SINIAT (ETEX AUSTRALIA) BUNDABERG - PLASTERBOARD MANUFACTURING

GROUND-MOUNT PHOTOVOLTAIC (PV) SYSTEM PLANNING REPORT

REPORT CONTROL SHEET

Project Title: GROUND-MOUNT PHOTOVOLTAIC (PV) SYSTEM FOR ETEX AUSTRALIA

Site ID: 500SP271547

Report Title: GROUND-MOUNT PHOTOVOLTAIC (PV) SYSTEM PLANNING REPORT

Report Author: Adam Mohsin

DOCUMENT CONTROL

Issue	Date	Details	Prepared	Reviewed	Approved
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3					

Disclaimer:

This report is a professional opinion based on the information available at the time of analysis.

This report will comment on the SDA feasibility to the project.

We recommend that its contents be reviewed in person with the author so that the assumptions and available information can be discussed in detail to enable the reader to make their own risk assessment in conjunction with information from other sources.

You must read the important disclaimer appearing within the body of this report.

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INTRODUCTION

This report has been prepared by Kuga Energy Pty Ltd ('the permit applicant') to accompany a State Development application for the construction of an **Ancillary Solar at 500SP271547** ('the proposed installation') at 96 Buss St, Burnett Heads QLD 4670 ('the subject site'). The purpose of this document is to provide a comprehensive overview of the project, including detailed descriptions of the proposed solar system, site-specific information, and an assessment of potential impacts. It also addresses possible natural disaster scenarios and outlines mitigation strategies to minimize adverse effects. The report aims to ensure that all relevant stakeholders and authorities have a clear understanding of the project's scope, technical specifications, environmental considerations, and safety measures, facilitating informed decision-making and responsible development.

1.1 SUBJECT SITE

The site is situated in Burnett Heads, a coastal town in Queensland, Australia. The specific address is 96 Buss Street, Burnett Heads, QLD 4670. Geographically, it is located approximately 15 kilometres northeast of Bundaberg, along the Queensland coast. The coordinates are approximately -24.76807 latitude and 152.38763 longitude, placing it just south of the Burnett River mouth where the river converges with the Coral Sea. This location is particularly suitable for the development of solar ground-mounted systems due to its high solar irradiance levels maintained throughout the year, making it an ideal site for solar energy projects and renewable energy initiatives. The area's climate and geographic features support consistent solar energy generation, which can contribute to sustainable energy solutions and reduce reliance on non-renewable energy sources.

Figure 1: Subject Site

1.2 PROPOSED SOLAR SYSTEM AREA

The proposed installation area for the solar panels is situated on the northern side of the building, specifically on an adjacent vacant land owned by the organization. The land measures for the development approximately 150 meters in length and 65 meters in width, providing a substantial space suitable for solar ground mount system. This location has been selected to optimize sunlight exposure and maximize energy generation efficiency, considering factors such as shading, orientation, and accessibility for maintenance activities. The strategic placement aims to support the organization's sustainability goals by harnessing renewable energy sources effectively while minimizing impact on existing structures and land use.

Figure 2: Solar Panel Area

1.3 SITE PLAN

The site plan below provides an overview of the entire installation. It includes details about temporary structures such as sheds and storage areas. Temporary sheds are used to house equipment and materials during construction as well as a lunchroom and parking space, ensuring safety and organization. Temporary storage areas are designated zones for storing materials such as solar panels, cable trays and steel structures and set up near to the area of development for efficient workflow. The flow of the development process involves initial planning, setup of temporary facilities, construction activities, and eventual removal of temporary structures once the project progresses to the next phase. This approach helps in managing resources effectively and maintaining a smooth construction process.

Figure 3: Overall Site Plan

1.4 STREEET VIEW AND ANGLE VIEW

1. Street View 1 at the front of the property

2. Street view 2 : looking at the development area

3. Street view 3 : looking directly at the development area

4. Angle view from North-West focusing on the front of the property

5. Angle view from North-West focusing on the rear of the property

6. Angle view from South focusing on right hand side of property

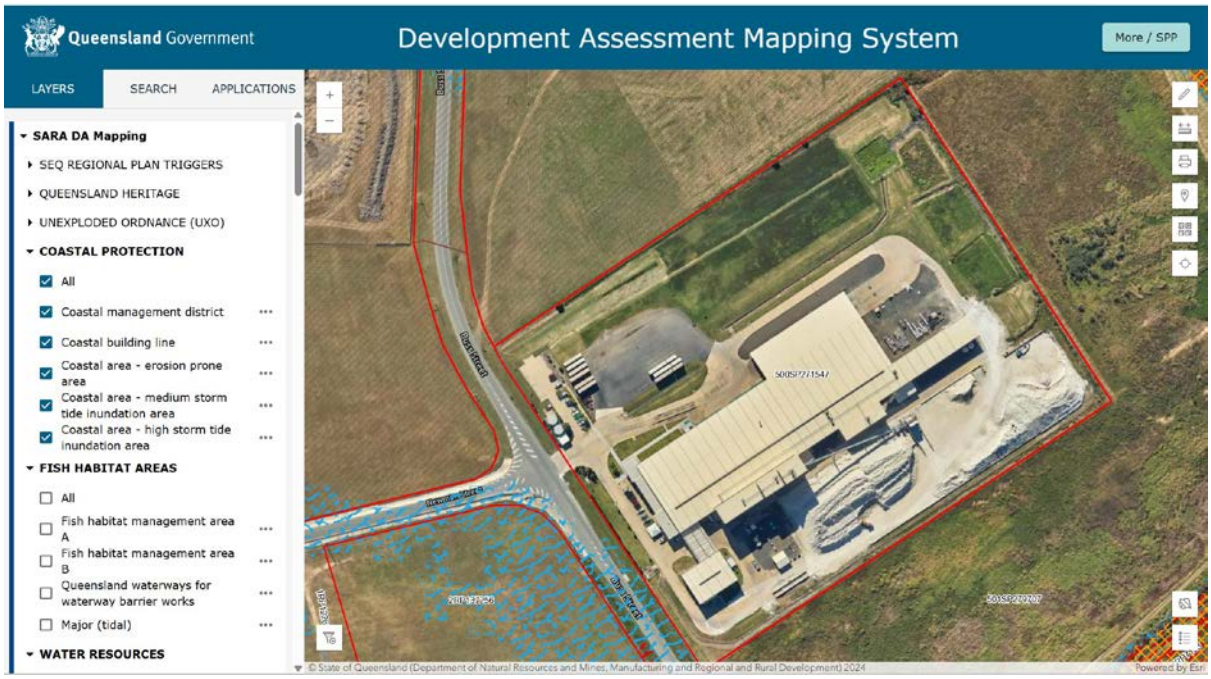
7. Angle view from North-West looking at the area of development.

1.5 Additional information about the site.

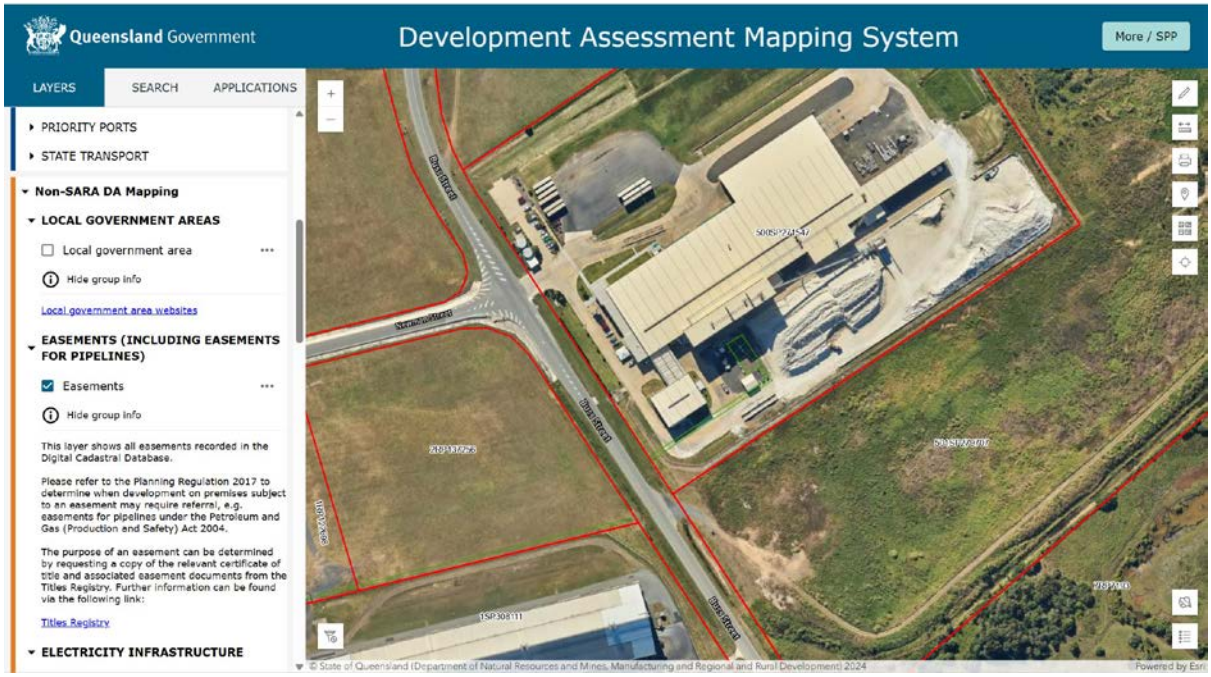
Item	Description
Building Envelopes	There is no building envelope over the proposed land to do the development.
Infrastructure Networks	It has access to key transport routes including Buss Street and Bundaberg Port Rd.
Frontage and Access	The access through main gate of the property, the area of development is directly in front of Buss St. Refer pictures in Street view and Angle View.
Topography and Views	The proposed area is on the flat terrain, there is no elevated land on this site it can be visible from the street.
Existing Vegetation	There's no vegetation on the proposed area of development apart from normal grass
Existing Waterways	The location is adjacent to where the Burnett River meet the Coral sea. However, the site is inland and does not directly interface with any mapped waterways, creeks or natural drainage line.

1.6 STATE PLANNING LAYER

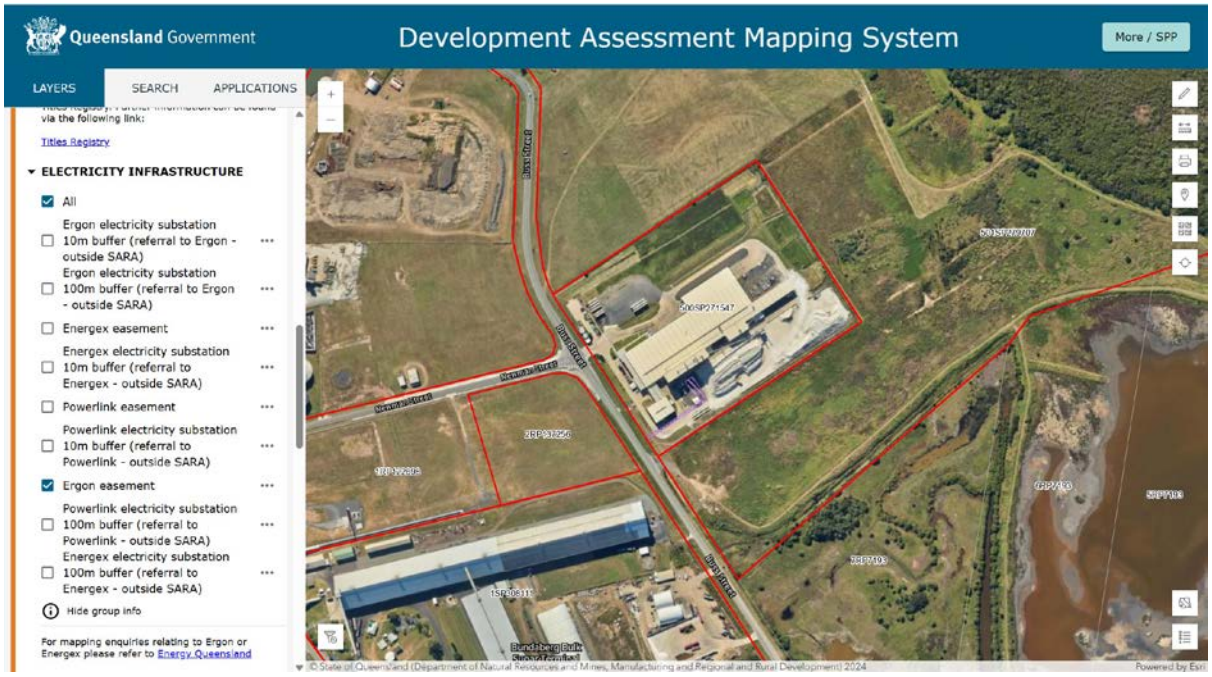
1. Coastal Protection : Not affected by the development.



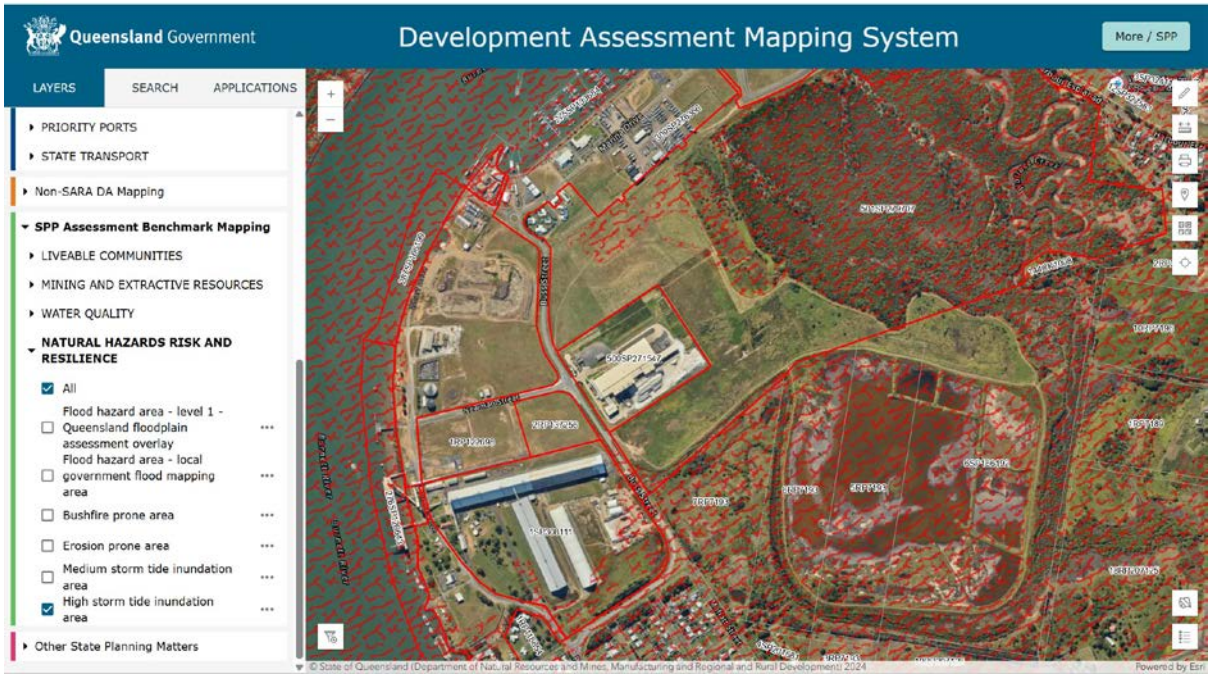
2. Easement : There're easement but it not affected by the development, The easement located the other side of the development area showing in light green.



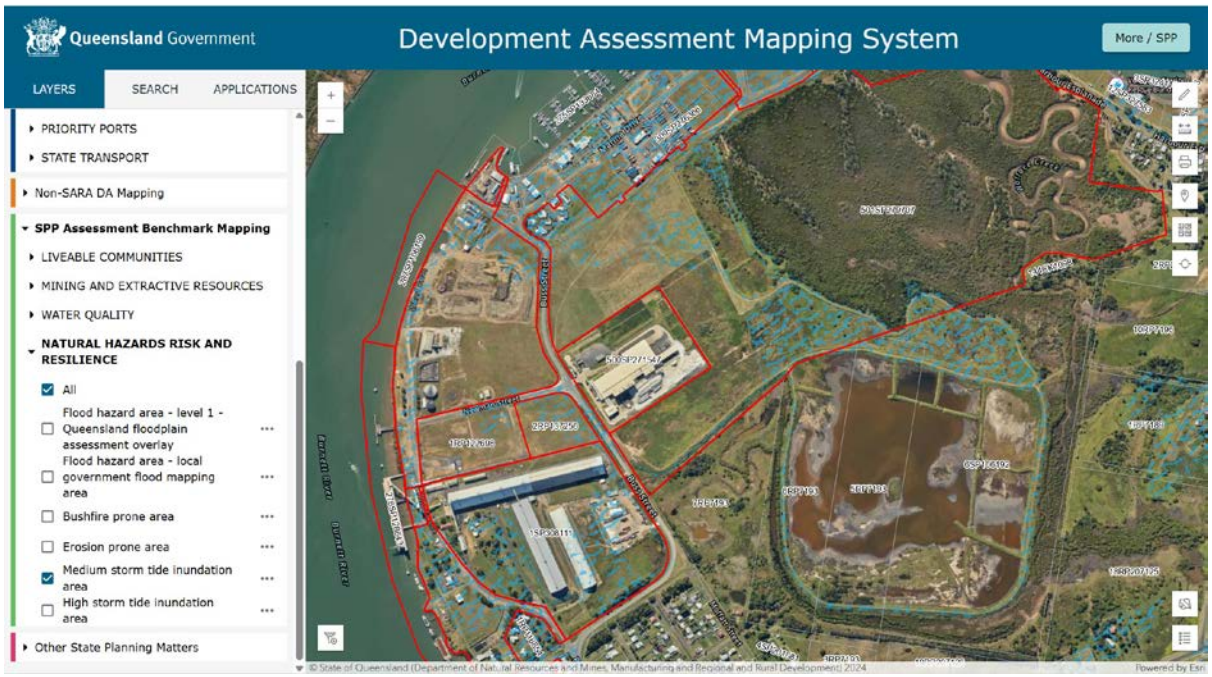
3. Ergon Easement : There're Ergon easement but it not affected by the development, The easement located the other side of the development area showing in purple.



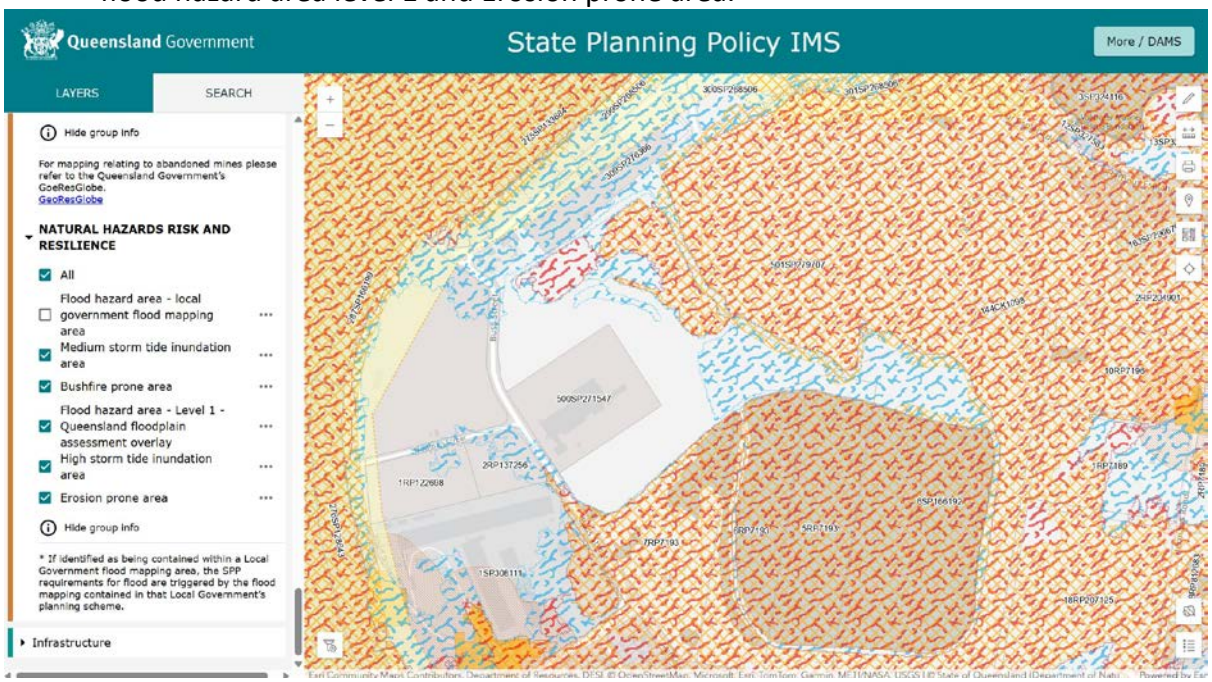
4. High Storm : The development is not on the High storm tide inundation area.



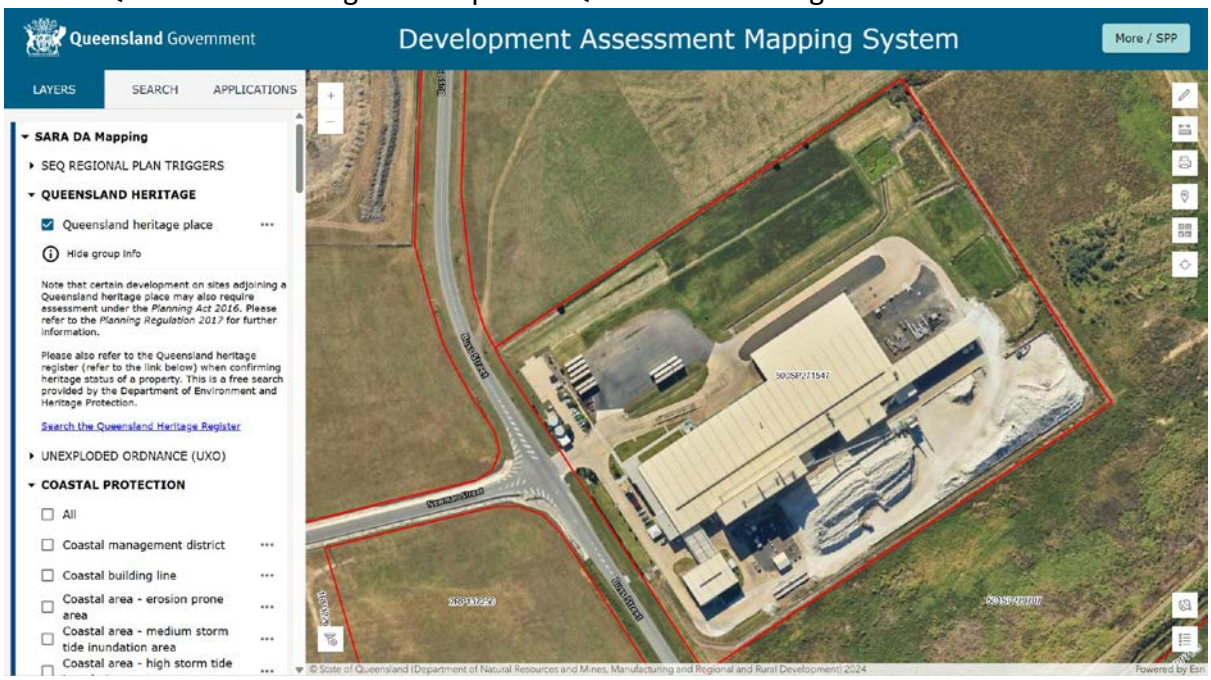
5. Medium Storm : The development is not on the medium storm tide inundation area.



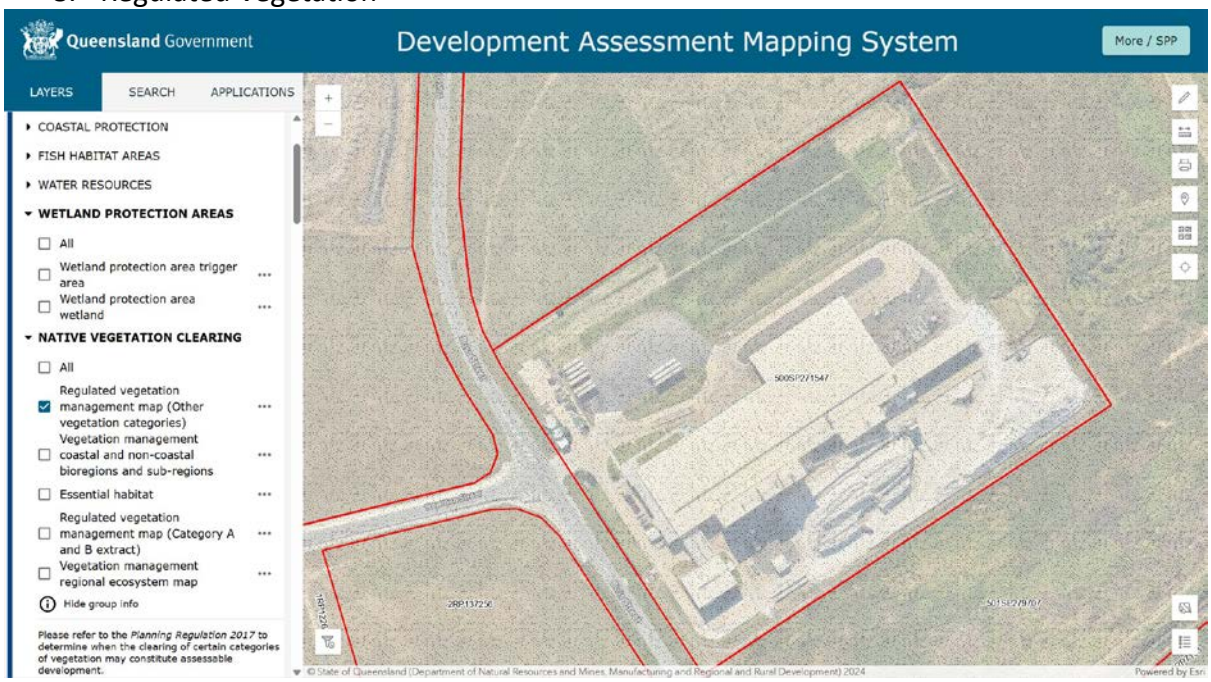
6. Natural Hazard Area : Minimal risk of natural hazards such as bushfire prone area, flood hazard area level 1 and Erosion prone area.



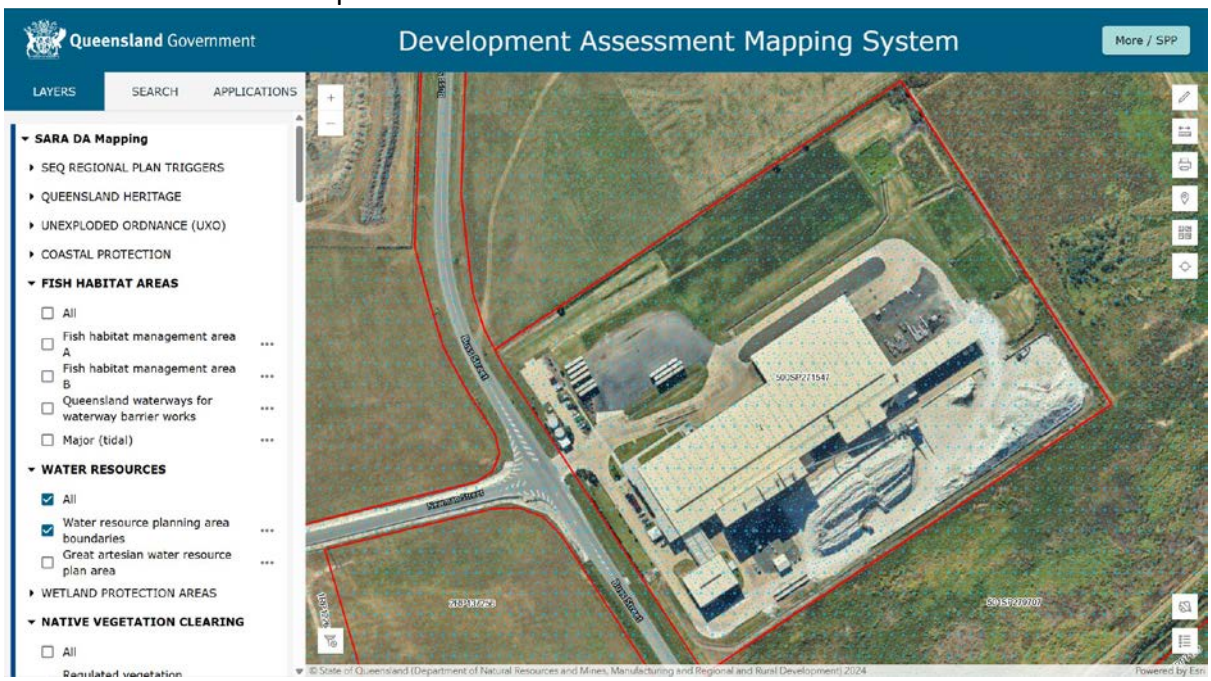
7. Queensland Heritage : not a part of Queensland Heritage.



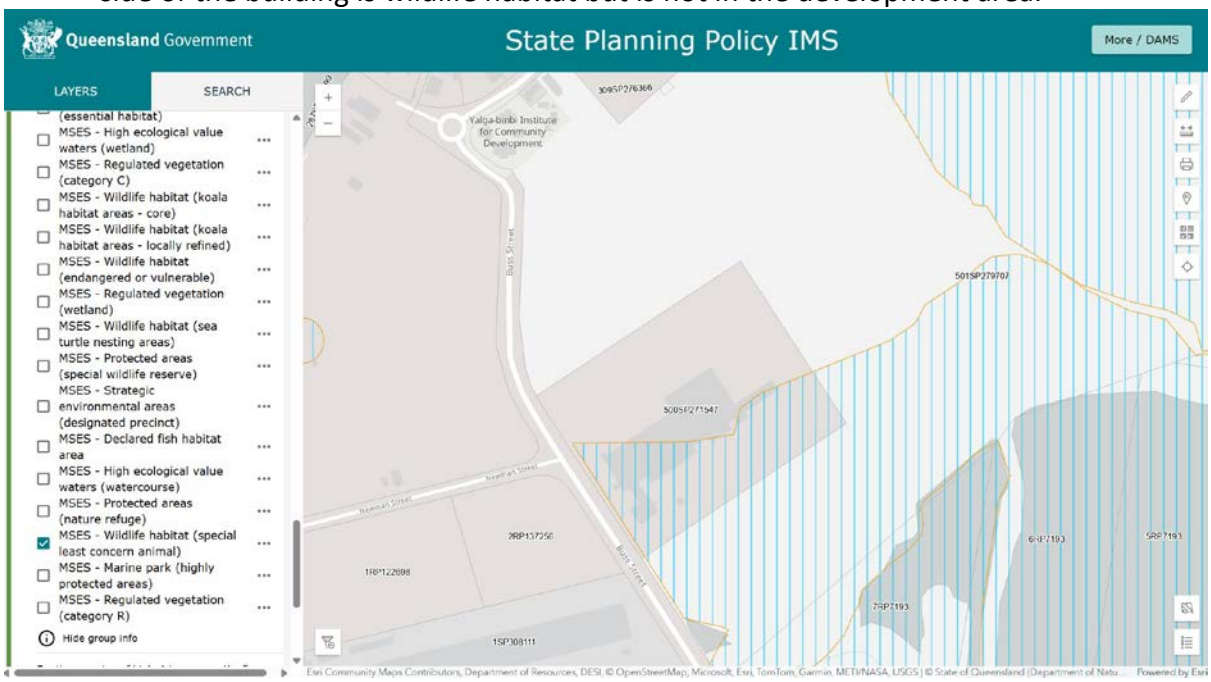
8. Regulated Vegetation



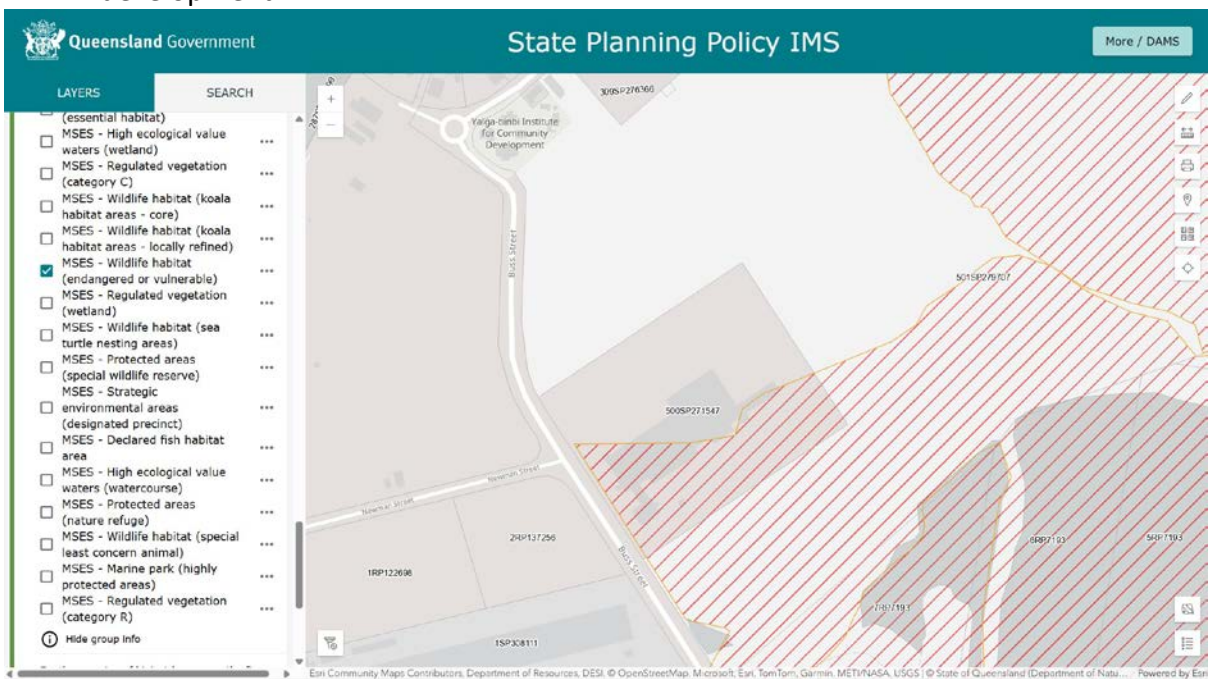
9. Water resources : part of water resources area boundaries.



10. Wildlife habitat : The area of development is not part of wildlife habitat. The other side of the building is wildlife habitat but is not in the development area.



11. Wildlife habitat least concern: Same with wildlife habitat lease concern, in the maps it shows the other side of the building is habitat lease concern but its not part of the development.



In conclusion, the area of proposed development doesn't have any state planning on it which make it easier and clearer to state development to review.

1.7 KUGA ENERGY

In a world where rising energy costs and tightening margins are pressuring businesses, Kuga Energy is leading a revolution. Like the relentless cougar, we've spent years pushing the boundaries of energy innovation, business optimisation, and vertical integration to deliver unmatched value to our clients. Driven by a passion for renewable energy, our team is committed to making a real impact on the businesses we work with every day. This fierce pursuit of performance and exceptional service has fuelled Kuga's growth into one of Australia's largest independently owned commercial energy companies.

With a strong presence across Victoria, New South Wales, Queensland, and South Australia, we've perfected our value proposition, streamlining every aspect of our operations to deliver powerful results—every time.

At Kuga Energy, we go beyond sustainability; we give businesses the power to take control of their energy future, embrace cutting edge technology, reduce costs and reinvest in their growth. Our commitment to energy innovation is a commitment to your success. That's why, in an era where market volatility is present with rising costs and energy transformation pressures, Kuga Energy ensures your business not only remains competitive but leads the pack.

Our expansive range of commercial solar services includes Solar Power, Battery Storage, Solar Off-Grid, Solar Car Parks, Ground Mount Systems, as well as energy-efficient solutions like LED Lighting and Hot Water Heat Pump upgrades.

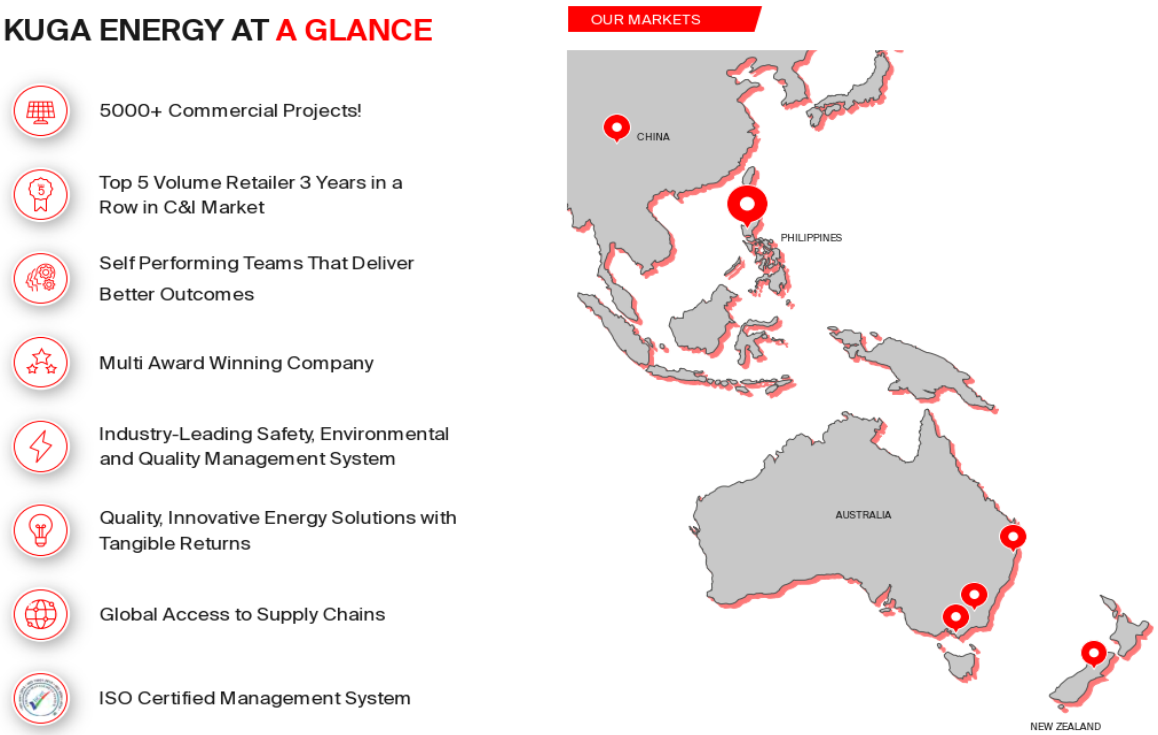


Figure 4: Kuga at a Glance

PROPOSED INSTALLATION

2.1 PROJECT DESCRIPTION

The ground mount photovoltaic system is composed of 22 rows of solar panels. Each row contains between 18 to 81 individual modules. 18 panels per string which are connected in series to form a single string. These modules are mounted on a fixed tilt system, which allows the panels to harvest the energy from the sun. By facing the panel to the north side it will optimize energy production throughout the year. Below are the proposed items for the development.

- PV Modules: Trina Solar PV Module
  Quantity: 1260 x Trina Solar, TSM-NEG21C.20 715W Modules
- PV Inverters: Fronius String Inverter
  Quantity: 7 x Fronius Tauro ECO 100-3-P inverters
- Mounting/Racking: Zilo Ground Fixed tilt System
  Quantity: 22 x rows (varying lengths)
- Module layout: 2P (Two modules in Portrait)

The energy collected by the PV array is initially in direct current (DC) form. It is then converted into alternating current (AC) using a transformerless inverter, which ensures that all the generated electricity is used on-site without the need for external export. Each inverter manages multiple strings of PV modules, with each string connected to the inverter's Maximum Power Point Tracker (MPPT). The MPPT optimizes the power output from each string by adjusting the electrical operating point. The Fronius inverter converts the DC electricity produced by the solar panels into AC electricity suitable for use in the electrical grid or the site's electrical system. These inverters are installed in the Main Switchboard room of the main building. This location was selected because of the considerable distance between the PV array area and the electrical connection point. Placing the inverters in the main building reduces the length of the AC cables needed, which is more cost-effective than extending the AC cables.

2.2 SITE LAYOUT

The solar panel will take up a total area of 9750m^2 at the northern side of the site where there is a vacant land as mentioned above. This coverage has been carefully selected considering the minimal impact to native vegetation, cultural heritage constraints, to protect the amenity of surrounding properties and the sensitive receptors such as people, facilities and ecosystems. Below are list impact for people, facilities and Ecosystems.
People: No individuals or groups will be harmed during or after the development process.
Facilities: The area does not contain any existing facilities such as schools, daycare centres, hospitals, or residential areas.
Ecosystems: There are no sensitive areas, such as natural habitats or habitats of endangered species, that will be affected by the development.
The solar installation will consist of;

- The installation of 1260 ground mounted solar photovoltaic (PV) modules (panels),
- Mounted on a Fixed tilt system with an approximate capacity of 900.9kWp.
- Each Panel approximately 2.384m (length) x 1.303m (width).
- Once mounted on the frames and tilted, the panels will be capable of reaching an overall height of no more than 2.723 metres above ground level.
- Ancillary Infrastructure like;
    - A 1.8m high chain mesh fence installed around the solar farm with lockable access gates. The purpose of the fence is to deter theft or vandalism and prevent unauthorised access to the solar farm.
    - Electrical System and Authorised Personnel Only nameboards and labels will be place at the entry gate.

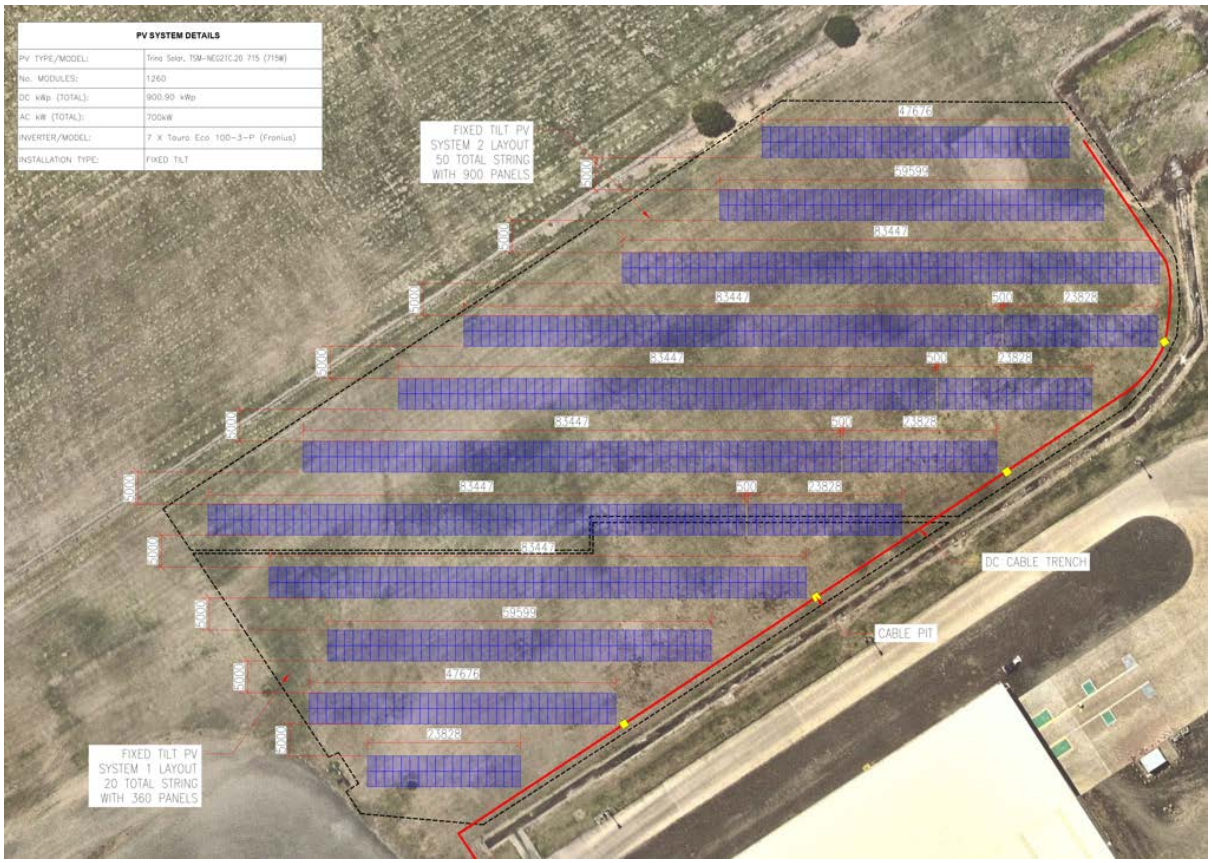


Figure 5: Solar Panel Layout

2.2.1 Solar Panels

The project will consist of the installation of 1260PV solar modules, with a combined power capacity of approximately 900.9kWp. The glass surfaced panels are coated to maximise daylight absorption, and thus minimise glare potential.

The panels will be attached in a fixed tilt mounting frames. The panels will facing the sun in north plane to maximise solar exposure. The mounting frames will be made of either galvanized steel and will have a rough matte finish, rather than a polished finish.

2.2.2 Tilt System

The mounting system will be installed in-ground with a concrete foundation. This is concluded after an extensive structural assessment and simulation by a third party company who specialise in such jobs. The solar panel tilt system is shown as below.

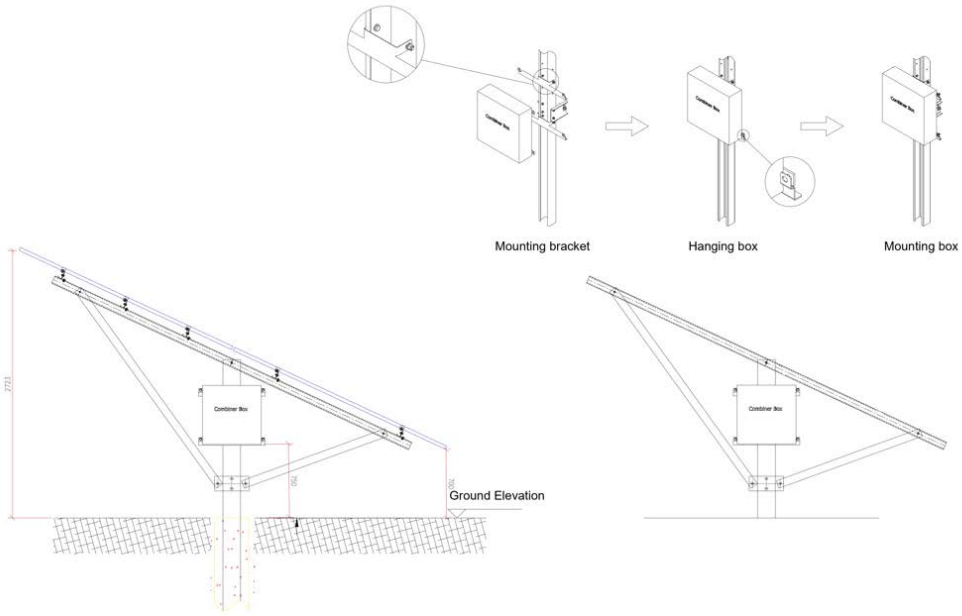


Figure 6: Fixed Tilt System

2.2.3 Inverters

The energy collected by the PV array is initially in direct current (DC) form. It is then converted into alternating current (AC) using a transformerless inverter (Fronius). Each inverter manages multiple strings of PV modules, with each string connected to the inverter's Maximum Power Point Tracker (MPPT). The MPPT optimizes the power output from each string by adjusting the electrical operating point. The Fronius inverter converts the DC electricity produced by the solar panels into AC electricity suitable for use in the electrical grid or the site's electrical system.

Figure 7: Fronius Tauro Inverter

2.3 SITE ACCESS

The site can be accessed from Buss St or Newman St, depending on where the travel is from. Once at the entry point, head straight in and take a slight left to the container storage area and Laydown area as a parking spots in red box. Keep heading forward to reach the proposed solar panel installation area marked in blue in the below image.

Figure 7: Site Access

Effective management of vehicle movements onsite is crucial for ensuring safety, efficiency, and smooth progress of construction activities. The proposed vehicle movements already carefully planned and coordinated to minimize disruptions and prevent accidents. This involves establishing designated routes for construction vehicles, delivery trucks, and personnel transport, as well as scheduling movements during off-peak hours whenever possible. Onsite vehicle movement plans will have signage, barriers, and communication protocols to inform all workers and visitors of the designated pathways and restricted zones. Regular monitoring and supervision are necessary to ensure compliance with the movement plan and to address any unforeseen issues promptly.

2.4 Management Plan

Management plans for ground mount solar development are comprehensive strategies designed to ensure the project is executed efficiently, sustainably, and in compliance with all relevant regulations. These plans encompass various phases of the project, from initial site assessment to post-installation maintenance, and involve multiple stakeholders including project managers, environmental specialists, engineers, and local authorities.

Pre-Development Planning
Site Assessment: Conducting detailed surveys to evaluate land suitability such as geotechnical analysis, and environmental impact.
Regulatory Compliance: Ensuring adherence to local zoning laws, environmental regulations, and obtaining necessary permits.
Design and Engineering

System Design: Developing detailed engineering plans for the solar array layout, foundation types, and electrical connections.
Environmental Impact Mitigation: Implementing measures to minimize habitat disruption, soil erosion, and water runoff.

Construction Management
Project Scheduling: Creating a timeline that coordinates procurement, construction activities, and inspections.
Resource Allocation: Managing labour, equipment, and materials to optimize efficiency and safety.
Environmental Safeguards: Enforcing protocols to protect local flora and fauna, and prevent pollution.

Operational Management
Monitoring and Maintenance: Establishing routine inspections, cleaning, and system performance assessments.
Safety Protocols: Ensuring safety procedures are followed to protect workers and the public.
Performance Optimization: Using data analytics to maximize energy output and system longevity.

Post-Development and Decommissioning
Decommissioning Plan: Preparing for eventual system dismantling, site restoration, and recycling of materials.
Environmental Restoration: Restoring the land to its original condition or suitable alternative use.

Overall, the management plan for development is a guides for the project through its lifecycle, emphasizing safety, environmental stewardship, and economic viability. Proper implementation of this plan ensures the successful deployment of solar infrastructure while minimizing adverse impacts and promoting sustainable energy generation.

2.5 Temporary storage

The temporary storage area is a designated space within a facility where materials, equipment, or supplies are stored temporarily before they are moved to their final destination or used in the ongoing operations. This area is essential for maintaining an organized workflow, ensuring that items are easily accessible when needed, and preventing clutter in the main work zones. Typically, the layout of a temporary storage area is designed to optimize space utilization, facilitate quick access, and ensure safety standards are met. It may include shelving units, pallets, bins, or containers to categorize and segregate different types of items. All temporary shed or storage item will be clear after the installation.

COMMUNITY AND STAKEHOLDER INVOLVEMENT

3.1 SINIAT (ETEX AUSTRALIA) BUNDABERG

Siniat is one of the Etex Group's flagship commercial brands, and one of the leading global manufacturers of interior and exterior materials for drywall construction. The Etex Group is a global family-owned business based in Belgium with a history going back to 1905. With a business strategy to develop and provide Inspiring Ways of Living, the Etex Group has grown to a successful "house of brands". All over the world Etex strives to improve customers' quality of living with ever more effective lightweight solutions. The Siniat brand is trusted around the world for its effectiveness in the building of quality living and working spaces, by specialising in smart solutions for lightweight construction systems.

In Australia, Etex has Siniat manufacturing facilities located in Sydney, Melbourne, Bundaberg and Brisbane and supplies steel framing, plasterboard, compounds, cornice and associated products and systems to the Australian building industry through its national distribution network. Siniat's comprehensive range of quality wall and ceiling lining products are developed with specific characteristics to enhance performance and provide fire, water, acoustic and decorative solutions to all construction projects. The Siniat team is committed to providing excellent technical service and sales support to continually improve the quality of current products and systems, and to identify innovative products, systems and solutions.

The Bundaberg plant is dedicated to plasterboard production, manufacturing a wide range of standard and specialty plasterboard for the residential sector. The main solutions that the facility provides are outlined below;

3.1.1 Plasterboard

Siniat supplies a wide range of standard and specialty plasterboard to the residential sector. The range includes fire-resistant boards such as Fireshield and Multishield, and water-resistant Watershield for wet areas. Other products such as Curveshield make attractive design options a reality. Opal is a premium plasterboard specifically designed for high-end residential projects.

Locally made plasterboards are available under Siniat's Opt2Act® opt-in carbon-neutral program. Currently, Siniat is the only Australian plasterboard and metal manufacturer to offer a carbon-neutral program of this kind. Opted-in products supplied under the program are certified carbon-neutral by the government's Climate Active program. By choosing carbon neutral, designers and builders can significantly reduce the embodied carbon of the build.

Locally made plasterboard products have also been independently certified by Global GreenTag to GreenRate Level A.

3.1.2 Opal

Opal plasterboard by Siniat is a unique product specifically made with the discerning homeowner in mind. Suitable for walls and ceilings, it comes with a pre-primed surface liner paper that creates a smooth, premium surface finish that adds an elegant touch to any project. The smooth finish helps to reduce glancing light issues for a polished look and feel.

3.1.3 Weather Defence

Weather Defence® is a rigid air barrier board supplied by Siniat that is commonly used behind facade cladding systems in ventilated facades. It also has a residential application for homes built in bushfire zones. In the construction of homes located in the most fire-prone areas defined as BAL-FZ, Weather Defence can be used in the roof system to help protect the building against radiation in the event of a fire.The system complies with AS 3959:2018: Construction of buildings in bushfire-prone areas.

3.1.4 Interhome

For the construction of adjoining residential dwellings such as duplexes or townhouses, Siniat offers the tried-and-trusted Interhome separating wall system. It's offered as a complete system, inclusive of metal, plasterboard and compounds. Interhome is differentiated from conventional double stud separating walls by its central fire barrier built between timber or steel house frames. This central fire barrier helps to prevent the spread of fire from one dwelling to the adjoining ones. Siniat's Shaftliner or Intershield is used in the construction of the central fire barrier, and being gypsum-based, it makes the installation of penetrations for services much safer and quicker.

3.2 Manufacturing operation

3.2.1 Operation

The Bundaberg plant is one of three Australian sites producing Siniat gypsum plasterboard, alongside Matraville (NSW) and Altona (VIC). It operates on a 24/5 schedule, running five days a week across three shifts, with production operators overseeing drying, batching, cutting, and quality control machinery to create various plasterboard such as standard type, moisture-resistant, fire-rated, impact-resistant, and acoustic boards. Intensive equipment includes gypsum dryers, mixers, rollers, cutting lines, and handling conveyors, plus site-wide lighting and HVAC systems. While larger sites in Matraville and Altona recently installed solar arrays (962 kW at Matraville, 1.45 MW at Altona) to offset 15–20 % of their power loads , similar solar-PV installations could be deployed at Bundaberg. With the area of vacant land it a good option to have ground mount system to reduce reliance on grid electricity and lower CO_2 emissions.

3.2.2 Customers & workforce

Bundaberg's plasterboard supply serves Queensland building contractors, residential and commercial developers, and regional distributors. It delivered via both nationally owned Siniat outlets and independent resellers like Plastamasta. Etex Australia employs over 330

people across its 12 Australian sites with Bundaberg believed to have around 50–80 production and support staff dedicated to operating the facilities.

Bundaberg is a fully-fledged plasterboard manufacturing plant producing a range of gypsum boards, running a three-shift schedule on weekdays. Its energy-intensive drying and handling equipment could benefit from solar-PV like sister sites, and the product reaches builders and distributors across Queensland.

3.2.3 Estimated Energy Generation and Energy Demand

1. Estimated Solar Generation

In Queensland (near Brisbane/Bundaberg), typical solar yield is about 4.2 kWh/kWp/day.
For a 900 kWp array:
900 kWp × 4.2 kWh/kWp/day ≈ 3780 kWh per day
Annually:
3780 kWh/day × 365 ≈ 1.38 GWh per year
Thus, the solar installation would generate roughly 3.78 MWh daily and about 1.38 GWh yearly, though actual output could vary ±10% depending on panel efficiency, weather, shading, and tilt.

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2. Bundaberg Plant Electricity Demand
Assuming Bundaberg has operations and equipment (dryers, mixers, conveyors, HVAC):
Total energy provide by solar ≈ 38.61%
Reduce Carbon Footprint by = 1509477kg

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3. Distribution of Solar Power On-Site
The generated electricity would feed into the Etex low-voltage distribution network, offsetting grid-supplied power for the heaviest equipment's such as:
Gypsum dryers (continuous high-temperature heat)
Mixers, rollers, conveyors
Assembly lines and cutting machines
Site-wide lighting, compressed air systems, HVAC, and administrative offices
Ideally, the onsite inverter output ties into the main switchboard, allowing automatic solar usage during daylight.

In summary, a 900 kWp solar system at the Bundaberg plant could generate about 1.38 GWh per year, offsetting around 38.61% of its electricity demand. The generated power would directly support major daytime operations such as gypsum drying, machinery, lighting, HVAC and will reducing grid dependency and cutting emissions.

NATURAL DISASTER AND MITIGATION MEASURES

Bundaberg has a history of experiencing various natural disasters, most notably floods and cyclones. Major floods occurred in 1875, 1890, 1893 (twice), 1928, 1942, 1954, 2010, and 2013.

4.1 FLOODS

Major floods have been recorded at Bundaberg in 1875, 1890, 1893 (twice in 2 weeks), 1928, 1942, 1954, 2010 and 2013. The most recent significant event was in January 2013 when the river rose to 9.53 metres at Bundaberg, about 7.34 metres above Highest Astronomical Tide (HAT).

Flash flooding is common in the Bundaberg Region with low lying roads commonly impacted for a short period of time.

With the proposed solar system, the tilt solar system will be about 0.7m above the ground so flash flooding will not be an issue. All the electrical wiring and cables will be secured inside heavy duty electrical conduits which will be installed in a trench at a minimum depth of about 600mm from ground level. All other electrical components like DC combiner boxes and circuits will have the highest IP rating to withstand these kinds of harsh climatic conditions. Additionally, solar panels themselves are designed to be waterproof and resistant to water damage. When the building supply is off due to flooding, the solar system automatic off as well because it need the voltage reference from the grid to operate.

4.2 CYCLONE

The Bundaberg Region is at risk of being impacted by cyclones during 'cyclone season' which officially runs from November to April, with several low-lying coastal areas at risk from storm surge and storm tide.

Ground-mounted solar systems are protected from cyclones through a combination of robust design, secure installation, and proactive measures taken before a cyclone arrives. These systems are engineered to withstand high winds and extreme weather conditions.

Ground-mounted solar panel frames are typically made of high-strength materials like aluminum or steel to resist wind forces and debris impact. Panels are securely bolted to the racking system, ensuring they remain in place during strong winds. The racking system itself is designed to withstand high winds and is often anchored to the ground using robust foundations. For this project, the foundation for the posts will be concrete which will be structurally engineered site specific taking into account the various wind speeds and cyclone probability in the area.

SDA Wide Assessment Criteria

Assessment Criteria	Comment
Services	
1. Development is designed to maximise efficiency and minimise cost for telecommunications, transport, water, wastewater, recycled water and energy networks.	Complies. The development is designed to minimise infrastructure costs and maximise efficiency for transport by positioning arrays to reduce trenching distances for electrical cabling and service conduits. The layout allows efficient access for maintenance vehicles, integrates with existing transport routes, and aligns with available energy network connection points to avoid costly upgrades. Water use is minimal, with no demand on wastewater or recycled water systems, further reducing service load and operational costs.
2. Development plans for and manages the impacts of the development on existing and future known telecommunications, transport, water, wastewater, recycled water and energy networks.	Complies. The development is planned to avoid disruption to existing telecommunications, transport, water, wastewater, and recycled water networks by maintaining clearances and avoiding easements. Energy network impact is managed through coordination with the utility provider to ensure grid capacity and connection compliance. There's easement is on the other side of the building which not be disturb.
3. Development is adequately serviced by telecommunications, transport, water, wastewater, recycled water and energy networks as relevant.	Complies. The development is adequately serviced by relevant networks, with energy infrastructure designed to meet grid requirements and compliant with distributor standards. Telecommunications access is available for monitoring and control systems. The development has no demand on water, wastewater, or recycled water networks, and existing transport access supports construction and ongoing maintenance without additional upgrades.
4. The use of reticulated town water supply is minimised using alternative water supply sources where appropriate.	Complies. The development minimises the use of reticulated town water by requiring minimal water during operation. Any necessary water use, such as occasional panel cleaning, can be sourced from alternative supplies like onsite rainwater tanks or non-potable sources, avoiding reliance on the town water network.
Emissions	
1. Development is designed to avoid or otherwise minimise emissions that will adversely affect the health and safety, wellbeing and amenity of	Complies. The development operates with no ongoing air, noise, or water emissions, avoiding adverse impacts on community health, safety, or amenity. During construction, emissions such as dust and noise are managed through standard mitigation measures. We decide to pour concrete instead of driven pile. The system's long-term operation is clean and silent,

communities and individuals.	supporting environmental quality and community wellbeing.
2. Development supports the achievement of the relevant acoustic and air quality objectives of the Environmental Protection (Noise) Policy 2008 and the Environmental Protection (Air) Policy 2008.	Complies. The development supports the objectives of the Environmental Protection (Noise) Policy 2008 and the Environmental Protection (Air) Policy 2008 by producing no ongoing noise or air emissions during operation. Construction impacts are temporary and managed through standard controls to minimise dust and equipment noise, ensuring compliance with applicable environmental standards.
3. Development is to minimise potential impacts arising from (but not limited to) spray drift, odour, noise, dust, smoke or ash emissions on sensitive uses, for example by providing for effective separation between land uses or management at the source.	Complies. The development minimises impacts such as noise, dust, and emissions through careful site selection, effective separation from sensitive uses, and low-impact design. Operational activities generate no odour, smoke, or ash. During construction, dust and noise are controlled at the source with standard mitigation measures, ensuring minimal disturbance to surrounding land uses. For example, if drilling the wall , vacuum will be use to sucks dust that come out.
Natural hazards – flooding	
1. Development, in accordance with current best practice, is to: (a) achieve an appropriate level of flood immunity and (b) not adversely affect existing flow rates, flood heights or cause or contribute to other flooding impacts on upstream, downstream, or adjacent properties. This includes potential impacts from changes to stormwater flows and local flooding.	Complies. The development is designed in accordance with best practice to ensure appropriate flood immunity by elevating electrical infrastructure above the designated flood level especially the termination. The layout maintains natural overland flow paths and does not obstruct or redirect stormwater, avoiding increases in flood height or flow rates. The system does not cause or contribute to flooding impacts on upstream, downstream, or adjacent properties.
2. Development is located, designed and constructed to avoid or mitigate potential flood damage, ensure no net worsening	Complies. The development by being sited in low-flood-risk areas, using elevated, corrosion-resistant mounts to keep components and terminations above flood levels, and maintaining drainage with permeable surfaces to prevent runoff increases. Safety is ensured with fencing,

and avoid risks to public safety	signage, remote shut-off systems, and flood-resistant access.
3. Development ensures that prior to or during a flood event, the self-evacuation of occupants and visitors to a safely shelter within the site, or evacuation via safe routes from the hazard to an area of safety is provided.	Complies. The development complies with the requirement to ensure safe evacuation during a flood event by being strategically located to avoid flood-prone areas, minimizing the need for occupant evacuation. For maintenance personnel or visitors, the site incorporates elevated safe routes to areas above flood levels, with emergency plans ensuring safe self-evacuation to designated on-site shelters or off-site safe zones, per local flood management guidelines.
4. Development does not adversely impact on flood immunity of the road corridors which provide for evacuation in a flood.	Complies. The development complies with the requirement to not adversely impact flood immunity of road corridors for evacuation by being designed to avoid obstructing or altering natural drainage patterns, using permeable ground cover and minimal grading to maintain existing runoff conditions. The system's access roads are elevated and constructed with flood-resistant materials to ensure they remain passable during flood events, preserving evacuation routes.
5. The risk of, and the adverse impacts from flooding are avoided, minimised or mitigated to protect people, property and the environment.	Complies. The development minimizing flood risks and impacts by being sited in low-flood-risk areas based on hydrological assessments, using elevated, corrosion-resistant structures to protect panels and equipment from flood damage. Permeable surfaces and retention basins prevent runoff increases, safeguarding the environment, while fencing, signage, and emergency plans mitigate risks to people, aligning with standards.
6. Flood mitigation measures consider environmental impacts including potential impacts on fish passage	Complies. The development complies with flood mitigation measures considering environmental impacts, including fish passage, by avoiding placement near critical waterways or fish migration routes, as identified through environmental assessments. The design incorporates permeable ground cover and minimal grading to maintain natural water flows, preventing barriers to fish passage.
7. Development maintains the safety of noxious and hazardous materials and chemicals manufactured or stored in bulk during flood events.	Complies. The development complies with maintaining the safety of noxious and hazardous materials during flood events by ensuring that any chemicals, are stored in elevated, sealed, and high IP rating enclosures. But there is no hazardous materials will be using in this development.
8. Development provides for efficient evacuation and	Complies. The development complies with efficient evacuation and access for emergency services during

access for evacuation resources including emergency services during flood events, or otherwise plans for the prospect and impact of isolation or hindered evacuation during flooding.	flood events by incorporating elevated, for evacuation and emergency vehicles. The site layout includes fence around the development make as a layer of isolation from unauthorised person or animals to come in.
Contaminated land	
1. Development on land likely to be contaminated or recorded on the Environmental Management Register or Contaminated Land Register does not adversely impact on human health or the environment by exposure, management, or movement of contaminants	Not Applicable. The development complies with requirements for development on potentially contaminated land by conducting thorough site assessments to identify contaminants listed on the Environmental Management Register or Contaminated Land Register. The design minimizes soil disturbance, using non-invasive piling methods and sealed foundations to prevent exposure or movement of contaminants. Hazardous materials are stored in elevated, secure enclosures to avoid flood-related dispersal, ensuring no adverse impacts on human health or the environment, per regulatory standards.
2. Where required, develop a strategy to manage any existing contamination and the potential for additional contamination such that human health and the environment are not adversely affected.	Not Applicable. The development there's no potential for contamination to human health and environment.
Acid sulfate soils	
1. Development, in accordance with current best practice, is to: Bundaberg State Development Area Development Scheme - 12 - December 2017 (a) avoid the disturbance of acid sulfate soils (ASS) or (b) ensure that the disturbance of ASS avoids or minimises the mobilisation and release of acid and metal contaminants	Not Applicable. The Development complies with the Bundaberg State Development Area Development Scheme (December 2017) by avoiding disturbance of acid sulfate soils (ASS) but for ground mount system there's no acid sulfate soil will be used.

Transport	
1. Increased traffic arising from development is either able to be accommodated within existing road networks or works are undertaken to minimise adverse impacts caused or contributed to by the development on existing and future uses and road networks.	Complies. The development ensuring increased traffic from construction and maintenance is accommodated within existing road networks through traffic impact assessments. Where necessary, temporary traffic management plans are implemented to minimize adverse impacts on existing and future road uses, ensuring safe and efficient access for all users while aligning with local transport planning standards.
2. Local road networks within the Bundaberg SDA are to be designed to accommodate the proposed vehicle type and predicted traffic volumes associated with the development and the precincts.	Complies. The local road networks to accommodate the vehicle types (e.g., maintenance trucks and construction equipment) and predicted low traffic volumes associated with the development. Access roads are constructed to meet precinct requirements, using durable, while aligning with the Bundaberg SDA Development Scheme's traffic planning standards.
3. Development is designed to facilitate safe and efficient vehicular ingress and egress and does not unduly impact on the safe and efficient operation of the use of external road, rail or transport infrastructure.	Complies. The access points to facilitate safe and efficient vehicles ingress and egress, with entry and exit routes planned to minimize disruption to external road, or transport infrastructure. The system incorporates well-placed to access roads sized for maintenance and construction vehicles, ensuring no undue impact on the safe and efficient operation of surrounding transport networks, in line with local planning standards.
4. Adequate car parking for number and nature of vehicles expected are provided.	Complies. Providing adequate car parking tailored to the low number and nature of vehicles expected, primarily for installer and occasional construction activities. Designated parking areas, designed with durable, permeable surfaces to manage runoff, are strategically located near access points to accommodate service vehicles efficiently, meeting local planning requirements and minimizing environmental impact.
5. The safety, efficiency and operational integrity of the Bundaberg Airport are protected from adverse impacts from development within the SDA	Complies. Designed to avoid adverse impacts on the safety, efficiency, and operational integrity of Bundaberg Airport. The system maintains safe distances from flight paths, adheres to height restrictions to avoid airspace interference, and minimizes reflective glare from panels through anti-reflective coatings or strategic orientation, ensuring compliance with aviation safety standards and protecting airport operations.

Environment, cultural heritage and community	
1. Environmental values, cultural heritage values and community values of the premises on which the development is undertaken and immediate surrounds are identified and managed, consistent with current best practice.	Complies. The development identifying and managing environmental, cultural heritage, and community values through pre-construction assessments, including ecological surveys and cultural heritage consultations, to avoid impacts on sensitive areas or significant sites. The system employs low-impact installation methods, such as pour concrete instead of pile driven, to minimize disturbance to local ecosystems and aligning with current best practice and regulatory standards.
2. Development is designed to avoid the clearing of remnant vegetation or where avoidance is not possible, minimise clearing to: (a) avoid land degradation (b) avoid the loss of biodiversity and (c) maintain ecological processes.	Complies. The development is minimise the clearing of vegetaion and on the proposed area of development there's no habitat.
3. Development avoids significant adverse environmental impacts on matters of national or State significance, or where significant impacts cannot be avoided are minimised. Any residual significant adverse impacts are offset in accordance with the relevant Commonwealth and Queensland environmental offset framework.	Complies. The must avoid significant adverse impacts on matters of national or state significance, such as protected ecosystems, threatened species habitats, or Ramsar wetlands. Where avoidance is not feasible, impacts must be minimized through careful site selection, reduced clearing, and low-impact construction techniques. Any unavoidable residual impacts must be offset in compliance with Commonwealth and Queensland environmental offset policies, ensuring no net loss of biodiversity or ecological value. This approach ensures sustainable solar development while safeguarding environmentally sensitive areas.
4. Where the development triggers the need for a buffer to mitigate the impacts of the development, that buffer must be accommodated within the development site.	Complies. any required buffer zones to mitigate impacts (such as visual, noise, or ecological effects) will incorporated within the project site boundaries. This ensures that adjacent lands remain unaffected while maintaining separation from sensitive areas like watercourses, wildlife habitats, or neighboring properties. Proper buffer planning minimizes environmental and community disruptions, keeping all mitigation measures self-contained within the

	development footprint. Compliance with this requirement demonstrates responsible project design and reduces off-site impacts.
5. Development in wetland protection areas is designed, constructed and operated to prevent the loss or degradation of wetland environmental values.	Not Applicable. This includes avoiding direct impacts on hydrology, water quality, and native vegetation through elevated mounting systems, permeable foundations, and strict erosion control measures. Construction must adhere to best practices to minimize disturbance.
Engineering standards	
1. Development is to be designed and constructed in accordance with the relevant engineering standards (and any subsequent revisions to the relevant standards) stated in Table 6 below, unless it can be demonstrated that an alternative solution that at least produces the same outcome is appropriate.	Complies. The development designed and constructed in compliance with the Australian standards including structural, electrical, and geotechnical requirements to ensure safety, durability, and performance.
Other government matters	
1. Development is to demonstrate consistency with any other relevant legislative requirements that may be required for the development to proceed and operate and to the extent practicable, be consistent with regional plans, the State Planning Policy, and the State Development Assessment Provisions where the State interests articulated by these instruments are likely to be affected by the development.	Complies. The development comply with all relevant legislative requirements, including environmental, planning, and energy regulations, to ensure lawful operation. Additionally, the project should align with regional plans, the State Planning Policy, and the State Development Assessment Provisions, particularly where state interests such as land use, biodiversity, or infrastructure are impacted. By adhering to these frameworks, the development balances renewable energy goals with broader planning and environmental objectives, ensuring sustainable and legally compliant project execution.
2. Development is to avoid or minimise adverse impacts on existing or	Complies. The development is designed to avoid or minimize adverse impacts on existing or planned State or local government infrastructure, such as roads, power

proposed State or local government infrastructure.	lines, drainage systems, or communication networks. Site selection and layout should prioritize compatibility with surrounding infrastructure, ensuring no disruption to public services or future development plans. These all already checked on state planning layer.
Energy and water efficiency	
1. Building, site design and layout maximises energy efficiency having regard to: (a) building orientation and passive solar design (b) maximising opportunities for cross ventilation Bundaberg State Development Area Development Scheme - 14 - December 2017 (c) appropriate shade treatments and (d) landscaping treatments to the western side of the building.	Complies. Solar ground-mount systems don't involve buildings, their design should maximize energy efficiency by optimizing panel orientation (typically east and west - facing in Australia) to capture maximum solar exposure, while minimizing shading between rows. The layout should incorporate natural airflow patterns to reduce heat buildup around equipment, and strategic landscaping (such as low-growing native vegetation) should be used on western exposures to mitigate dust and heat island effects without casting shadows on panels. These considerations ensure the system operates at peak efficiency while harmonizing with the local environment.
2. Water efficiency is optimised through the use of alternative water supply sources, including: (a) rainwater harvesting systems and (b) recycled water source	Complies. Water efficiency should be optimized by utilizing alternative water sources.
Visual impacts	
1. Visual impacts of buildings and any retaining structures are minimised through building design and landscaping when viewed from a publicly accessible view point such as major roads.	Complies. The visual impact of development systems should be minimized if viewed from public vantage points, especially major roads, through strategic design. This includes aligning panel rows. Placing the inverters or distribution board inside the building.
2. Development incorporates high quality urban design and landscape treatments particularly for those areas highly visible from public roads.	Complies. The development will focus in areas visible from public roads to enhance visual appeal and ecological integration. This includes using low mounting systems, fencing will further reduce visual intrusion. By prioritizing thoughtful design, the project maintains functionality while minimizing its aesthetic impact on the surrounding landscape.

Built form	
1. The scale, character and built form of development contributes to a high standard of amenity.	Complies. The development will have standard of amenity for the worker. The workers can used the amenity on the facilities when working inside the building.
2. Development must incorporate crime prevention through environmental design principles.	Complies. The area of development will be fence and it can prevent people to come in and commit a crime.
Landscaping	
1. Development provides landscaping that: (a) minimises the visual impacts of the development (b) incorporates at least 50% local species (c) is low maintenance and (d) maintains and enhances significant vegetation.	Complies. The development will have minimise visual impact from the street because the height of the pole is less than 3 meter. With the arrangement it will looks good from the street and from the top view.
Natural hazards – other	
1. Development, in accordance with current best practice: (a) identifies relevant natural hazards that may impact upon the project (b) appropriately manages risk associated with identified hazards (c) avoids increasing the severity of the natural hazard and (d) for coastal hazards, avoids erosion prone areas wherever possible.	Complies. The development will have least impact on natural hazards that can impact the project. The development will have fence around the development area to minimise natural hazards.
Lighting impacts	
1. Lighting associated with the construction and operation of development is designed to limit the impacts on aquatic wildlife, including turtles and migratory species.x	Complies. Lighting should be motion-activated or time-restricted where possible, and directed away from waterways or sensitive habitats. But, In this development no lighting will be install.

PORT RELATED INDUSTRY PRECINCT – PREFERRED DEVELOPMENT INTENT

The preferred development intent for the Port Related Industry Precinct is described below.

1. This precinct will primarily accommodate industrial activities and infrastructure that have a connection to the Port of Bundaberg and benefit from close proximity to port related infrastructure and services.	Complies. The development supports industrial activities in the precinct by providing a reliable renewable energy source, reducing operational costs, and enhancing grid dependency.
2. The precinct may also accommodate other industries and facilities which support the continued growth of the port and industrial development in the SDA.	Complies. The development supports the region growth by supplying sustainable energy to facilities and reduce the burden of the grid network used by port and surrounding area.
3. Development within the precinct supports the function of the Port of Bundaberg and does not interfere with the ability of the Port to carry out operations and avoids adverse impacts on existing or planned port infrastructure.	Complies. The development supports the Port of Bundaberg without interfering with port operations or impacting existing or planned port infrastructure.
4. The precinct will accommodate development that minimises and mitigates adverse amenity impacts on existing residential areas outside of the SDA.	Complies. The development is designed to operate with minimal noise, traffic, and visual impact, ensuring no adverse effects on nearby residential areas.
5. Development minimises and mitigates impacts on the biodiversity values of environmentally sensitive areas, including the existing migratory bird habitat areas.	Complies. The development avoids environmentally sensitive areas and incorporates measures to minimise and mitigate impacts on biodiversity, including migratory bird habitats.
6. Defined uses which may meet the precinct intent include: linear infrastructure facility, medium impact industry, port facilities, utility installation and, warehouse	Not Applicable
7. High impact industry may be considered where appropriate	Not Applicable. The solar ground mount system is low-impact enabling infrastructure that supports any future high impact industry by supplying clean energy.

CONCLUSION AND RECOMMENDATIONS

This application provides justification for a Development Application Permit for the solar system installation involving land described at 500SP271547, situated at 96 Buss St, Burnett Heads QLD 4670, on the following grounds:

- The proposed development represents a consistent land use which does not conflict with any of the SDA Assessment Criteria
- The proposed development complies with the applicable criteria and provisions of the Bundaberg State Development Area wide Assessment criteria.

Thus, The proposed solar ground mount system fully complies with the Bundaberg State Development Area Development Scheme. It delivers low-impact, renewable energy infrastructure that supports industrial growth linked to the Bundaberg region while minimising environmental, amenity, and infrastructure impacts. The design aligns with best practices for flood resilience, emissions control, transport access, and biodiversity protection. It incorporates efficient service integration, avoids interference with existing networks and operations, and ensures compliance with engineering, planning, and environmental standards. The development is compatible with the precinct's intent and supports long-term sustainable industrial expansion.

APPENDIX

KUGA ENERGY

CONSTRUCTION PLAN

CUSTOMISED FOR: ETEX AUSTRALIA PTY LTD

DATE PREPARED: 29.08.2025

REVIEWED BY: Muhamad Zuhaili

PROJECT INFORMATION	
PROJECT NAME:	ETEX AUSTRALIA PTY LTD
ADDRESS:	96 Bus St. Burnett Heads, QLD 4670, Australia
DC POWER (kW):	900.90 kWp
AC POWER (kW):	700 kVA
JOB NUMBER	J3087

SYSTEM INFORMATION			
	BRAND / MODEL	**QTY**	**TOTAL KW**
PANEL	Trina Solar, TSM-NEG21C.20 715 (715W)	1260 PCS	900.90 kWp
INVERTER	Tauro Eco 100-3-P (Fronius)	7	700 kVA

KUGA CONTACT DETAILS				
NAME	**COMPANY**	**POSITION**	**CONTACT NUMBER**	**EMAIL ADDRESS**
JOHN KURTA	KUGA ENERGY	MANAGING DIRECTOR	0433239898	j.kurta@kuga.energy
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ADAM MOHSIN	KUGA ENERGY	HEAD OF ENGINEERING	0414685929	a.mohsin@kuga.energy
MUHAMAD ZUHAILI ANUAR	KUGA ENERGY	PROJECT ENGINEER	0452367829	m.anuar@kuga.energy
JUSTIN LUMSDEN	KUGA ENERGY	PROJECT MANAGER	0432790399	j.lumsden@kuga.energy

SITE CONTACT DETAILS				
NAME	**COMPANY**	**POSITION**	**CONTACT NUMBER**	**EMAIL ADDRESS**
WILLIAM KEAST	ETEX AUSTRALIA PTY LTD	TECHNICAL MANAGER	0491051223	william.keast@etexgroup.com

KUGA ENERGY

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

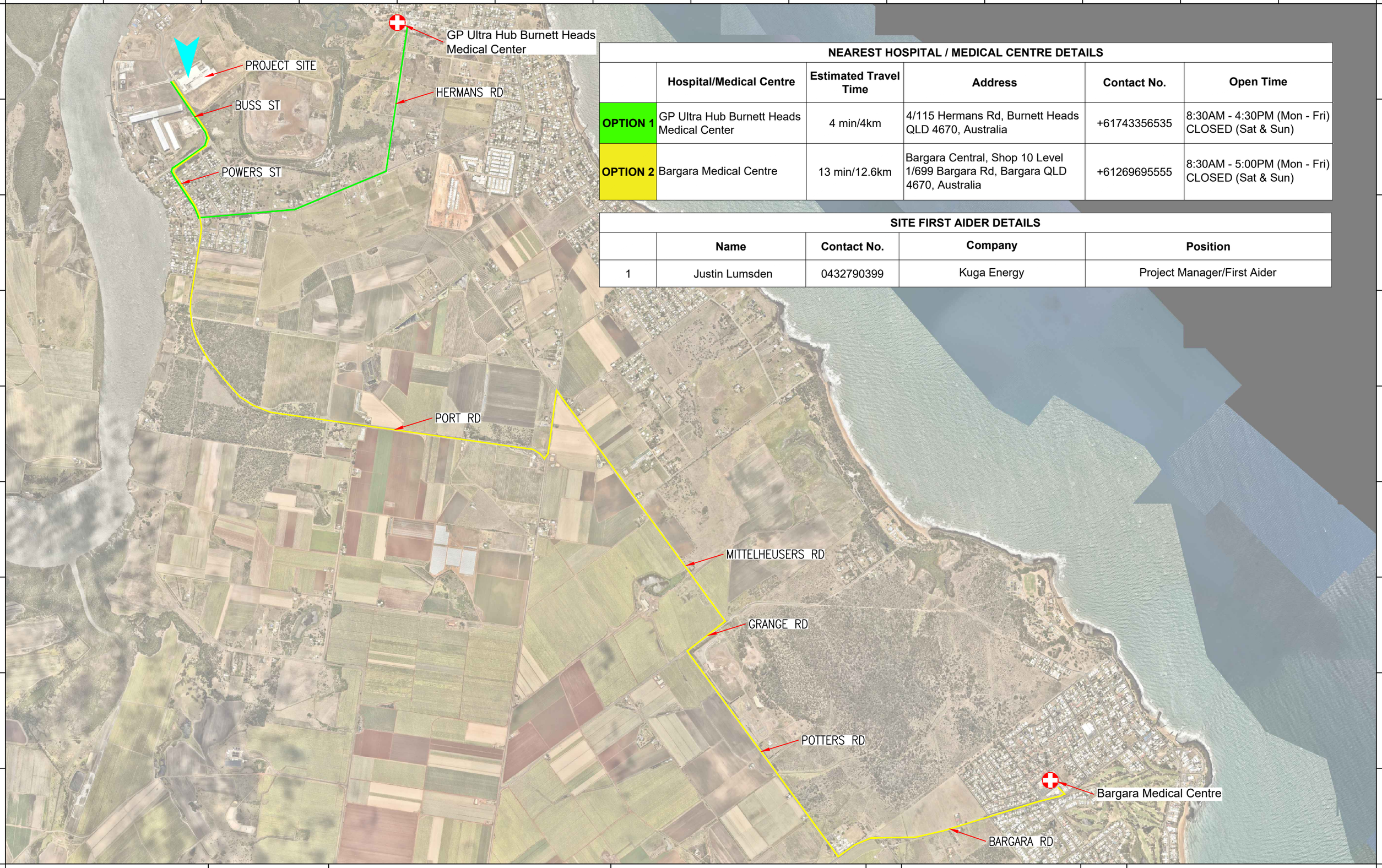
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

SITE INDUCTION

DWG NO: J3087 - 001

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN



NEAREST HOSPITAL / MEDICAL CENTRE DETAILS

	Hospital/Medical Centre	Estimated Travel Time	Address	Contact No.	Open Time
OPTION 1	GP Ultra Hub Burnett Heads Medical Center	4 min/4km	4/115 Hermans Rd, Burnett Heads QLD 4670, Australia	+61743356535	8:30AM - 4:30PM (Mon - Fri) CLOSED (Sat & Sun)
OPTION 2	Bargara Medical Centre	13 min/12.6km	Bargara Central, Shop 10 Level 1/699 Bargara Rd, Bargara QLD 4670, Australia	+61269695555	8:30AM - 5:00PM (Mon - Fri) CLOSED (Sat & Sun)

SITE FIRST AIDER DETAILS

	Name	Contact No.	Company	Position
1	Justin Lumsden	0432790399	Kuga Energy	Project Manager/First Aider

KUGA ENERGY

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

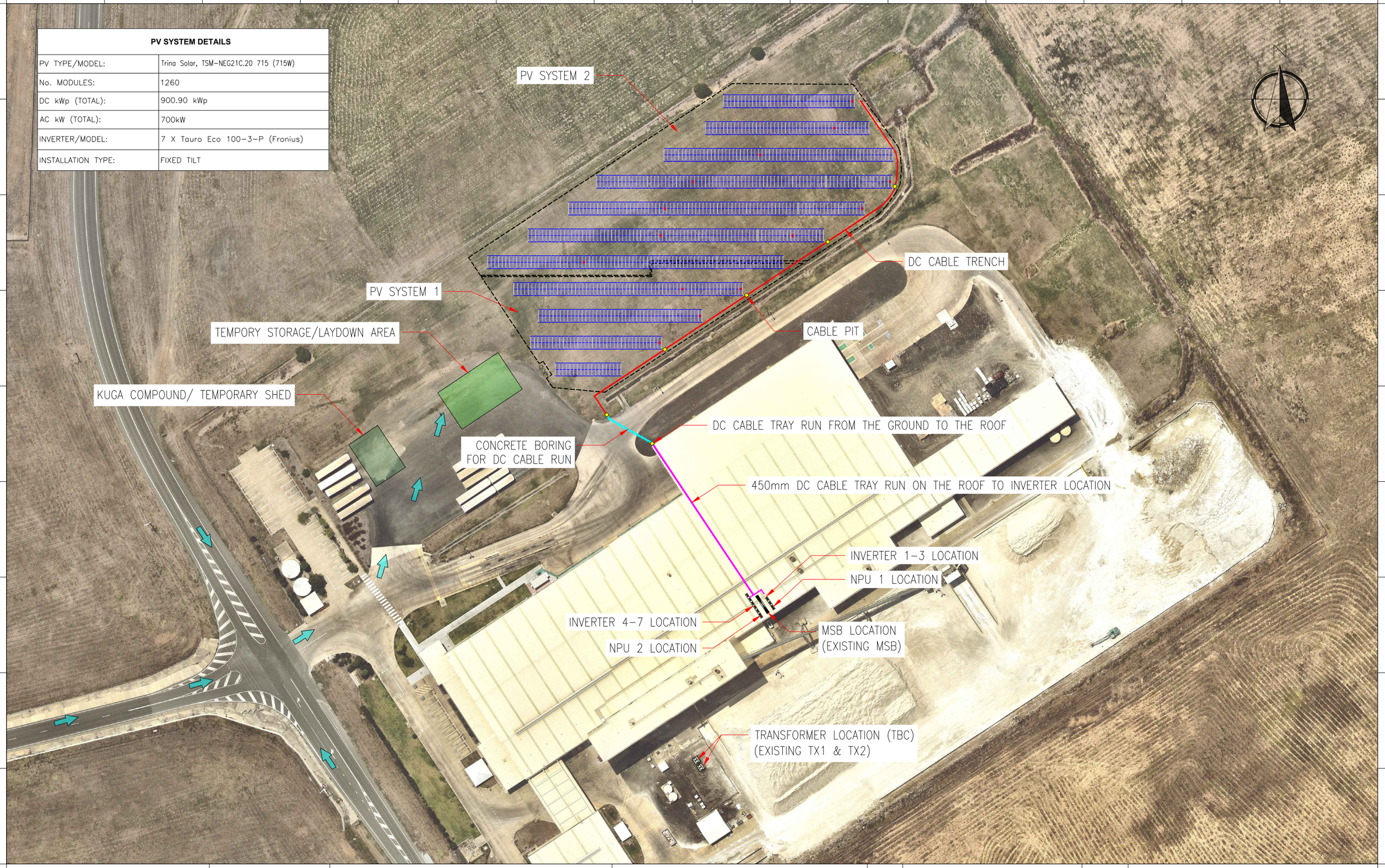
EMERGENCY DETAILS

DWG NO: J3087 - 002

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

PV SYSTEM DETAILS	
PV TYPE/MODEL:	Trina Solar, TSM-NEG21C.20 715 (715W)
No. MODULES:	1260
DC kWp (TOTAL):	900.90 kWp
AC kW (TOTAL):	700kW
INVERTER/MODEL:	7 X Tauro Eco 100-3-P (Fronius)
INSTALLATION TYPE:	FIXED TILT



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

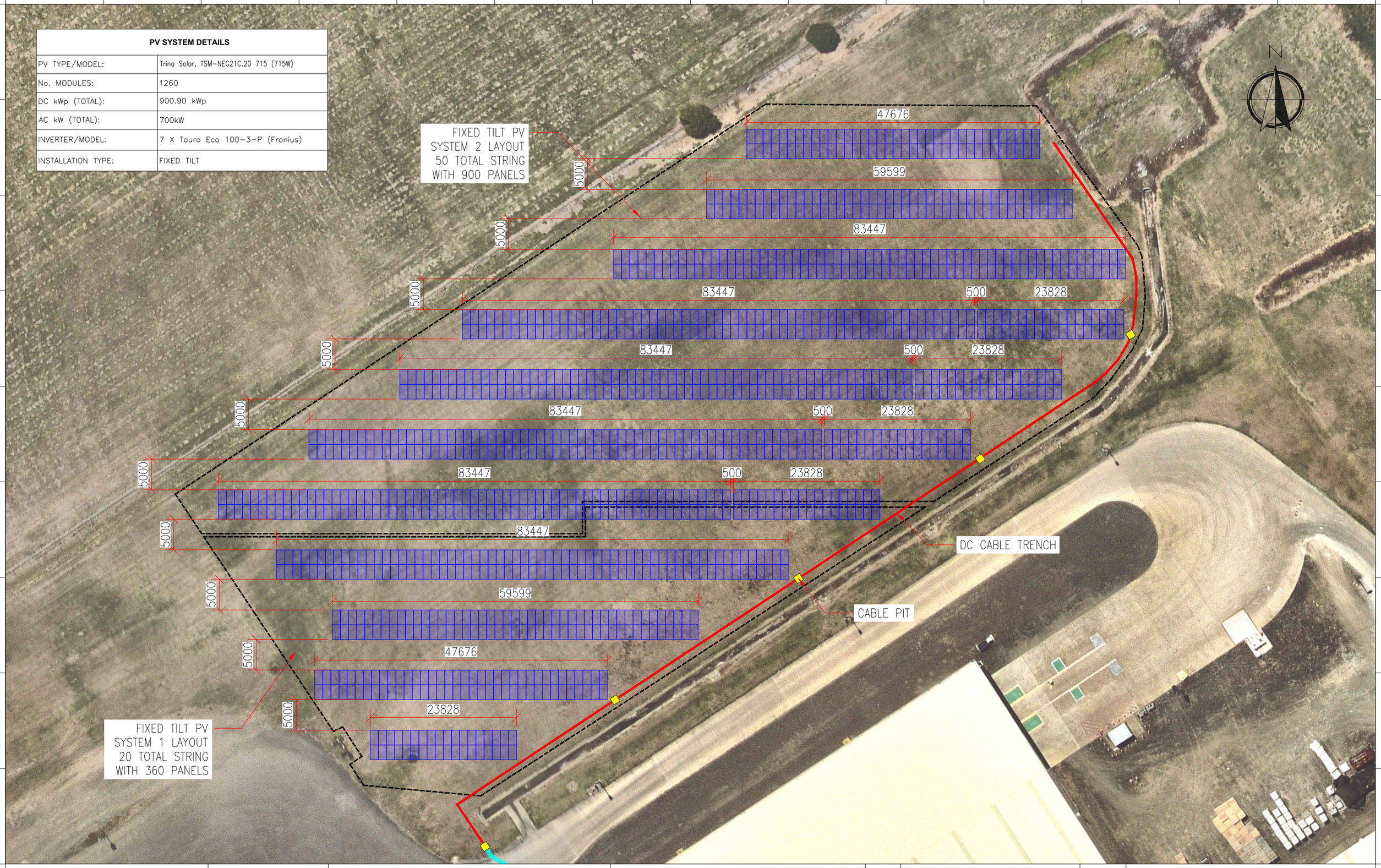
SITE ACCESS PLAN

DWG NO: J3087 - 003

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

PV SYSTEM DETAILS	
PV TYPE/MODEL:	Trina Solar, TSM-NEG21C.20 715 (715W)
No. MODULES:	1260
DC kWp (TOTAL):	900.90 kWp
AC kW (TOTAL):	700kW
INVERTER/MODEL:	7 X Tauro Eco 100-3-P (Fronius)
INSTALLATION TYPE:	FIXED TILT



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

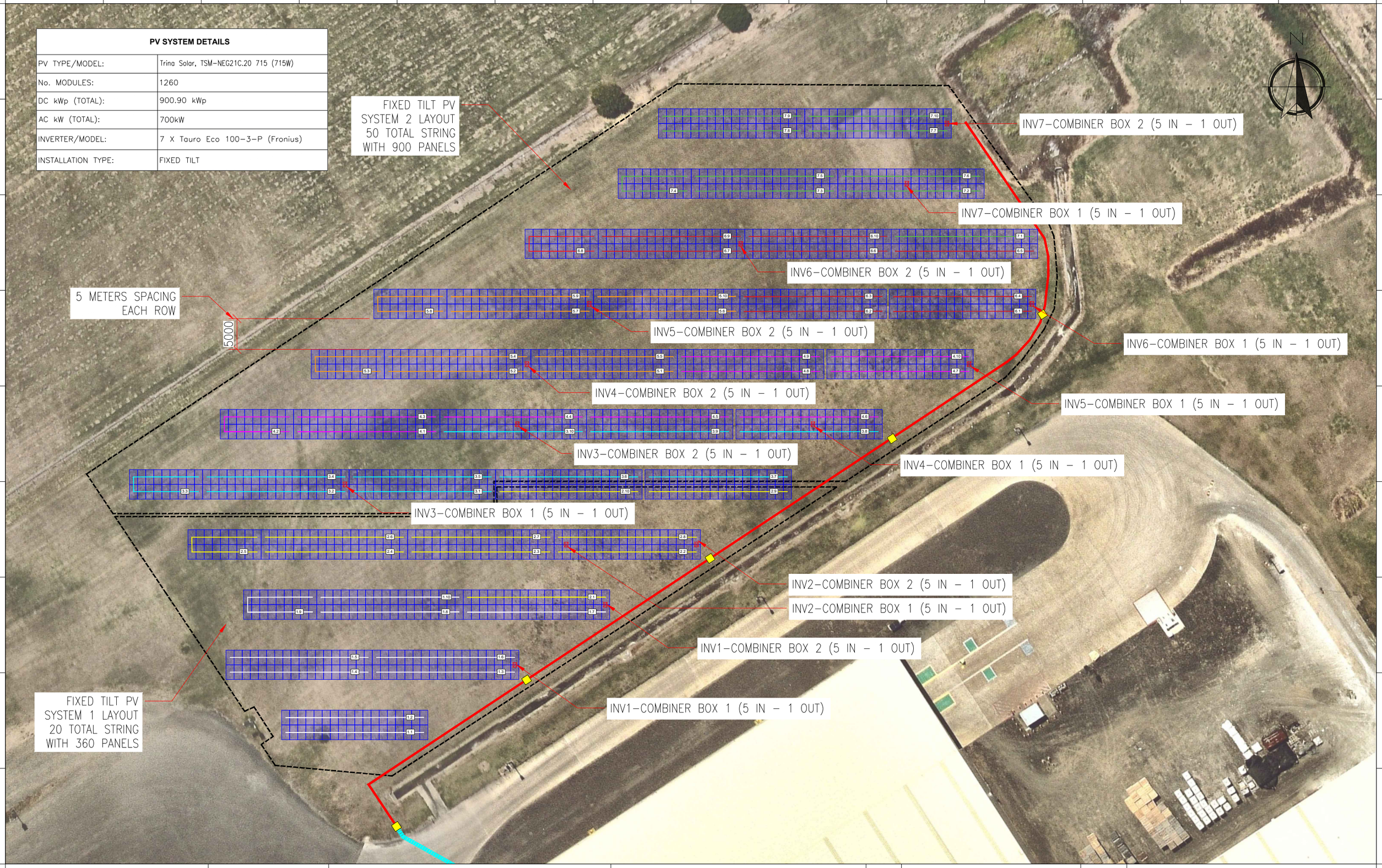
PV Layout

DWG NO: J3087 - 004

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

PV SYSTEM DETAILS	
PV TYPE/MODEL:	Trina Solar, TSM-NEG21C.20 715 (715W)
No. MODULES:	1260
DC kWp (TOTAL):	900.90 kWp
AC kW (TOTAL):	700kW
INVERTER/MODEL:	7 X Tauro Eco 100-3-P (Fronius)
INSTALLATION TYPE:	FIXED TILT



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

STRING WIRING PV SYSTEM

DWG NO: J3087 - 005

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

						String to Iso							Iso to Inverter							
Inverter Count	Number of panels per inverter	PV Inverter Input	Combiner Box	String Number	Number of panels p/string	Cable Size	Resistance	Voltage	Current	Distance	Vd	Vd%	Cable Size	Resistance	Voltage	Current	Distance	Vd	Vd%	TOTAL VD%
INV 1	180	PV1	CB1	1.1	18	6 mm	3.75	739.8	18.44	65	8.99	1.22%								
				1.2	18	6 mm	3.75	739.8	18.44	65	8.99	1.22%								
				1.3	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				1.4	18	6 mm	3.75	739.8	18.44	73	10.10	1.36%								
				1.5	18	6 mm	3.75	739.8	18.44	73	10.10	1.36%	95 mm	0.236	739.8	92.2	130	5.66	0.76%	2.13%
		PV2	CB2	1.6	18	6 mm	3.75	739.8	18.44	65	8.99	1.22%								
				1.7	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				1.8	18	6 mm	3.75	739.8	18.44	73	10.10	1.36%								
				1.9	18	6 mm	3.75	739.8	18.44	98	13.55	1.83%								
				1.10	18	6 mm	3.75	739.8	18.44	73	10.10	1.36%	95 mm	0.236	739.8	92.2	147	6.40	0.86%	2.23%
INV 2	180	PV1	CB1	2.1	18	6 mm	3.75	739.8	18.44	116	16.04	2.17%								
				2.2	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				2.3	18	6 mm	3.75	739.8	18.44	31	4.29	0.58%								
				2.4	18	6 mm	3.75	739.8	18.44	79	10.93	1.48%								
				2.5	18	6 mm	3.75	739.8	18.44	104	14.38	1.94%	120 mm	0.188	739.8	92.2	187	6.48	0.88%	2.82%
		PV2	CB2	2.6	18	6 mm	3.75	739.8	18.44	119	16.46	2.22%								
				2.7	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				2.8	18	6 mm	3.75	739.8	18.44	119	16.46	2.22%								
				2.9	18	6 mm	3.75	739.8	18.44	81	11.20	1.51%								
				2.10	18	6 mm	3.75	739.8	18.44	107	14.80	2.00%	120 mm	0.188	739.8	92.2	166	5.75	0.78%	3.00%
INV 3	180	PV1	CB1	3.1	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%								
				3.2	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				3.3	18	6 mm	3.75	739.8	18.44	51	7.05	0.95%								
				3.4	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				3.5	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%	95 mm	0.236	739.8	92.2	254	11.05	1.49%	2.45%
		PV2	CB2	3.6	18	6 mm	3.75	739.8	18.44	110	15.21	2.06%								
				3.7	18	6 mm	3.75	739.8	18.44	61	8.44	1.14%								
				3.8	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				3.9	18	6 mm	3.75	739.8	18.44	72	9.96	1.35%								
				3.10	18	6 mm	3.75	739.8	18.44	97	13.42	1.81%	95 mm	0.236	739.8	92.2	199	8.66	1.17%	2.98%
Inv 4	180	PV1	CB1	4.1	18	6 mm	3.75	739.8	18.44	51	7.05	0.95%								
				4.2	18	6 mm	3.75	739.8	18.44	77	10.65	1.44%								
				4.3	18	6 mm	3.75	739.8	18.44	51	7.05	0.95%								
				4.4	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				4.5	18	6 mm	3.75	739.8	18.44	48	6.64	0.90%	95 mm	0.236	739.8	92.2	260	11.31	1.53%	2.97%
		PV2	CB2	4.6	18	6 mm	3.75	739.8	18.44	72	9.96	1.35%								
				4.7	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				4.8	18	6 mm	3.75	739.8	18.44	74	10.23	1.38%								
				4.9	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				4.10	18	6 mm	3.75	739.8	18.44	74	10.23	1.38%	95 mm	0.236	739.8	92.2	217	9.44	1.28%	2.66%
Inv 5	180	PV1	CB1	5.1	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%								
				5.2	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				5.3	18	6 mm	3.75	739.8	18.44	51	7.05	0.95%								
				5.4	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				5.5	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%	95 mm	0.236	739.8	92.2	291	12.66	1.71%	2.67%
		PV1	CB2	5.6	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%								
				5.7	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				5.8	18	6 mm	3.75	739.8	18.44	51	7.05	0.95%								
				5.9	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				5.10	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%	95 mm	0.236	739.8	92.2	304	13.23	1.79%	2.74%
Inv 6	180	PV1	CB1	6.1	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				6.2	18	6 mm	3.75	739.8	18.44	74	10.23	1.38%								
				6.3	18	6 mm	3.75	739.8	18.44	74	10.23	1.38%								
				6.4	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				6.5	18	6 mm	3.75	739.8	18.44	49	6.78	0.92%	95 mm	0.236	739.8	92.2	233	10.14	1.37%	2.75%
		PV1	CB2	6.6	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%								
				6.7	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				6.8	18	6 mm	3.75	739.8	18.44	51	7.05	0.95%								
				6.9	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				6.10	18	6 mm	3.75	739.8	18.44	28	3.87	0.52%	95 mm	0.236	739.8	92.2	284	12.36	1.67%	2.62%
Inv 7	180	PV1	CB1	7.1	18	6 mm	3.75	739.8	18.44	74	10.23	1.38%								
				7.2	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				7.3	18	6 mm	3.75	739.8	18.44	49	6.78	0.92%								
				7.4	18	6 mm	3.75	739.8	18.44	74	10.23	1.38%								
				7.5	18	6 mm	3.75	739.8	18.44	49	6.78	0.92%	95 mm	0.236	739.8	92.2	271	11.79	1.59%	2.98%
		PV1	CB2	7.6	18	6 mm	3.75	739.8	18.44	58	8.02	1.08%								
				7.7	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%								
				7.8	18	6 mm	3.75	739.8	18.44	73	10.10	1.36%								
				7.9	18	6 mm	3.75	739.8	18.44	73	10.10	1.36%								
				7.10	18	6 mm	3.75	739.8	18.44	25	3.46	0.47%	95 mm	0.236	739.8	92.2	268	11.66	1.58%	2.94%

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

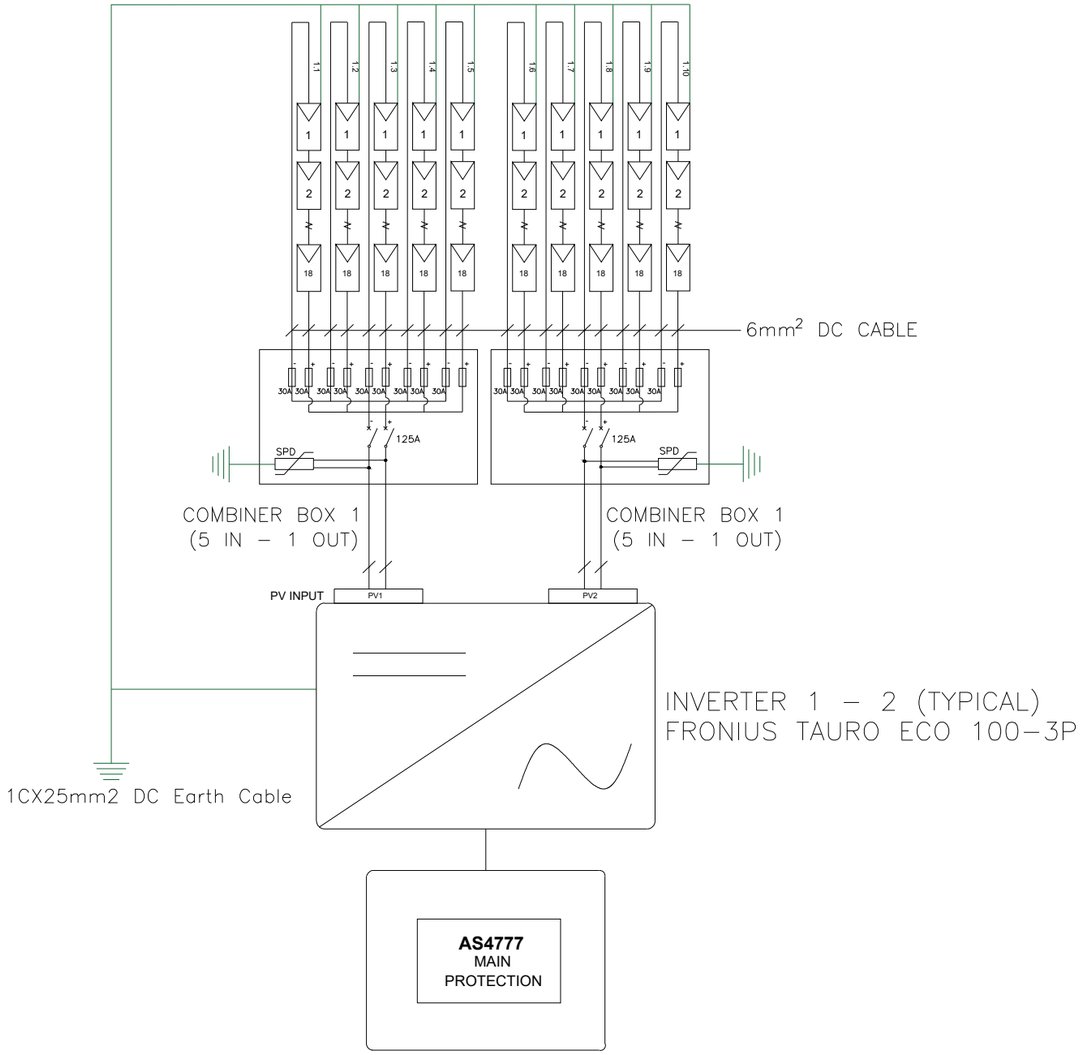
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

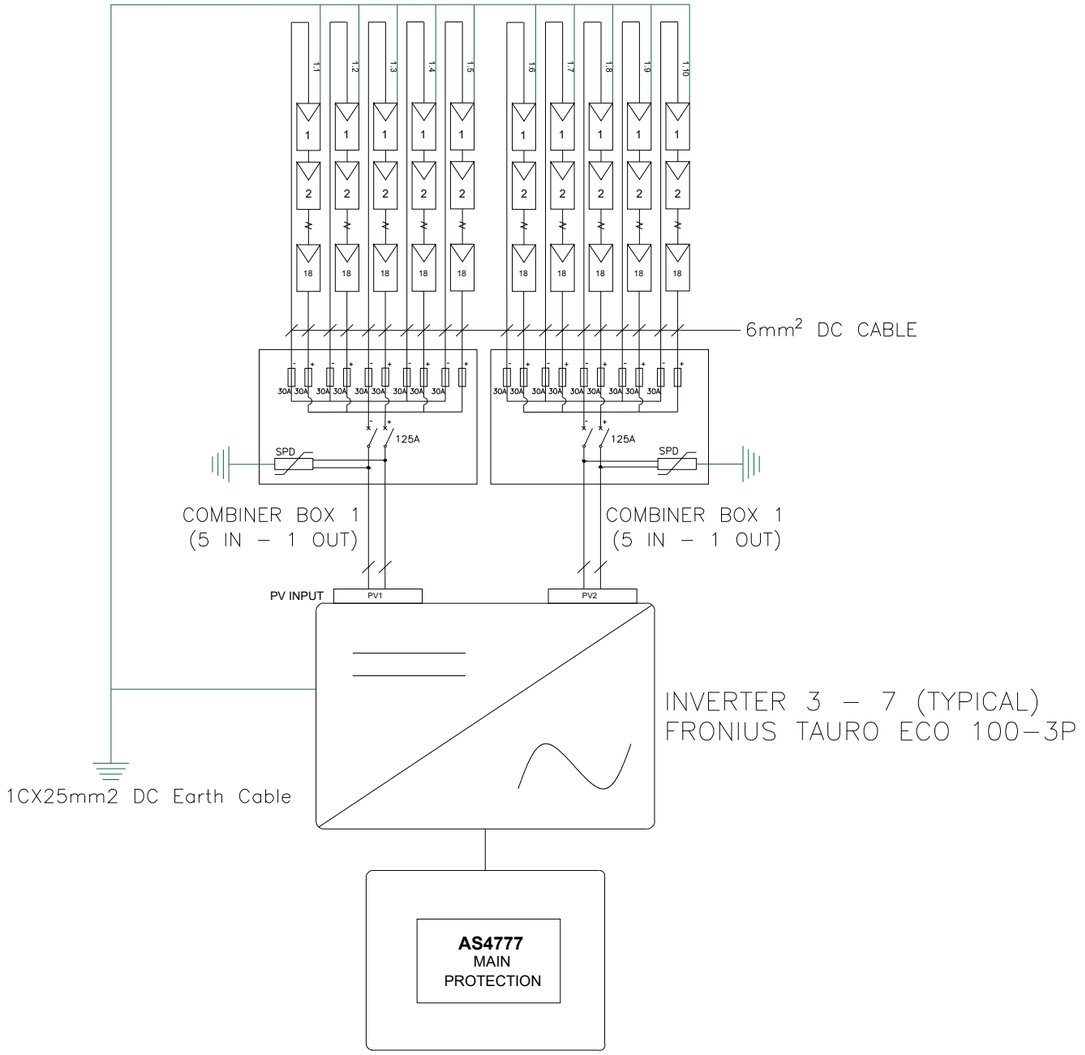
STRING WIRING PV SYSTEM

DWG NO: J3087 - 006

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN





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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

DC WIRING SCHEMATIC

DWG NO: J3087 - 007

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

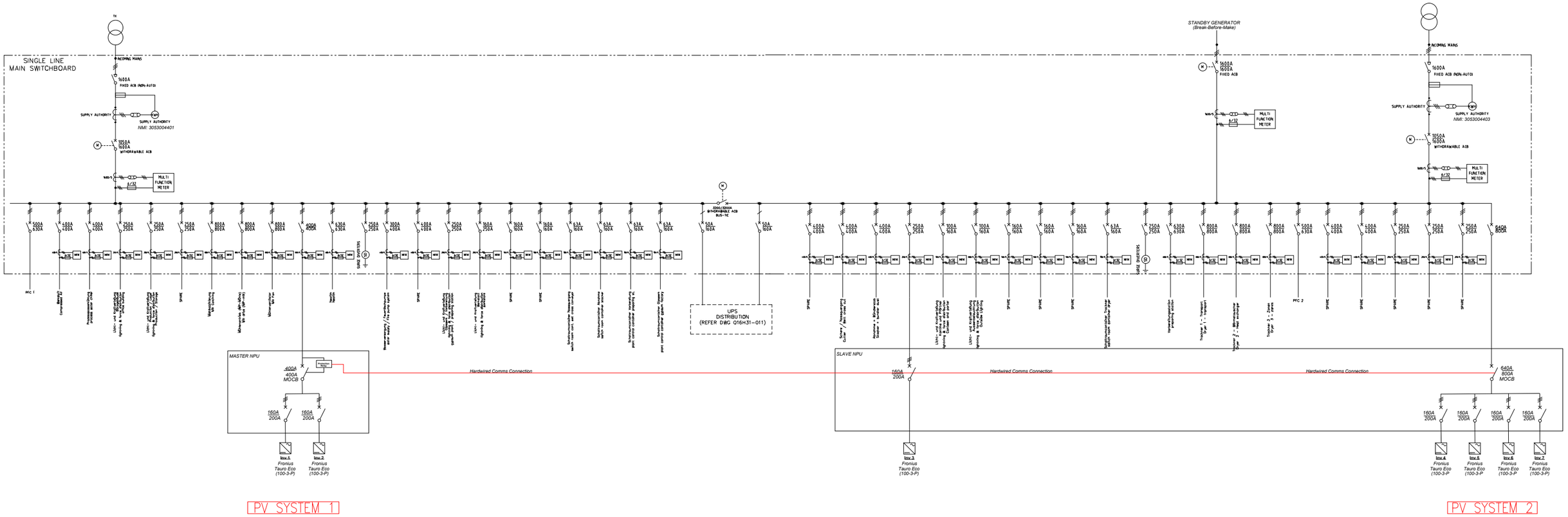
INVERTER PROTECTION SETTINGS SCHEDULE			
PROTECTION FUNCTION	**PROTECTIVE FUNCTION LIMIT**	**TRIP TIME DELAY**	**MAX DISCONNECTION TIME**
Over Voltage 2 (V>>)	*275V*	*-*	*0.20S*
Over Voltage 1 (V>)	*265V*	*1 sec*	*2S*
Under Voltage 2 (V<<)	*70V*	*1 sec*	*2S*
Under Voltage 1 (V<)	*180V*	*10 sec*	*11S*
Over Frequency (Hz)	*52*	*-*	*0.20S*
Under Frequency (Hz)	*47*	*1 sec*	*2S*
ROCOF (81R)	*+/- 4Hz/s*	*-*	*0.25S*
Vector Shift (78)	*8 Deg*	*-*	*Instantaneous*

VOLT-VAR and VOLT-WATT SETTINGS		
REFERENCE	**VOLTAGE**	**P OUTPUT/ P RATED (%)**
Vw1	*253V*	*100*
Vw2	*260V*	*20*
VOLT VAR SETTINGS		
Vv1	*207V*	*44% Supplying*
Vv2	*220V*	*0*
Vv3	*240V*	*0*
Vv4	*258V*	*60% Absorbing*

AC VOLTAGE RISE (PV SYSTEM 1)							
FROM	TO	CURRENT	LENGTH (m)	CABLE SIZE	EARTH CABLE	VOLTAGE RISE(V)	VOLTAGE RISE %
INVERTER 1	NPU 1	144.9	3	4 X 1CX70mm^2 +E,Cu XLPE-110deg	1CX25mm^2,Cu	0.25	0.06%
INVERTER 2	NPU 1	144.9	6	4 X 1CX70mm^2 +E,Cu XLPE-110deg	1CX25mm^2,Cu	0.5	0.13%
INVERTER 3	NPU 1	144.9	9	4 X 1CX70mm^2 +E,Cu XLPE-110deg	1CX25mm^2,Cu	0.76	0.19%
NPU 1	MSB1	434.7	15	4 X 1CX240mm^2 +E,Cu XLPE-110deg	1CX95mm^2,Cu	1.54	0.38%
MSB 1	TRANSFORMER 1	434.7	30	16 X 1CX240mm^2 +E,Cu XLPE-110deg (TBC)	1CX240mm^2,Cu (TBC)	0.71	0.18%
	TOTAL VOLTAGE RISE (VOLTS)	3.01					
	TOTAL VOLTAGE RISE %	0.75%					

AC VOLTAGE RISE (PV SYSTEM 2)							
FROM	TO	CURRENT	LENGTH (m)	CABLE SIZE	EARTH CABLE	VOLTAGE RISE(V)	VOLTAGE RISE %
INVERTER 4	NPU 2	144.9	3	4 X 1CX70mm^2 +E,Cu XLPE-110deg	1CX25mm^2,Cu	0.25	0.06%
INVERTER 5	NPU 2	144.9	6	4 X 1CX70mm^2 +E,Cu XLPE-110deg	1CX25mm^2,Cu	0.5	0.13%
INVERTER 6	NPU 2	144.9	9	4 X 1CX70mm^2 +E,Cu XLPE-110deg	1CX25mm^2,Cu	0.76	0.19%
INVERTER 7	NPU 2	144.9	12	4 X 1CX70mm^2 +E,Cu XLPE-110deg	1CX25mm^2,Cu	1.01	0.25%
NPU 2	MSB2	579.6	15	4 X 1CX300mm^2 +E,Cu XLPE-110deg	1CX120mm^2,Cu	1.83	0.46%
MSB 2	TRANSFORMER 2	579.6	30	16 X 1CX240mm^2 +E,Cu XLPE-110deg (TBC)	1CX240mm^2,Cu (TBC)	0.95	0.24%
	TOTAL VOLTAGE RISE (VOLTS)	3.79					
	TOTAL VOLTAGE RISE %	0.95%					

INVERTER SPECIFICATION	
MODEL	Fronius Tauro ECO 100-3-P
MAX. AC POWER RATING	100 KVA
MAX. DC INPUT VOLTAGE	1000 V
MAX. DC INPUT CURRENT	200 A
RATED AC VOLTAGE	400 V
MAX. AC OUTPUT CURRENT	144.9 A
INVERTER WEIGHT	103 kg



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

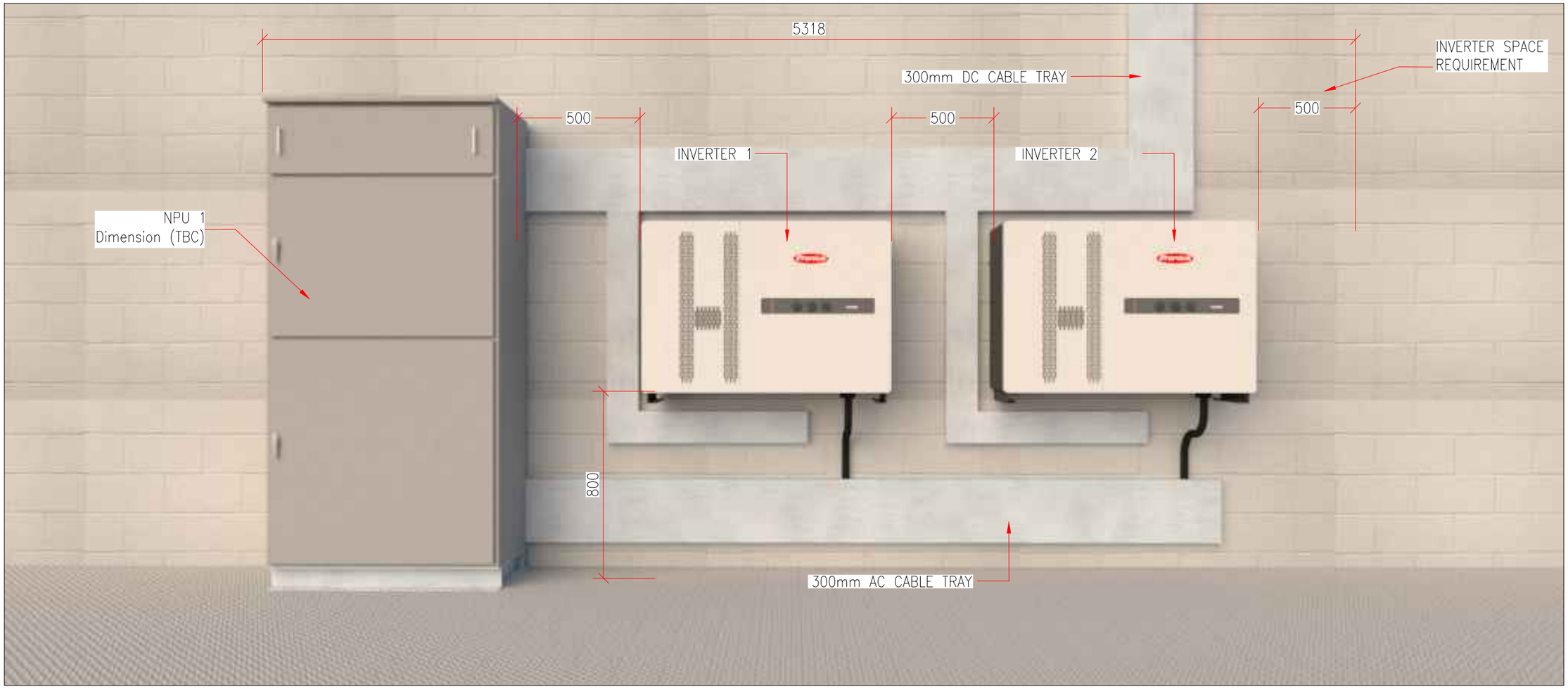
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

DWG NO: J3087 - 008

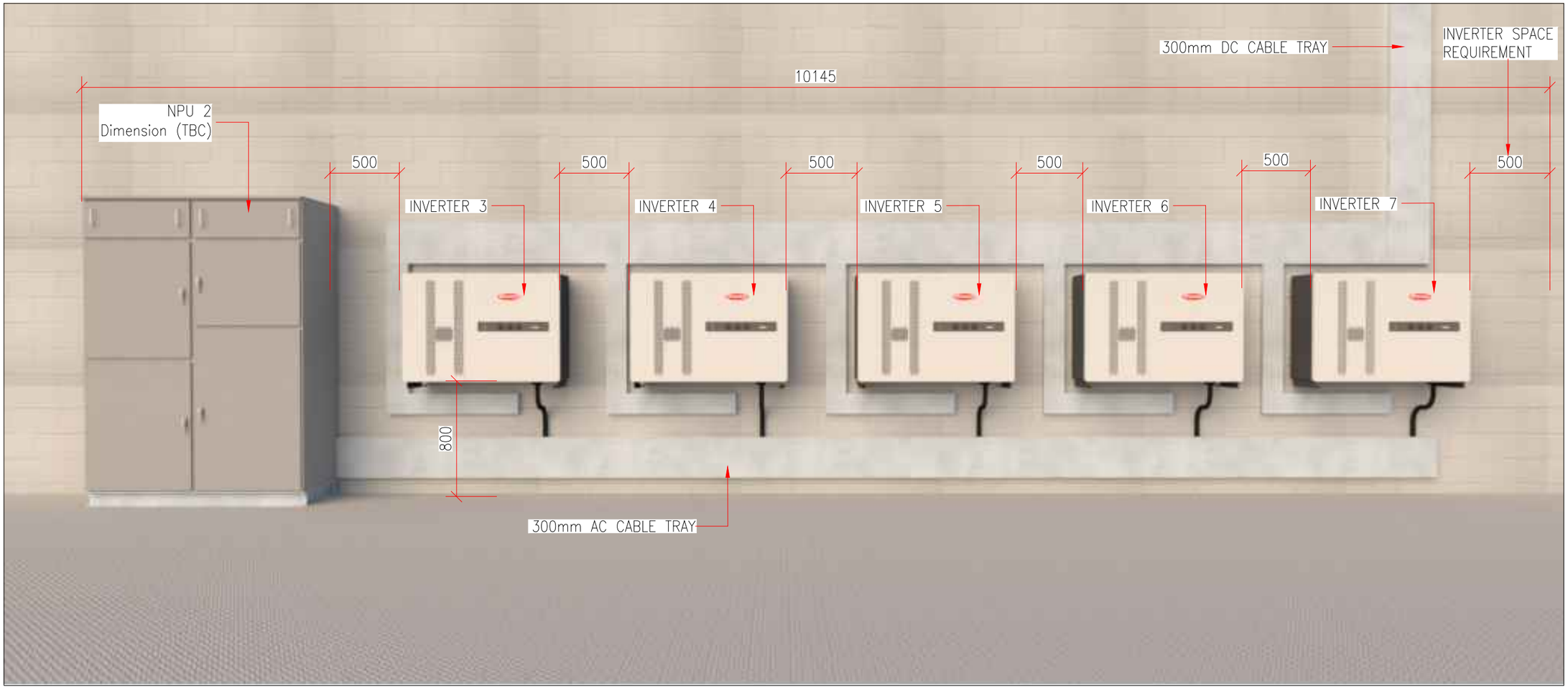
AC SLD

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN



KUGA ENERGY	**CLIENT NAME:** ETEX AUSTRALIA PTY LTD	INVERTER STATION 1	VER.	DESCRIPTION	DATE	CONSTRUCTION PLAN
KUGA ENERGY T: 13 58 42 E: m.merluza@kuga.energy W: www.13kuga.com.au	**PROJECT NUMBER:** J3087		1	ISSUED FOR CONSTRUCTION	29/08/2025	
	SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670	**DWG NO:** J3087 - 009A				



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

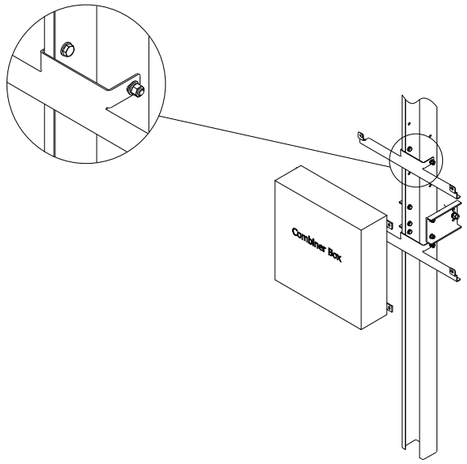
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

INVERTER STATION 2

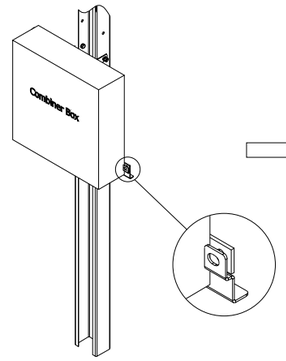
DWG NO: J3087 - 009B

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

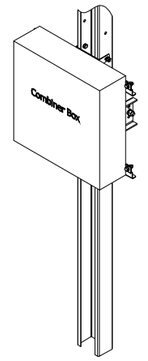
CONSTRUCTION PLAN



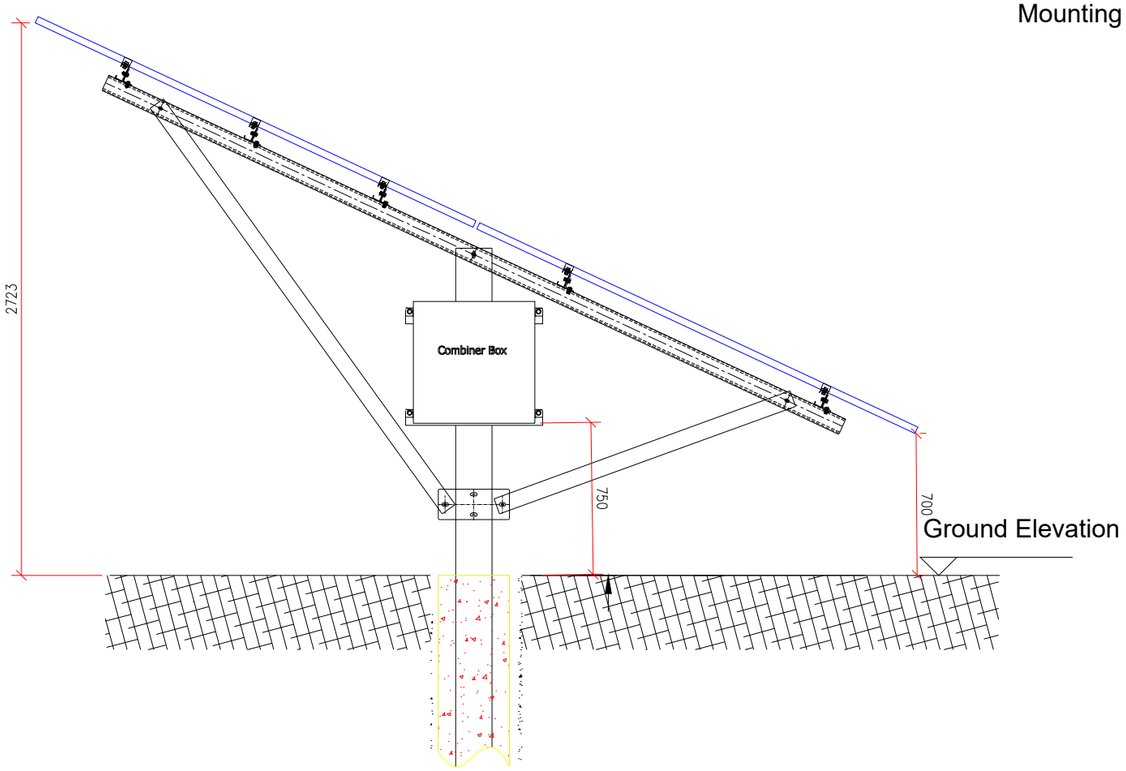
Mounting bracket

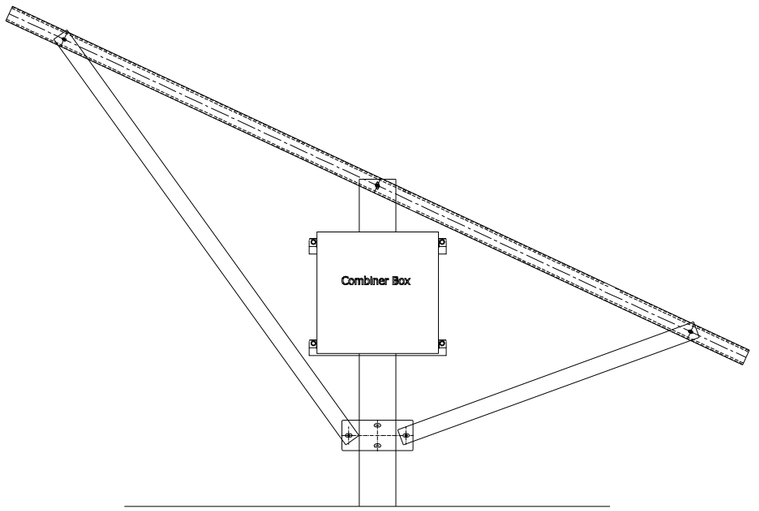


Hanging box



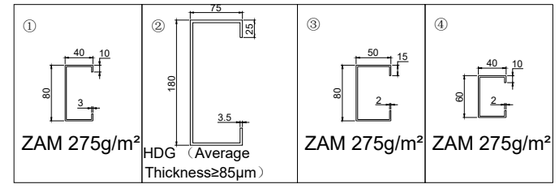
Mounting box

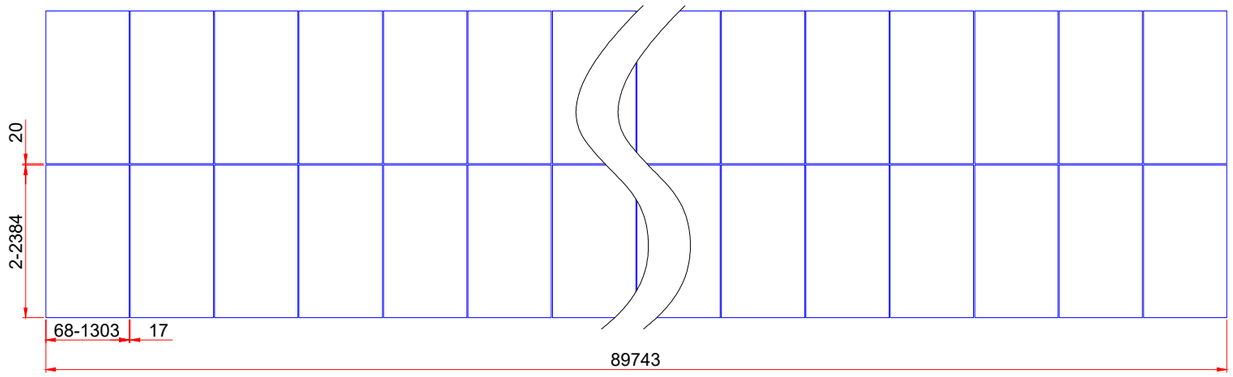


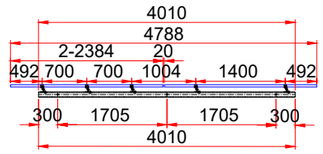


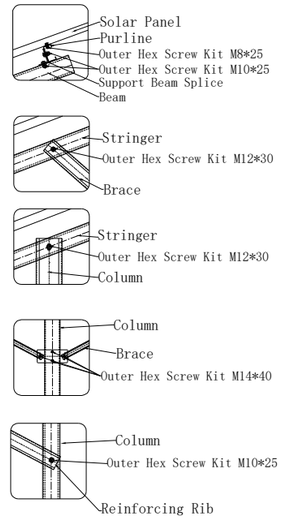
KUGA ENERGY	**KUGA ENERGY** T: 13 58 42 E: m.merluza@kuga.energy W: www.13kuga.com.au	**CLIENT NAME:** ETEX AUSTRALIA PTY LTD	COMBINER BOX MOUNTING DETAILS	**DWG NO:** J3087 - 0010	CONSTRUCTION PLAN	
		PROJECT NUMBER: J3087				
		SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670				

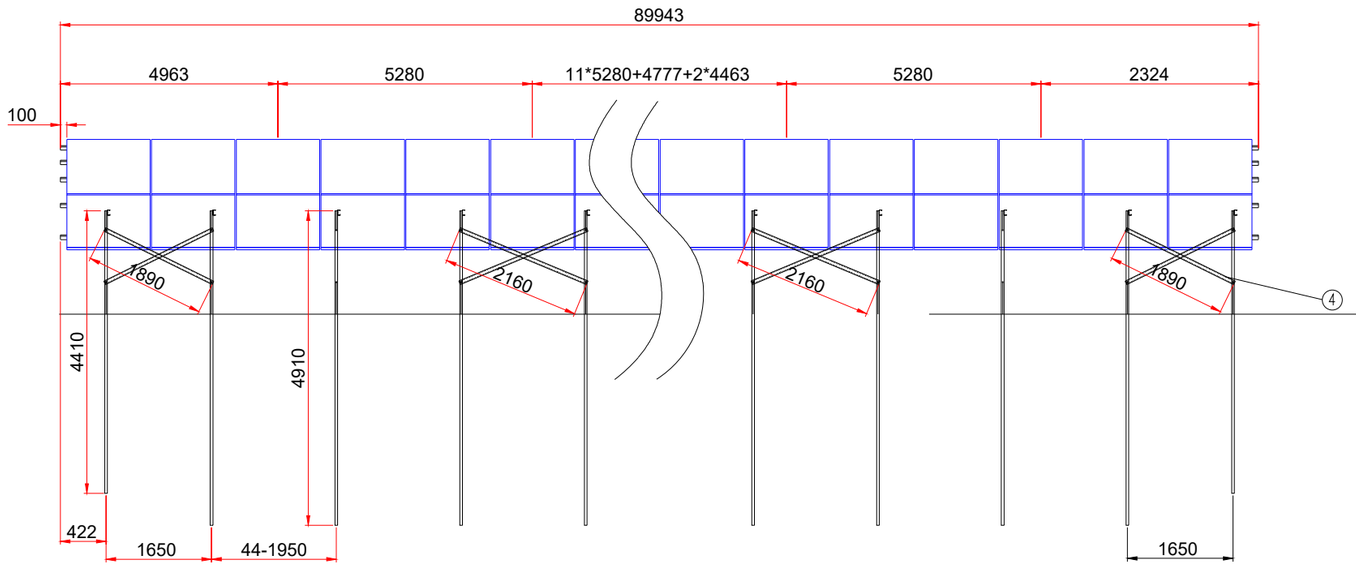
VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

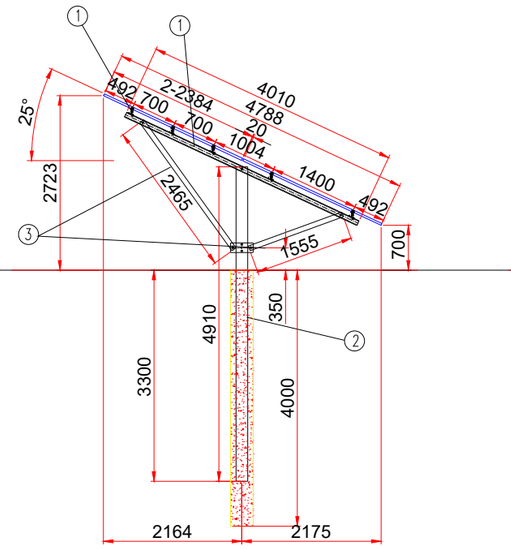


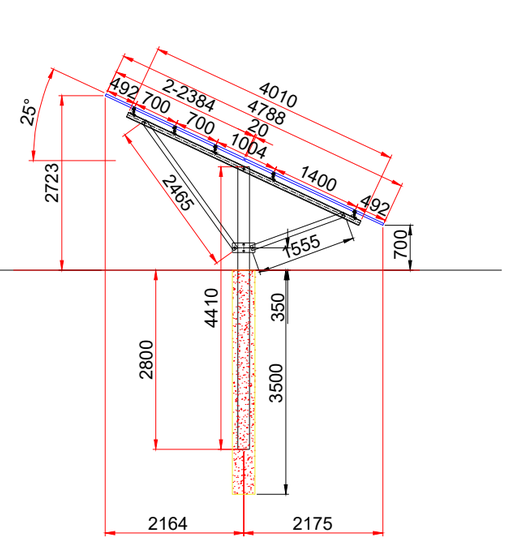












Technical information:
1.Module size is 2384x1303x33mm
2.Unit array is 2X68(136pcs)
3.Design wind speed is 69.3m/s
4.Design snow load is -kn/m²

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

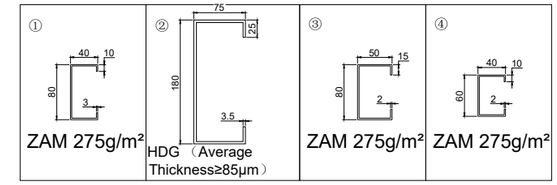
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

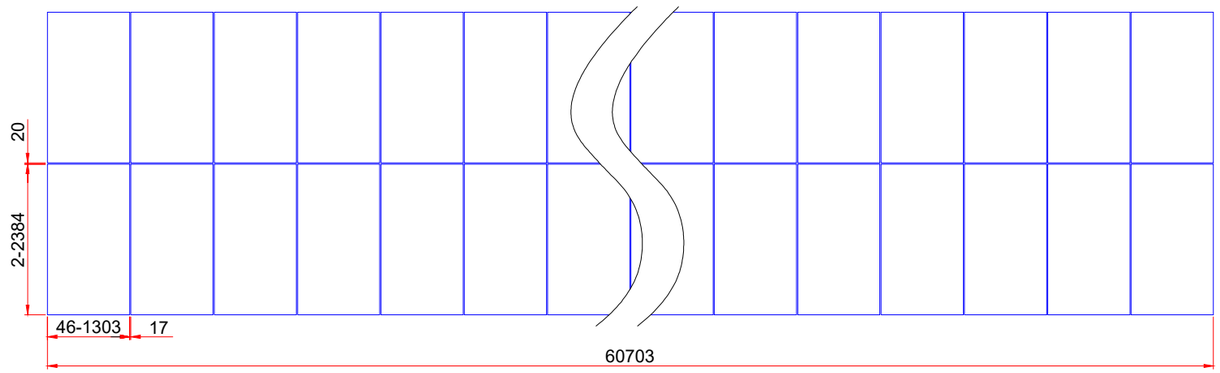
FIXED TILT SYSTEM DRAWING

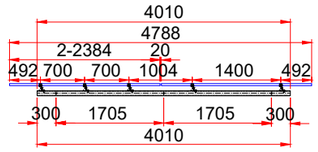
DWG NO: J3087 - 0011

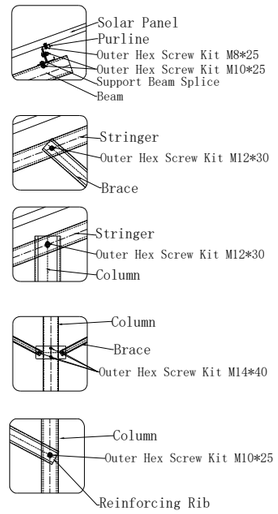
VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

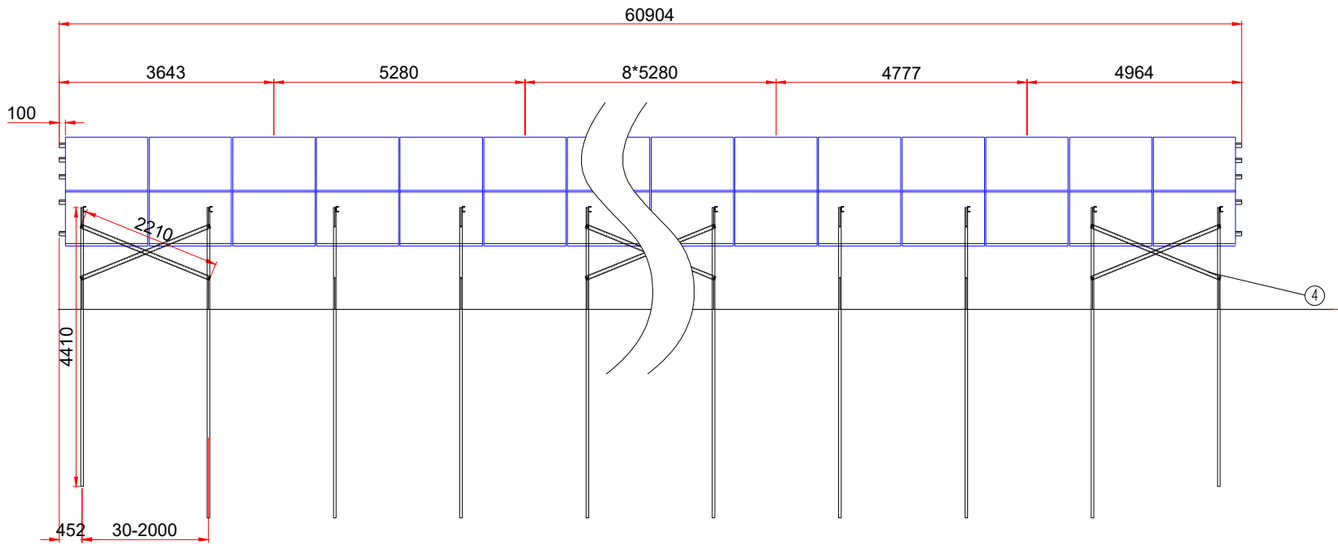
CONSTRUCTION PLAN

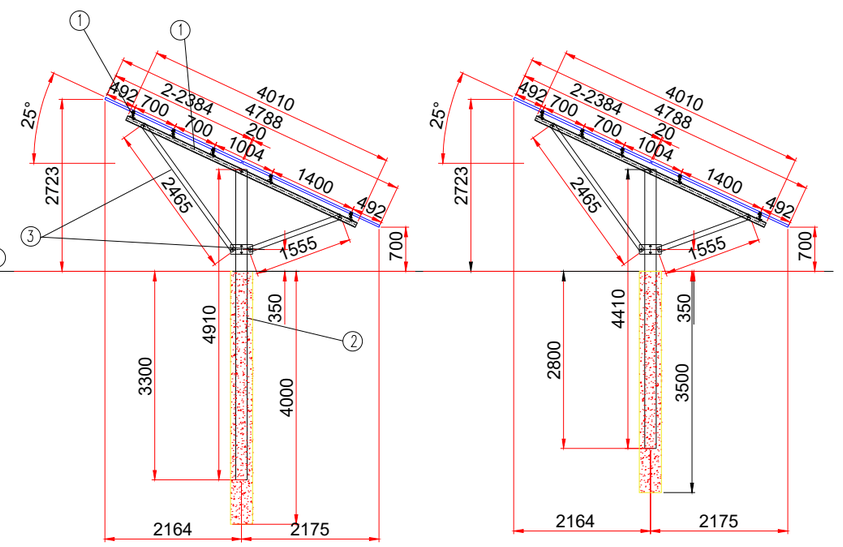












Technical information:

1.Module size is 2384x1303x33mm
2.Unit array is 2X46(92pcs)
3.Design wind speed is 69.3m/s
4.Design snow load is -kn/m²

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PROJECT NUMBER: J3087

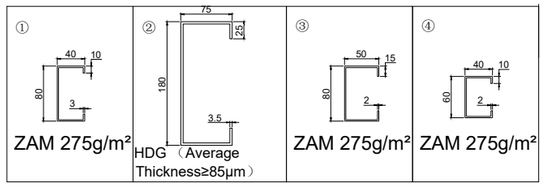
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

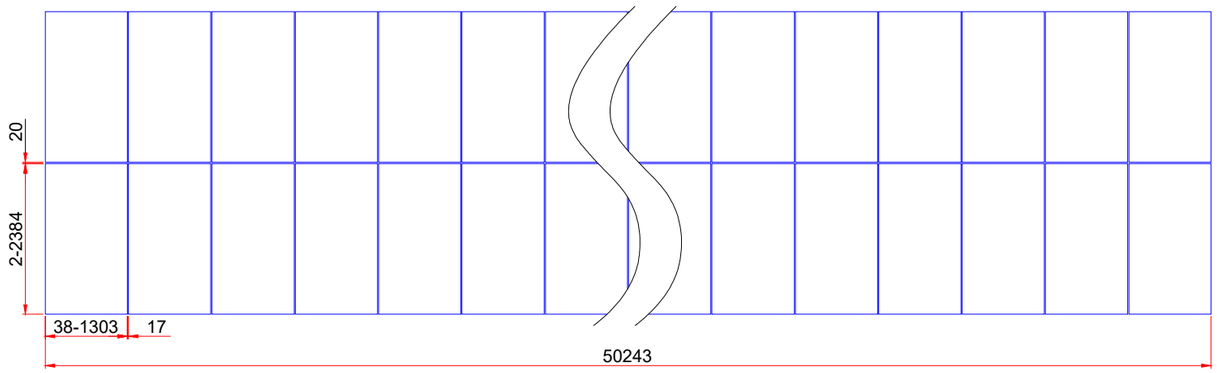
FIXED TILT SYSTEM DRAWING

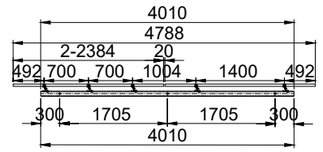
DWG NO: J3087 - 0012

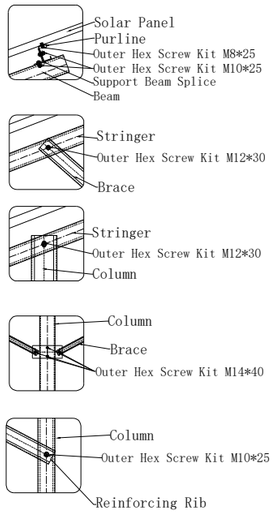
VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

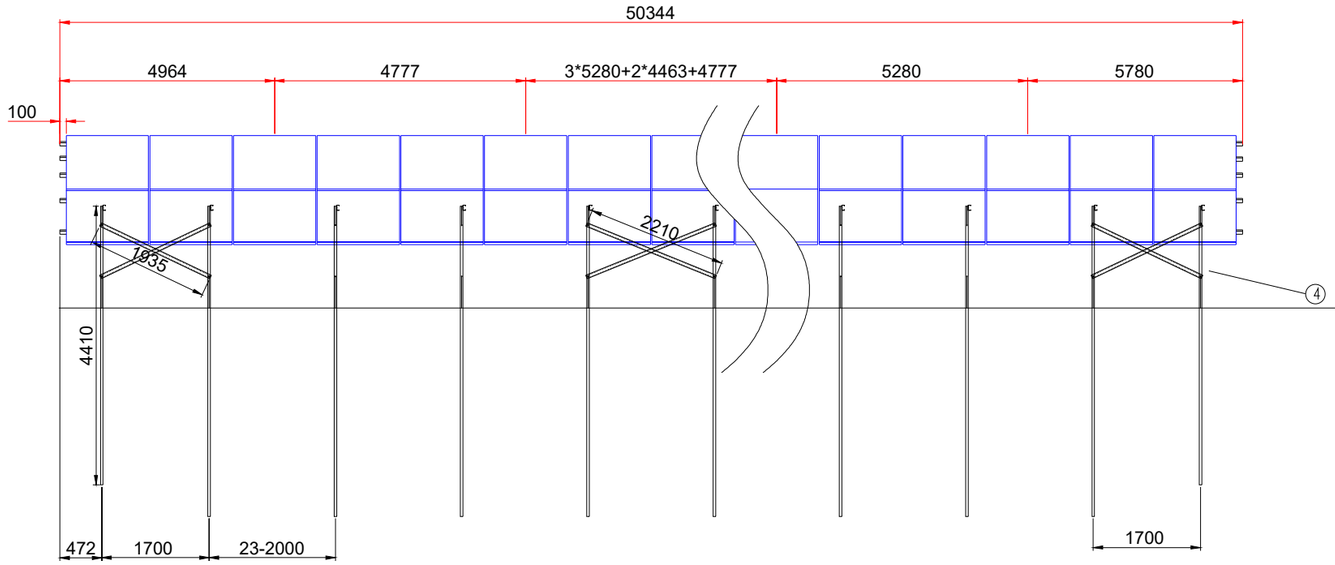
CONSTRUCTION PLAN

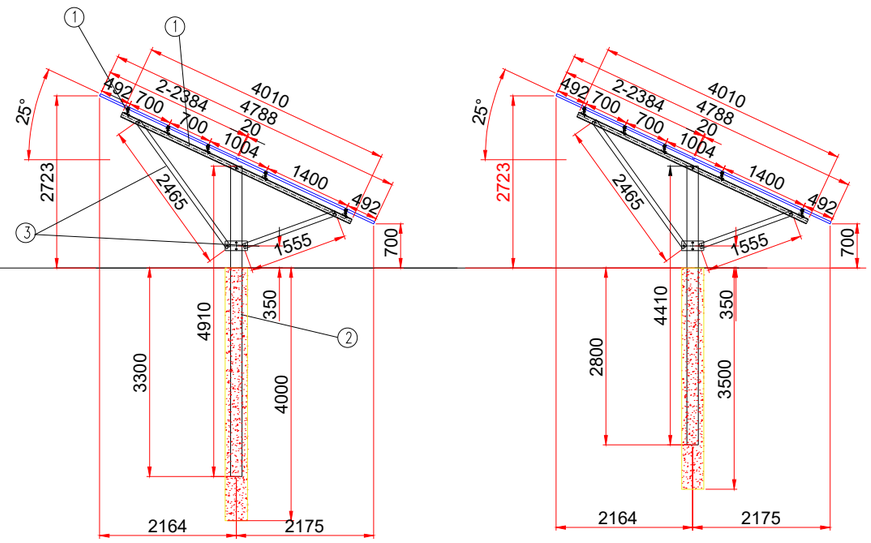












Technical information:

1.Module size is 2384x1303x33mm

2.Unit array is 2X38(76pcs)

3.Design wind speed is 69.3m/s

4.Design snow load is -kn/m²

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

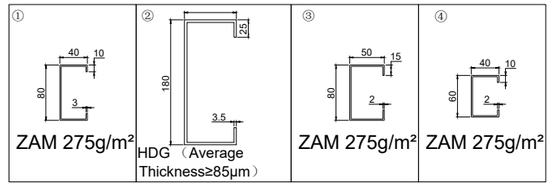
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

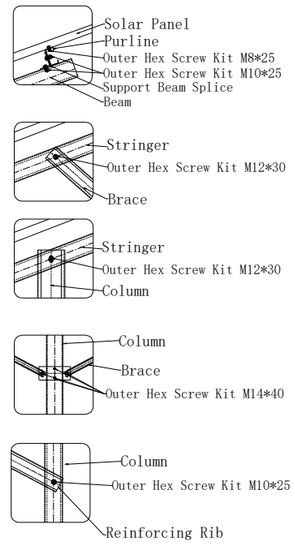
FIXED TILT SYSTEM DRAWING

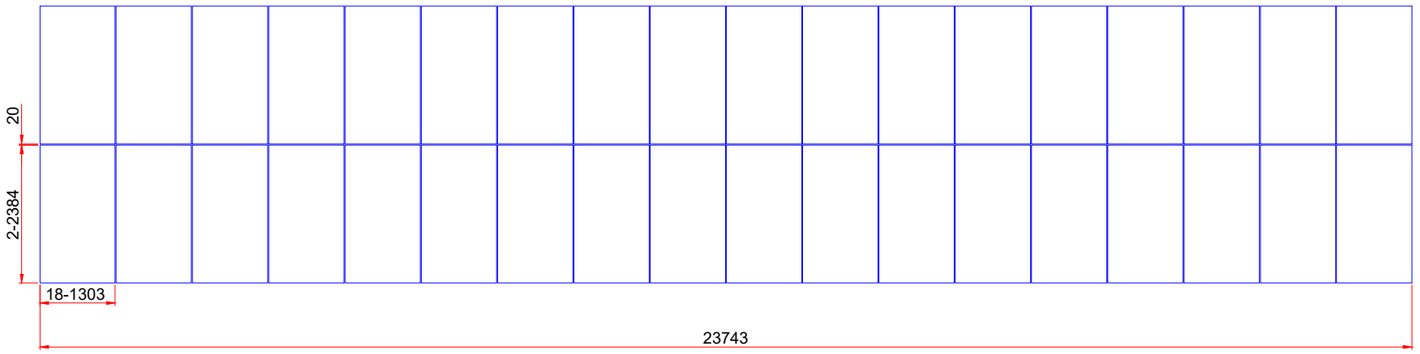
DWG NO: J3087 - 0013

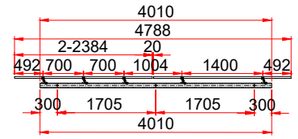
VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

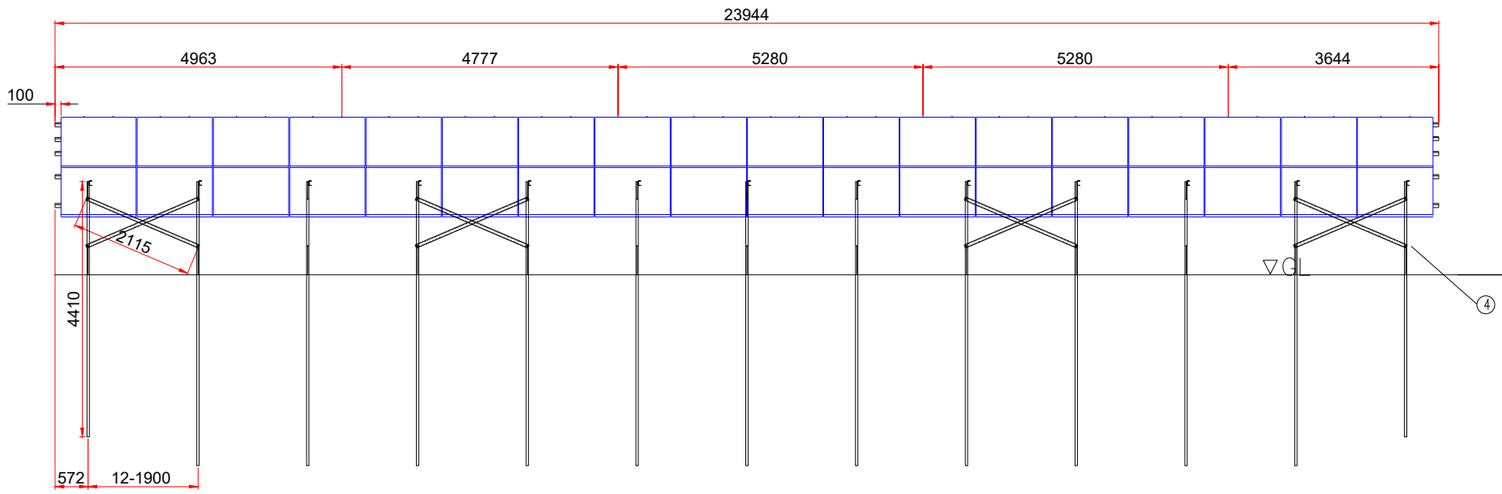
CONSTRUCTION PLAN

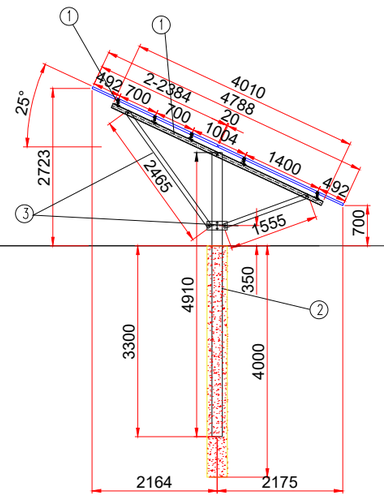


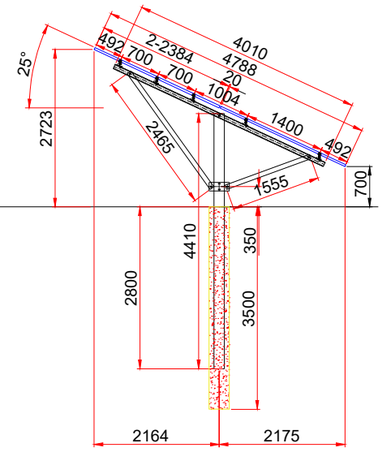








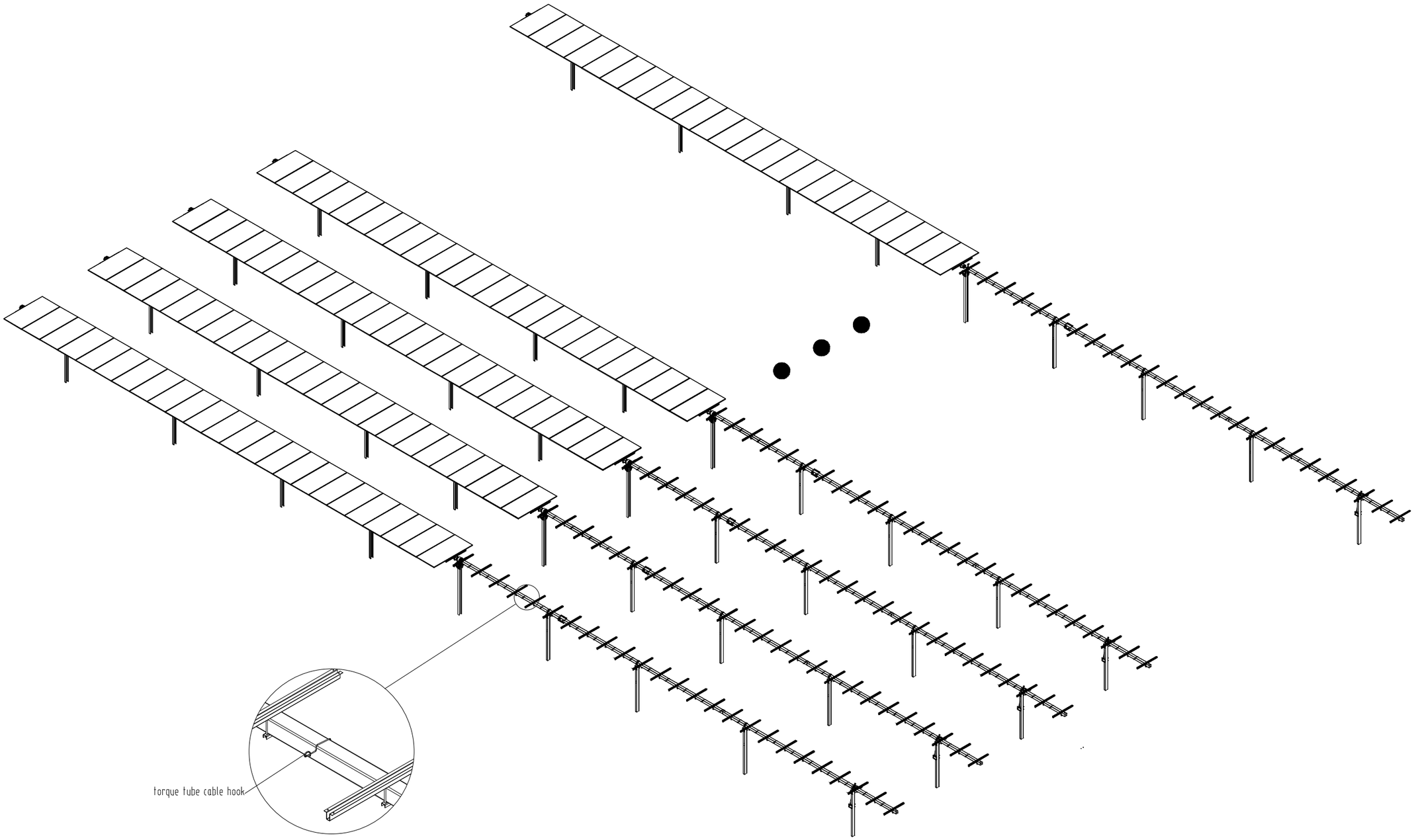




Technical information:
1.Module size is 2384x1303x33mm
2.Unit array is 2X18(36pcs)
3.Design wind speed is 69.3m/s
4.Design snow load is -kn/m²

KUGA ENERGY T: 13 58 42 E: m.merluza@kuga.energy W: www.13kuga.com.au	**CLIENT NAME:** ETEX AUSTRALIA PTY LTD	FIXED TILT SYSTEM DRAWING	CONSTRUCTION PLAN
	PROJECT NUMBER: J3087		
	SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670	**DWG NO:** J3087 - 0014	

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

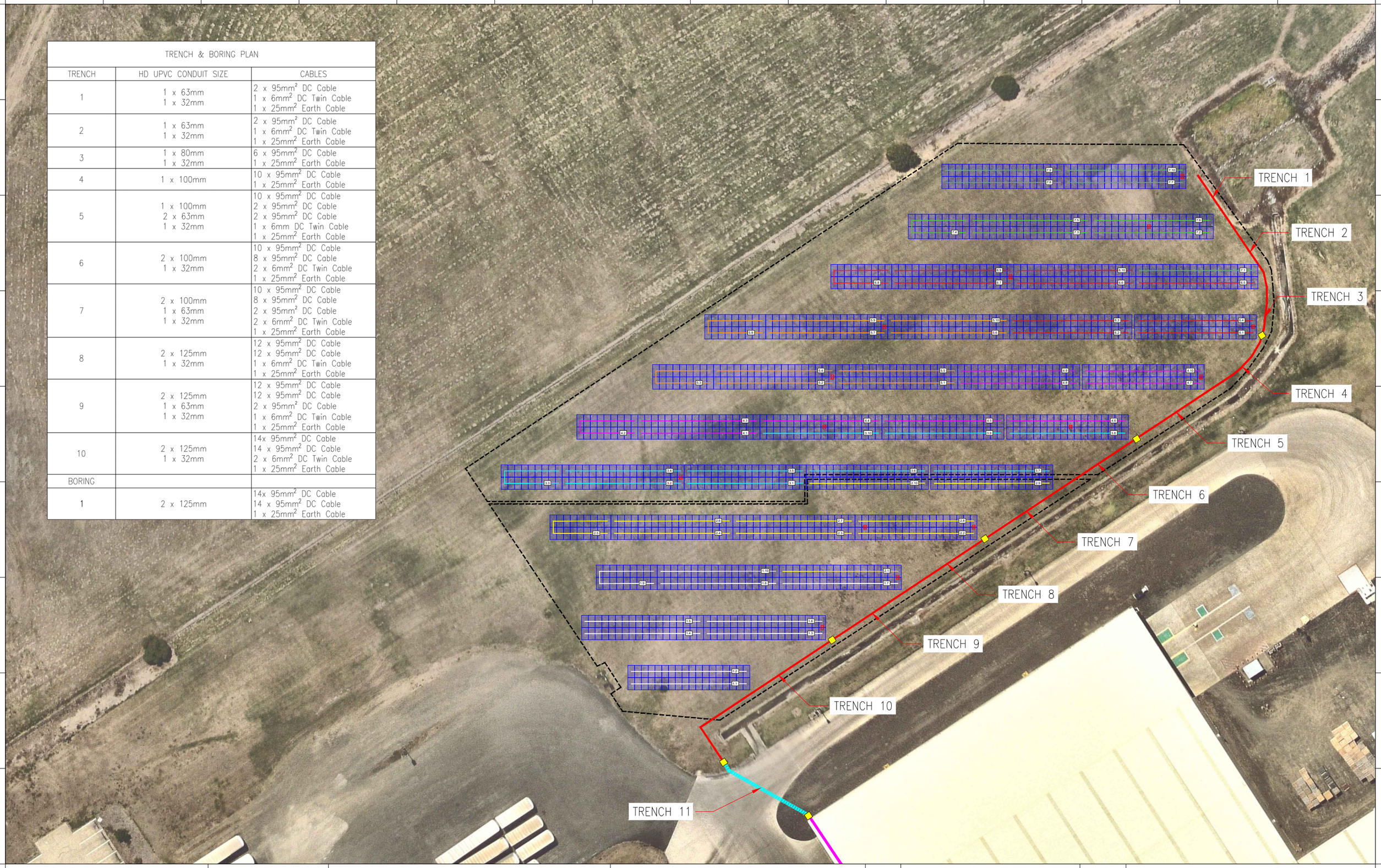
FIXED TILT SYSTEM DRAWING

DWG NO: J3087 - 0015

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

TRENCH & BORING PLAN		
TRENCH	HD UPVC CONDUIT SIZE	CABLES
1	1 x 63mm 1 x 32mm	2 x 95mm² DC Cable 1 x 6mm² DC Twin Cable 1 x 25mm² Earth Cable
2	1 x 63mm 1 x 32mm	2 x 95mm² DC Cable 1 x 6mm² DC Twin Cable 1 x 25mm² Earth Cable
3	1 x 80mm 1 x 32mm	6 x 95mm² DC Cable 1 x 25mm² Earth Cable
4	1 x 100mm	10 x 95mm² DC Cable 1 x 25mm² Earth Cable
5	1 x 100mm 2 x 63mm 1 x 32mm	10 x 95mm² DC Cable 2 x 95mm² DC Cable 2 x 95mm² DC Cable 1 x 6mm DC Twin Cable 1 x 25mm² Earth Cable
6	2 x 100mm 1 x 32mm	10 x 95mm² DC Cable 8 x 95mm² DC Cable 2 x 6mm² DC Twin Cable 1 x 25mm² Earth Cable
7	2 x 100mm 1 x 63mm 1 x 32mm	10 x 95mm² DC Cable 8 x 95mm² DC Cable 2 x 95mm² DC Cable 2 x 6mm² DC Twin Cable 1 x 25mm² Earth Cable
8	2 x 125mm 1 x 32mm	12 x 95mm² DC Cable 12 x 95mm² DC Cable 1 x 6mm² DC Twin Cable 1 x 25mm² Earth Cable
9	2 x 125mm 1 x 63mm 1 x 32mm	12 x 95mm² DC Cable 12 x 95mm² DC Cable 2 x 95mm² DC Cable 1 x 6mm² DC Twin Cable 1 x 25mm² Earth Cable
10	2 x 125mm 1 x 32mm	14x 95mm² DC Cable 14 x 95mm² DC Cable 2 x 6mm² DC Twin Cable 1 x 25mm² Earth Cable
BORING		
1	2 x 125mm	14x 95mm² DC Cable 14 x 95mm² DC Cable 1 x 25mm² Earth Cable



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

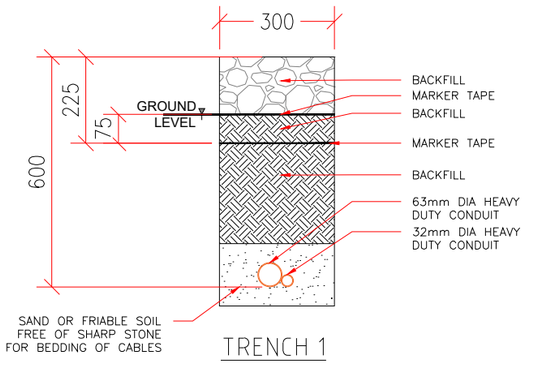
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

TRENCHING LAYOUT

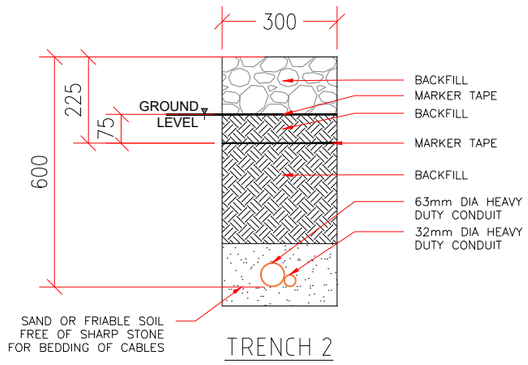
DWG NO: J3087 - 0016

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN



TRENCH 1



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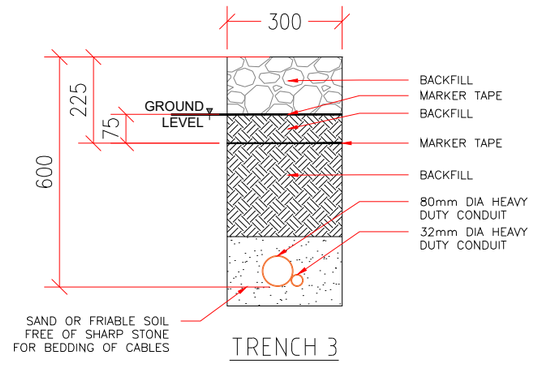

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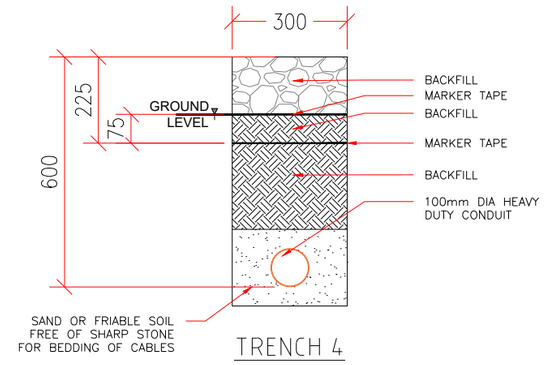

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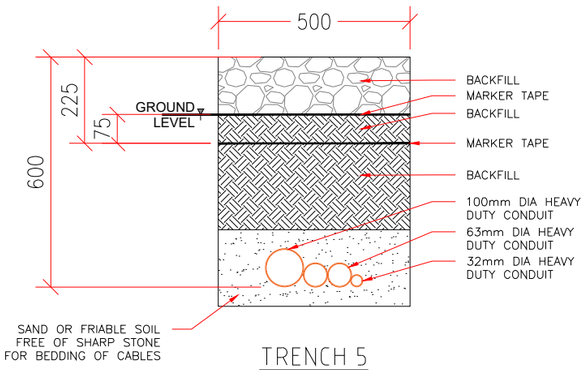
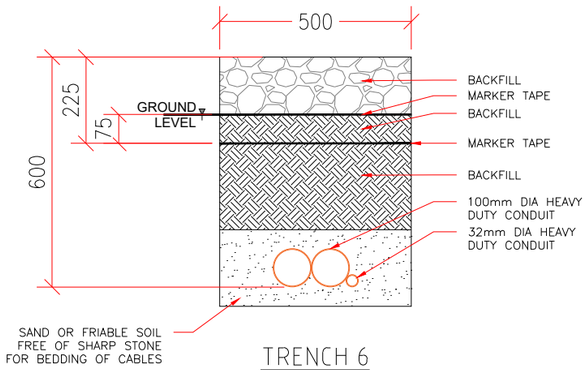
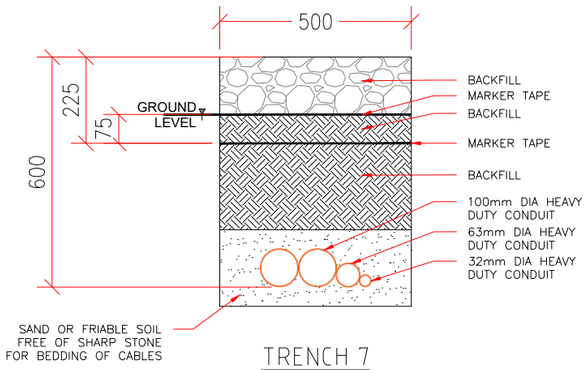


TRENCH 5



TRENCH 6



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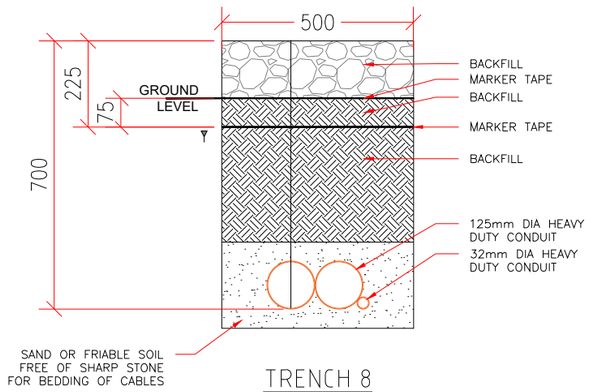
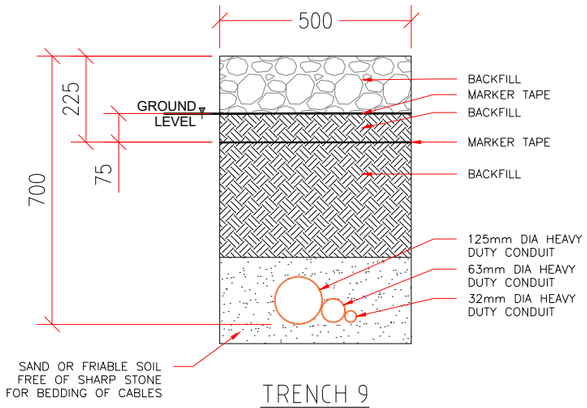
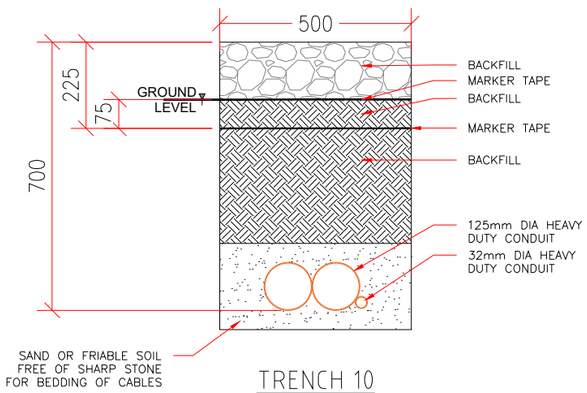


TRENCH 8



TRENCH 9



TRENCH 10

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

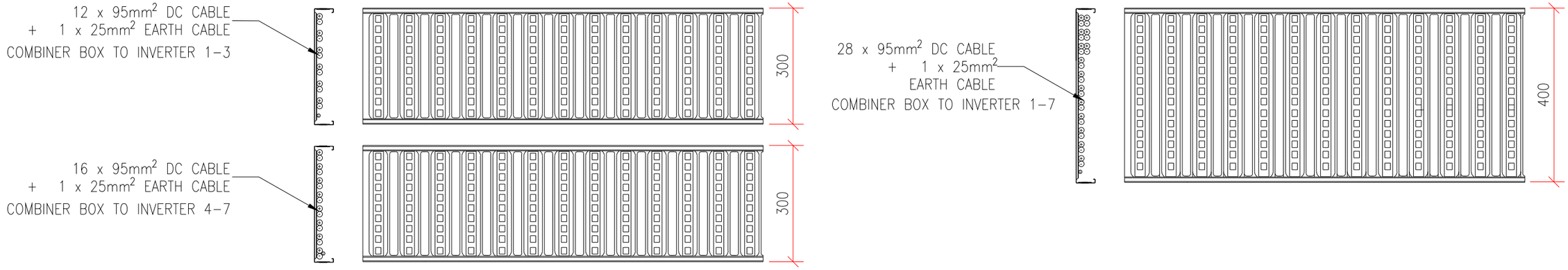
TRENCHING DETAILS

DWG NO: J3087 - 0017

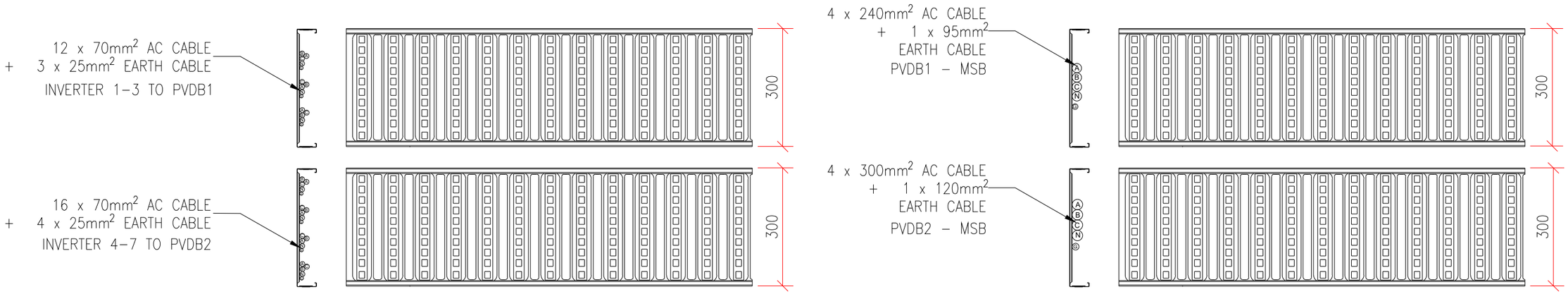
VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

DESIGN 1: DC CABLE TRAY SCHEMATIC



DESIGN 2: AC CABLE TRAY SCHEMATIC



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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

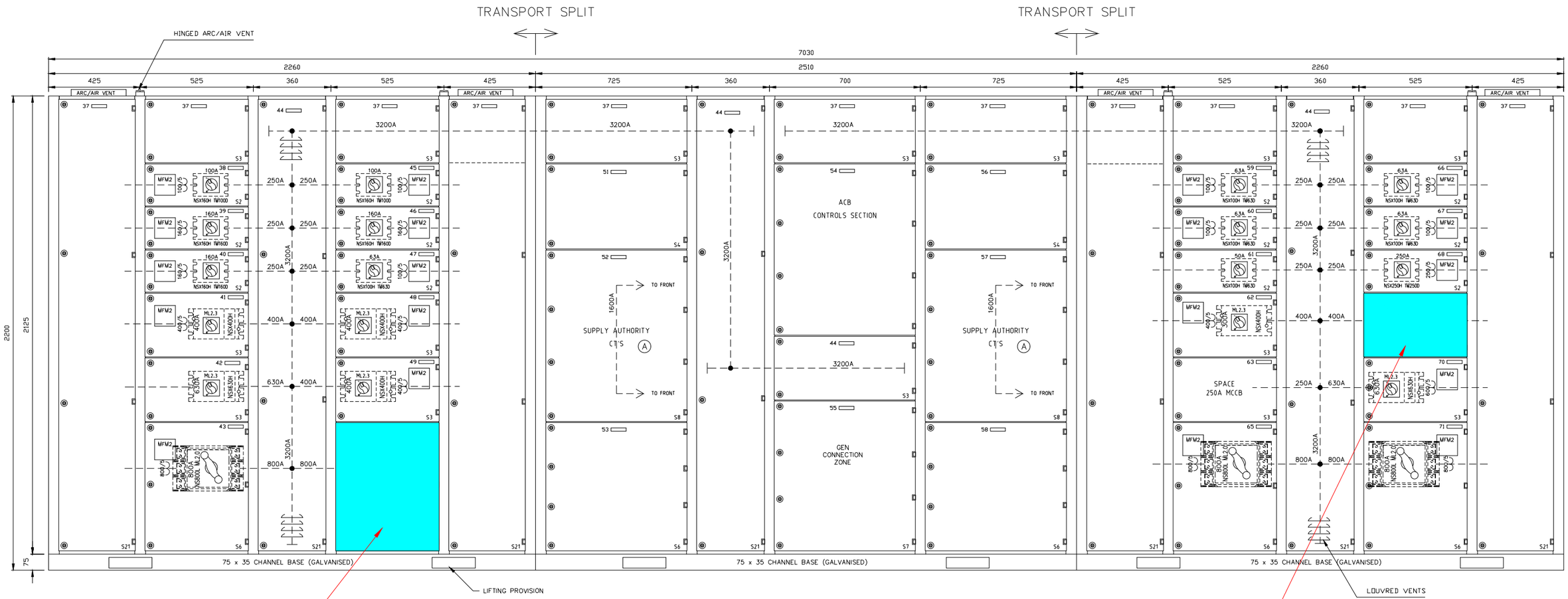
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

CABLE TRAY

DWG NO: J3087 - 0018

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN



REAR VIEW.

AC CONNECTION POINT DETAILS:

1. AC CONNECTION POINT WILL BE THE SPARE SLOT IN THE MSB.
2. THE SPARE SLOT IS AVAILABLE FOR FUTURE CONNECTION.
3. FOR THE PV SYSTEM 1 AND 2 (4 INVERTERS), A 400A AND 800A BREAKER NEEDS TO BE INSTALLED IN THE SPARE SLOT OF MSB WHERE THE PVDB1 WILL BE CONNECTED.
4. ESTIMATED TIME OF SHUTDOWN FOR THE CONNECTION OF AC CABLES WILL BE 2 TO 2.5 HOURS EACH.

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

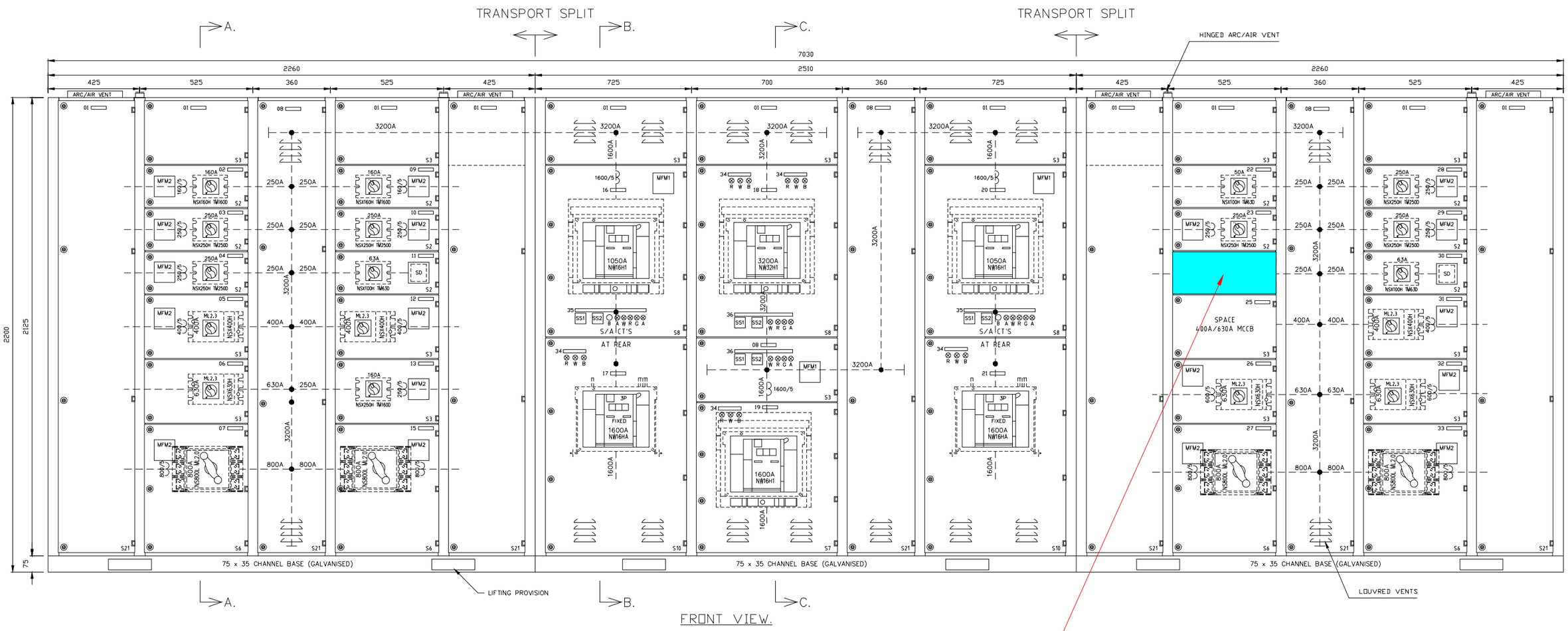
SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

AC CONNECTION

DWG NO: J3087 - 0019A

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN



AC CONNECTION POINT DETAILS:

1. AC CONNECTION POINT WILL BE THE SPARE SLOT IN THE MSB.
2. THE SPARE SLOT IS AVAILABLE FOR FUTURE CONNECTION.
3. FOR THE PV SYSTEM 1 (1 INVERTERS), A 250A BREAKER NEEDS TO BE INSTALLED IN THE SPARE SLOT OF MSB WHERE THE PVDB1 WILL BE CONNECTED.
4. ESTIMATED TIME OF SHUTDOWN FOR THE CONNECTION OF AC CABLES WILL BE 2 TO 2.5 HOURS EACH.

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

AC CONNECTION

DWG NO: J3087 - 0019B

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

PV SYSTEM DETAILS	
PV TYPE/MODEL:	Trina Solar, TSM-NEG21C.20 715 (715W)
No. MODULES:	1260
DC kWp (TOTAL):	900.90 kWp
AC kW (TOTAL):	700kW
INVERTER/MODEL:	7 X Tauro Eco 100-3-P (Fronius)
INSTALLATION TYPE:	FIXED TILT

FIXED TILT PV SYSTEM 2 LAYOUT 50 TOTAL STRING WITH 900 PANELS

FIXED TILT PV SYSTEM 1 LAYOUT 20 TOTAL STRING WITH 360 PANELS

N

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

EARTHING LAYOUT

DWG NO: J3087 - 0020

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

REVIEW AND APPROVAL

NAME	COMPANY	POSITION	EMAIL ADDRESS	SIGNATURE
JOHN KURTA	KUGA ENERGY	MANAGING DIRECTOR	j.kurta@kuga.energy	
CLEMENT DOUDET	KUGA ENERGY	GENERAL MANAGER	c.doudet@kuga.energy	
ADAM MOHSIN	KUGA ENERGY	HEAD OF ENGINEERING	a.mohsin@kuga.energy	
JUSTIN LUMSDEN	KUGA ENERGY	PROJECT MANAGER	j.lumsden@kuga.energy	
WILLIAM KEAST	ETEX AUSTRALIA PTY LTD	TECHNICAL MANAGER	william.keast@etexgroup.com	

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CLIENT NAME: ETEX AUSTRALIA PTY LTD

PROJECT NUMBER: J3087

SITE ADDRESS: 96 Buss st. Burnett Heads QLD 4670

REVIEW AND APPROVAL

DWG NO: J3087 - 0021

VER.	DESCRIPTION	DATE
1	ISSUED FOR CONSTRUCTION	29/08/2025

CONSTRUCTION PLAN

Vertex N

N-type i-TOPCon bifacial dual glass

Monocrystalline module

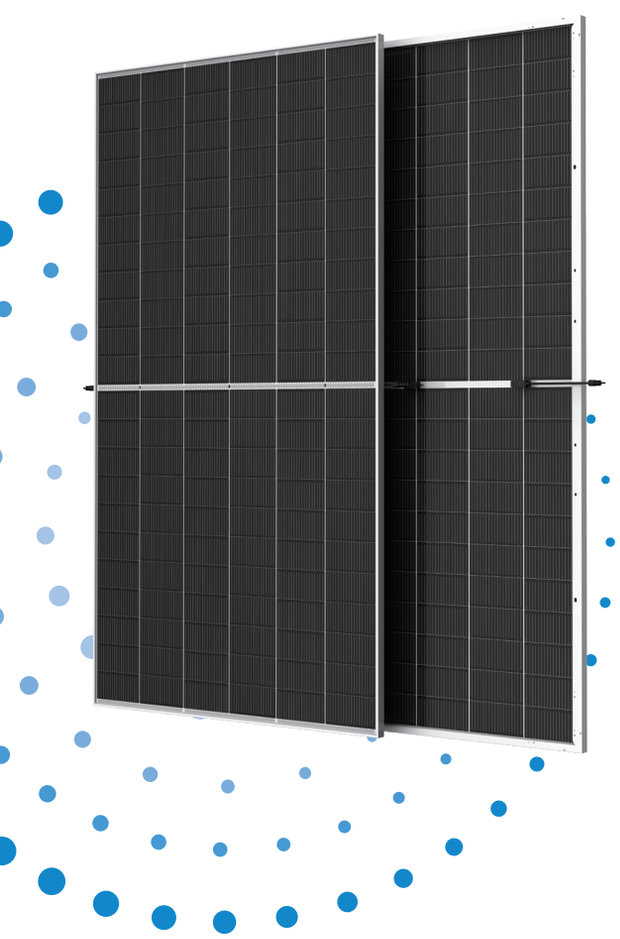
PRODUCT: TSM-NEG21C.20

POWER RANGE: 695-720W

720W
MAXIMUM POWER OUTPUT

0~+5W
POSITIVE POWER TOLERANCE

23.2%
MAXIMUM EFFICIENCY



High customer value

- Standardized module size with flagship module power, 35W higher compared with conventional technology
- Low voltage design with higher string power, effectively reducing BOS (Balance of System) and LCOE (Levelized Cost of Energy) by 2%~6%
- Higher container space utilization effectively reduces the freight cost
- Certified Low-Carbon Footprint
- The Star of LCOE

High power up to 720W

- Up to 23.2% module efficiency , on 210 innovation platform
- Patented i-TOPCon technology with continous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment

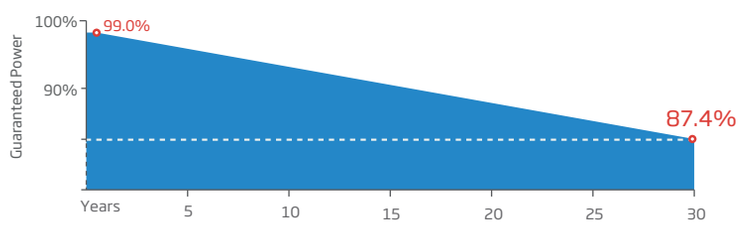
High reliability

- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot with half-cut technology
- Certified high resistance against salt, ammonia, sand, PID, LID, LeTID
- Sustainable in harsh environments and extreme weather conditions

High energy yield

- Excellent low irradiation performance, validated by 3rd party
- Lower temperature coefficient (-0.29%/°C)
- Higher bifaciality, with up to 10%~20% additional power gain from back side depending on albedo
- Reliable dual-glass structure with 30-year power guarantee

Trina Solar's Vertex Bifacial Dual Glass Performance Warranty



Comprehensive Products and System Certificates

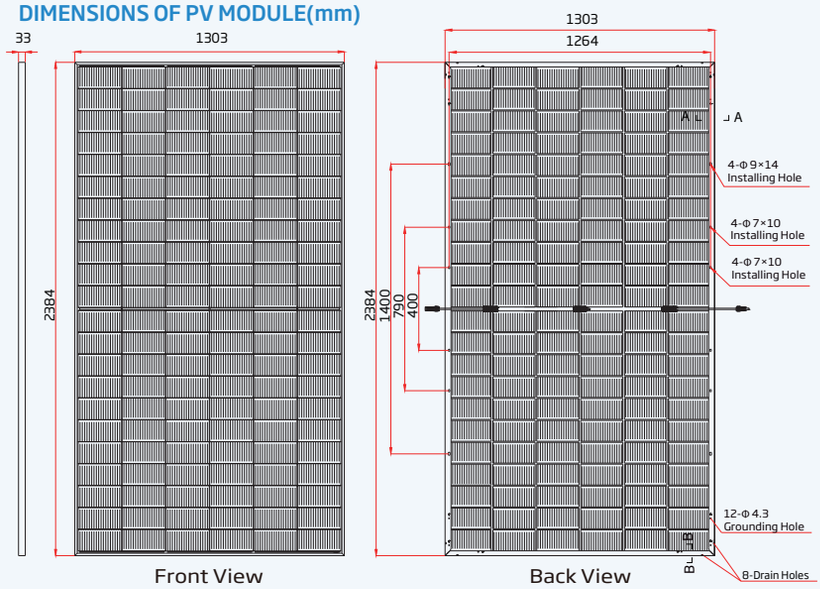
IEC61215/IEC61730/IEC61701/IEC62716
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System
ISO14067: Product Carbon Footprint Limited Assurance

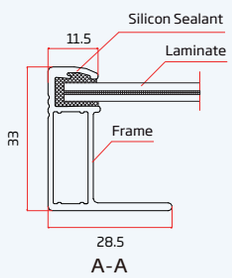
Trinasolar

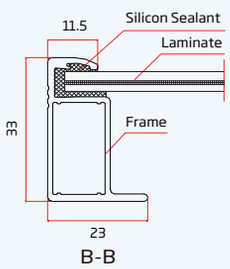
Vertex N

N-type i-TOPCon bifacial dual glass Monocrystalline module

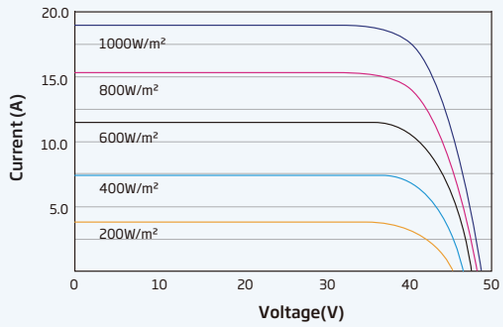
DIMENSIONS OF PV MODULE(mm)



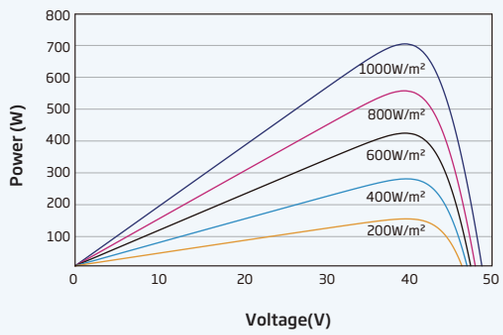




I-V CURVES OF PV MODULE(705 W)



P-V CURVES OF PV MODULE(705 W)



MECHANICAL DATA

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	132 cells
Module Dimensions	2384×1303×33 mm (93.86×51.30×1.30 inches)
Weight	38.3 kg (84.4 lb)
Front Glass	2.0 mm (0.08 inches), High Transmission, AR Coated Heat Strengthened Glass
Encapsulant material	POE/EVA
Back Glass	2.0 mm (0.08 inches), Heat Strengthened Glass (White Grid Glass)

Frame	33mm(1.30 inches) Anodized Aluminium Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²) Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	MC4 EVO2 / TS4 Plus / TS4*

*Please refer to regional datasheet for specified connector.

ELECTRICAL DATA (STC & NOCT)

Testing Condition	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Peak Power Watts-PMAX (Wp)*	695	531	700	534	705	540	710	543	715	547	720	551
Power Tolerance-PMAX (W)	0 ~ +5											
Maximum Power Voltage-VMPP (V)	40.3	37.9	40.5	38.0	40.7	38.3	40.9	38.5	41.1	38.7	41.3	38.8
Maximum Power Current-IMPP (A)	17.25	14.00	17.29	14.04	17.33	14.08	17.36	14.12	17.40	14.14	17.44	14.19
Open Circuit Voltage-VOC (V)	48.3	45.9	48.6	46.1	48.8	46.3	49.0	46.5	49.2	46.7	49.4	46.9
Short Circuit Current-ISC (A)	18.28	14.72	18.32	14.76	18.36	14.80	18.40	14.83	18.44	14.86	18.49	14.90
Module Efficiency η m (%)	22.4		22.5		22.7		22.9		23.0		23.2	

STC: Irrdiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s. *Measuring tolerance: ±3%.

Electrical characteristics with different power bin (reference to 5% & 10% backside power gain)

Backside Power Gain	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%
Total Equivalent power -PMAX (Wp)	730	765	735	770	740	776	746	781	751	787	756	792
Maximum Power Voltage-VMPP (V)	40.3	40.3	40.5	40.5	40.7	40.7	40.9	40.9	41.1	41.1	41.3	41.3
Maximum Power Current-IMPP (A)	18.11	18.98	18.15	19.02	18.20	19.06	18.23	19.10	18.27	19.14	18.31	19.18
Open Circuit Voltage-VOC (V)	48.3	48.3	48.6	48.6	48.8	48.8	49.0	49.0	49.2	49.2	49.4	49.4
Short Circuit Current-ISC (A)	19.19	20.11	19.24	20.15	19.28	20.20	19.32	20.24	19.36	20.28	19.41	20.34

Power Bifaciality:80±5%.

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of PMAX	- 0.29%/°C
Temperature Coefficient of VOC	- 0.24%/°C
Temperature Coefficient of ISC	0.04%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85° C
Maximum System Voltage	1500V DC (IEC) 1500V DC (UL)
Max Series Fuse Rating	35A

WARRANTY

12 year Product Workmanship Warranty

30 year Power Warranty

1% first year degradation

0.40% Annual Power Attenuation

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 33 pieces

Modules per 40' container: 594 pieces

Trinasolar

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

Version number: TSM_EN_2024_A

www.trinasolar.com

Fronius Tauro
Precombined version

Designed to perform.

Product advantages

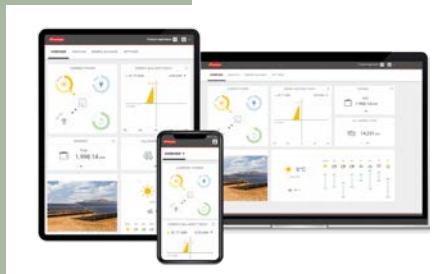
01 Robust and durable
02 Lower costs and efficient servicing
03 Intelligent control and an open system
04 Design flexibility
05 Repairable and sustainable

Maximum flexibility in terms of system design with minimal overall system operating costs: the robust Fronius Tauro inverter makes large-scale PV systems even more cost-effective. Whether under direct sunlight or in extreme heat, its double-walled housing and active cooling enable full power and maximum yields even under the harshest environmental conditions. At the same time, the sturdy project inverter from Austria is quick to install and maintain. **Fronius Tauro. Designed to perform.**

The solution for large-scale PV systems

01

02



03

04

01 Robust and durable

Designed to buck direct sunlight and high temperatures: its double-walled housing and active cooling give the Fronius Tauro a long service life and make it a robust commercial solar inverter that will always deliver top performance.

02 Lower costs and efficient servicing

For minimal overall system operating costs: Fronius Tauro is quick to install and efficient to maintain. When servicing is required, only the affected power stage set needs to be replaced rather than the entire project inverter. This makes for safe operation and fast, cost-efficient servicing.

03 Intelligent control and an open system

Like all Fronius products, Fronius Tauro can be conveniently monitored, controlled and maintained from a smartphone or PC. Fronius Solar.web lets you keep an eye on your system at all times. Its open system architecture means third-party components are easily integrated.

04 Design flexibility

Centralised, decentralised, vertical or horizontal: Fronius Tauro offers you maximum flexibility in the design and installation of large-scale PV systems. The flexible Tauro and the cost-effective Tauro ECO can be combined in any way you choose. Pre-integrated surge protection device and AC daisy chaining reduce the need for additional components and cables.

05 Repairable and sustainable

Fronius Tauro shows that sustainability at every stage of the product cycle pays dividends. The project inverter is designed for durability and was developed and produced in Austria with the fewest possible, replaceable components. This makes the Tauro particularly robust and failure-resistant, and means that only individual parts need to be replaced during on-site servicing, thereby saving time and conserving resources.

Fronius Tauro is available in two versions:

– **Fronius Tauro** | 50 kW | 3 MPP trackers
– **Fronius Tauro ECO** | 50, 99.99 and 100 kW | 1 MPP tracker

Technical data

			Tauro			Tauro ECO					
			50-3-P			50-3-P		99-3-P		100-3-P	
Input data	Number of MPP trackers		3			1		1		1	
	Max. input current ($I_{dc\ max}$)	A	134			87.5		175		175	
	Max. short circuit current ($I_{sc\ max,\ inverter}$)	A	240			178		250		250	
	DC input voltage range ($U_{dc\ min}$ - $U_{dc\ max}$)	V	200 - 1000			580 - 1000		580 - 1000		580 - 1000	
	Feed-in start voltage ($U_{dc\ start}$)	V	200			650		650		650	
	Usable MPP voltage range ($U_{mpp\ min}$ - $U_{mpp\ max}$) [1]	V	400 - 870			580[2] - 930		580[2] - 930		580[2] - 930	
	Max. PV generator power ($P_{dc\ max}$)	kWp	75			75		150		150	
			PV1	PV2	PV3	PV1	PV2	PV1	PV2	PV1	PV2
	Max. input current module array ($I_{dc\ max.\ pv}$)	A	36	36	72	75	75	100	100	100	100
	Max. module array short circuit current ($I_{sc\ pv}$)[3]	A	72	72	125	125	125	125	125	125	125
	Number of DC connections		1	1	1	1	1	1	1	1	1

Output data	AC rated output ($P_{ac,r}$)	W	50,000			50,000		99,990		100,000	
	Max. output power	VA	50,000			50,000		99,990		100,000	
			380 VAC	400 VAC		380 VAC	400 VAC	380 VAC	400 VAC	380 VAC	400 VAC
	Rated AC output current ($I_{ac,\ r}$)	A	75,8	72,5		75,8	72,5	151,5	144,9	151,5	144,9
	Grid connection ($U_{ac,r}$)	V	3~ (N)PE 400/230; 3~ (N)PE 380/220								
	Frequency (frequency range f_{min} - f_{max})	Hz	50 / 60 (45 - 65)								
	Power factor ($\cos \varphi_{ac,r}$)		0 - 1 ind. / cap.								

General data	Dimensions (height x width x depth)	mm	755 × 1109 × 346 (without wall mount)								
	Weight	kg	98			74		103		103	
	Degree of protection		IP 65			IP 65		IP 65		IP 65	
	Protection class		1			1		1		1	
	Night-time consumption	W	< 16			< 16		< 16		< 16	
	Cooling		Active Cooling Technologie and Double-Wall System								
	Installation		Indoor and outdoor[4]								
	Ambient temperature range	°C	-40 to +65 °C[5]								
	Certificates and compliance with standards[6]		AS/NZS 4777.2:2020 | IEC62109-1/-2 | VDE-AR-N 4105:2018 | IEC62116 | EN50549-1:2019 & EN50549-2:2019 | VDE-AR-N 4110:2018 | CEI 0-16:2019 | CEI 0-21:2019								
	Life cycle analysis		For Tauro ECO 100 in accordance with Austrian standards ÖNORM EN ISO 14040 and 14044 (verified by Fraunhofer IZM)								

Connection technology	AC	Cable cross section	mm^2	35 - 240			35 - 240		70 - 240		70 - 240	
		AC conductor material		Al and Cu								
		Connection terminals		Cable lug or V clamps								
		Single Core Option (single core cable)		Cable gland: 5 x M40 (10 - 28 mm)								
		Multi Core Option (multi core cable)		Cable gland: 1 x multi core connection Ø 16 - 61.4 mm + 1 x M32								
		AC Daisy Chaining Option (single core cable)		Cable gland: 10 x M32 (10 - 25 mm)								
	DC	Cable cross section	mm^2	25 - 95								
		DC conductor material		Al and Cu								
		Connection terminals		Cable lug or V clamps | Cable gland: 6 x M40 (10 - 28 mm)								

Efficiency	Max. efficiency	%	98.5			98.5		98.5		98.5	
	European efficiency (ηEU)	%	98.3			98.2		98.2		98.2	
	MPP-adaptation efficiency	%	> 99.9			> 99.9		> 99.9		> 99.9	

[1] *The usable MPP voltage range is identical to the MPP voltage range at rated power*
[2] *At 230 V actual mains voltage; design recommendation (Umpp min): 600V*
[3] *Isc pv = Isc max. ≥ Isc (STC) x 1.25 according to e.g. IEC 60364-7-712, NEC 2020, AS/NZS 5033:2021.*
[4] *Direct sunlight is possible*
[5] *Optional AC-disconnect mounted inside the inverter: from -30 to +65 °C*
[6] *These are planned certificates. For the current certificates, please see www.fronius.com/tauro-cert*

			Tauro	Tauro ECO		
			50-3-P	50-3-P	99-3-P	100-3-P
Protection devices	DC disconnector		integrated			
	RCMU		integrated			
	DC insulation measurement		integrated			
	DC/AC surge protection		Type 1 + 2 integrated [7], Type 2 optional			
Interfaces	Wi-Fi		Fronius Solar.web, Modbus TCP Sunspec, Fronius Solar API (JSON)			
	Ethernet LAN RJ45 [8]		10/100 Mbit; max. 100 m Fronius Solar.web, Modbus TCP Sunspec, Fronius Solar API (JSON)			
	Wired Shutdown (WSD)		Emergency stop			
	2 x RS485		Modbus RTU SunSpec			
	6 digital inputs / 6 digital I/Os		Programmable interface for ripple control receiver, energy management, load control			
	Datalogger and web server [8]		Integrated			

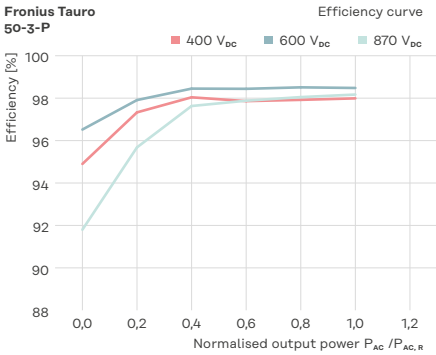
[7] *Typ 1 + 2: I_{imp} kA*

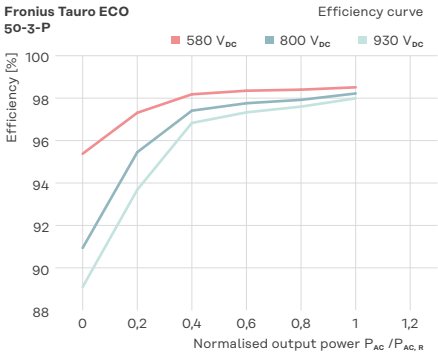
[8] *An Ethernet star-configuration is used for communication with multiple inverters. Each individual inverter communicates independently with the network/Internet via its integrated data logger*

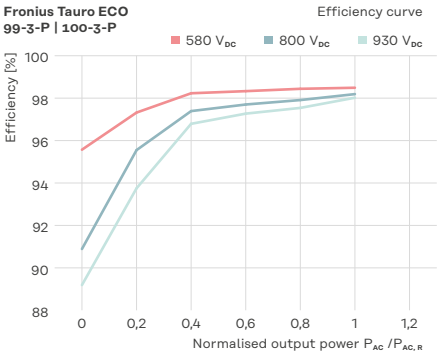
Measurably better

The performance speaks for itself: Fronius Tauro delivers impressive performance, with constant efficiency and maximum output at temperatures up to 50 °C.

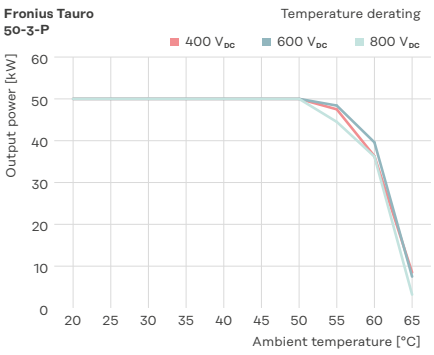
Efficiency

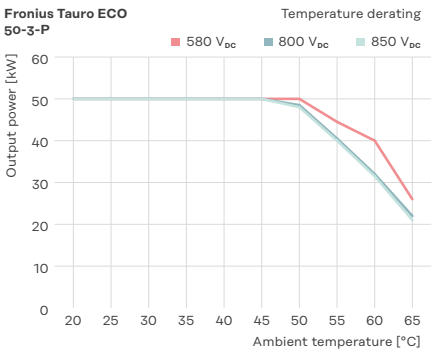


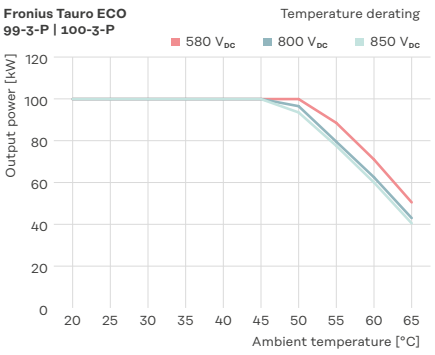




Power derating







For more information about the product, visit: www.fronius.com/tauro

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