour VRLA battery for internal communication unit and RMU motor supply
Station internal Accessories	Smoke Detector	Yes with contact output
	Humidity sensor with space heater	RMU room
	LOTO	no
	Language	All in English including but not limited to manuals, All Labels/ Warning Signs/ Name Plates etc
	Terminals for auxiliary (60kVA for LC auxiliary)	AC Auxillary Supply for up to 2 x ST-2752-UX BESS Containers

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AMENDMENTS

Rev.	Date:	By:	Changes:
0.1	19/12/2024	APT	PRELIMINARY RELEASE 0.1
0.2	28/01/2025	APT	Release for Council Comment on access roads and fencing.
0.3	18/03/2025	APT	Released to Council for Comments.
0.4	01/04/2025	APT	Revised HV RMU SPEC and fixed Typo
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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ASP Accreditation No: 2659

Client: Cabonne Council
99-101 Bank St
Molong NSW 2866

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: SG 3400 INVERTER SPECIFICATION

Site Address: Eugowra Sewerage Treatment Plant 255 Casuarina Drive Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 10 OF 14	
Sheet Reference: S2456-DC-10	A2

Configuration List ST-2752UX & Ancillary

Items	Item Name	Specification
ST-2752UX (Must meet AS/NZS Standards)		
Battery Specs	Total Capacity	2752KwHr
	System Voltage	1500V
	Cell Chemistry	LFP
	Discharge Rate	0.5C
	Number of DC/DC Converters	8 x SD175HV
	Number of DC Inputs Pairs	4
	Out Going DC Fuse Sizes	420A Fuses + 4 * Spares (12 in Total for each BESS)
	Fuse fixed	Bolted
	Positive Fuse or Negative Fuse	Positive and Negative Fusing
Enclosure Mechanical Specifications	Protection Level	Outdoor IP54
	Corrosivity Category	C5M
	Cable Entry	Bottom entry rectangle metallic cover
	Color	RAL7035
	Back to Back Mounting Brackets	YES
LC-1000 Control Cabinet (Must meet AS/NZS Standards)		
LC1000	Number of Battery Containers to Support	2 (Both 0.5C)
	AUX TX	YES (600V/400V to Support 2 x Battery Liquid Cooling Systems up to 60KVA)
	Backup/UPS Function	Yes - Enough reserve to run cooling system long enough to have batteries cool down and system to be able to shut down in a controlled manner. Power to Fire Control System to be maintained even when system is in standby. (two hour minimum)
	Aux Supply Breaker Requirements	2 x 400v 30kVA for Battery Liquid Cooling System 4 x 230v 2p Breakers for Site LV Aux Requirements - FACP - 6A MCCB - Solar Farm ST_COMMS Site Control Board - 10A MCCB - 2 x DC Field Isolator cabinets DCISO_CAB1/DCISO_CAB2 Aux Supply (Cabinet Cooling fans)
	Fibre Splice Box	No - Not Required - connection via Ethernet
	Communications	Enough Spare Ports on Switch 2 for connection to Solar Farm SCADA system via Ethernet.
	Cable Entry	Bottom entry rectangle metallic cover
	Cabinet Protection Level	Outdoor IP54

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0.3	18/03/2025	APT	Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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ASP Accreditation No: 2659

Client:
Cabonne Council
99-101 Bank St
Molong NSW 2866

CABONNE COUNCIL

Job Title:
EUGOWRA SOLAR FARM
DC DESIGN

Sheet Title: BESS ST-2752UX SPECIFICATION

Site Address:
Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 11 OF 14	
Sheet Reference: S2456-DC-11	A2

BESS DC FIELD ISOLATION SWITCHBOARD SPEC SHEET

ELECTRICAL SYSTEM	
CHARACTERISTICS	**USER REQUIREMENT**
Applicable Standard	AS/NZS61439
Nominal voltage (L-L or L-N)	1500V DC
Transient voltages	IV
Rated frequency in Hz	DC
SHORT CIRCUIT WITHSTAND CAPABILITY	
Prospective short circuit current at the supply terminals - Icp (kA)	10kA 3s
Prospective short circuit current in the protective circuit	100%
SPCD (Short circuit protective device) in the incoming functional unit requirement	YES
PROTECTION OF PERSONS AGAINST ELECTRIC SHOCK IN ACCORDANCE WITH IEC 60364-4-41	
Type of protection against electric shock — Basic protection (protection against direct contact)	Basic protection
Type of protection against electric shock — Fault protection (protection against indirect contact)	Automatic disconnection of supply/electrical separation/total insulation
INSTALLATION ENVIRONMENT	
Location type	Outdoor
Protection against ingress of solid foreign bodies and ingress of water	IP 56
Resistance to UV radiation (applies for outdoor assemblies only unless specified otherwise).	Warm Temperate Climate
Resistance to corrosion	Outdoor Arrangements
Ambient air temperature — Lower limit	Outdoor -25 °C
Ambient air temperature — Upper limit	40°C
Ambient air temperature — Daily average maximum	35°C
Maximum relative humidity	Outdoor 100% at 25 °C
Pollution degree (of the installation environment)	3
Altitude	Less than or equal to 1000m
Specify special service conditions (e.g. vibrations, exceptional condensation, heavy pollution, corrosive environment, strong electric or magnetic fields, fungus, small creatures, explosion hazards, heavy vibrations and shocks, earthquakes)	No special service conditions
INSTALLATION METHODS	
Type	Steel Plinth
Stationary/movable	Stationary
External conductor type (s)	Cable
Direction(s) of external conductor entering the assembly	Bottom
External conductor material	Copper
External phase conductor, cross sections and terminations	As defined within AS/NZS61439 Standard
External PE, N, PEN conductors cross sections, and terminations	As defined within AS/NZS61439 Standard
STORAGE AND HANDLING	
Maximum dimensions and weight of transport units	1500kg
Methods of transport (e.g. forklift, crane)	Forlift
OPERATING ARRANGEMENTS	
Access to manually operated devices	Authorised Persons
Location of manually operated devices	Front
Isolation of load installation equipment	Individual
MAINTENANCE AND TESTING CAPABILITIES	
Method of functional unit's connection	Fixed
Form of separation	Form-3B
CURRENT CARRYING CAPABILITY	
Rated current of the Assembly	4 x 400amp
Rated current of circuits	4 x 400amp
Rated diversity factor	1
PROTECTION REQUIREMENTS	
Fuse / Protection Maximum current	400A
Protection Curves	Fuse Curves to be gPV similar to BUSSMAN/EATON Photovoltaic Fuse Links or DC Breakers with the same or quicker trip curves
Cabinet terminal Maximum Temperature	DCFI Cabinet's must maintain maximum temperature of 70c at the fuse terminals.

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0.1	19/12/2024	APT	PRELIMINARY RELEASE 0.1
0.2	28/01/2025	APT	Release for Council Comment on access roads and fencing.
0.3	18/03/2025	APT	Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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CABONNE COUNCIL

Job Title:
EUGOWRA SOLAR FARM
DC DESIGN

Sheet Title: BESS DC Field Isolator (DCFI) Board Requirements

Site Address:
Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 12 OF 14	
Sheet Reference: S2456-DC-11	A2

PV DC COMBINER SWITCHBOARD SPEC SHEET

ELECTRICAL SYSTEM	
CHARACTERISTICS	**USER REQUIREMENT**
Applicable standard	AS/NZS61439
Nominal voltage (L-L or L-N)	1500V DC
Rated frequency in Hz	DC
SHORT CIRCUIT WITHSTAND CAPABILITY	
Prospective short circuit current at the supply terminals - Icp (kA)	10kA 1s
Prospective short circuit current in the protective circuit	100%
SPCD (Short circuit protective device) in the incoming functional unit requirement	No
PROTECTION OF PERSONS AGAINST ELECTRIC SHOCK IN ACCORDANCE WITH IEC 60364-4-41	
Type of protection against electric shock — Basic protection (protection against direct contact)	Basic protection
Type of protection against electric shock — Fault protection (protection against indirect contact)	Automatic disconnection of supply /electrical separation/total insulation
INSTALLATION ENVIRONMENT	
Location type	Outdoor
Protection against ingress of solid foreign bodies and ingress of water	IP 56
Resistance to UV radiation (applies for outdoor assemblies only unless specified otherwise),	Warm Temperate Climate
Resistance to corrosion	Outdoor Arrangements
Ambient air temperature — Lower limit	Outdoor -25 °C
Ambient air temperature — Upper limit	40°C
Ambient air temperature — Daily average maximum	35°C
Maximum relative humidity	Outdoor 100% at 25 °C
Pollution degree (of the installation environment)	3
Altitude	Less than or equal to 1000m
INSTALLATION METHODS	
Type	Plinth or Post Mounted
Stationary/movable	Stationary
Maximum overall dimensions and weight	Final structure to be higher than lowest point of top plan of solar panels
External conductor type (s)	Cable
Direction(s) of external conductor entering the assembly	Bottom
External conductor material	Copper for conductors under 150mm2 and Aluminium for conductors 150mm2 or above
External phase conductor, cross sections and terminations	As defined within AS/NZS61439 Standard
External PE, N, PEN conductors cross sections, and terminations	As defined within AS/NZS61439 Standard
Special terminal identification requirements	AS Per DC Design
OPERATING ARRANGEMENTS	
Access to manually operated devices	Authorised Persons
Location of manually operated devices	Front
Isolation of load installation equipment	Individual
MAINTENANCE AND UPGRADE CAPABILITIES	
Method of functional unit's connection	Fixed
Protection against direct contact with hazardous live internal parts during maintenance or upgrade (e.g. functional units, main busbars, distribution busbars)	Protection during testing
Form of separation	Form-1
Capability to test individual operation of the auxiliary circuits relating to specified circuits while the functional unit is isolated	Yes
CURRENT CARRYING CAPABILITY	
Rated current of the Assembly	400amp
Rated current of circuits	12 x 25amp
Rated diversity factor	1
PROTECTION REQUIREMENTS	
Fuse / Protection Maximum current	Up stream315A Fuse (Hollyland 2XLPV315U15)
Protection Curves	Fuse Curves to be gPV similar to BUSSMAN/EATON Photovoltaic Fuse Links or DC Breakers with the same or quicker trip curves
Cabinet terminal Maximum Temperature	Cabinet's must maintain maximum temperature of 70 Celius at the terminals.

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Job Title:
EUGOWRA SOLAR FARM
DC DESIGN

Sheet Title: PV DC Combiner Box Requirements

Site Address:
Eugowra Sewerage Treatment Plant
255 Casuarina Drive
Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
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Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 13 OF 14	
Sheet Reference: S2456-DC-12	A2

CABLE SCHEDULE (DC BUS)

FROM	TO	CABLE DETAILS	EST. ROUTE LENGTH (m)	EST. CABLE LENGTH (m)
DC ISOLATOR NW.01	SUNGROW INVERTER 1.1 NW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	104	114
DC ISOLATOR NW.02	SUNGROW INVERTER 1.1 NW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	79	89
DC ISOLATOR NW.03	SUNGROW INVERTER 1.1 NW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	54	64
DC ISOLATOR NW.04	SUNGROW INVERTER 1.1 NW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	14	24
DC ISOLATOR NW.05	SUNGROW INVERTER 1.1 NW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	41	51
DC ISOLATOR NW.06	SUNGROW INVERTER 1.1 NW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	67	77
DC ISOLATOR SW.01	SUNGROW INVERTER 2.2 SW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	69	79
DC ISOLATOR SW.02	SUNGROW INVERTER 2.2 SW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	44	54
DC ISOLATOR SW.03	SUNGROW INVERTER 2.2 SW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	18	28
DC ISOLATOR SW.04	SUNGROW INVERTER 2.2 SW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	58	68
DC ISOLATOR SW.05	SUNGROW INVERTER 2.2 SW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	83	93
DC ISOLATOR SW.06	SUNGROW INVERTER 2.2 SW.DC CAB1	2 x 1.5/1.5kV DC 1C 240mm² Al SDI XLPE	109	119
SUNGROW INVERTER 1.1 NW.DC CAB1	DCFI1 (BESS1 FIELD ISOLATOR CABINET)	8 x 1.5/1.5kV DC 1C 300mm² Cu XLPE SDI	3	11
SUNGROW INVERTER 2.2 SW.DC CAB1	DCFI2 (BESS2 FIELD ISOLATOR CABINET)	8 x 1.5/1.5kV DC 1C 300mm² Cu XLPE SDI	3	11
DCFI1 (BESS1 FIELD ISOLATOR CABINET)	BESS-1 BCP CABINET	8 x 1.5/1.5kV DC 1C 300mm² Cu XLPE SDI	11	19
DCFI2 (BESS2 FIELD ISOLATOR CABINET)	BESS-2 BCP CABINET	8 x 1.5/1.5kV DC 1C 300mm² Cu XLPE SDI	13	21

DC DESIGN LABEL SCHEDULE

LOCATION	ITEM	LABEL	LABEL STYLE	QTY
DC COMBINER CABINET FOR EACH SUB-ARRAY	LABEL FOR EACH SUB-ARRAY - CAPTURING ALL COMBINER CABINET SUPPLYING SUNGROW INVERTER 1.1. "DC COMBINER CAB NW.01" .... TO "DC COMBINER CAB NW.06"	DC COMBINER CAB NW.01 --- DC COMBINER CAB NW.06	LARGE	1 of each (6 TOTAL)
	LABEL FOR EACH DC ISOLATOR - CAPTURING ALL ISOLATORS SUPPLYING SUNGROW INVERTER 1.1. "DC ISOLATOR NW.ISO.01" .... TO "DC ISOLATOR NW.ISO.06"	DC ISOLATOR NW.ISO.01 --- DC ISOLATOR NW.ISO.06	SMALL	
DC COMBINER CABINET ON END OF SUB-ARRAY STRINGS	LABEL FOR EACH SUB-ARRAY - CAPTURING ALL COMBINER CABINET SUPPLYING SUNGROW INVERTER 2.1 "DC COMBINER CAB SW.07" .... TO "DC COMBINER CAB SW.12"	DC COMBINER CAB SW.07 --- DC COMBINER CAB SW.12	LARGE	1 of each (6 TOTAL)
	LABEL FOR EACH DC ISOLATOR - CAPTURING ALL ISOLATORS SUPPLYING SUNGROW INVERTER 2.1. "DC ISOLATOR SW.ISO.07" .... TO "DC ISOLATOR SW.ISO.12"	DC ISOLATOR SW.ISO.07 --- DC ISOLATOR SW.ISO.12	SMALL	
SOLAR FARM ACCESS GATE AND EVERY 50m ALONG PERIMETER	DANGER SIGN FOR 1500V DC INSIDE SOLAR FARM - OUTDOOR RATED LABELS	DANGER 1500V DC AUTHORISED ACCESS ONLY	OUTDOOR - 'DANGER'	18
DC COMBINER CABINET ON END OF SUB-ARRAY STRINGS	ARCFLASH DANGER SIGN TO BE ATTACHED TO EACH COMBINER CABINET	DANGER - ARCFLASH HAZARD	OUTDOOR - 'DANGER'	12
DC FIELD ISOLATION CABINETS FOR BATTERY 1 INVERTER DISCONNECTS	CABINET LABEL TO BE PLACED ON DOOR AT LEGIBILE HEIGHT	DCIF CAB1	LARGE	1
	LABEL FOR EACH DC ISOLATOR - CAPTURING ALL ISOLATORS SUPPLYING BESS 1 (4 IN TOTAL) "BESS1 DC ISO1 " TO BESS1 DC ISO 4"	BESS1 DC ISO1 --- BESS1 DC ISO 4	SMALL	4
DC FIELD ISOLATION CABINETS FOR BATTERY 2 INVERTER DISCONNECTS	CABINET LABEL TO BE PLACED ON DOOR AT LEGIBILE HEIGHT	DCIF CAB1	LARGE	1
	LABEL FOR EACH DC ISOLATOR - CAPTURING ALL ISOLATORS SUPPLYING BESS 2 (4 IN TOTAL) "BESS2 DC ISO1 " TO BESS2 DC ISO 4"	BESS2 DC ISO1 --- BESS2 DC ISO 4	SMALL	4
ALL DC COMBINER/SUPPLY/SWITCHING CABINETS TO HAVE WARNING LABELS FOR RISK OF MULTIPLE SOURCES OF SUPPLY AND THAT CABLES MAY STILL BE LIVE AFTER SWITCHING	WARNING LABEL FOR EACH CABINET TO BE INSTALLED THAT THERE ARE MULTIPLE SOURCES OF SUPPLY AND OPENING ISOLATOR ALONE DOES NOT ISOLATE ALL SOURCES OF SUPPLY AND CABLES CAN STILL BE LIVE.	WARNING: OPENING ISOLATORS MAY NOT ISOLATE ALL SOURCES OF ELECTRICITY & CABLES CAN STILL BE LIVE EVEN AFTER SWITCHING.	SMALL - DANGER	18

LABEL STYLE	LABEL MATERIAL REQUIREMENTS
LARGE	1mm THICK POWDER COATED ALUMINIUM PLATE OR SUITABLE UV RATED ABS PLASTIC FOR OUTDOORS SIGNAGE/ LABELS ("TRAFFOLITE" OR SIMILAR). LABEL TO HAVE BLACK LETTERING ON YELLOW BACKGROUND. FONT TO BE 20mm IN HEIGHT.
SMALL - OPERATIONAL	UV STABILISED EXTERIOR GRADE 2 PLY ABS LABEL PRODUCT ("TRAFFOLITE" OR SIMILAR) WITH ENGRAVED LETTERING. BLACK LETTERING ON YELLOW BACKGROUND. FONT TO BE 10mm IN HIEGHT.
SMALL - DANGER	UV STABILISED EXTERIOR GRADE 2 PLY ABS LABEL PRODUCT ("TRAFFOLITE" OR SIMILAR) WITH ENGRAVED LETTERING. BLACK LETTERING ON WHITE BACKGROUND. FONT TO BE 10mm IN HIEGHT.
OUTDOOR - 'DANGER'	1mm THICK POWDER COATED ALUMINIUM PLATE OR SUITABLE UV RATED ABS PLASTIC FOR OUTDOOR SIGNAGE/ LABELS ("TRAFFOLITE" OR SIMILAR). LABELS TO HAVE BLACK LETTERING ON WHITE BACKGROUND. LABEL TO HAVE STANDARD DANGER SYMBOL (DANGER" IN WHITE LETTERS ON A RED OVAL INSIDE A BLACK BACKGROUND) AND COMPLY WITH AS1319.

CAD DRAWING DO NOT MANUALLY AMEND

AMENDMENTS

Rev.	Date:	By:	Changes:
0.1	19/12/2024	APT	PRELIMINARY RELEASE 0.1
0.2	28/01/2025	APT	Release for Council Comment on access roads and fencing.
0.3	18/03/2025	APT	Release for Council Comment
0.4	14/04/2025	APT	Release for Tendering Purpose
0.5	ZZ/ZZ/ZZZZ	APT	ZZZZ

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Molong NSW 2866

Job Title: **EUGOWRA SOLAR FARM DC DESIGN**

Sheet Title: DC SCHEDULES SHEET 1 (CABLES & LABELS)

Site Address: Eugowra Sewerage Treatment Plant 255 Casuarina Drive Eugowra NSW 2866

Scale	
Drawn	APT
Checked	MJD
Designed	MJD
Date Issued	18/03/25
Version	0.4
SED Project No	**S2456**
SHEET 14 OF 14	
Sheet Reference: S2456-DC-12	A2