Aitken Rowe
GEOTECHNICAL ENGINEERING

Geotechnical Engineering
Environmental Consultancy
Soil Concrete Aggregate Testing
NATA Accredited Laboratories

ABN 53 058 315 138 ACN 058 315 138

20 February 2023 Reg. No.: S23-020

Riverina Outbuild
6b Altin Street
Griffith, NSW 2680

Attention: Mr. Josh Vearing

Dear Josh,

**GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS,
LAKE CARGELLIGO SOLAR THERMAL PLANT, 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW**

Further to a request in an email dated 12 January 2023, we drilled four (4) boreholes to the depth of 4.0m at the proposed location of the two (2) proposed industrial sheds as shown in the attached borehole and DCP test location plan, using our trailer-mounted drill rig on 1 February 2023. Dynamic Cone Penetrometer testing (DCP) was also carried out at each borehole location (BH1 to BH4) to assess the strength of the underlying material at various depths throughout the investigation depth. Disturbed samples were recovered from the boreholes for relevant laboratory testing.

The purpose of the investigation is to assess the type and condition of the underlying soil strata and make recommendation in respect to geotechnical design parameters for the proposed development which includes two (2) large industrial sheds. It should be noted that the car parking and pavements areas are outside the scope of this investigation and report as advised by the client therefore not provided.

1.0 Site Description

The site for the proposed sheds is located within the existing Lake Cargelligo Solar Thermal Plant at No. 222 Lake Cargelligo Road, Lake Cargelligo, NSW (refer to attached site location plan). The proposed new sheds are to be located near the north-east corner of the existing subject site (refer to attached borehole & DCP test location plan) with shed 1 located where the existing boundary fence is located and shed 2 located directly south of shed 1 at the locations as shown in the attached borehole and DCP test location plan. The site is noted as generally flat and covered with shallow fill across the existing solar thermal plant and topsoil outside the boundary fence as noted at the time of the investigation.

2.0 Subsurface Condition

2.1 Proposed Shed Site 1

BH1 and BH2 represent the proposed shed at the location of Site 1. The borehole investigation revealed that the site is generally underlain by fill comprising topsoil to 0.2m in BH1 and 0.15m in BH2 and low plasticity sandy silty clay to 0.35m in BH1 and 0.2m in BH2 overlying natural alluvial material comprising medium plasticity sandy clay (in BH2 only) and high plasticity clays, extending to the borehole termination depth at 4.0m in BH1 and BH2. The fill material encountered across the site appeared to have been placed "poorly compacted" and "uncontrolled".

The moisture condition of the underlying natural alluvial clay-based material was generally greater than plastic limit throughout the investigation depth in BH1 and BH2 at the time of the investigation. No seepage was encountered within the investigated depth during the course of the drilling. It should however be noted that the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP test results and visual observation of the resistance by auger TC bit, the underlying natural alluvial clay-based material is assessed to be generally very stiff consistency throughout the investigated depth in BH1 and stiff consistency in the upper profile then increasing to very stiff consistency throughout the investigated depth in BH2 at the time of the investigation.

The borehole logs with explanatory notes and DCP test reports are herewith attached.

2.2 Proposed Shed Site 2

BH3 and BH4 represents the proposed shed at the location of Site 2. The borehole investigation revealed that the site is generally underlain by fill comprising low plasticity sandy clayey silt to 0.1m in BH1 and BH2 overlying natural alluvial material comprising low and medium plasticity sandy clay (in BH3 only) and high plasticity clays, extending to the borehole termination depth at 4.0m in BH3 and BH4. The fill material encountered across the site appeared to have been placed "moderately compacted" and "uncontrolled".

The moisture condition of the underlying natural alluvial clay-based material was generally les than plastic limit in the upper profile and less than plastic limit in the lower profile in BH3 and greater than plastic limit throughout the investigation depth in BH4 at the time of the investigation. No seepage was encountered within the investigated depth during the course of the drilling. It should however be noted that the water table level could fluctuate with changes to the season, temperature and rainfall.

As per the DCP test results and visual observation of the resistance by auger TC bit, the underlying natural alluvial clay-based material is assessed to be generally very stiff to hard consistency throughout the investigated depth in BH3 and firm to stiff consistency in the upper profile to 0.6m

then increasing to stiff to very stiff and very stiff consistency with depth throughout the investigated depth in BH4 at the time of the investigation.

The borehole logs with explanatory notes and DCP test reports are herewith attached.

3.0 Laboratory Testing

To confirm and evaluate the results of the fieldwork, laboratory tests were carried out on the recovered soil samples from the boreholes. The laboratory tests included field moisture content (FMC) determination and linear shrinkage (LS) tests and they were carried out at our NATA accredited testing laboratory in Wagga Wagga, NSW. The test report is herewith attached. The FMC and LS test results are also incorporated in the respective borehole logs.

4.0 Site Preparation and Earthworks

The fill material encountered across the site appeared to have been placed "uncontrolled" and therefore considered "not suitable" to use as subgrade or foundation of any structure in its current state unless it is proven to be "controlled fill" and "well" compacted throughout. We therefore recommend excavation of this material and replace and re-compact with approved fill material in such a way that it achieves a minimum of 98% of Standard Maximum Dry Density (SMDD) if it is to be used as subgrade and foundation for the proposed construction.

It should be noted that if a deep footing system, such as deep pad footing or pile footing system is to be adopted and the slab is to be suspended on the footing system, then the removal of the existing fill material may not be required.

In general, **if the slab is not to be fully suspended**, the following site preparation is recommended as required once the fill and unsuitable materials, if any, are removed and cuts if required are undertaken.

- Remove topsoil, fill, and unsuitable material including silt-based material, if any, and stockpile for later use as appropriate. An average stripping depth of 0.15m to 0.2m is anticipated for topsoil (BH1 & BH2 only) and 0.2m to 0.35m for fill material at the locations of BH1 and BH2 (proposed shed 1) and 0.1m for fill material at the location of BH3 and BH4 (proposed shed 2).
- The exposed natural subgrade should then be scarified to a depth of about 200mm; moisture conditioned to within +2% of Standard Optimum Moisture Content (SOMC) and compacted to a minimum of 98% of Standard Maximum Dry Density (SMDD) or 75% of Density Index.
- Proof roll the exposed natural material using a minimum of 10 passes of 12 tonne dead weight roller to detect any soft, loose or heaving areas. **It should be noted the natural clay-based material was noted to be firm to stiff consistency in the upper profile to a depth of approximately 0.6m in BH4 at the time of the investigation (refer to attached borehole logs). It should be noted that surface movement on the firm to stiff consistency subgrade material may be experienced during the construction. This material should be**

removed and or treated as required prior to the placement of any fill material during the construction.

- Any soft, loose or heave areas, if detected, should be excavated down and backfilled with appropriate approved materials, compacted in 150mm thick layers to the equivalent density of minimum 98% of SMDD. **It should be noted that the depth and location of the affected subgrade material may be varied across the site depending on the climatic condition at the time of the construction.**
- Any area of exposed subgrade, which exhibits shrinkage cracking and does not require re-compaction, should be watered and rolled until the shrinkage cracks do not reappear. During this undertaking, care should be exercised to ensure the surface does not become soft.

Subsequent to the above subgrade preparation, clean approved fill preferably granular material can be placed as required and compacted to the compaction requirements as given above. Any excavated fill material, if undertaken, may be used provided any organic matter and unsuitable materials are completely removed. The degree of compaction of any fill placement should be verified by a NATA accredited testing authority to ensure that it achieves specified density as specified above. The boundaries of the fill areas should be sloped to a maximum batter of 1.0 Vertical to 2.0 Horizontal or retained with the retaining wall as appropriate.

The structural fill supporting any structural element of the structures shall be prepared in such a way that it achieves a minimum of 98% of Standard Maximum Dry Density in every 150mm thick compacted layers and certified by a relevant NATA accredited testing laboratory for which a safe allowable bearing pressure of 100kPa may be adopted, provided proper drainage measures are incorporated in the design, during and after the construction.

It is highly recommended the construction of fill pads be undertaken under Level 1 supervision in accordance with "AS3798 – 2007 – Guidelines on earthworks for commercial and residential developments" if the fill pads are to be used for the foundation of any structure of the proposed shed developments.

5.0 Footing Design and Foundation

5.1 Proposed Shed Site 1 (BH1 & BH2)

Based on the field and laboratory investigation, the calculated characteristic surface movement (y_s) values noted to be above 85mm and therefore the site for the proposed shed at site 1 (BH1 & BH2) shall be classified as **"E-D – Extremely reactive deep drying"** in accordance with the Australian Standard AS 2870 - 2011 "Residential Slab and Footings". The footing system may be founded on the prepared subgrade as specified in Section 4.0 or into natural ground.

The shallow footing system such as deep edge beam or pad and strip footings may be adopted and they may be proportioned for a maximum allowable bearing pressure of 100kPa and a subgrade reaction modulus (k) of 30kPa/mm founded on the natural stiff consistency or better clay-based

material at or below a depth of 0.35m in BH1 and BH2 measured from the existing surface level (refer to attached borehole logs) or on "controlled fill" subgrade, prepared as specified in Section 4.0 provided **proper drainage measures are incorporated during and after the construction**.

The deep pad footing system, if adopted, may be taken into the underlying very stiff consistency or better clay-based material at or below a depth of 0.8m in BH1 and BH2 measured from the existing surface level (refer to attached borehole logs) as required and the footing system may be proportioned for an allowable end bearing pressure of 200kPa.

The bored and cast-in-place pile footing system, if adopted, should be taken into the underlying natural very stiff consistency or better clay-based material at or below a depth of 2.0m measured from the existing surface as required and the footing system may be proportioned for an allowable end bearing pressure of 250kPa and an allowable shaft adhesion of 25kPa within the clay-based formation. The average skin friction of 20kPa and the average undrained shear strength of 60kPa with the clay-based formation may also be adopted. The skin friction within the top 1.0m depth of natural soil and within structural fill, if any, shall be ignored.

5.2 Proposed Shed Site 2 (BH3 & BH4)

Based on the field and laboratory investigation, the calculated characteristic surface movement (y_s) values noted to be above 85mm and therefore the site for the proposed shed at site 2 (BH3 & BH4) shall be classified as **"E-D – Extremely reactive deep drying"** in accordance with the Australian Standard AS 2870 - 2011 "Residential Slab and Footings". The footing system may be founded on the prepared subgrade as specified in Section 4.0 or into natural ground.

The shallow footing system such as deep edge beam or pad and strip footings may be adopted and they may be proportioned for a maximum allowable bearing pressure of 100kPa and a subgrade reaction modulus (k) of 30kPa/mm founded on the natural stiff consistency or better clay-based material at or below a depth of 0.2m in BH3 and 0.6m in BH4 measured from the existing surface level (refer to attached borehole logs) or on "controlled fill" subgrade, prepared as specified in Section 5.0 provided proper drainage measures are incorporated during and after the construction.

The deep pad footing system, if adopted, may be taken into the underlying very stiff consistency or better clay-based material at or below a depth of 1.0m in BH3 and BH4 measured from the existing surface level (refer to attached borehole logs) as required and the footing system may be proportioned for an allowable end bearing pressure of 200kPa.

The bored and cast-in-place pile footing system, if adopted, should be taken into the underlying natural very stiff consistency or better clay-based material at or below a depth of 2.0m measured from the existing surface as required and the footing system may be proportioned for an allowable end bearing pressure of 250kPa and an allowable shaft adhesion of 25kPa within the clay-based formation. The average skin friction of 20kPa and the average undrained shear strength of 60kPa with the clay-based formation may also be adopted. The skin friction within the top 1.0m depth of natural soil and within structural fill, if any, shall be ignored.

5.3 Footing Design and Foundation – General Comment

If the fill placement is required, it is highly recommended to remove the existing topsoil, fill, silt-based material and unsuitable material, if any, then place granular fill comprising mainly sand and well graded gravel, but caution shall be exercised not to select a 'raw' or non-plastic material that may induce erosion. It should be noted that the clay-based soils are subject to saturation and shrink/swell problems. **The fill shall be placed in accordance with clause 6.4.1 & 6.4.2 of AS2870, or otherwise the site classification shall be reviewed.**

Care would be required to ensure the bases of the pile shafts and footings must be clean and free of soft, remoulded and loose material and the sides of bored pier holes where side adhesion is adopted must be free of smear prior to concreting. To achieve this, bases of bored pier holes should be cleaned using a cleaning bucket and the sides of the pile holes should be roughed to remove the smear zone associated with drilling, or the side adhesion values given above should be reduced by 50%. Some localized seepage or pile wall instability requiring temporary liners may be expected within natural materials during the footing excavation.

If uplift forces are to be assessed, the allowable side resistance on the footing system may be taken as equivalent to 50% of the allowable side adhesion values given above.

The slab panel, internal beams and load support thickening may be founded on the natural ground or prepared fill subgrade as specified in Section 4.0 as required. The ground slab may either be suspended on the footing system or by ground bearing slab if required. For the latter, we recommend that the structure be supported on a stiffened raft placed on the natural ground or prepared fill subgrade, comprising a grid of reinforced beam cast integrally with the floor slab, with load bearing beams thickened to extend to the clay stratum as required in order to minimise the risk of significant damage from the reactive clay foundation. The maximum edge beam pressure of the stiffened raft slab should not exceed the allowable bearing capacity of the underlying natural clay-based foundation or prepared fill foundation of 100kPa.

A minimum of 150 mm thick of approved granular fill materials should be placed on the prepared subgrade before the construction of the slab to cater surface movements, such as shrink/swell movements as the natural clay-based materials are considered extremely reactive.

The footing excavations should not be left exposed for prolonged periods as deterioration of footing bases may occur when subjected to wetting and drying processes. Care should be exercised during construction to ensure water ponding does not occur since this may lead to subsequent softening of the founding materials. Groundwater seepage may be encountered in the footing excavation. Any such seepage should be readily controllable by conventional sump and pump dewatering systems installed at the base of the excavation as appropriate. The footing excavations shall be cleared off the debris and ponding water prior to the placement of the concrete in order to adopt the above recommended bearing pressures.

If water ponds in the base of footings or the base founding materials are affected by moisture ingress, then this material should be excavated to expose the natural subgrade, which has not been exposed to moisture, and pour the concrete immediately. If a delay in pouring the concrete is anticipated, then a blinding layer should be placed over the base of the footing to prevent softening of the footing base.

It is highly recommended to incorporate proper drainage measures around the perimeter of the structure to ensure surface run-off does not ingress into the founding material.

It is also highly recommended to undertake inspections of the footing construction by an experienced geotechnical engineer to ensure that the specified allowable bearing capacity is achieved for the footing system during the construction.

6.0 Site Sub-Soil Class – Earthquake Design

The site sub-soil class in accordance with Section 4.2 of AS1170.4-2007 "Part 4: Earthquake actions in Australia", is assessed to be "Class C_e- Shallow soil site".

7.0 General Comment

Occasionally, the subsurface soil conditions within the site may be found different (or may be interpreted to be different) from those expected. This can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact us.

Should you have any queries, please do contact us.

Yours Faithfully,

Jarrod Gornall
Senior Geotechnical Engineer

Tin Maung
Principal Geotechnical Engineer

Attachments:

- Addendum
- Plan showing site location
- Plan showing borehole & DCP test locations
- Borehole logs with Explanatory Notes
- Dynamic Cone Penetrometer test reports
- Laboratory test report

ADDENDUM

LIMITS OF INVESTIGATION

The recommendations made in this report are based on the assumption that the test results are representative of the overall subsurface conditions. However, it should be noted that even under optimum circumstances, actual conditions in some parts of the building site may differ from those said to exist, because no geotechnical engineer, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal all that is hidden by earth, rock and time.

The client should also be aware that our recommendations refer only to our test site locations and the ground level at the time of testing.

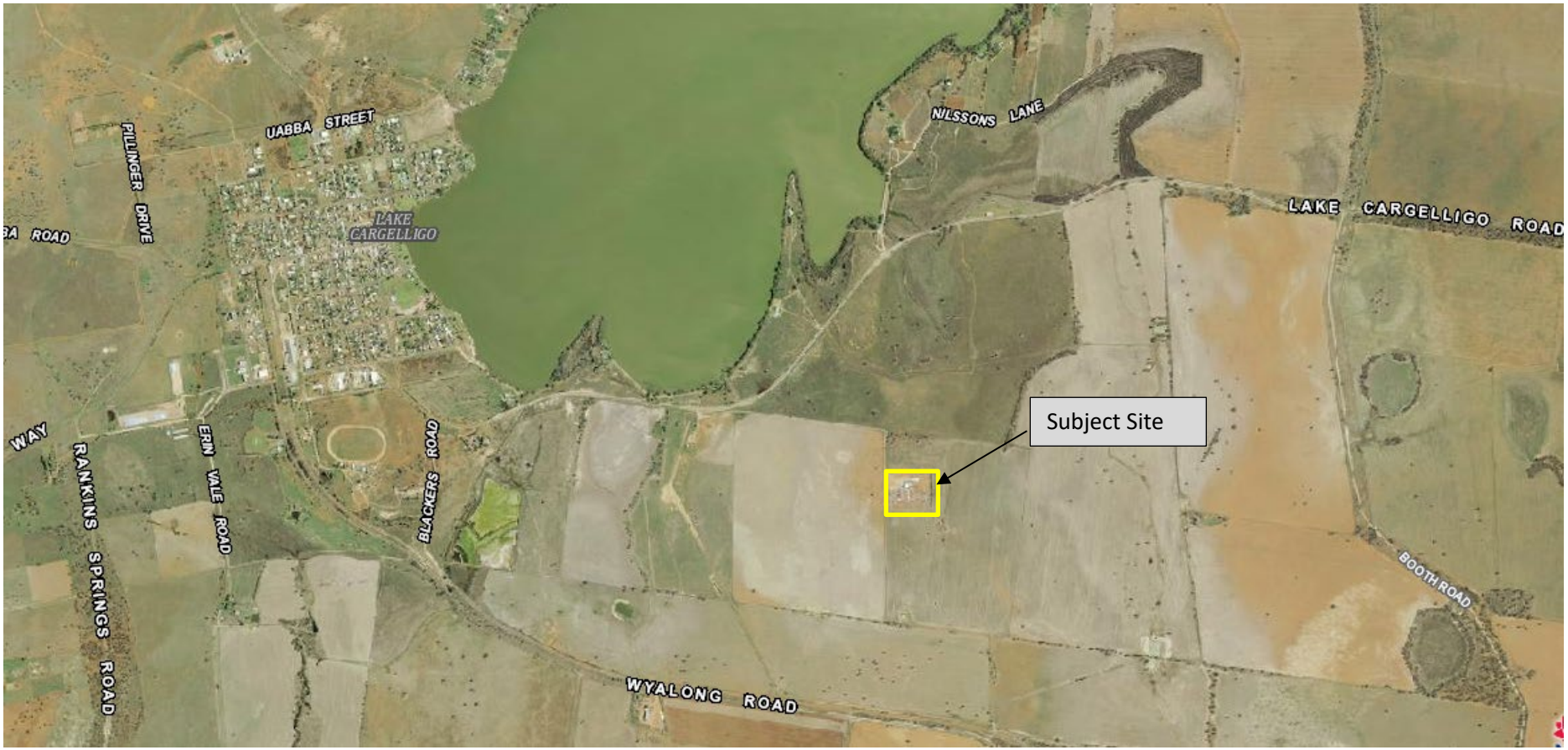
The recommendations in this report are based on the following: -

a) The information gained from our investigation.
b) The present "state of the art" in testing and design.
c) The building type and site treatment conveyed to us by the client.
d) Historical Information

Should the client or their agent have omitted to supply us with the correct relevant information, or make significant changes to the building type and/or building envelope, our report may not take responsibility for any consequences and we reserve the right to make an additional charge if more testing is necessary.

Not withstanding the recommendations made in this report, we also recommend that whenever footings are close to any excavations or easements, that consideration should be given to deepening the footings.

Unless otherwise stated in our commission, any dimensions or slope direction and magnitude should not be used for any building costing calculations and/or positioning. Any sketch supplied should be considered as only an approximate pictorial evidence of our work.



Aitken Rowe Testing Laboratories Pty Ltd

Registration Number: S23-020

Client: RIVERINA OUTBUILD – GRIFFITH, NSW

Project: GEOTECHNICAL INVESTIGATION
PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT, No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW
SITE LOCATION PLAN

Aitken Rowe Testing Laboratories Pty Ltd

Registration Number: S23-020

Client: RIVERINA OUTBUILD – GRIFFITH, NSW

Project: GEOTECHNICAL INVESTIGATION
PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT, No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW
BOREHOLE & DCP TEST LOCATION PLAN

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **1**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***1/02/2023***
GPS N: ***6314144***
E: ***0445111***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Lab. Test L.S % -425µm	Remarks & Field Records
ML	FILL/TOPSOIL: Sandy Clayey SILT; low plasticity, fine to coarse sand, grey brown		MC>PL	VS	D	1A		FILL; Appears poorly compacted 'Uncontrolled'
CL	FILL: Sandy Silty CLAY; low plasticity, fine to coarse sand, red grey brown			F-St.	D	1B		
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, orange	0.5		VSt.	D	1C	18.0	NATURAL FMC = 20.6%
		1.0						
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, orange brown	1.5			D	1D	18.5	
		2.0			D	1E	18.0	
CH	CLAY; high plasticity, trace sand, orange brown	2.5			D	1F	18.5	
		3.0						
		3.5			D	1G	18.5	
		4.0						

End of Borehole (BH1) @ 4.0m

Registration No.: S23-020

Location: Geotechnical Investigation - Proposed Industrial Sheds, Lake Cargelligo Solar Thermal Plant, No. 212 Lake Cargelligo Road, Lake Cargelligo, NSW

Client: Riverina Outbuild - Griffith, NSW

Logged By: T.L

Scale: As shown

Dry on completion

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **2**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***1/02/2023***
GPS N: ***6314146***
E: ***0445135***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Lab. Test L.S % -425µm	Remarks & Field Records
ML	FILL/TOPSOIL: Sandy Clayey SILT; low plasticity, fine to coarse sand, grey brown		MC>PL	S				FILL; Appears poorly compacted 'Uncontrolled' (Saturated)
CL	FILL: Sandy Silty CLAY; low plasticity, fine to coarse sand, red grey brown							
CI	Sandy CLAY; medium plasticity, fine to coarse sand, with fine to medium gravel, orange brown	0.5		St.	D	2A		NATURAL
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, orange brown	1.0		VSt.	D	2B		
CH	CLAY; high plasticity, with fine to coarse sand, with fine to coarse gravel, orange brown	1.5			D	2C		
CH	CLAY; high plasticity, trace sand, orange brown	2.0			D	2D		
		2.5						
		3.0			D	2E		
		3.5						
		4.0						

End of Borehole (BH2) @ 4.0m

Registration No.: S23-020

Location: Geotechnical Investigation - Proposed Industrial Sheds, Lake Cargelligo Solar Thermal Plant, No. 212 Lake Cargelligo Road, Lake Cargelligo, NSW

Client: Riverina Outbuild - Griffith, NSW

Logged By: T.L

Scale: As shown

Dry on completion

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **3**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***1/02/2023***
GPS N: ***6314127***
E: ***0445109***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Lab. Test L.S % -425µm	Remarks & Field Records
ML	FILL: Sandy Clayey SILT; low plasticity, fine to coarse sand, with fine to coarse gravel, orange		MC<PL	VSt.-H	D	3A		FILL: Appears moderately compacted 'Uncontrolled'
CL	Sandy CLAY; low plasticity, fine to coarse sand, trace gravel, orange brown				D	3B		NATURAL
CI	Sandy CLAY; medium plasticity, fine to coarse sand, with fine to medium gravel, brown red	0.5			D	3C		
CH	CLAY; high plasticity, with fine to coarse sand, with fine to medium gravel, orange brown	1.0			D	3D		
		1.5			D	3E		
CH	CLAY; high plasticity, with fine to coarse sand, with fine to medium gravel, red brown	2.0			D	3F		
CH	CLAY; high plasticity, with fine to coarse sand, with fine to medium gravel, brown	2.5			D	3G		
CH	CLAY; high plasticity, trace sand, trace gravel, grey brown	3.0	MC>PL		D	3H		
		3.5						
		4.0						

End of Borehole (BH3) @ 4.0m

Registration No.: S23-020

Location: Geotechnical Investigation - Proposed Industrial Sheds, Lake Cargelligo Solar Thermal Plant, No. 212 Lake Cargelligo Road, Lake Cargelligo, NSW

Client: Riverina Outbuild - Griffith, NSW

Logged By: T.L

Scale: As shown

Dry on completion

AITKEN ROWE TESTING LABORATORIES PTY LTD

Borehole No.: **4**
Sheet No.: 1 of 1

Ground Level: Existing
Method: Auger Drilling with TC Bit

Date: ***1/02/2023***
GPS N: ***6314131***
E: ***0445135***

USCS Symbol	Description	Depth (m)	Moisture Condition	Consistency/ Rel. Density	Sample Type	Sample No.	Lab. Test L.S % -425µm	Remarks & Field Records
ML	FILL: Sandy Clayey SILT; low plasticity, fine to coarse sand, with fine to coarse gravel, orange brown		MC>PL	S	D	4A		FILL: Appears moderately compacted 'Uncontrolled'
CH	CLAY; high plasticity, with fine to coarse sand, trace gravel, brown			F-St.	D	4B	16.0	NATURAL
CH	CLAY; high plasticity, with fine toc oarse sand, trace gravel, yellow orange brown	0.5			D	4C	17.0	FMC = 27.2%
CH	CLAY; high plasticity, with fine to coarse sand, orange brown	1.0		St.-VSt.	D	4D	17.5	
		1.5						
CH	CLAY; high plasticity, trace sand, orange brown			VSt.	D	4E	17.0	
		2.0						
		2.5						
CH	CLAY; high plasticity, trace sand, brown				D	4F	19.0	
		3.0						
		3.5			D	4G	19.0	
		4.0						

End of Borehole (BH4) @ 4.0m

Registration No.: S23-020

Location: Geotechnical Investigation - Proposed Industrial Sheds, Lake Cargelligo Solar Thermal Plant, No. 212 Lake Cargelligo Road, Lake Cargelligo, NSW

Client: Riverina Outbuild - Griffith, NSW

Logged By: T.L

Scale: As shown

Dry on completion

AITKEN ROWE TESTING LABORATORIES PTY LTD

LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record	▼	Standing water level. Time delay following completion of drilling may be shown.
	▶	Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	D	Disturbed bag sample taken between the depths indicated by lines.
	U	Undisturbed 50mm diameter tube sample taken between the depths indicated by lines
Field Tests	4, 7, 10 N=17	Standard Penetration Test (S.P.T.) performed between depths indicated by lines. Individual figures show blows per 150mm penetration driven by SPT hammer.
	5 7 3	Dynamic Cone Penetration Test performed between depths indicated by lines. Individual figures show blows per 100mm penetration for 60 degree solid cone driven by 9 kg hammer.
Moisture Condition (Silt or Clay based)	MC<PL	Moisture content estimated to be less than plastic limit.
	MC=PL	Moisture content estimated to be approx. equal to plastic limit.
	MC>PL	Moisture content estimated to be greater than plastic limit.
Moisture Condition (Gravel or Sand based)	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Consistency (Silt or Clay based)	VS	VERY SOFT – unconfined compressive strength less than 25kPa.
	S	SOFT – unconfined compressive strength 25-50 kPa.
	F	FIRM – unconfined compressive strength 50-100kPa.
	St.	STIFF – unconfined compressive strength 100-200kPa.
	VSt.	VERY STIFF – unconfined compressive strength 200-400kPa.
	H	HARD – unconfined compressive strength greater than 400kPa.

Relative Density (Gravel or Sand based)		Description	Density Index Range %	'N' Value Range Blows/300mm
	VL	VERY LOOSE	<15	0-5
	L	LOOSE	15-35	6-10
	MD	MEDIUM DENSE	35-65	11-30
	D	DENSE	65-85	31-60
	VD	VERY DENSE	>85	>60

Hand Penetrometer Readings	300 250 280	Numbers indicate individual test results in kPa on representative undisturbed material.
Laboratory Test	L.S. %	Linear Shrinkage (As per TfNSW Method T113)
	M.C. %	Field Moisture Content (As per Australian Standard AS1289.2.1.1 or TfNSW Method T120)
	Iss	Shrink-Swell Index (As per Australian Standard AS1289.7.1.1)

Piezometer Construction	Fill		Piezometer	
		Bentonite		Solid Pipe
		Washed Fine Graded Gravel		Slotted Screen

Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten Carbide wing bit.

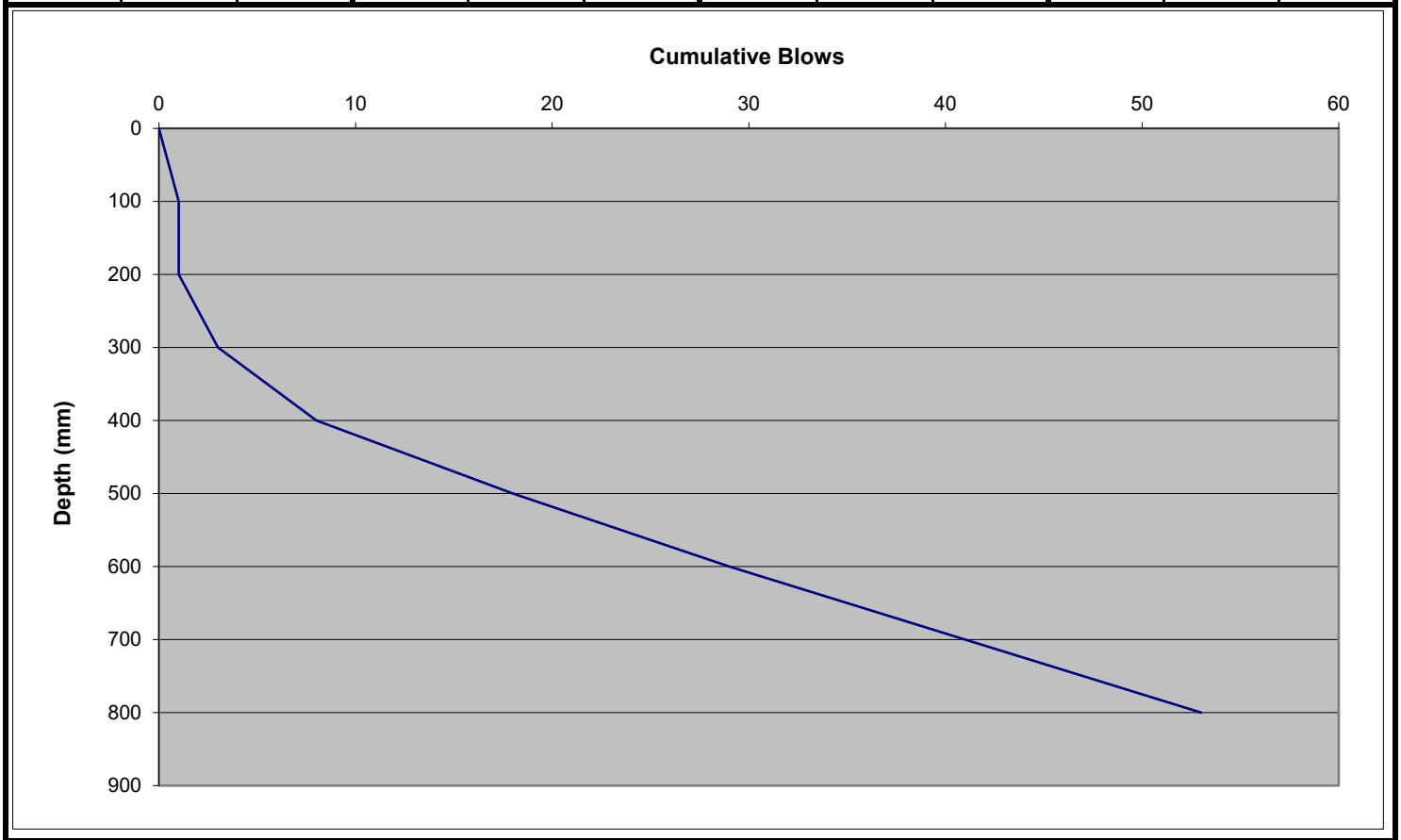
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 1 OF: 9 ***DCP: 1 (BH1)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	1	1	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2			1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	2	3	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	5	9	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	10	23	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	11	25	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	12	28	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	12	28	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	END	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing.

ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

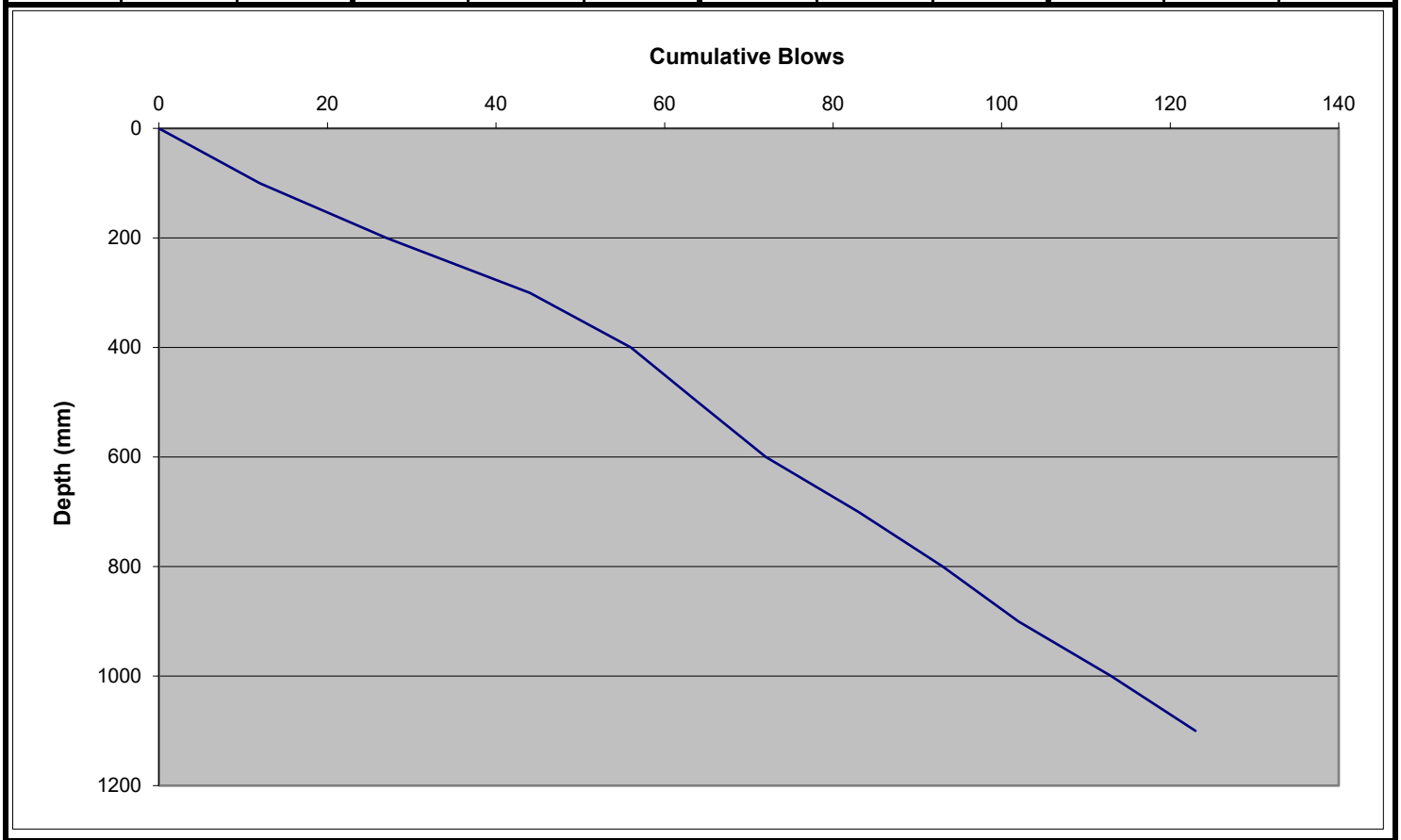
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 2 OF: 9 ***DCP: 2 (BH1)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): 1900
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	12	28	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	15	38	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	17	44	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	12	28	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	8	17	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	8	17	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	11	25	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	10	23	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	9	20	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	11	25	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	10	23	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	END	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

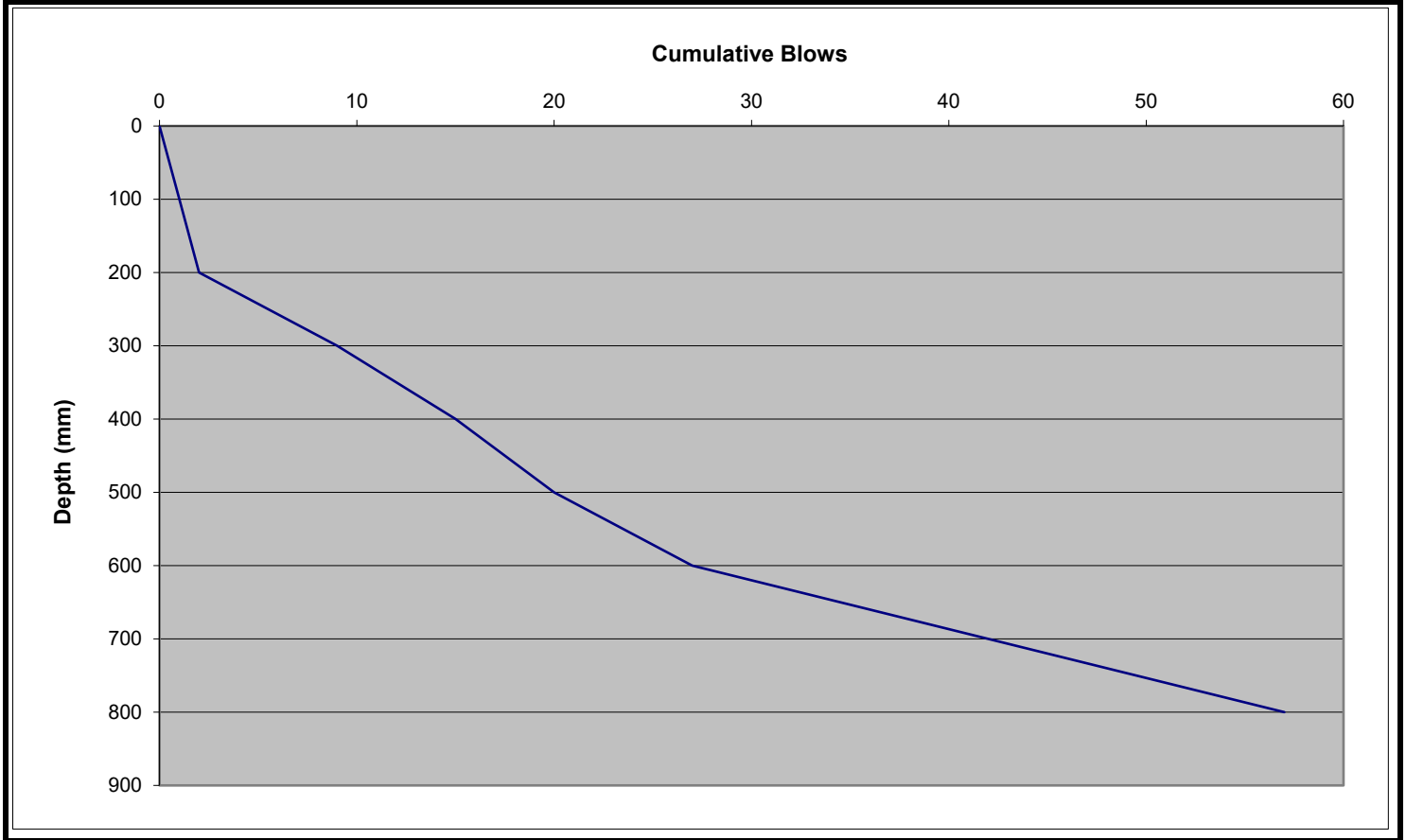
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 3 OF: 9 ***DCP: 3 (BH2)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	1	1	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	1	1	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	7	14	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	6	12	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	5	9	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	7	14	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	15	38	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	15	38	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	END	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

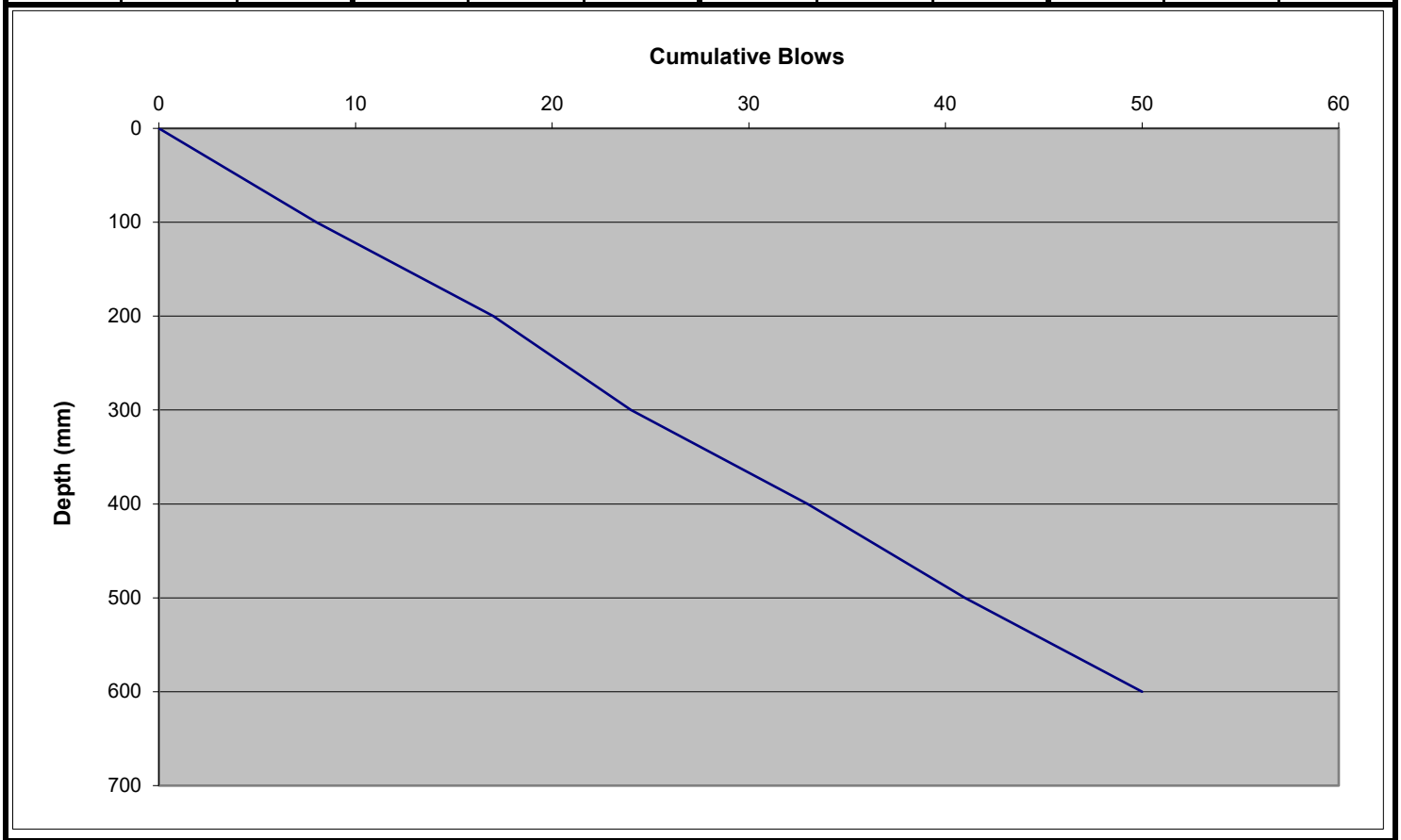
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 4 OF: 9 ***DCP: 4 (BH2)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): 1900
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	8	17	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	9	20	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	7	14	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	9	20	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	8	17	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	9	20	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	END	*	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	*	*	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	*	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

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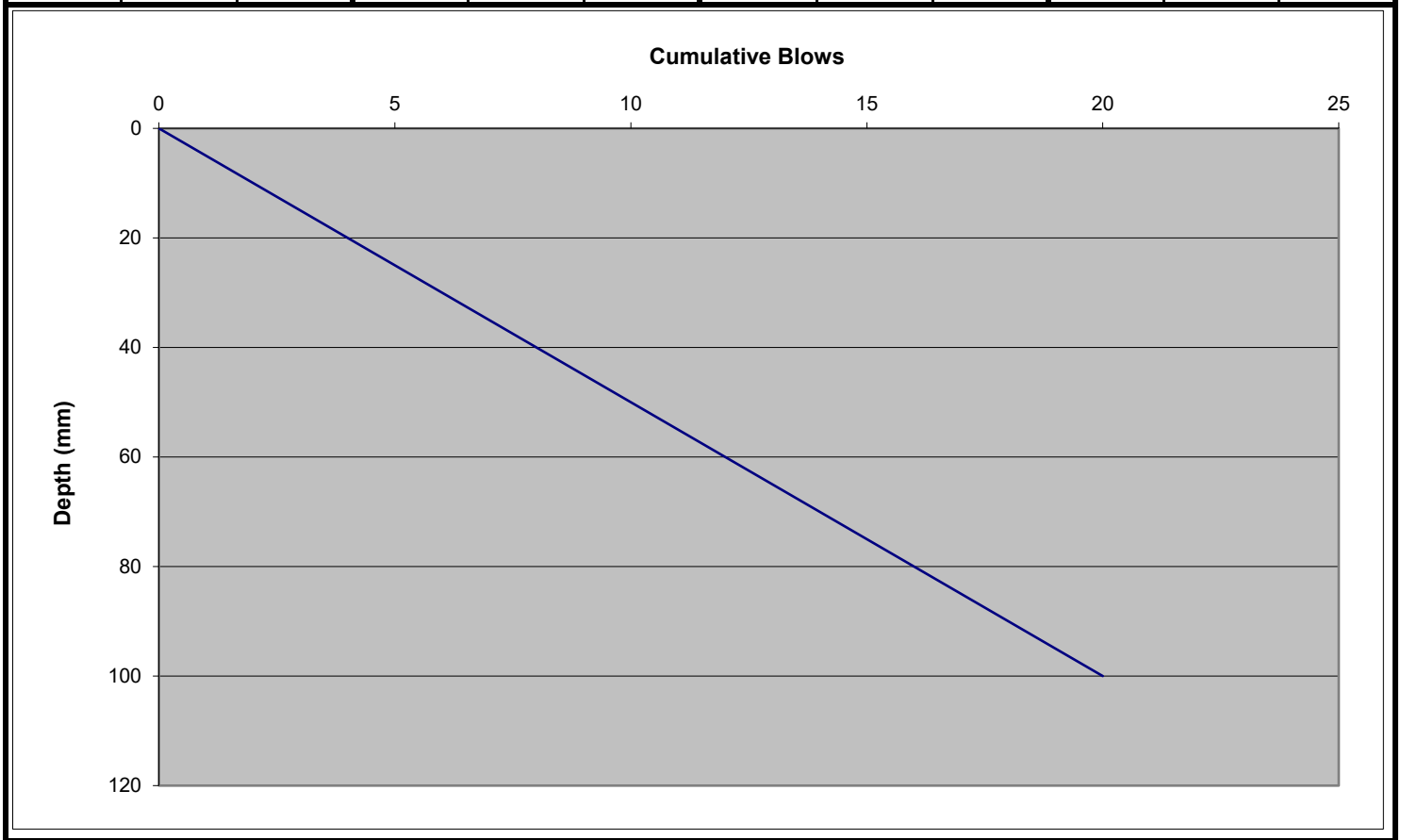
ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 5 OF: 9 ***DCP: 5 (BH3)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	20	55	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	END	*	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	*	*	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	*	*	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	*	*	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	*	*	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	*	*	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	*	*	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	*	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

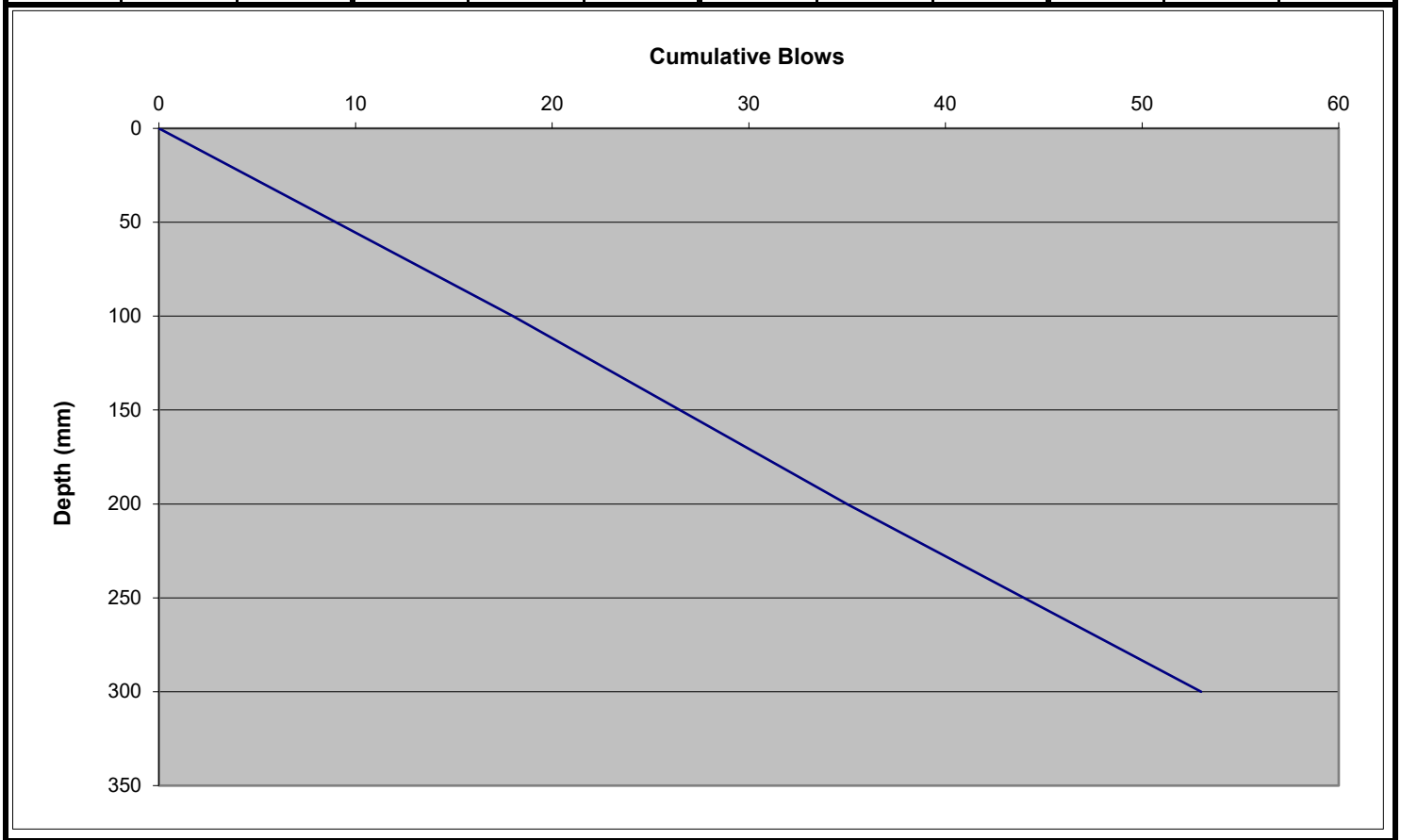
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 6 OF: 9 ***DCP: 6 (BH3)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): 500
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	18	48	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	17	44	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	18	48	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	END	*	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	*	*	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	*	*	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	*	*	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	*	*	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	*	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

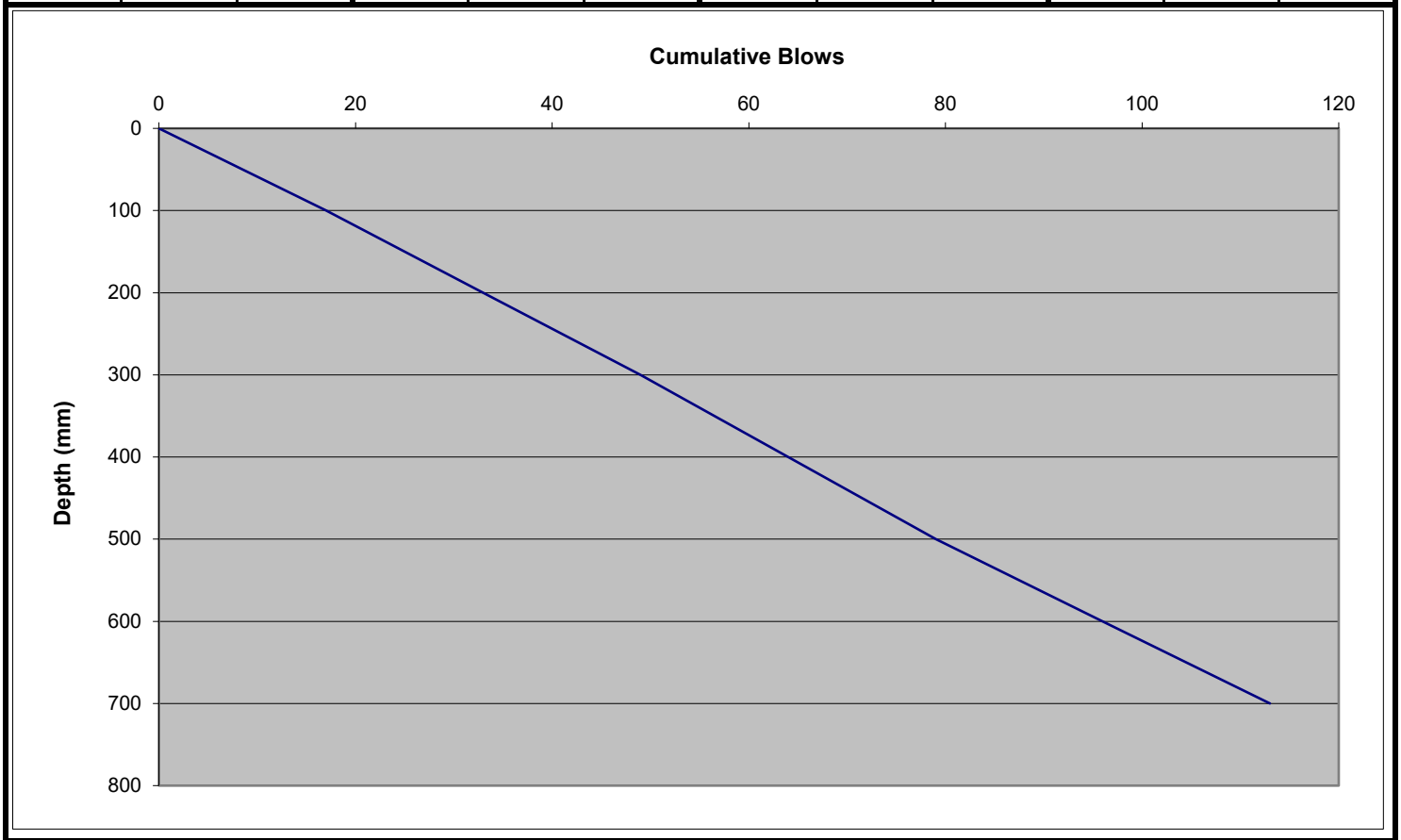
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 7 OF: 9 ***DCP: 7 (BH3)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): 1900
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	17	44	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	16	41	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	16	41	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	15	38	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	15	38	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	17	44	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	17	44	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	END	*	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	*	*	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	*	*	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	*	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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Accredited for compliance with ISO/IEC 17025 - Testing.

ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

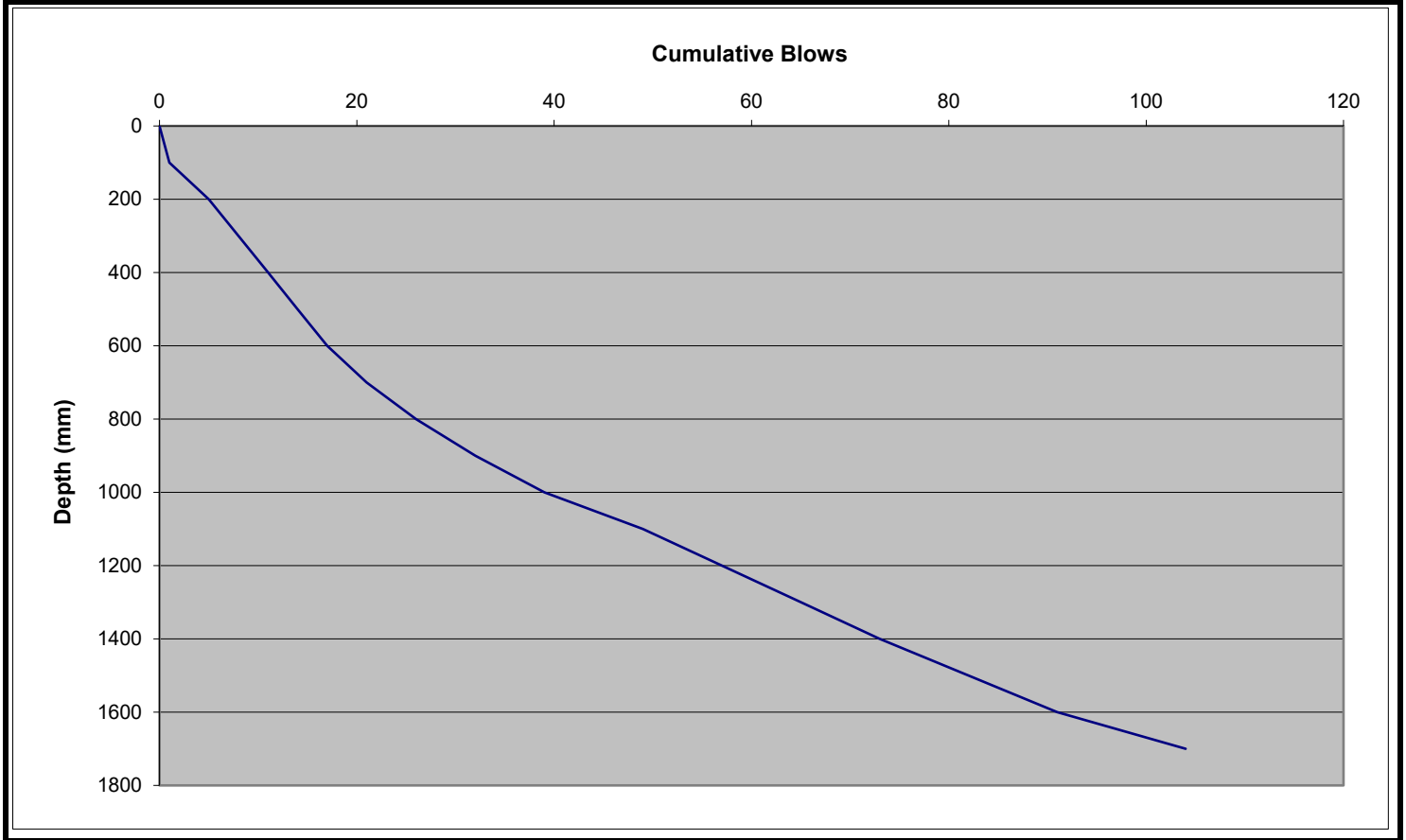
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 8 OF: 9 ***DCP: 8 (BH4)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): NIL
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	1	1	1.5 - 1.6	9	20	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	4	7	1.6 - 1.7	13	32	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	3	5	1.7 - 1.8	END	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	3	5	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	3	5	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	3	5	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	4	7	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	5	9	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	6	12	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	7	14	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	10	23	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	8	17	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	8	17	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	8	17	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	9	20	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

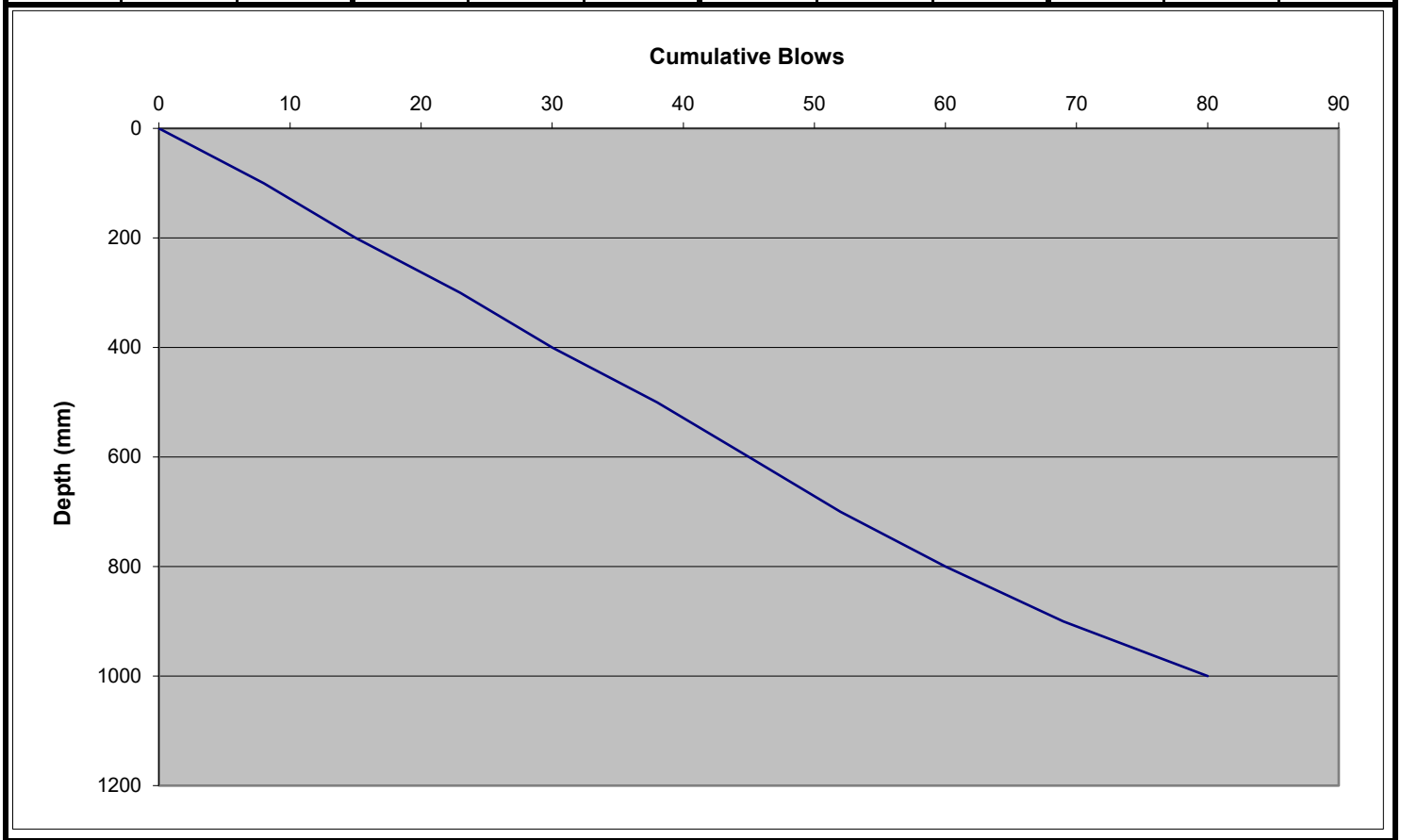
Aitken Rowe Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

DYNAMIC CONE PENETROMETER REPORT

CLIENT: RIVERINA OUTBUID - GRIFFITH, NSW	PAGE: 9 OF: 9 ***DCP: 9 (BH4)***
PROJECT: GEOTECHNICAL INVESTIGATION - PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO SOLAR THERMAL PLANT	REGISTRATION NO: **S23-020**
	DATE OF TEST: 1/02/2023
LOCATION: No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW	DEPTH BELOW ESL (mm): 2000
SOIL DESCRIPTION: REFER TO BOREHOLE LOGS	MOISTURE CONDITION: REFER TO LOGS
DEPTH OF GROUND WATER TABLE IF INTERSECTED: N/A	TEST METHOD: AS 1289.6.3.2

Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR	Depth(m)	Blows	Est. CBR
0.0 - 0.1	8	17	1.5 - 1.6	*	*	3.0 - 3.1	*	*	4.5 - 4.6	*	*
0.1 - 0.2	7	14	1.6 - 1.7	*	*	3.1 - 3.2	*	*	4.6 - 4.7	*	*
0.2 - 0.3	8	17	1.7 - 1.8	*	*	3.2 - 3.3	*	*	4.7 - 4.8	*	*
0.3 - 0.4	7	14	1.8 - 1.9	*	*	3.3 - 3.4	*	*	4.8 - 4.9	*	*
0.4 - 0.5	8	17	1.9 - 2.0	*	*	3.4 - 3.5	*	*	4.9 - 5.0	*	*
0.5 - 0.6	7	14	2.0 - 2.1	*	*	3.5 - 3.6	*	*	5.0 - 5.1	*	*
0.6 - 0.7	7	14	2.1 - 2.2	*	*	3.6 - 3.7	*	*	5.1 - 5.2	*	*
0.7 - 0.8	8	17	2.2 - 2.3	*	*	3.7 - 3.8	*	*	5.2 - 5.3	*	*
0.8 - 0.9	9	20	2.3 - 2.4	*	*	3.8 - 3.9	*	*	5.3 - 5.4	*	*
0.9 - 1.0	11	25	2.4 - 2.5	*	*	3.9 - 4.0	*	*	5.4 - 5.5	*	*
1.0 - 1.1	END	*	2.5 - 2.6	*	*	4.0 - 4.1	*	*	5.5 - 5.6	*	*
1.1 - 1.2	*	*	2.6 - 2.7	*	*	4.1 - 4.2	*	*	5.6 - 5.7	*	*
1.2 - 1.3	*	*	2.7 - 2.8	*	*	4.2 - 4.3	*	*	5.7 - 5.8	*	*
1.3 - 1.4	*	*	2.8 - 2.9	*	*	4.3 - 4.4	*	*	5.8 - 5.9	*	*
1.4 - 1.5	*	*	2.9 - 3.0	*	*	4.4 - 4.5	*	*	5.9 - 6.0	*	*



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ACCREDITATION NUMBER: 4679

REMARKS:

APPROVED SIGNATORY: Jarrod Gornall

DATE: 20/02/2023

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

*

SAMPLED BY: ARTL
DATE SAMPLED: 1/02/2023
DATE SUBMITTED: 6/02/2023
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3
DATES TESTED: 7-13/02/2023
ORDER No.: *

TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : RIVERINA OUTBUILD - GRIFFITH, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO THERMAL PLANT, No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **S23-020**

		SAMPLE NUMBER :	1C	1D	1E	1F	1G	4B
		SAMPLING LOCATION :	BH1	BH1	BH1	BH1	BH1	BH4
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	400-600	1400-1600	2000-2200	2500-2700	3400-3600	100-300
TESTS	TEST ELEMENT		*	*	*	*	*	*
AS1289.3.6.1		PASS 100.0mm SIEVE %	*	*	*	*	*	*
		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	*	*	*	*
		PASS 13.2mm SIEVE %	*	*	*	*	*	*
		PASS 9.50mm SIEVE %	*	*	*	*	*	*
		PASS 6.70mm SIEVE %	*	*	*	*	*	*
		PASS 4.75mm SIEVE %	*	*	*	*	*	*
		PASS 2.36mm SIEVE %	*	*	*	*	*	*
AS1141.19	WHOLE SAMPLE	PASS 425 µm SIEVE %	*	*	*	*	*	*
		PASS 75 µm SIEVE %	*	*	*	*	*	*
		LESS THAN 13.5 µm %	*	*	*	*	*	*
AS1141.19	-2.36mm	PASS 425 µm SIEVE %	*	*	*	*	*	*
		PASS 75 µm SIEVE %	*	*	*	*	*	*
		LESS THAN 13.5 µm %	*	*	*	*	*	*
		OBSERVATIONS	*	*	*	*	*	*
AS1289.3.1.2		LIQUID LIMIT %	*	*	*	*	*	*
AS1289.3.2.1		PLASTIC LIMIT %	*	*	*	*	*	*
AS1289.3.3.1		PLASTICITY INDEX	*	*	*	*	*	*
		PREPARATION METHOD	*	*	*	*	*	*
AS1289.5.1.1		STANDARD MAX. DRY DENSITY t/m^3	*	*	*	*	*	*
(NOT DRY PREPPED)		OPTIMUM MOISTURE CONTENT %	*	*	*	*	*	*
		OVERSIZE MATERIAL % RETAINED ON 19.0mm	*	*	*	*	*	*
		LL METHOD OF CURING TIME DETERMINATION	*	*	*	*	*	*
		CURING DURATION HOURS	*	*	*	*	*	*
AS1289.3.4.1		LINEAR SHRINKAGE %	18.0	18.5	18.0	18.5	18.5	16.0
(PREP-AIR DRIED)		LENGTH OF MOULD mm	253	253	253	253	253	250
		CRACKING (CA), CRUMBLING (CR) OR CURLING (CU) OCCURRED	CA	CA	CA	CA	CA	CA
AS1289.2.1.1		FIELD MOISTURE CONTENT %	20.6	*	*	*	*	*

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All samples are oven dried and dry sieved during prep. unless otherwise stated

APPROVED SIGNATORY : ..... DATE: 20/02/2023

Jarrod Gornall

AITKEN ROWE Testing Laboratories Pty Ltd

ARTL Wagga: 4/2 Riedell Street, Wagga Wagga NSW 2650

*

SAMPLED BY: ARTL
DATE SAMPLED: 1/02/2023
DATE SUBMITTED: 6/02/2023
SAMPLING METHOD: AS1289.1.2.1
SAMPLING CLAUSE: 6.5.3
DATES TESTED: 7-13/02/2023
ORDER No.: *

TEST REPORT: GEOTECHNICAL INVESTIGATION - SOIL ANALYSIS

CLIENT : RIVERINA OUTBUILD - GRIFFITH, NSW
JOB DESCRIPTION : GEOTECHNICAL INVESTIGATION
PROPOSED INDUSTRIAL SHEDS, LAKE CARGELLIGO THERMAL PLANT, No. 212 LAKE CARGELLIGO ROAD, LAKE CARGELLIGO, NSW

MATERIAL SOURCE : IN-SITU BOREHOLES
MATERIAL TYPE : REFER TO BOREHOLE LOGS
PROPOSED USE : DESIGN

REGISTRATION No : R28 **S23-020**

		SAMPLE NUMBER :	4C	4D	4E	4F	4G	*
		SAMPLING LOCATION :	BH4	BH4	BH4	BH4	BH4	*
		DEPTHS BETWEEN WHICH SAMPLES TAKEN (mm) :	500-700	1000-1200	1700-1900	2800-3000	3400-3600	*
TESTS	TEST ELEMENT		*	*	*	*	*	*
AS1289.3.6.1		PASS 100.0mm SIEVE %	*	*	*	*	*	*
		PASS 75.0mm SIEVE %	*	*	*	*	*	*
		PASS 53.0mm SIEVE %	*	*	*	*	*	*
		PASS 37.5mm SIEVE %	*	*	*	*	*	*
		PASS 26.5mm SIEVE %	*	*	*	*	*	*
		PASS 19.0mm SIEVE %	*	*	*	*	*	*
		PASS 13.2mm SIEVE %	*	*	*	*	*	*
		PASS 9.50mm SIEVE %	*	*	*	*	*	*
		PASS 6.70mm SIEVE %	*	*	*	*	*	*
		PASS 4.75mm SIEVE %	*	*	*	*	*	*
		PASS 2.36mm SIEVE %	*	*	*	*	*	*
AS1141.19	WHOLE SAMPLE	PASS 425 µm SIEVE %	*	*	*	*	*	*
		PASS 75 µm SIEVE %	*	*	*	*	*	*
		LESS THAN 13.5 µm %	*	*	*	*	*	*
AS1141.19	-2.36mm	PASS 425 µm SIEVE %	*	*	*	*	*	*
		PASS 75 µm SIEVE %	*	*	*	*	*	*
		LESS THAN 13.5 µm %	*	*	*	*	*	*
		OBSERVATIONS	*	*	*	*	*	*
AS1289.3.1.2		LIQUID LIMIT %	*	*	*	*	*	*
AS1289.3.2.1		PLASTIC LIMIT %	*	*	*	*	*	*
AS1289.3.3.1		PLASTICITY INDEX	*	*	*	*	*	*
		PREPARATION METHOD	*	*	*	*	*	*
AS1289.5.1.1		STANDARD MAX. DRY DENSITY t/m^3	*	*	*	*	*	*
(NOT DRY PREPPED)		OPTIMUM MOISTURE CONTENT %	*	*	*	*	*	*
		OVERSIZE MATERIAL % RETAINED ON 19.0mm	*	*	*	*	*	*
		LL METHOD OF CURING TIME DETERMINATION	*	*	*	*	*	*
		CURING DURATION HOURS	*	*	*	*	*	*
AS1289.3.4.1		LINEAR SHRINKAGE %	17.0	17.5	17.0	19.0	19.0	*
(PREP-AIR DRIED)		LENGTH OF MOULD mm	250	250	250	250	250	*
		CRACKING (CA), CRUMBLING (CR) OR CURLING (CU) OCCURRED	CA	CA	CA	CA	CA	*
AS1289.2.1.1		FIELD MOISTURE CONTENT %	27.2	*	*	*	*	*

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APPROVED SIGNATORY : ..... DATE: 20/02/2023

Jarrod Gornall