25 Bunya Street
Eagle Farm Q
4009
Ph. (07) 3403 8888
Fx. (07) 3403 1898

16 th April 2004

OPERATING MANUAL FOR:

WYNNUM RD to GIBSON IS TRUNK MAIN

S16 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WATER SYSTEM SERVICES

MANUAL CONTENTS

DRAWINGS

486/6/25-AA1C0021E	Standard Rectifier Wiring Diagram
(No Number)	Bimonthly Maintenance Program

(1.0) INTRODUCTION

Steel when immersed or covered in water has a tendency to corrode (or rust) as the oxidized form is more stable than the metal.

Because of this, precaution must be taken to stop or minimize the corrosion reaction to an acceptable level consistent with the design life of the structure. This is normally achieved by the use of protective coatings which control the corrosion reaction by isolating the steel from its surrounding environment.

However, it is not practical to achieve a perfect coating and coating damage will always occur with time. Because of this, corrosion may occur at imperfections in the paint coating, causing further deterioration in the coating as well as loss of metal.

As a result of this, the coating defects must be rectified by periodic maintenance or an additional method of protection used to prevent this deterioration and corrosion occurring. This additional protection is achieved by the cathodic protection system.

(2.0) CORROSION AND CATHODIC PROTECTION

Corrosion is an electrochemical process in that it is accompanied by a flow of electrical current.

Corrosion occurs on the surface of metals at active areas known as anodes, which are electrically continuous with less active or passive areas known as cathodes. The electric current flows from the anode through the electrolyte to the cathode, with the circuit being completed by the electrical continuity between the cathode and anode. In practice anodes and cathodes are generally part of the same metallic surface and individual anodic areas may be small.

In applying cathodic protection an external current is applied to the surface so that the entire surface to be protected acts as a cathode. This involves the use of an auxiliary anode and when the current flow from this anode is sufficient, no part of the structure acts as an anode.

An external source of direct current such as a transformer rectifier is used in conjunction with an anode consisting of material with a very slow corrosion rate.

While it is the flow of current which achieves the cathodic protection of the surface it is impractical to measure these currents over individual anodic areas to determine when cathodic protection has been achieved. However, with the flow of cathodic protection current, the structure becomes more negative with respect to the surrounding electrolyte. Because of this, it is possible to state values of metal/electrolyte potential at which corrosion does not occur. This metal/electrolyte potential is generally measured against a standard reference electrode which allows a reproducible potential at which corrosion does not occur to be quoted.

(3.0) MAINS DETAILS

Size: 755 mm Dia mild steel cement lined.

Coating: Enamel Coated.

Length: Appox 1.9 Km.

Location: From Valve 272 cnr Wynnum Rd.and Northcliffe St. Murarrie to AC main near toll booths at Gateway Bridge.

Construction Drawings:

486/1/22-C0024E	Cathodic Protection Standard Switchboard Cabinet
486/1/22-AAT0001E	Cathodic Protection Test Points

(4.0) CATHODIC PROTECTION DETAILS

(4.1) Type of Cathodic Protection: Impressed Current.

(4.2) Rectifier: Standard 20 Volt, 20 amp direct current output enclosed in a stainless steel switchboard. This system has 1 rectifier installed. The rectifier is in the park, corner Murarrie and Queensport Rds. and has a 240V supply from Energex pole No.47748 corner Murarrie Rd. and Queensport Rd Murarrie.

(4.3) Cathode: The cathode point is located on the 755 mm dia mains, adjacent to manhole (MH376) , approx 30 metres from the rectifier. The cathode point is where the cabling from the rectifier is attached to the structure under cathodic protection.

(4.4) Anodes: Four 1500 x 75mm silicone iron anodes were installed approximately 30 metres from the trunk mains, in a vertical bed 5 metres deep, in the park adjacent to the creek. The anodes are backfilled with cokebreeze thereby improving anode - ground resistance. The anodes are identified by a marker post and label. See layout drawing.

(4.5) Test Points: Test points are installed on cathodically protected structures to enable testing to ensure full protection of the mains. On these mains six test points have been installed on the trunk main which can be identified from the layout drawing.

(4.6) Associated Drawings:

Cathodic Protection Test Point Details	- 486/1/22-AAT0001E
Standard Rectifier Wiring Diagram	- 486/6/25-AA1C0021
Cathodic Protection Test Point & Anode Bed Locations S16 Trunk Main.	-2 / 24.00-01 Sheets 1 to 3

(4.7) Associated Standards:

AS/NZS 3000	2000	Electrical Installations
AS/NZS 2832.1	1998	Cathodic Protection of Metals-Pipes and Cables.

(4.8) Government Regulations:
Queensland Electricity Safety Rules and Regulations. 2002

(5.0) PERFORMED TESTING

(1) Natural Potential Survey.

(2) Testing of Insulated Flanges, Joints.

(3) Soil Resistance Testing.

(4) Current Drain Survey.

(5) Pipe Coating Anomaly Survey.

(6) Rectifier Loop Resistance.

(7) Foreign Structure Interference Survey and Mitigation.

(8) Final Potential Survey and Commissioning.

(6.0) CONCLUSION

Full Cathodic protection has been achieved on this section of trunk mains. The cathodic protection system is registered with the Electrical Safety Office, Department of Industrial Relations, and has approval to operate.

(7.0) MAINTENANCE

The cathodic protection system is maintained on a bimonthly basis after commissioning. These checks involve testing rectifier operation and recording of pipe to soil potentials.

16 th April, 2004.
Cathodic Protection Unit.

CPS Bimonthly Maintenance Details.

Required:

1/ Notify plant operator and/or sign entry logs where necessary.
2/ Have appropriate keying.

Labour:

One tradesperson, one vehicle. 20 minutes per site.

Procedure:

1/ Identify installation.
2/ Check system for operation.
3/ Record voltmeter.
4/ Record ammeter.
5/ Comments.
6/ Log entry.

16 th April. 2004.
Cathodic Protection Unit

CPS 6 Monthly Maintenance Details.

Required:

1/ Notify plant operator and/or sign entry logs where necessary.
2/ Have appropriate keying.
3/ Set of tools. (Electricians)
4/ Multimeter.
5/ DC clampmeter.
6/ Copper sulphate reference cell and leads.
7/ Cleaning equipment.
8/ Gatic cover lifters.

Labour:

One tradesperson electrical, one laborer, one vehicle.
Two hours per site.

Procedure:

1/ Identify system.
2/ Check system for operation.
3/ Record voltmeter.
4/ Record ammeter.
5/ Record "on" potentials for all test points.
6/ Record "instant off" potentials for all test points.
7/ Record "off" potentials for all test points.
8/ Perform loop resistance and record.
9/ Check and record anode string currents.
10/ Comments.
11/ Log entry.

16 th April, 2004.
Cathodic Protection Unit

CPS 60 Monthly Maintenance Details.

Required:

1/ Notify plant operator and/or sign entry logs where necessary.
2/ Have appropriate keying.
3/ Set of tools. (Electricians)
4/ Multimeter.
5/ DC clampmeter.
6/ Copper sulphate reference cell and leads.
7/ Cleaning equipment.
8/ Gatic cover lifters.
9/ Rectifier load bank.
10/ PCS2000 Detection Equipment.

Labour:

One tradesperson electrical, one laborer, one vehicle.
Eight hours per site.

Procedure:

1/ Identify system.
2/ Check system for operation.
3/ Record voltmeter.
4/ Record ammeter.
5/ Record "on" potentials for all test points.
6/ Record "instant off" potentials for all test points.
7/ Record "off" potentials for all test points.
8/ Perform loop resistance and record.
9/ Check and record anode string currents.
10/ Load test rectifier for 10 minutes.
11/ Check all switchboard and testpoint terminals for tightness.
12/ Check all switchboard and testpoints are labelled and I.D. tags attached.
13/ Check plans are correctly drawn and modify if necessary.
14/ Remove and inspect anodes.
15/ Recheck all interference (CPS) bleeds.
16/ Pipecamp structure if applicable.
17/ Apply to reregister system if applicable

Brisbane Water

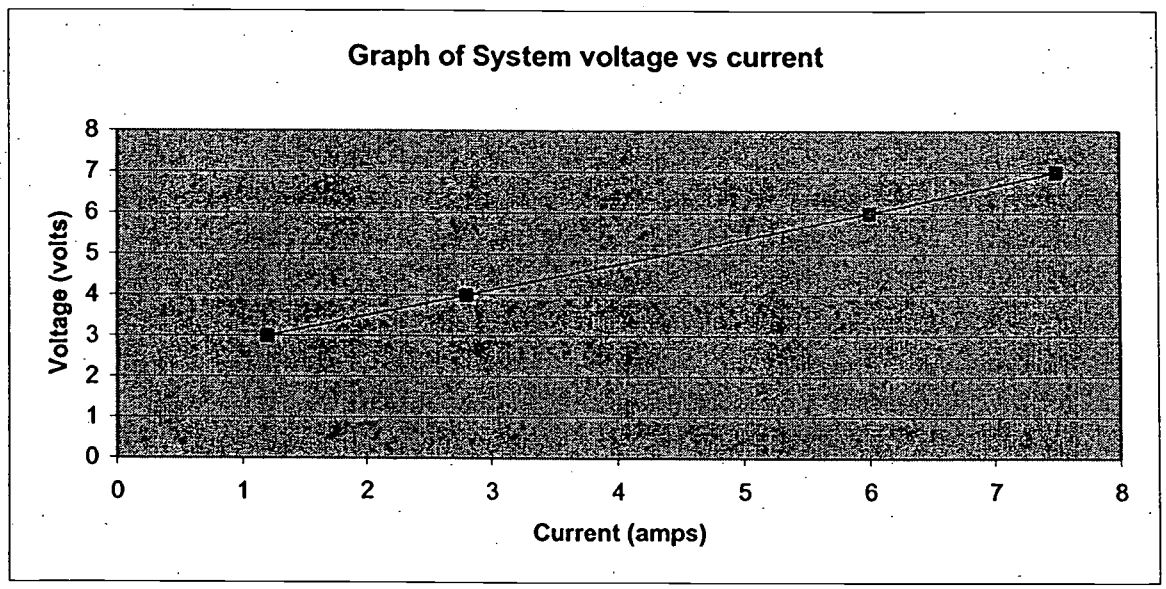
Network Services

Cathodic Protection System Loop Resistance — Queensport Rd. Rectifier. CPS 204

Date: 6th April 2004
Cathodic Protection System: Wynnum Rd to Gibson Island S16
System Operating Volts: 5.5 System Operating amps: 5

Test Voltage: (volts)		Test Current: (amps)	
7		7.5	
6		6	
4		2.8	
3		1.2	

Loop Resistance (ohms)
1.42857143



22/04/2004

Brisbane Water CP Form No. 23

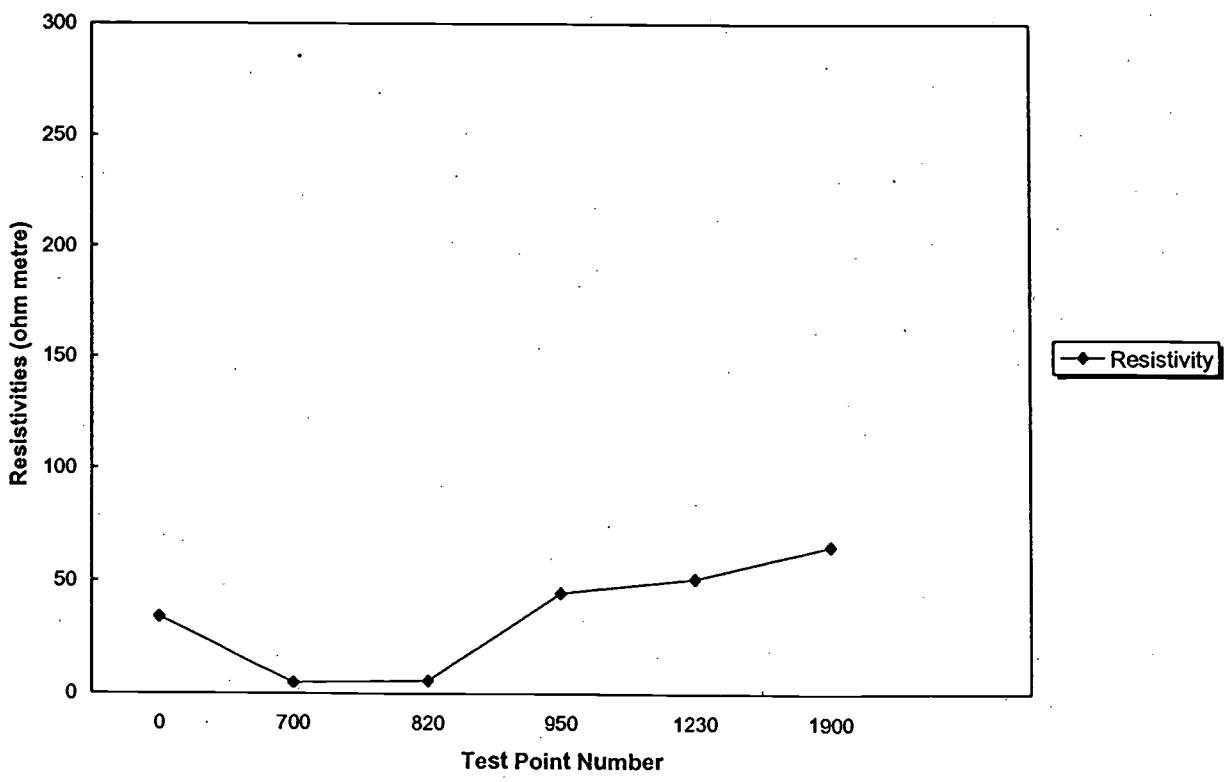
Network Services

Cathodic Protection System Resistivities Recording Form

Project S16 Trunk Main.Wynnum Road to Gibson Island. **Date** 6th April 2004

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres ohm metres
1	0	33.9
2	700	4.8
3	820	5.6
4	950	44.6
5	1230	51
6	1900	65.3

Graph of resistivities vs pipelength



Revision 27/04/2004

Brisbane Water CP Form No. 23

Network Services

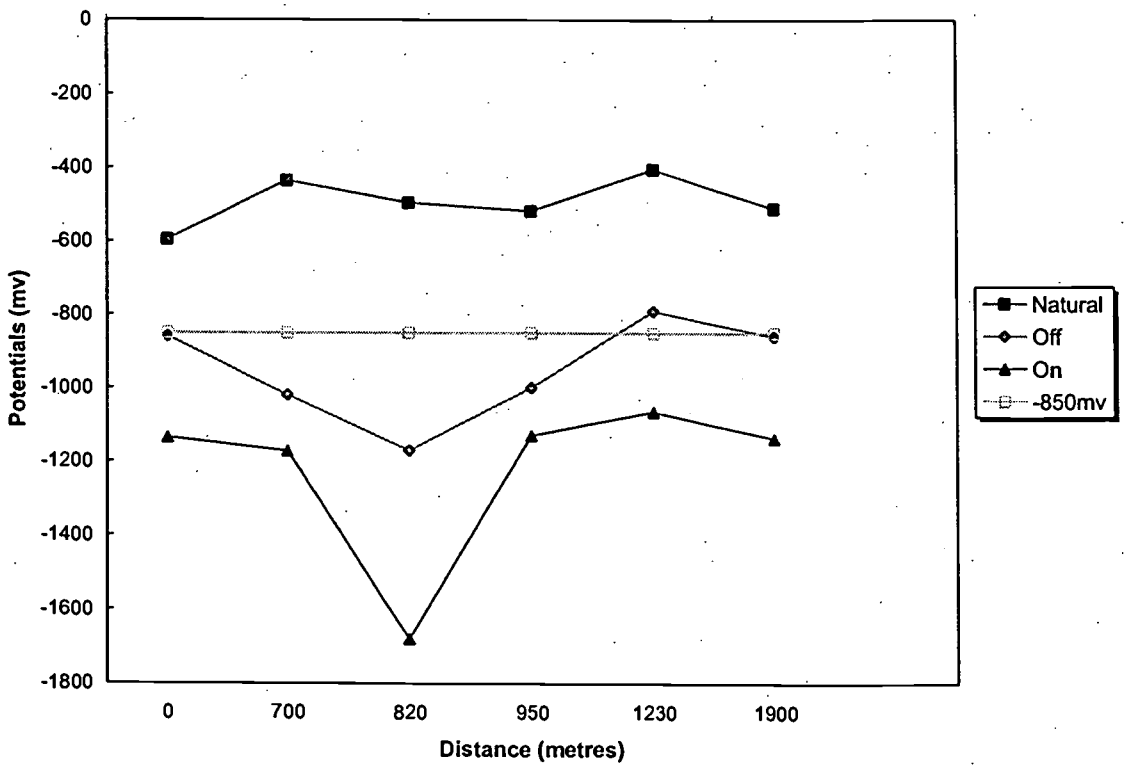
Cathodic Protection System Potential Recording Form

Project S16 Trunk Main.Wynnum Rd. to Gibson Island **Date** 6th April 2004

Test Point number	Distances to T.P.	Potentials to CuSO4			
		Natural	Off	On	
	(metres)	(mV)	(mV)	(mV)	(mV)
1	0	-595	-860	-1136	-850
2	700	-435	-1020	-1172	-850
3	820	-495	-1170	-1680	-850
4	950	-517	-1000	-1130	-850
5	1230	-404	-790	-1065	-850
6	1900	-510	-860	-1138	-850

Rectifier at TP No3

Graph of potentials vs pipelength



Revision 22/04/2004

FORM 9
V3.01-04

Queensland Government

Department of Industrial Relations
ABN 52 293 849 579

APPLICATION TO REGISTER A REGISTERABLE CATHODIC PROTECTION SYSTEM

PLEASE COMPLETE ALL SECTIONS OF THIS FORM- PLEASE PRINT

Application Details

Name of system owner:	Brisbane City Council / Brisbane Water	
		ABN 72002765795
Postal address:	GPO Box 1434 Brisbane 4001	
Contact name:		TEL

Name of authorised agent of system owner:	Brisbane Water Network Services	
		ABN 72002765795
Postal Address:	268 Cullen Ave Eagle Farm 4009	
Contact Name:	Jeff Say	
		TEL 07 34078365

Type of Application: (Tick as appropriate)			
	√ New System		
	☐ Alteration to an existing system, Registration No:		
	☐ Renewal of system, Registration No:		
Location of system:	From cnr Wynnum Rd & NorthcliffeSt to cnr Lytton & Queensport Rds .		
	Rectifier cnr Queensport & Murarrie Rds. Murarrie		POST CODE 4172
Structure to be protected:	755 mm dia Mild Steel Trunk Main		
Maximum operating current:	8.00 Amperes DC	Water or Marine environment Maximum operating voltage:	Volts

Declaration

I/We, being the owner/operators of the cathodic protection system described above, make application for the registration of this system and certify with respect to the system that:

(i) I/We have complied with the requirements of Part 11 of *Electrical Safety Regulation 2002*;
(ii) tests pursuant to section 177 of *Electrical Safety Regulation 2002*, based on the maximum operating current stated this application have been performed;
(iii) the maximum operating voltage stated in this application in the case of the system operating with an anode/s immersed in water or a marine environment corresponds to the maximum operating current mentioned in paragraph (ii); and
(iv) any necessary interference mitigation measures for foreign structures (in the case where the system is currently registered) have been tested and are operating satisfactorily.

Signature of system owner: _____ **Day** **Month** **Year**

PRIVACY STATEMENT. The Department of Industrial Relations respects your privacy and is committed to protecting your personal information. The information provided on this form is for the purpose of applying for the registration of a cathodic protections system and monitoring compliance under the Electrical Safety Act 2002, and will be managed within the requirements of Information Standard 42. The Department may be required to disclose your personal information to other government agencies, entities, or persons as may be required by law or that are outsourced functions. This information may also be used for statistical research, information provision and evaluation of our services. We will assume that we have your permission to do this unless you tell us otherwise. You can do this at any time by contacting Equipment Safety on (07) 3237 0281. Further information on our privacy policy is available at www.dir.qld.gov.au

Application of accompany registration fee of $205.00
Application for systems to be immersed in a marine environment must have technical schedule attached.
Forward to: Electrical Safety Office, LMB 2234 Brisbane Qld 4001
Please note: This is a GST free supply. No tax invoice will be issued.

Queensland Government
Department of Industrial Relations

Electrical Safety Act 2002

NOTICE OF REGISTRATION OF CATHODIC PROTECTION SYSTEM

Registration No: 3333

Date of Registration: 01 March 2006 **Expiry Date:** 01 March 2011

The cathodic protection system referred to below has been registered for a term of five years, and the conditions of registration shown hereunder shall apply in addition to the provisions of the Electrical Safety Act and Electrical Safety Regulation 2002.

Name and Postal Address of System Owner	Brisbane City Council Brisbane Water GPO Box 1434 BRISBANE QLD 4001
Location of System	From Cnr Wynnum Rd and Northcliffe St to Cnr Lytton and Queensport Rds Rectifier Cnr Queensport and Murrie Road Murarrie - Post Code: 4172
Structure to be Protected	Mild Steel Trunk Main

CONDITIONS OF REGISTRATION

Maximum Operating Current: **8.00 Amperes DC**

DES EDE
Director – Equipment Safety

21/3/2006

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Sct 16 Wynnum Rd - Gibson Isl **Unit Reading** 8V 8w **Date** 27-4-04

	Reading	Test Point I. D.	Location	Swing
On	-660		Queens Prot Rd	
Off	-668	Men	Pole No 58049	+8
On	-272			
Off	-272	Men	Pole No 58044	0
On	-320			
Off	-317	Men	Pole no 58038	-3
On	-377			
Off	-377	Men	Pole no 11018	0
On	-380			
Off	-380	Men	Pole no 43959	0
On	-890		Murarrie Rd	
Off	-620	Light	Park Lockt.	-270
On	-698			
Off	-800	Light	" "	-98
On	-896			
Off	-590	Light	" "	-306
On	-589			
Off	-589	Light	" "	0
On	-600			
Off	-600	Light	" "	0
On	-550			
Off	-550	Light	" "	0
On	-540			
Off	-540	Light	" "	0
On	-396		North Cliff Rd	
Off	-386	Men	Pole no 26077	-10
On	-335			
Off	-335	Men	Pole no 26078 2	0
On	-420			
Off	-418	Men	Pole no 37258	-2

TESTED BY P. SMYTH

Revision 6/08/2002

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Set 16 Wynnum Rd - Gibson Isl **Unit Reading** 8r 8a **Date** 27-4-04

	Reading	Test Point I. D.	Location	Swing
On	-418		North Cliff Rd	
Off	-418	Men	Pole no 26071	0
On				
Off				
On				
Off				
On				
Off				
On				
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TESTED BY P. SMYTH

Revision 6/08/2002

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project SeT 16 wynnum Rd – Gibson IS1 Date 21-4-04

TP Location Chr Wynnum & Northcliffe TP No. 1

Mains Size ..... TP Type B Pit.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	·2 Ω
ZINC REFERENCE TO PIPE	+555
CuSo4 REFERENCE TO PIPE	-595.
ZINC TO CuSo4	-1122

EARTH TESTING

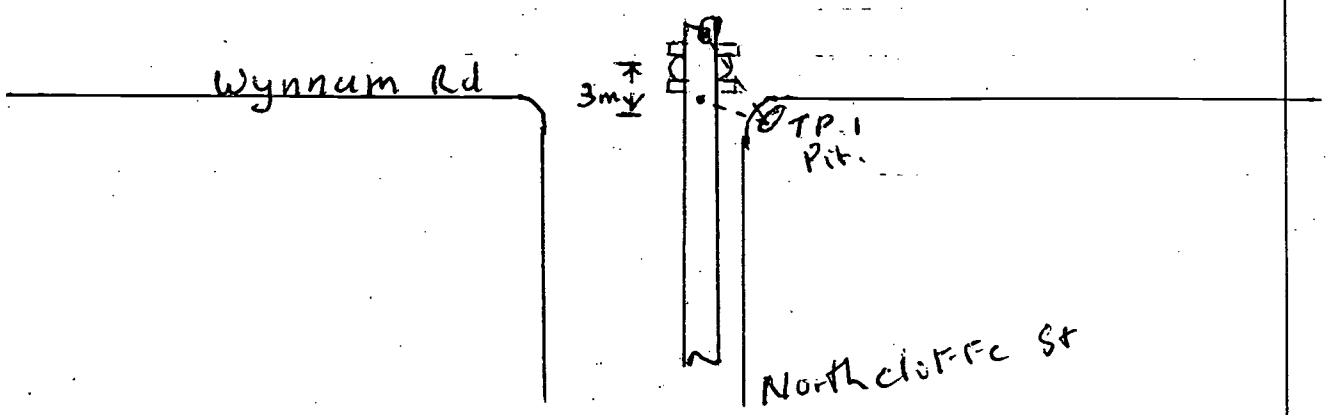
TEST NO. 1
PIN SPACING 2m RESISTIVITY 33·9 Ω PM
MEGGER READING 2-1

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING

cannon Hill Shops.

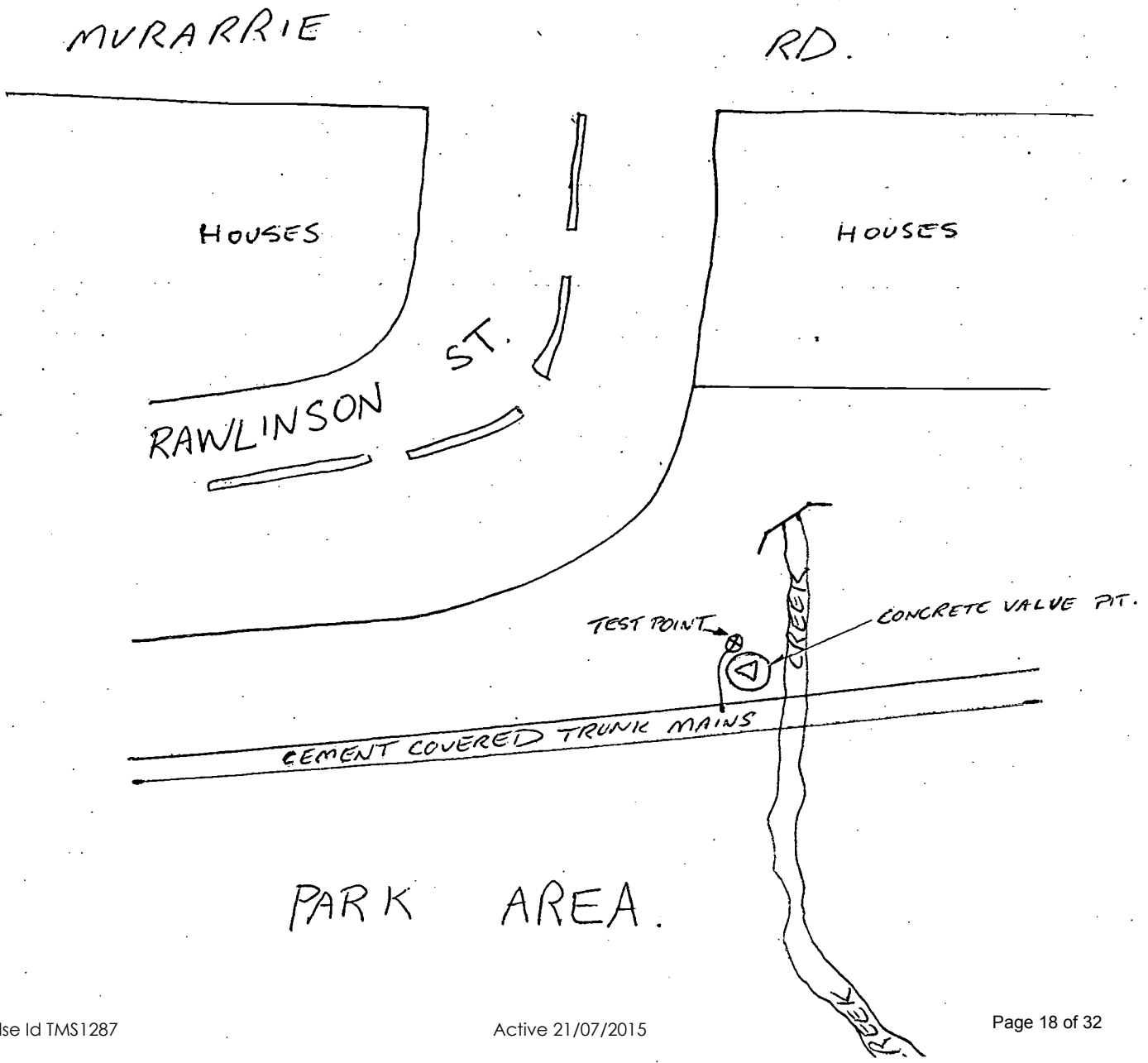


INSTALLED BY P. SMYTH

Revision 09/28/95

Test P No 2

Test point at Rawlinson St, Murarrie.
VBD Ref. 28 4C
installed on mild steel trunk mains on 2nd April 1987.



Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 16 Wynnum Rd – Gibson Date 20-4-04

TP Location Cnr Queens Port & Maravvie Rd TP No. 3

Mains Size ..... TP Type ....B...Rectifier

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1Ω
ZINC REFERENCE TO PIPE	+510
CuSo4 REFERENCE TO PIPE	-495
ZINC TO CuSo4	-1120

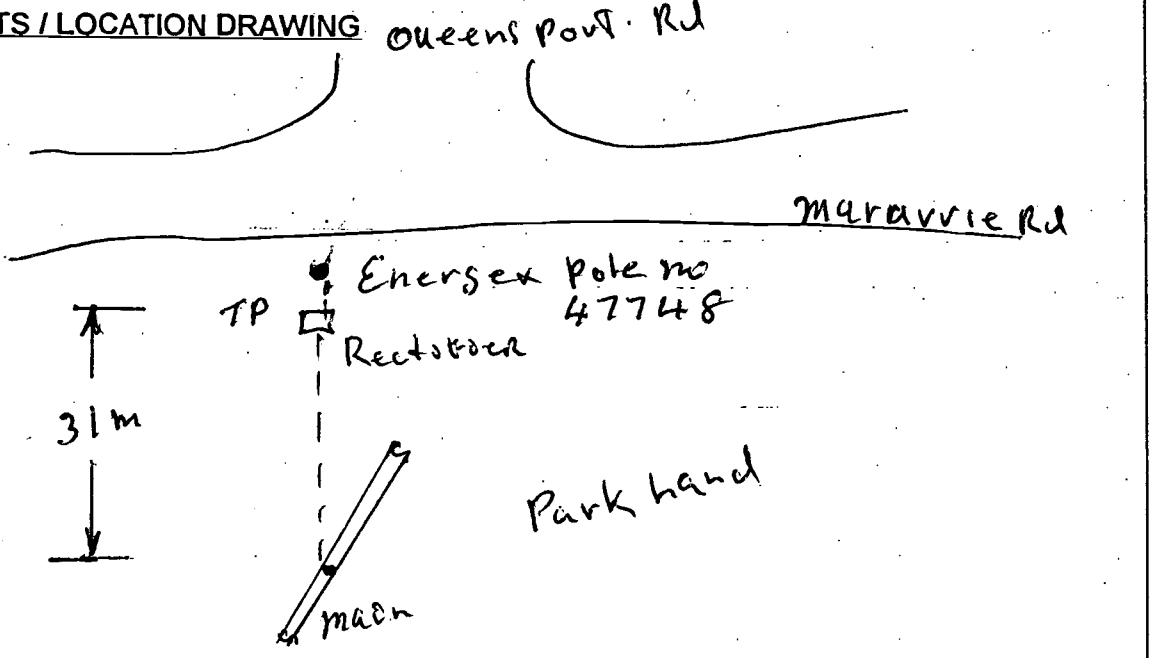
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 5.652 ΩPM
MEGGER READING .45

TEST NO 2
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

TEST NO 3
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

COMMENTS / LOCATION DRAWING



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Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 17

Electrical Engineering Unit

Cathodic Protection Anode Bed Testing

TP 3

Project Sct 16 Wynnum Rd - Gibson ISI Date 21-4-04

ANODE MATERIAL: Silicone Iron

BURIAL: Virtical

ANODE SIZE/WEIGHT:

TEST POINT TYPE: B Rectifier

ANODE PACKAGING:

SOIL RESISTIVITY: 3.5 Ω Pm

ANODE DEPTH: A1 2m A2 1.75m A3 2m A4 1.75m

SIGNAGE:

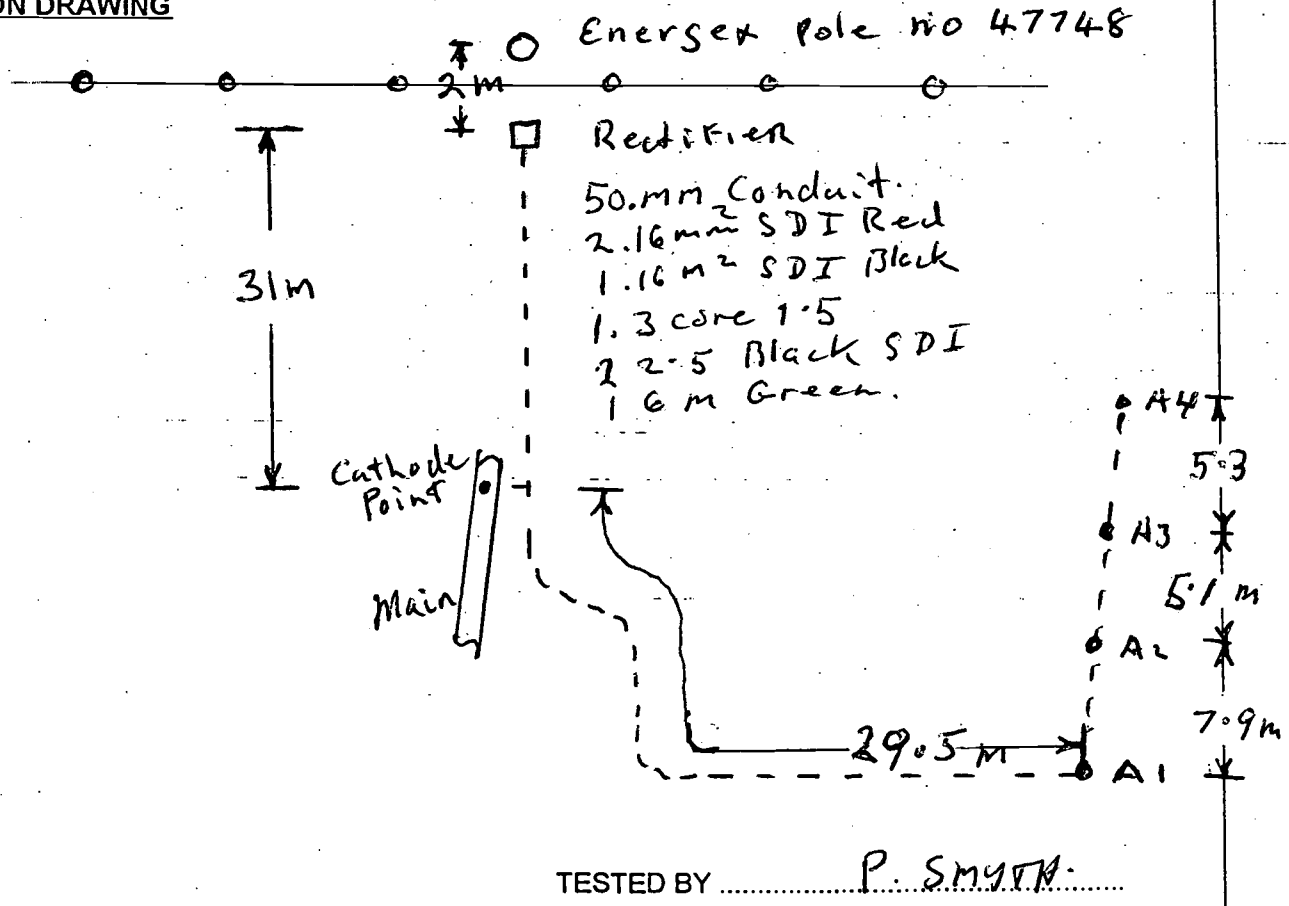
RESISTANCE TO GROUND:

ANODE NO.1	1.2 Ω
ANODE No.2	1 Ω
ANODE No.3	.7 Ω
ANODE No.4	.5 Ω
ANODE No.5	
TOTAL	

ANODE CURRENT

ANODE No.1	1 amps
ANODE No.2	.8 amps
ANODE No.3	1.5 amps
ANODE No.4	1.3 amps
ANODE No.5	
TOTAL	

LOCATION DRAWING

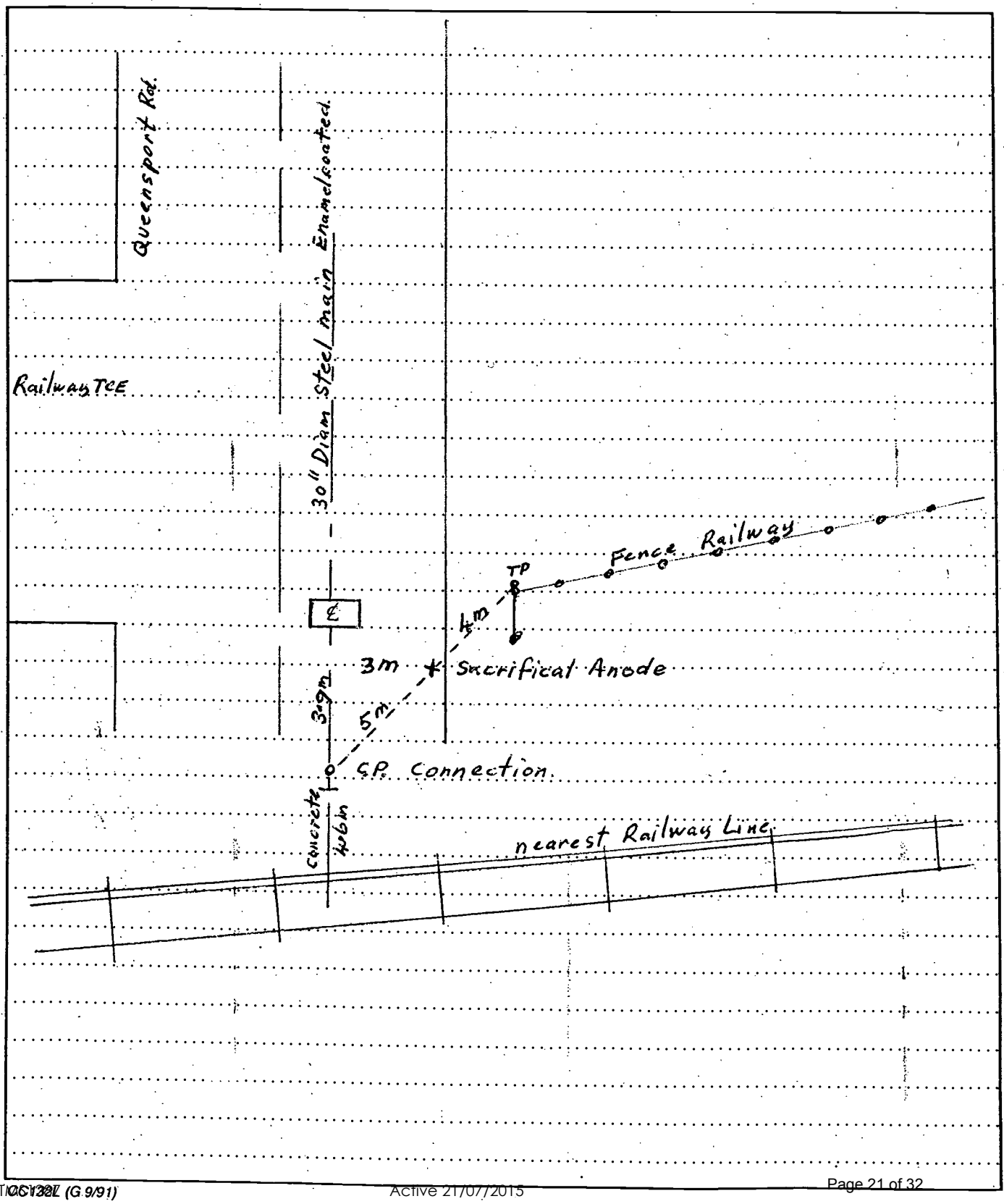


TESTED BY P. SMYTH.

Revision 09/28/95

BRISBANE CITY COUNCIL
MEMORANDUM

To	File No. REFGU5 02
From J. TAYLOR.	Date 29/ 9/93
Subject Queens Port Rd / Railway Tce Test Point No 4	



Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 16 Wynnum Rd-Gibson Date 27-1-04

TP Location Queens port + Ives. TP No. 5

Mains Size ..... TP Type B.Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1 Ω
ZINC REFERENCE TO PIPE	+632
CuSo4 REFERENCE TO PIPE	−404
ZINC TO CuSo4	−1035

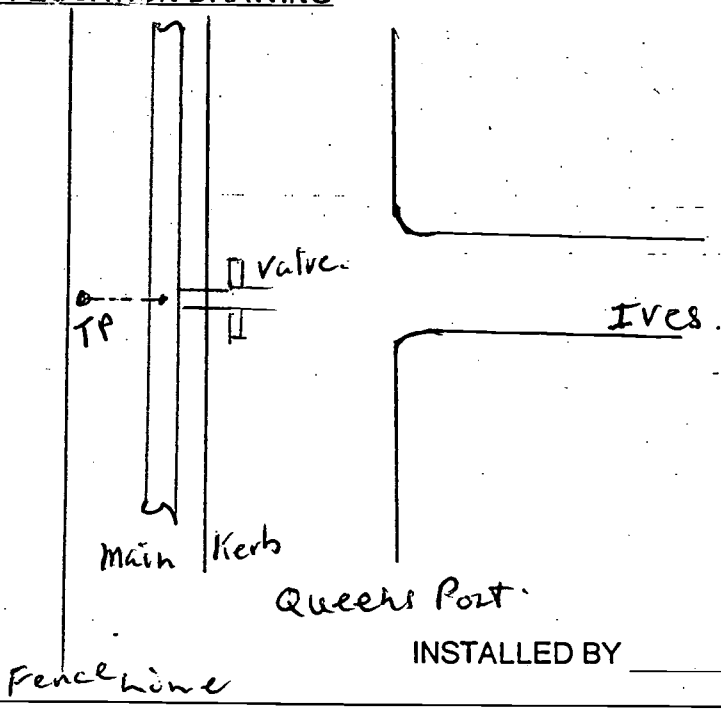
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 51 Ω Pm
MEGGER READING 4.1

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



INSTALLED BY P. SMYTH

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Sct 16 Wynnum Rd Gibson Date 22-1-04

TP Location Cnr Queens Port & Lytton TP No. 6

Mains Size ..... TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1 Ω
ZINC REFERENCE TO PIPE	+560
CuSo4 REFERENCE TO PIPE	−510
ZINC TO CuSo4	−990

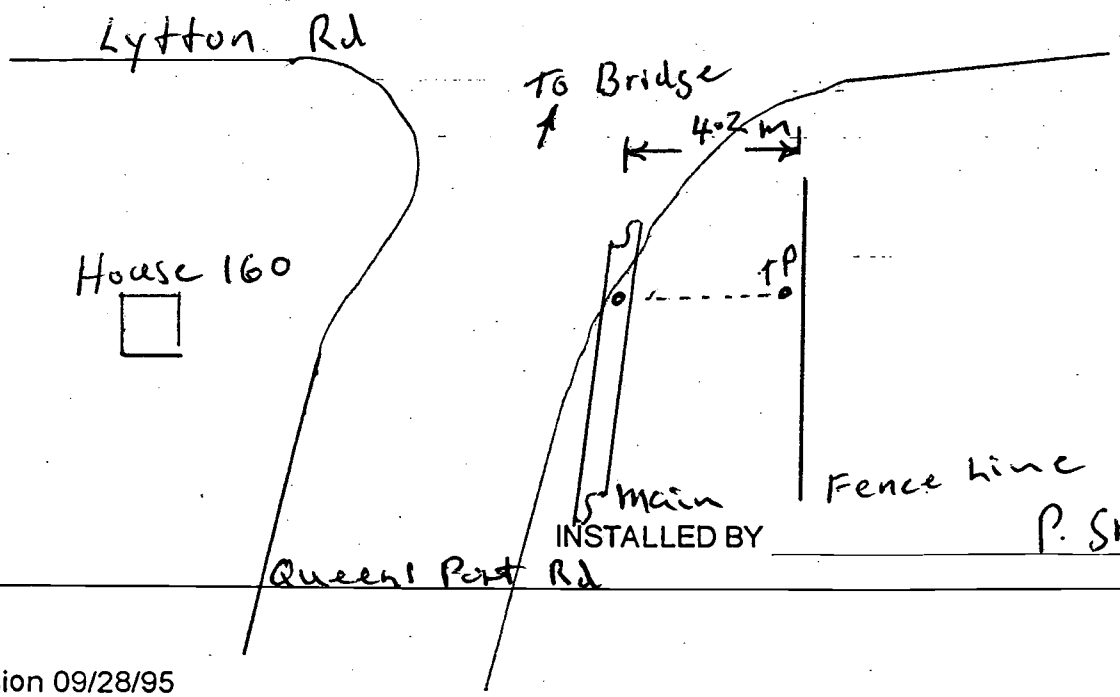
EARTH TESTING

TEST NO. 1
PIN SPACING 2.
MEGGER READING 5.2
RESISTIVITY 65.3 Ω pm

TEST NO 2
PIN SPACING
MEGGER READING
RESISTIVITY

TEST NO 3
PIN SPACING
MEGGER READING
RESISTIVITY

COMMENTS / LOCATION DRAWING



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Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 13

Project Sct 16 wynnum Rd - Gibson ISI Date 21-4-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: cnr wynnum Rd - Northcliffe
SIZE:
MATERIAL: Mild Steel.
COATING: Powder Coat
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200 Ω
NUMBER OF BOLT: 24
FLANGE TO FLANGE RESISTANCE: .5MΩ
INSULATION CHECKER MODEL 702: N/A.

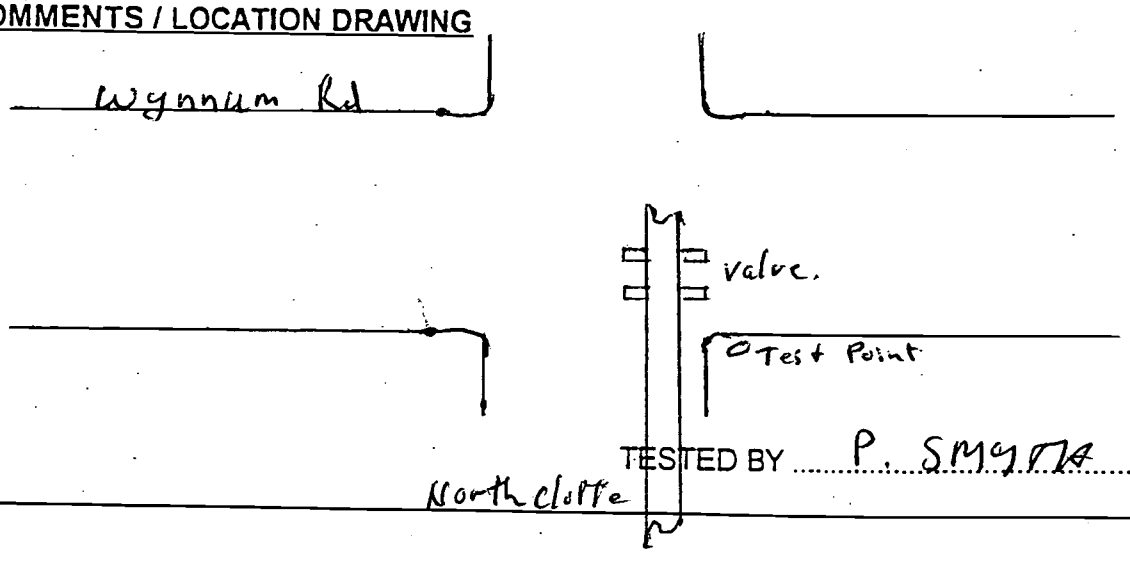
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -595
UNPROTECTED SIDE: -430

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P. SMYTH

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Sct 16 Isolation 14

Project Wynnum Rd - Gibson ISL **Date** 23-1-02

DESCRIPTION

MAINS DETAILS: S16
LOCATIONS: Cnr Queens Port - and Murraire St
SIZE: 300 Branch
MATERIAL: Mild Steel
COATING:
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 1.9KΩ
INSULATION CHECKER MODEL 702: N/A

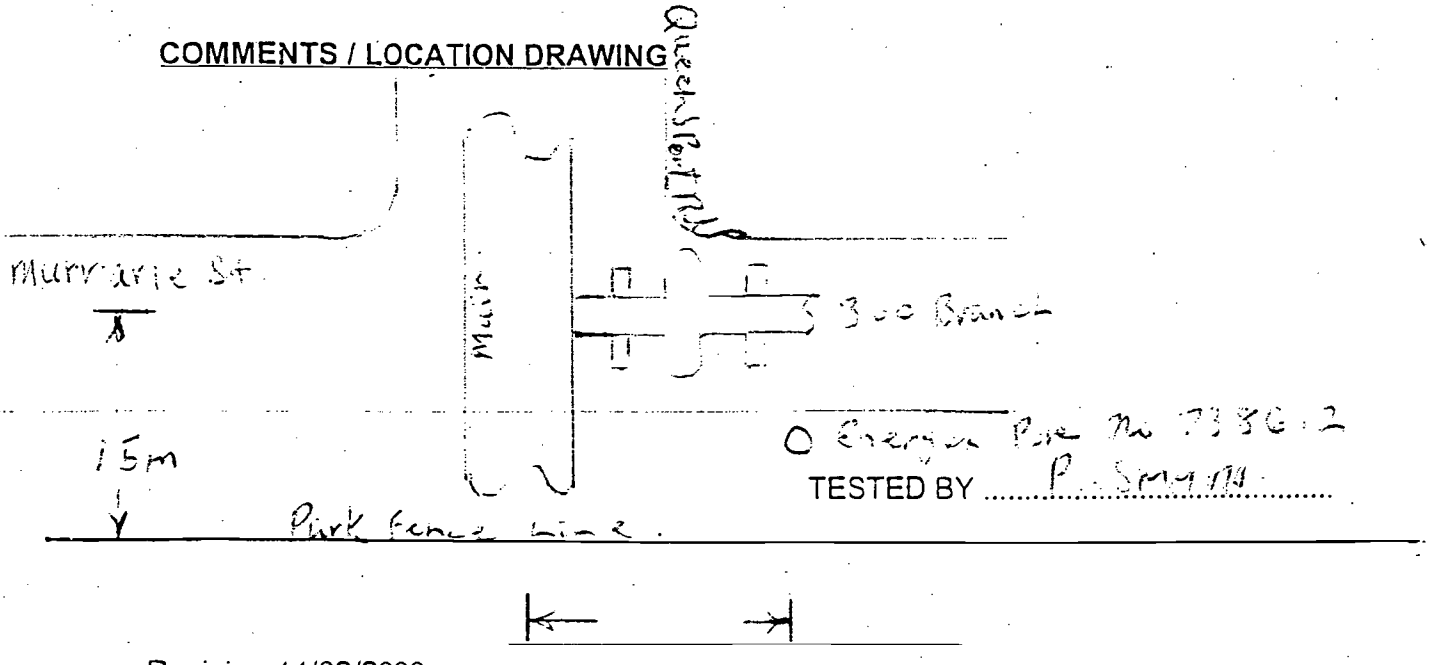
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -695
UNPROTECTED SIDE: -660

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



O Energex Pole No 73BG12

TESTED BY P. Smith

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 15

Project Sct 16 Wynnum Rd Gibson Isl Date 20-2-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: CnR Queensport & Ives ST
SIZE:
MATERIAL: Mild Steel
COATING: TA.
VALVE No. 300 Take OFF

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .8 KΩ
INSULATION CHECKER MODEL 702: N/A

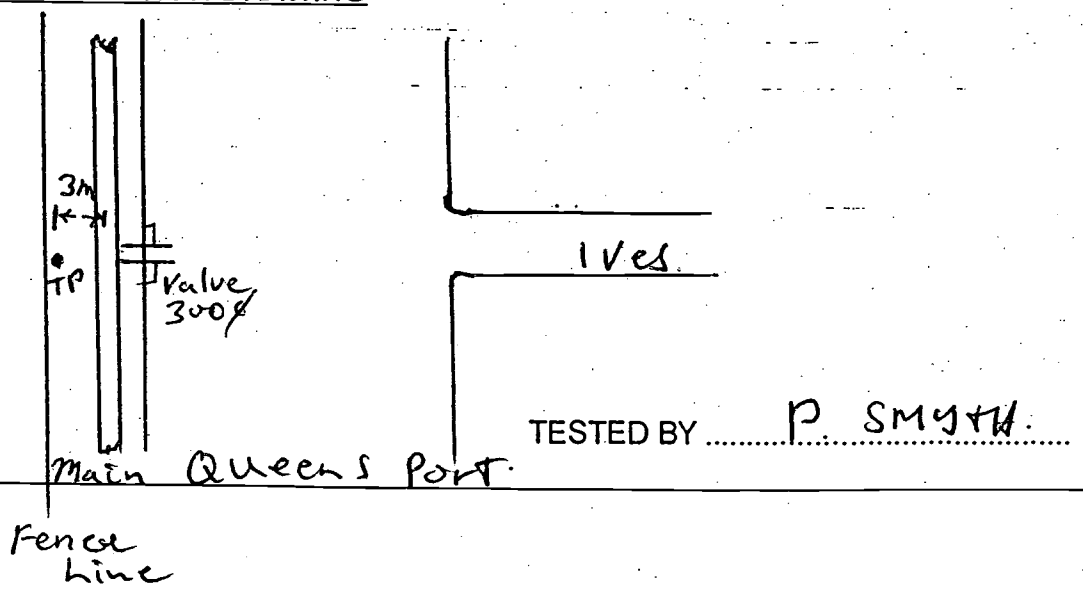
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -400
UNPROTECTED SIDE: -310

ABOVE TESTING

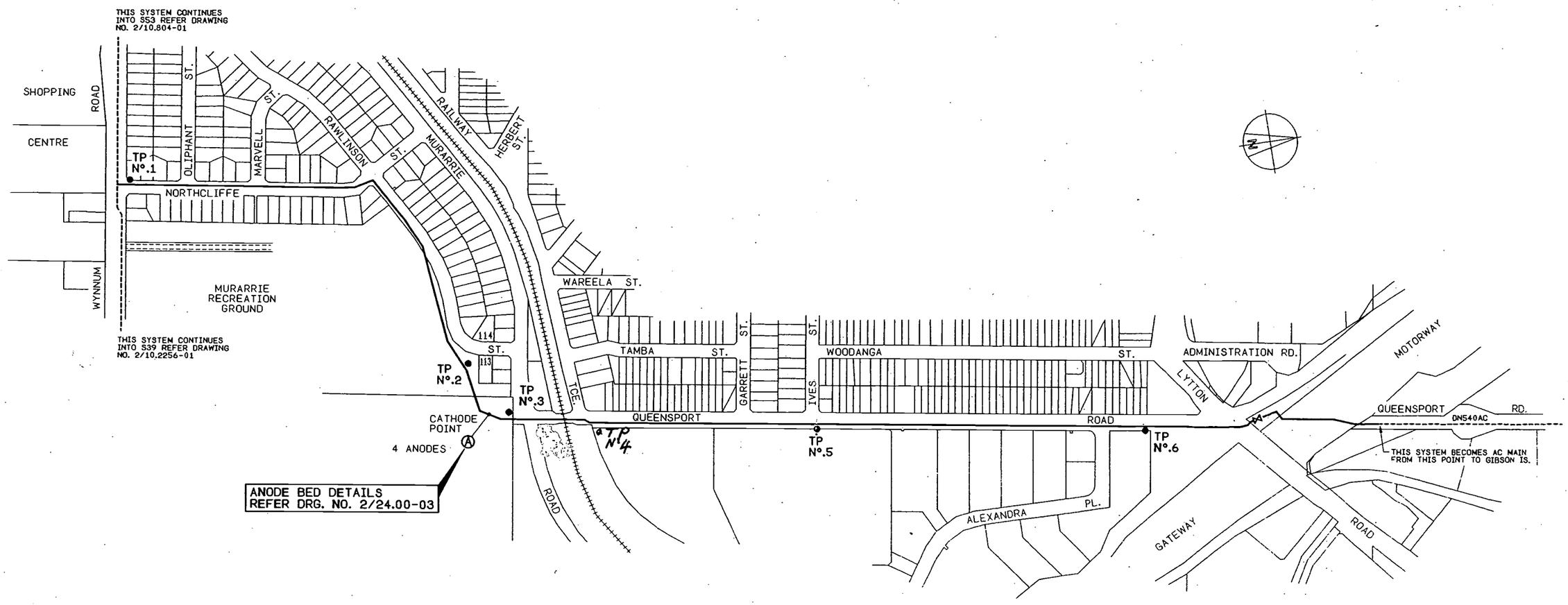
BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P SMYTH.

Revision 09/28/95



LOCALITY PLAN

DESIGN CHARGE N°	PA000820
CONSTRUCTION PROJECT N°	

AS BUILT RECEIVED	
BY	
OFFICER CODE	
DATE	

ON MAINTENANCE DETAILS	
START	FINISH

D.R.S. COMMENTS

FUNDING

PRIVATE BOOSTER REQUIRED?	YES / NO
FUNDED BY B.C.C. (✓)	DEVELOPER ( )
FED. GOV'T ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	

PLAN CUSTODIAN	
OFFICER/RECO	
DATE RELEASED	

LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	

BMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	

BMAP COMMENTS

NO.	DATE	AMENDMENT	INITIALS

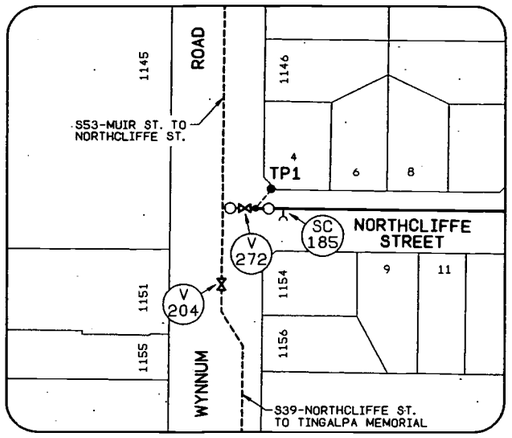
PRINCIPAL ENGINEER	R.P.E.Q. NO.	DATE
MANAGER ENGINEERING		DATE
PRODUCTION / NETWORK DELEGATE		DATE

CADD FILE	\WATER\INFRASTRUCTURE\2240001.DTA		
FILE NO.			
SURVEYED			
SURVEY NO.	FIELD BOOK		

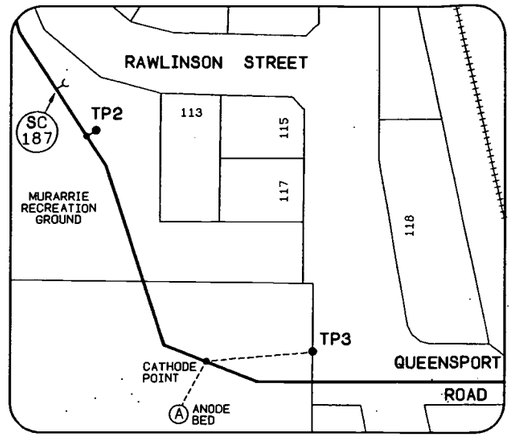
DESIGN		
DESIGN CHECK		
DRAWN	B.O.B	OCT. 2004
DRAFTING CHECK		

Brisbane Water

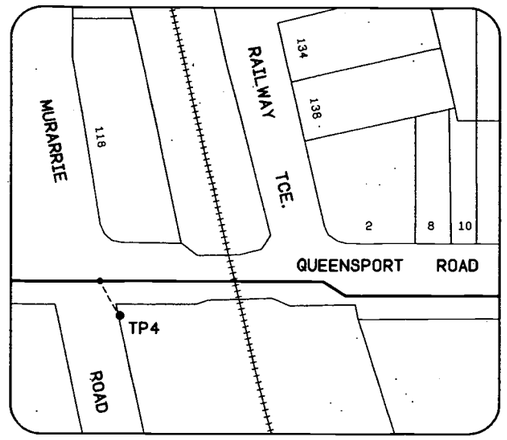
PROJECT	S16-WYNNUM ROAD TO GIBSON ISLAND
TITLE	CATHODIC PROTECTION TEST POINT AND ANODE BED LOCATIONS
SCALE	A.H. DATUM
	N° 1 OF 3 SHEETS
DRAWING N°	2/24.00-01
AMEND.	P1



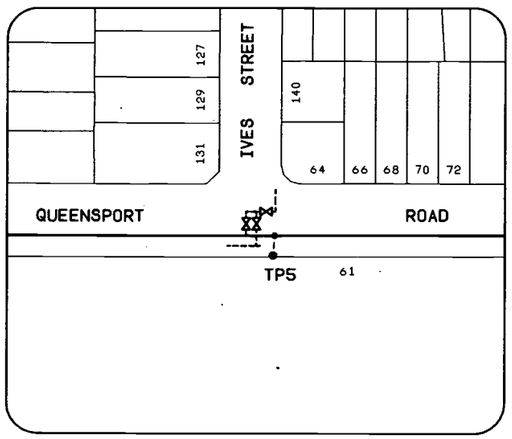
TEST POINT NO.1



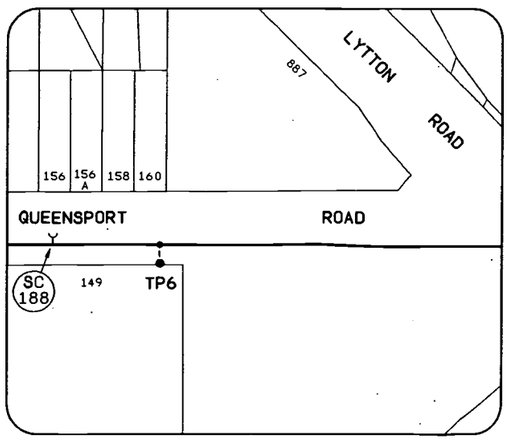
TEST POINT NO.2 AND 3



TEST POINT NO.4



TEST POINT NO.5



TEST POINT NO.6

DESIGN CHARGE Nº	PA000820
CONSTRUCTION PROJECT Nº	
AS BUILT RECEIVED	
BY	
ORDER CODE	
DATE	
ON MAINTENANCE DETAILS	
START	FINISH
D.R.S. COMMENTS	
FUNDING	
PRIVATE BOOSTER REQUIRED?	YES / NO
FUNDED BY B.C.C. (✓)	DEVELOPER ( )
FED. GOVT ( )	STATE ( ) OTHER ( )
DRS ORDER	
DATE RELEASED	
PLAN CUSTODIAN	
ORDER/RECD	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BIMAP CAPTURE	
JOB NUMBER	
ORDER CODE	
DATE	
BIMAP COMMENTS	

PRINCIPAL ENGINEER	R.P.E.Q. NO.	DATE	CADD FILE	\WATER\INFRASTRUCTURE\2240002.DTA	DESIGN		
MANAGER ENGINEERING		DATE	FILE NO.		DESIGN CHECK		
PRODUCTION / NETWORK DELEGATE		DATE	SURVEYED		DRAWN	B.O.B	OCT. 2004
			SURVEY NO.	FIELD BOOK	DRAFTING CHECK		

DATE	AMENDMENT	INITIALS

Brisbane Water

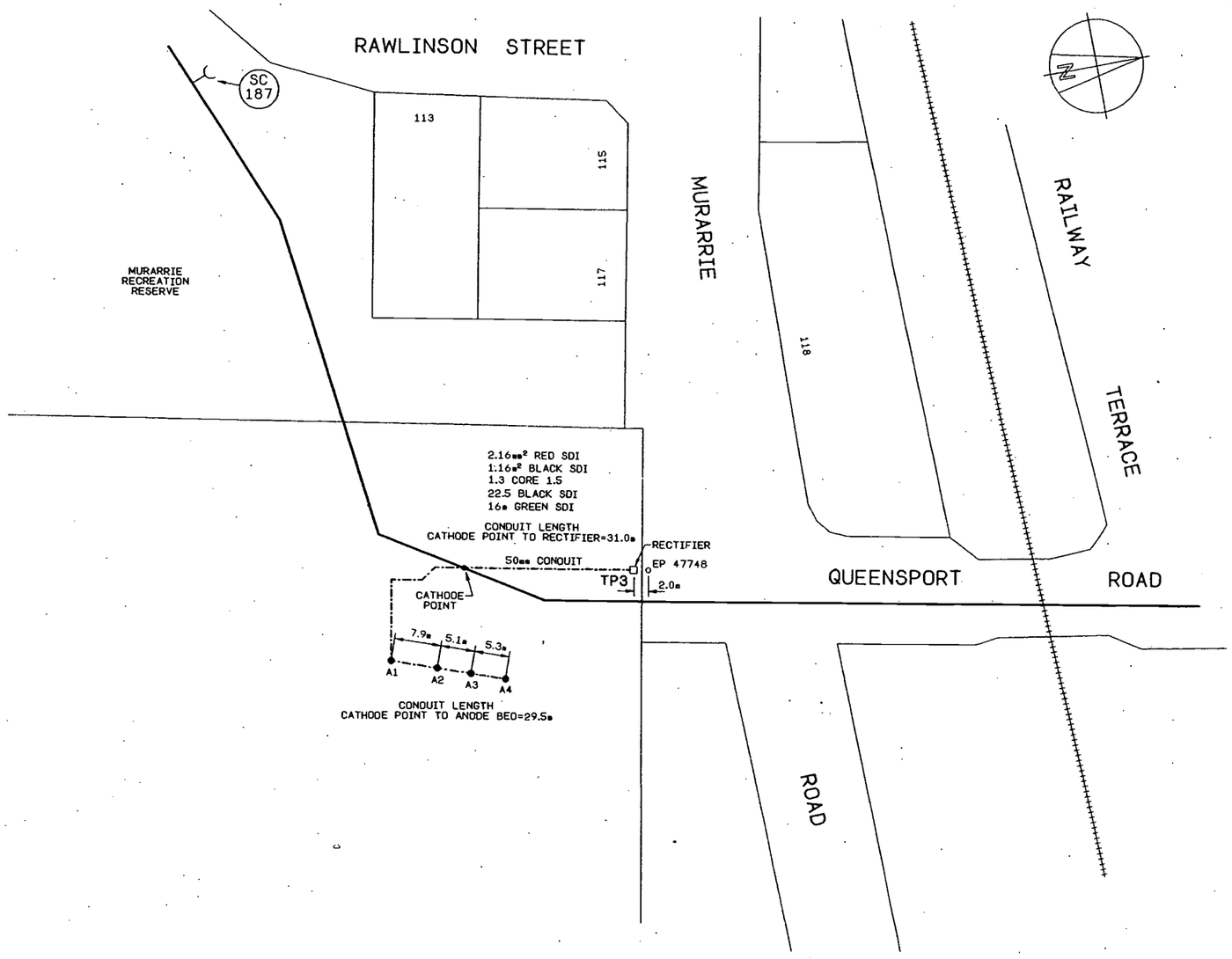
PROJECT: S16-WYNNUM ROAD TO GIBSON ISLAND

TITLE: CATHODIC PROTECTION TEST POINT NOS. 1 TO 6

SCALE: | A.H. DATUM

DRAWING Nº: 2/24.00-02 | AMEND. P

Nº 2 OF 3 SHEETS



ANODE BED DETAILS

DESIGN CHARGE No.	PA000820		
CONSTRUCTION PROJECT No.			
AS BUILT RECEIVED			
BY			
ORDER CODE			
DATE			
ON MAINTENANCE DETAILS			
START		FINISH	
D.R.S. COMMENTS			
FUNDING			
PRIVATE BOOSTER REQUIRED?	YES / NO		
FUNDED BY B.C.C. (✓)	DEVELOPER ( )		
FED. GOV'T ( )	STATE ( )	OTHER ( )	
DRS ORDER			
DATE RELEASED			
PLAN CUSTODIAN			
ORDER/RECD			
DATE RELEASED			
LIVE CONNECTION(S) / PASSED(W)			
REFERENCE			
DATE			
BIMAP CAPTURE			
JOB NUMBER			
ORDER CODE			
DATE			
BIMAP COMMENTS			

NO.	DATE	AMENDMENT	INITIALS

PRINCIPAL ENGINEER	RPEQ NO.	DATE
MANAGER ENGINEERING		DATE
PRODUCTION / NETWORK DELEGATE		DATE

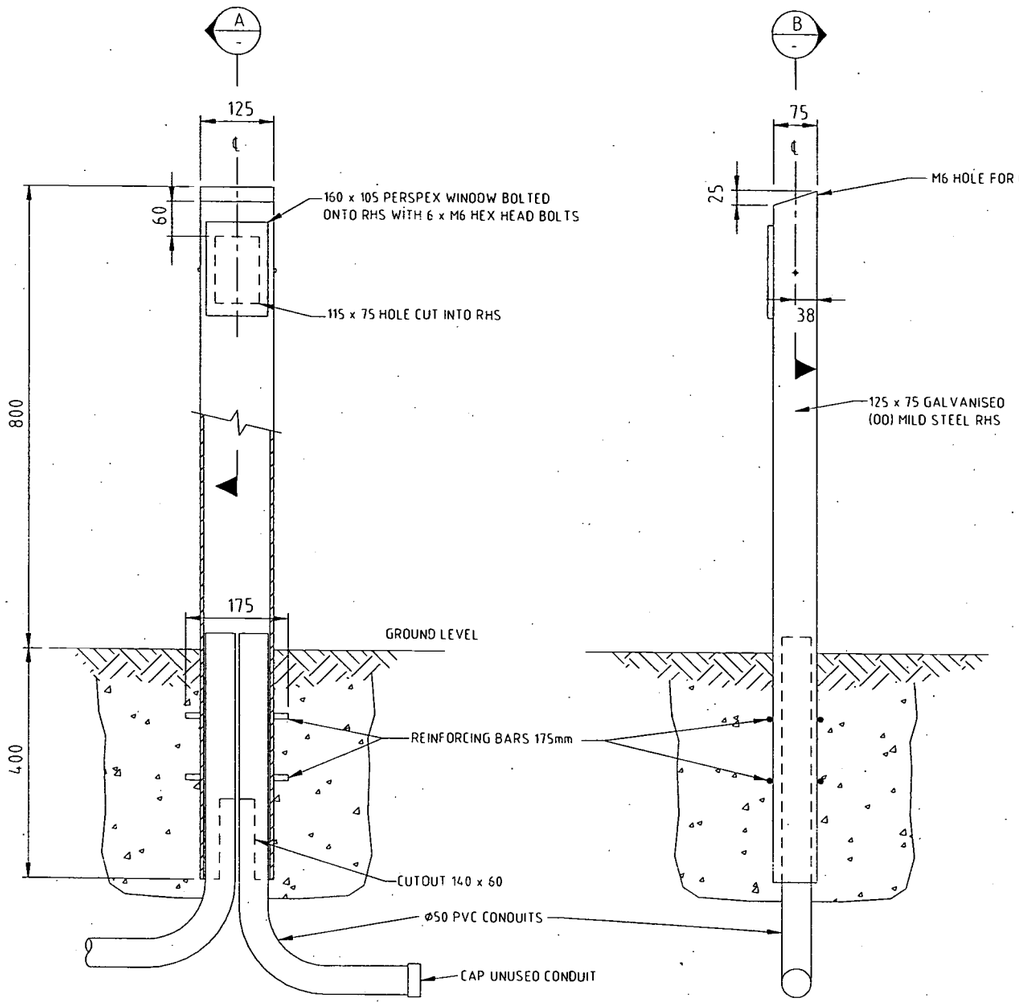
CADD FILE	\WATER\INFRASTRUCTURE\2240003.DTA		
FILE NO.		DESIGN	
SURVEYED		DESIGN CHECK	
SURVEY NO.	FIELD BOOK	DRAWN	B.O.B OCT. 2004
		DRAFTING CHECK	

Brisbane Water

PROJECT	S16-WYNNUM ROAD TO GIBSON ISLAND
TITLE	CATHODIC PROTECTION ANODE BED DETAILS
SCALE	A.H. DATUM
	No. 3 OF 3 SHEETS
DRAWING No.	2/24.00-03
AMEND.	P

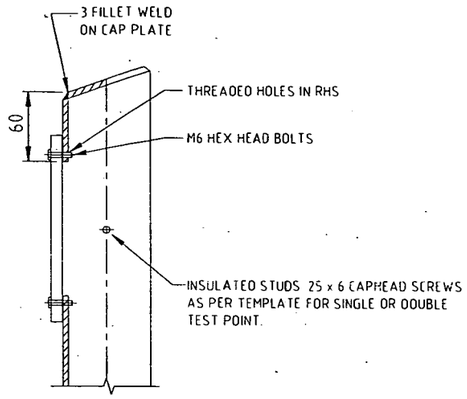
NOTES

1. HOT DIP GALVANISE AFTER FABRICATION.

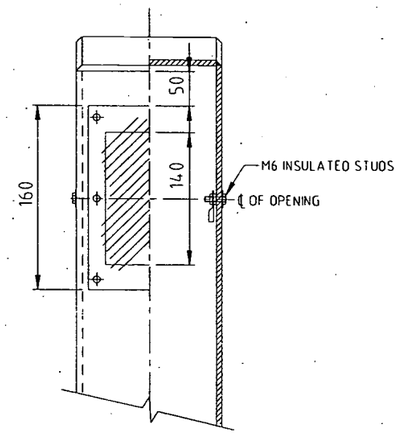


FRONT ELEVATION SECTIONED

SIDE ELEVATION



SECTION A-A



SECTION B-B

NO.	DATE	AMENDMENT	INITIALS
C	9-97	NOTE 7 REVISED	HT
B	11-95	MODIFIED	DLP
A	5-92	ISSUED FOR APPROVAL	DLP

DIRECTOR OF P.D. & P.S. — DATE
ENGINEER IN CHARGE — DATE
SUPERVISING ENGINEER — R.P.E.Q. NO. — DATE

	NAME	DATE
DESIGN	K.McG.	5-5-92
DRAWN	D.L.P	7-5-92
CHECKED		

Brisbane City

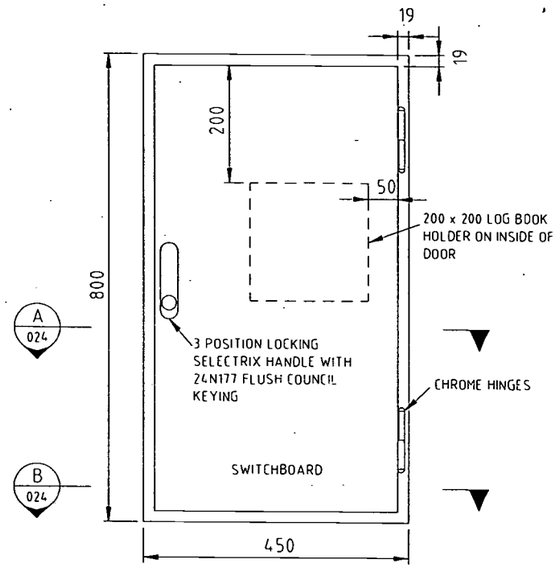
JOB FILE
ACAD FILE 2270001-RevA — SHEET SIZE A1
SURVEY No. — FIELD BOOK
SURVEYED — A.H. DATUM

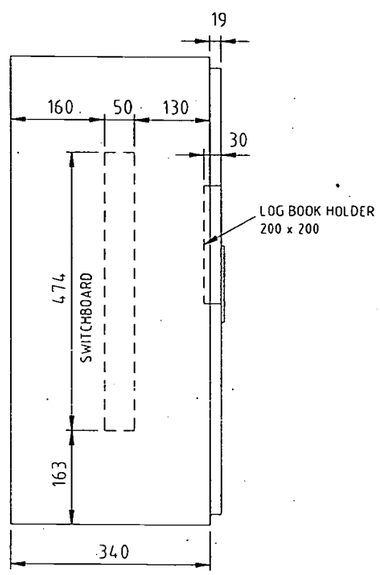
Brisbane Water — Professional Service Engineering

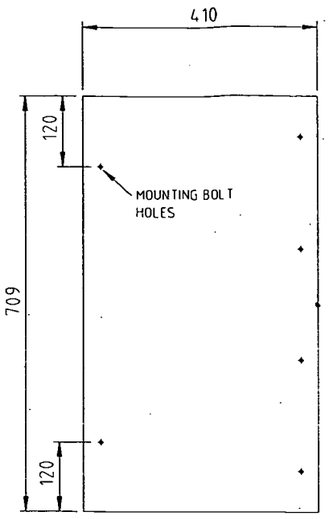
PROJECT: CATHODIC PROTECTON

TITLE: STANDARD TEST POINT CONSTRUCTION DETAILS

SCALE NTS — N° 1 OF 1 SHEETS
DRAWING N° 486/1/22-AAT0001E — AMEND C







FRONT INSULATED PANEL
(6mm THICK SUPPLIED)

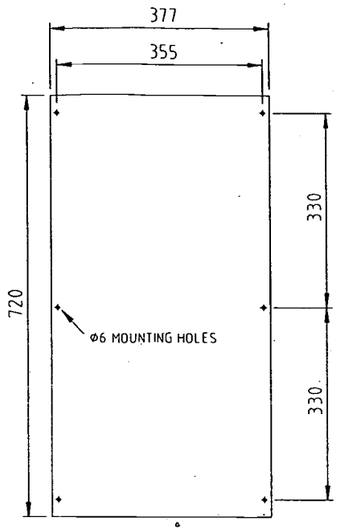


FIG 1
EQUIPMENT PANEL DETAILS

1. CABINET TO BE MANUFACTURED FROM 1.6mm 2B STAINLESS STEEL.

2. UNLESS SPECIFIED, SUPPLY CABINET WITH PLINTH. (MOUNT PLINTH TO SWITCHBOARD CABINET USING STAINLESS STEEL SCREWS).

3. REAR EQUIPMENT PANEL TO BE ZINC PLATED STEEL. POWDER COATED 'ORANGE'. (FULL LENGTH, FULL WIDTH & REMOVABLE). SEE FIG.1.

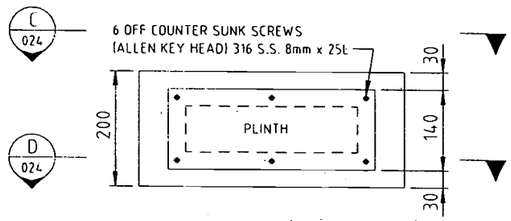
4. DOUBLE HINGED PANEL SUPPLIED BY B.C.C.

5. PROVIDE 1/4" WW STAINLESS STEEL STUDS TO DOOR & SWITCHBOARD CABINET.

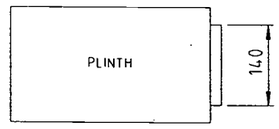
6. DEGREE OF WEATHER PROTECTION IP55.

7. SELECTRIX TYPE HANDLE TO BE SUPPLIED & FITTED BY SWITCHBOARD MANUFACTURER. HANDLE TO BE 1107 SS CU1. KEY TO BE 24N177.

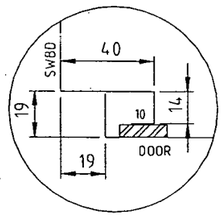
8. DOUBLE HINGED PANEL MOUNT TO BE SUPPLIED WITH MOUNTING BOLTS & NUTSERTS TOP & BOTTOM. SEE DETAIL A.



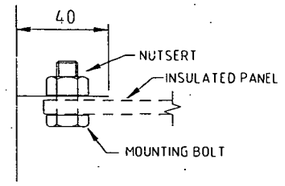
FRONT ELEVATION
SWITCHBOARD & PLINTH



SIDE ELEVATION
SWITCHBOARD & PLINTH

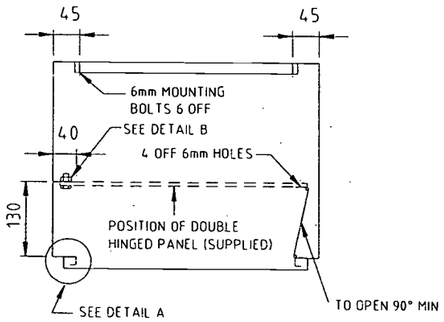


DETAIL A
DOOR/CORNER DETAIL

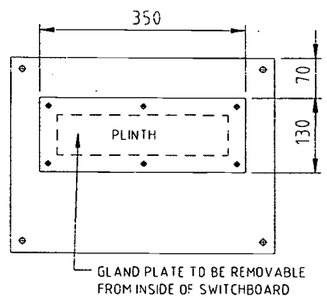


DETAIL B

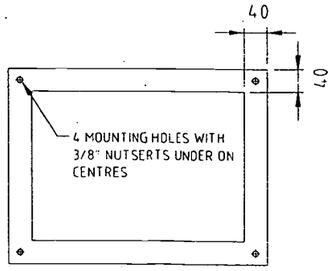
NUMBER OF SWITCHBOARDS REQUIRED	
NUMBER OF PLINTHS REQUIRED	



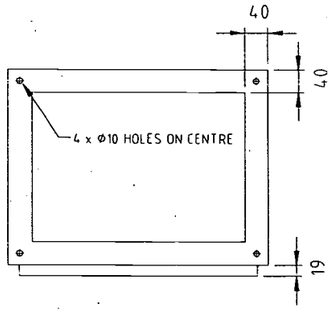
SECTION A-A
(SHOWING HINGED PANEL)



SECTION B-B
(SHOWING GLAND PLATE)



SECTION C-C
PLINTH MOUNTING DETAILS



SECTION D-D
PLINTH MOUNTING DETAILS

NO.	DATE	AMENDMENT	INITIALS
C	9-02	NOTE 3 REVISED	HI
B	11-95	MODIFIED	DLP
A	5-92	ISSUED FOR APPROVAL	DLP

		DATE
DIRECTOR OF P.D. & P.S.		
ENGINEER IN CHARGE		DATE
SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE

	NAME	DATE
DESIGN	K.M.G	5-5-92
DRAWN	D.L.P	7-5-92
CHECKED		

Brisbane City

JOB FILE			
ACAD FILE	22C0024-Rev-C	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water — Professional Services Engineering

PROJECT: CATHODIC PROTECTON

TITLE: STANDARD SWITCHBOARD CABINET

SCALE: NTS | N° 1 OF 1 SHEETS

DRAWING N°: 486/1/22-C0024E | AMEND: C

RECTIFIER UNIT

FIELD

G.P.O. C/B 4A

RECTIFIER UNIT C/B 16A

N/L

TO DATA LOGGER (GPO)

VARISTOR

NEON

INTERUPT SWITCH

TRANSFORMER (SEE NOTE 1)

DIODE FUSE 25A

BRIDGE

VOLTMETER

+VE

-VE

VARISTOR

+VE OUTPUT SEE NOTE

-VE

AMMETER

LINK

COUPON DISCONNECT

ANODE

CATHODE

CATHODE REF RETURN

COUPON BLEED

ZINC REF

COUPON

ZINC REF (COUPON)

CuSo4 TEST CONNECTION

BANANA PLUG SOCKETS ON FRONT PANEL

CATHODE REF. RETURN

ZINC REFERENCE

ZINC REF. COUPON

PROTECTED COUPON

CuSo4 CONNECTION

TEST POINT TERMINALS FOR REMOTE RECTIFIER SITES

GREEN/YELLOW

BROWN

BLUE

3 CORE 2.5mm2

CATHODE REF CONN 6mm2 PVC/PVC BLACK
CATHODE CONNECTION 16mm2 PVC/PVC BLACK
TO ANODE 16mm2 PVC/PVC RED

GREEN/YELLOW

BROWN

BLUE

6mm2 PVC GREEN

Zn

No.1

CuSo4 REF. TUBE (IF SUITABLE LOCATION AVAIL.)

ZINC REFERENCE

PROTECTED POTENTIAL

STANDARD ZINC TYPE REFERENCE

COUPON TYPE REFERENCE

NOTES

1. TRANSFORMER OUTPUT CURRENT & VOLTAGE TO SUIT APPLICATION PROVIDING SUITABLE RESOLUTION & CONTROL

2. AMMETER & VOLTMETER TO PROVIDE SUITABLE RESOLUTION FOR SYSTEM

3. + POSITIVE WIRING TO BE RED
   -NEGATIVE WIRING TO BE BLACK
   L.V. AC WIRING TO BE 4mm2 BLUE/WHITE
   DC WIRING TO BE 4mm2
   240V AC WIRING TO BE 1.5mm2-BROWN/BLACK
   REFERENCE WIRING TO BE 1.5mm2-GREY

4. +VE AND -VE DC FUSES TO BE SIZED APPROX. 5AMPS ABOVE NORMAL OUTPUT CURRENT

NO.	DATE	AMENDMENT	INITIALS
D	27.03.95	VARIAC REMOVED, TRANSFORMER MULTI-TAP SEC ADDED	DPM
C	14.10.94	TELEMETRY REMOVED, BW BORDER UPDATED	DPM
B	11.4.94	CHANGES AS SHOWN	RL
A	18.10.93	CHANGES AS SHOWN	RL
1	25.8.93	ISSUED FOR CONSTRUCTION	RL

PRINCIPAL ENGINEER M.Jukes 25.8.93 R.P.E.Q. NO. DATE
MANAGER ENGINEERING DATE
PRODUCTION / NETWORK DELEGATE DATE

	NAME	DATE
DESIGN	J.S.	3.8.93
DRAWN	R.L.	3.8.93
CHECKED	J.S.	25.8.93

Brisbane City

JOB FILE
ACAD FILE A625C21e-RevD
SURVEY No. FIELD BOOK
SURVEYED A.H. DATUM

Brisbane Water Projects - Engineering

PROJECT
STANDARD CATHODIC PROTECTION

TITLE
RECTIFIER UNIT WITHOUT LOGGING FACILITIES WIRING DIAGRAM

SCALE - N° OF SHEETS
DRAWING N° 486/6/25-AA1C0021E AMEND. D

Q:\PSEDRAWING2\Standard Drawings\Sewerage\Infrastr\CathodicProtection\ta625c21e-RevD.dwg, 08/03/2005 02:24:12 PM