



Ref: W12143/J740

JPR Architects Pty Ltd
Level 4, 50 Stanley St
East Sydney NSW 2010

21st August 2015

Attention: *Yogesh Sane*

Email: *ys@jptra.com.au*
Phone: *(02) 9366 1133*

Dear Yogesh,

**ELECTROLYSIS TESTING AT
175-177 CLEVELAND STREET AND 1-5 WOODBURN STREET, REDFERN**

As requested, between Wednesday 19th August and Thursday 20th August 2015 Corrosion Control Engineering (NSW) Pty Ltd carried out electrolysis testing at the above development site.

THE ELECTROLYSIS PROBLEM

Most of the D.C. current to power the electric trains returns to the railway sub stations via the rail lines. However, some leaks to ground (stray traction current) and in returning to the substation via this path can be picked up (and discharged) from buried metallic structures, leading to possible electrolysis type corrosion problems. The problems can be significant if:

1. The metallic structures are sufficiently large or long enough and close to the electrified railway lines.
2. The stray traction current leakages to soil are of sufficient frequency and magnitude to cause a problem.

TEST METHOD

We monitored the in-ground stray traction causing voltage fluctuation on the development property, by carrying out the following tests:

1. Data logging voltage gradients, between earth stakes parallel to the electrified rail lines, over a 24-hour period. In this case the earth stakes were installed approximately 22 metres apart.
2. Data logging voltage gradients, between earth stakes perpendicular to electrified rail and over a 24-hour period. The earth stakes were installed about 20 metres apart.
3. Data logging the potentials on the water service meter over a 24- hour period.
4. Data logging the potentials on a galvanised pipe service over a 24- hour period.



TEST RESULTS

A summary of the test results is as follows:

Test Performed	Test Duration	Observed Results
1. 24-hour potential recording between steel earth stakes, parallel to rail. 22 metres apart.	24 hrs.	Maximum fluctuation range of 377 mV Most within 114 mV (average)
2. 24-hour potentials recording between steel earth stakes, perpendicular to rail, 20 metres apart.	24 hrs.	Maximum fluctuation ranging 54 mV. Most within 15 mV (average).
3. 24-hour potential recording on the water service at the property.	24 hrs.	Maximum fluctuation range of 818 mV Most within 294 mV (average).
4. 24-hour potential recording on a galvanised pipe service at the property	24 hrs	Maximum fluctuation range of 621 mV Most within 195 mV (average).

DISCUSSION OF RESULTS

The results show there are overall some minor to moderate stray traction currents present at the site.

The logger charts for the earth stakes parallel to rail showed minor to moderate stray current effects (most with 114 mV), over the 24 hour period.

The logger charts for the earth stakes perpendicular to rail showed minor stray current effects (most with 15 mV), over the 24 hour period.

The logger charts for the water service showed minor to moderate stray current effects (mostly within 294 mV), over the 24 hour period.

The logger charts for the galvanised pipe service meter showed minor to moderate stray current effects (mostly within 195 mV), over the 24 hour period.

The drawings reviewed, as part of the study, were:

Drawings by JPR Architects – 175-177 Cleveland St & 1-5 Woodburn St, REDFERN.
Project Number: 2014067

- DA 2000 D4
- DA 2001 D4
- DA 2002 D4
- DA 2003 D4
- DA 2004 D4
- DA 2005 D4
- DA 2006 D4
- DA 2007 D4
- DA 2008 D4
- DA 3000 D4
- DA 3001 D4
- DA 3002 D4
- DA 3003 D4
- DA 3100 D4

CONCLUSION

We conclude the present stray traction currents, at the proposed building site, may present a corrosion hazard to on or in ground metallic structures. It should be noted that stray traction current effects at the site will almost certainly change with time and may, at some time in the future, become a significant corrosion hazard.

RECOMMENDATIONS

We recommend either of the following protective measures where applicable, to mitigate any possible corrosive effects of stray traction currents:

1. The installation of heavy plastic membrane (e.g. Forticon) under (or behind) all reinforced concrete slabs, piers and walls to electrically isolate the slabs and/or piers from soil and the stray currents.
2. The use of plastic, rather than metallic, in-ground pipework where possible. In the event buried metallic pipework and/or cables are installed within the property, we recommend installation within sealed non-metallic conduit.
3. Use high strength (min 32 MPa), high cover (min 50 mm) concrete to effectively limit soil moisture penetrating through to the reinforcing steel.

We trust you find our test results and report satisfactory. Should you have any further queries, please do not hesitate to contact our office.

Yours faithfully

Corrosion Control Engineering (NSW) Pty. Ltd.

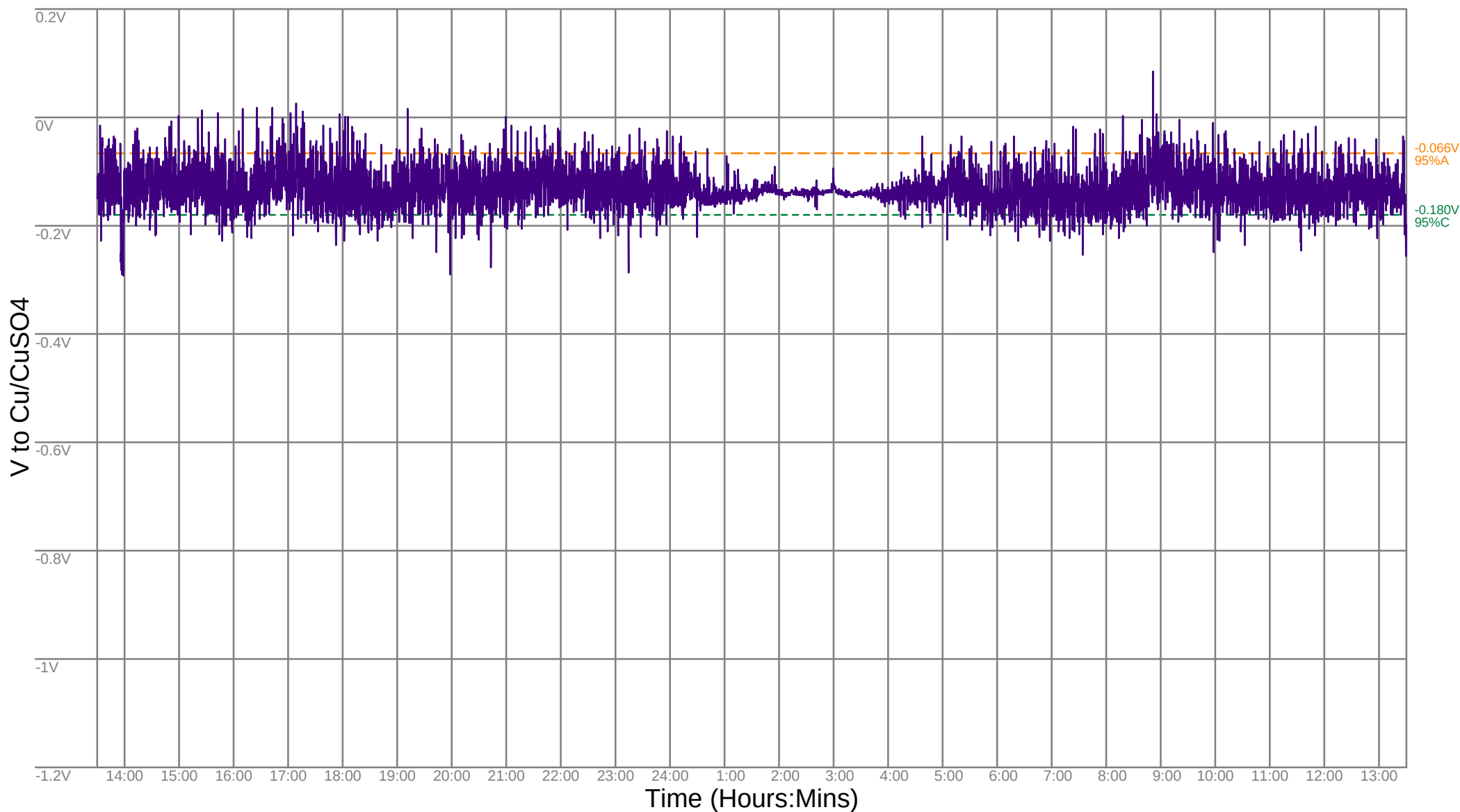


David Sunjaya
Corrosion Engineer

**ELECTROLYSIS TESTING : 175-177 Cleveland St & 1-5 Woodburn St, Redfern
: Parallel to Railway**

Start: 19/08/2015 1:30:00 PM End: 20/08/2015 1:30:00 PM

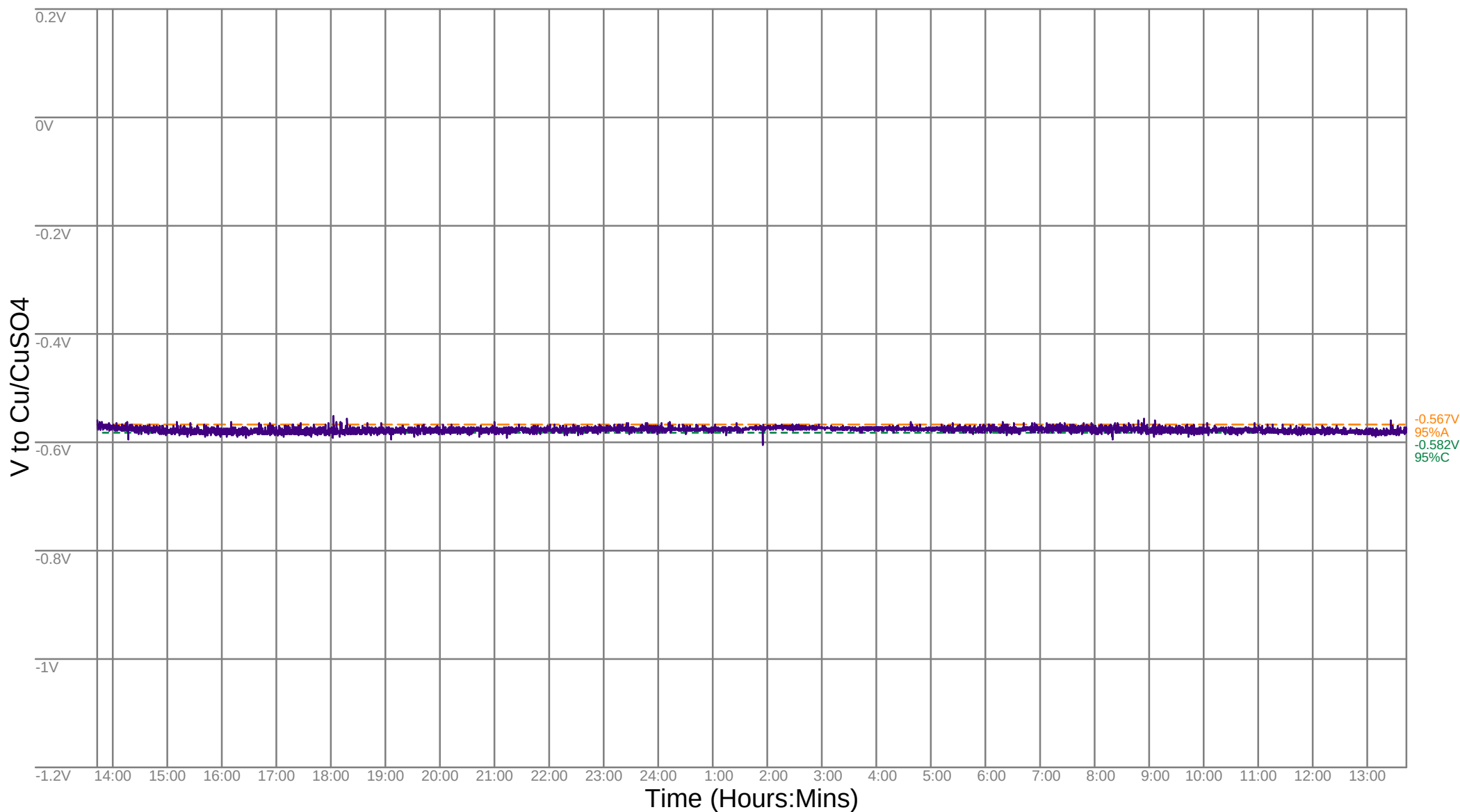
Waikura-512K-2A 7598 Channel 1



**ELECTROLYSIS TESTING : 175-177 Cleveland St & 1-5 Woodburn St, Redfern
: Perpendicular to Railway**

Start: 19/08/2015 1:43:00 PM End: 20/08/2015 1:43:00 PM

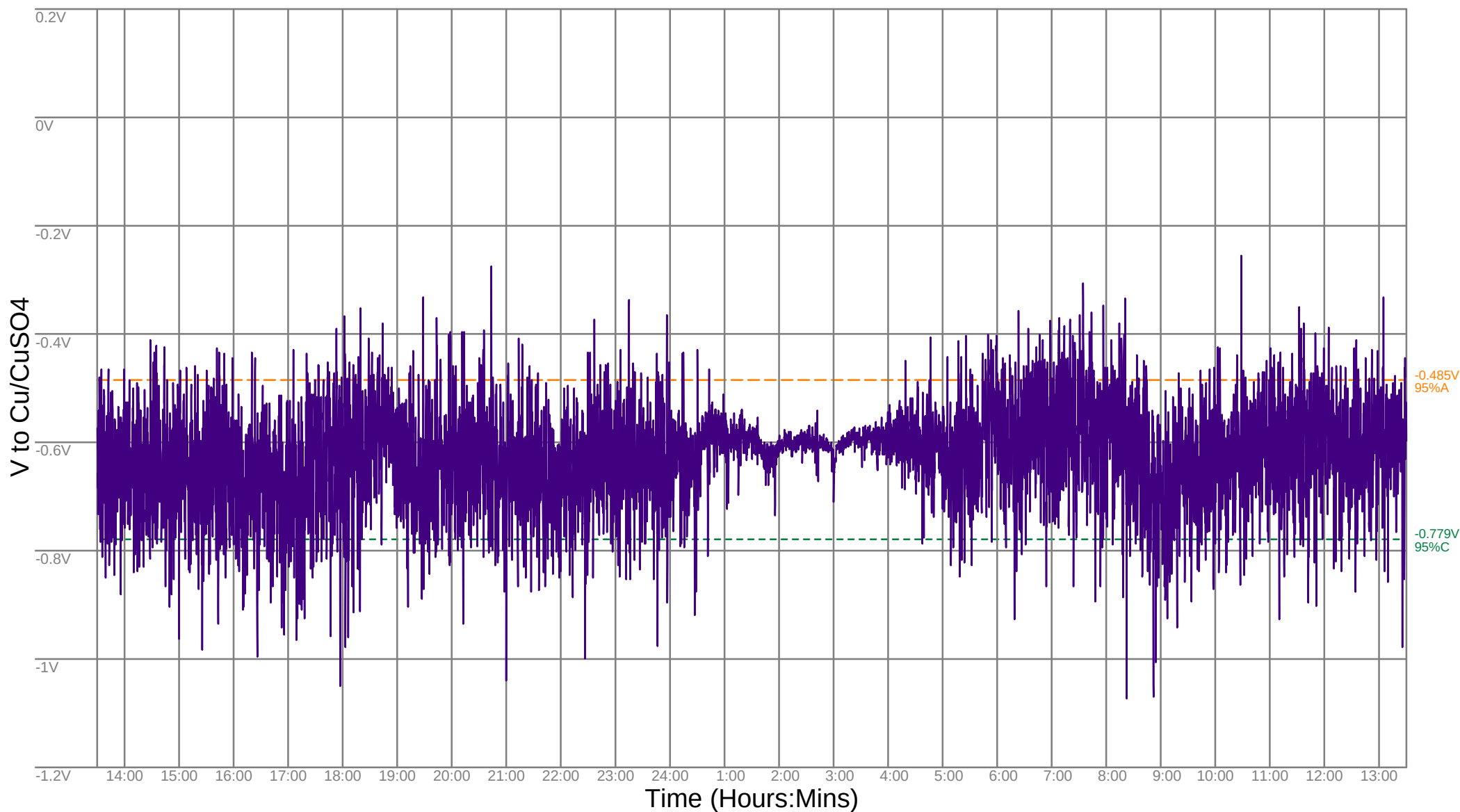
Waikura-512K-2A 7610 Channel 1



**ELECTROLYSIS TESTING : 175-177 Cleveland St & 1-5 Woodburn St, Redfern
: Water Service at 1-5 Woodburn St.**

Start: 19/08/2015 1:30:00 PM End: 20/08/2015 1:30:00 PM

Waikura-512K-2A 7619 Channel 1



**ELECTROLYSIS TESTING : 175-177 Cleveland St & 1-5 Woodburn St, Redfern
: Galvanised Pipe Service at 1-5 Woodburn St.**

Start: 19/08/2015 1:30:00 PM End: 20/08/2015 1:30:00 PM

Waikura-512K-2A 7786 Channel 1

