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

12 th May 2005

OPERATING MANUAL FOR:

EILDON HILL / BARTLEYS HILL TRUNK MAIN

S42 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WATER SYSTEM SERVICES

MANUAL CONTENTS

DRAWINGS

(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: 910 mm dia mild steel cement lined.

Coating: Tar Epoxy.

Length: Appox 3.1 km.

Location: From Valve 127 Eildon Hill Reservoir. (Entry from Hawdon St.) to Valve 119 Bartleys Hill Reservoir.

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 30 Volt, 30 amp direct current output enclosed in a stainless steel switchboard. This system has 1 rectifier installed. The rectifier is in Windsor Park, at the end of Grafton St. Windsor, and has a 240V supply from Energex pole No.6367 Grafton St. Windsor.

(4.3) Cathode: The cathode point is located on the 910 mm dia mains, adjacent to valve12, approx 120 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 100 metres from the trunk mains, in a vertical bed 5 metres deep, in the park adjacent to the rectifier. 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 seven 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 S42 Trunk Main.	- 2 / 10.2070-01 and 2 / 10.2070-02

(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.

12 th May, 2005.
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.

12 th May, 2005.
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.

12 th May, 2005.
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 Engineering Services

CP Form No. 23

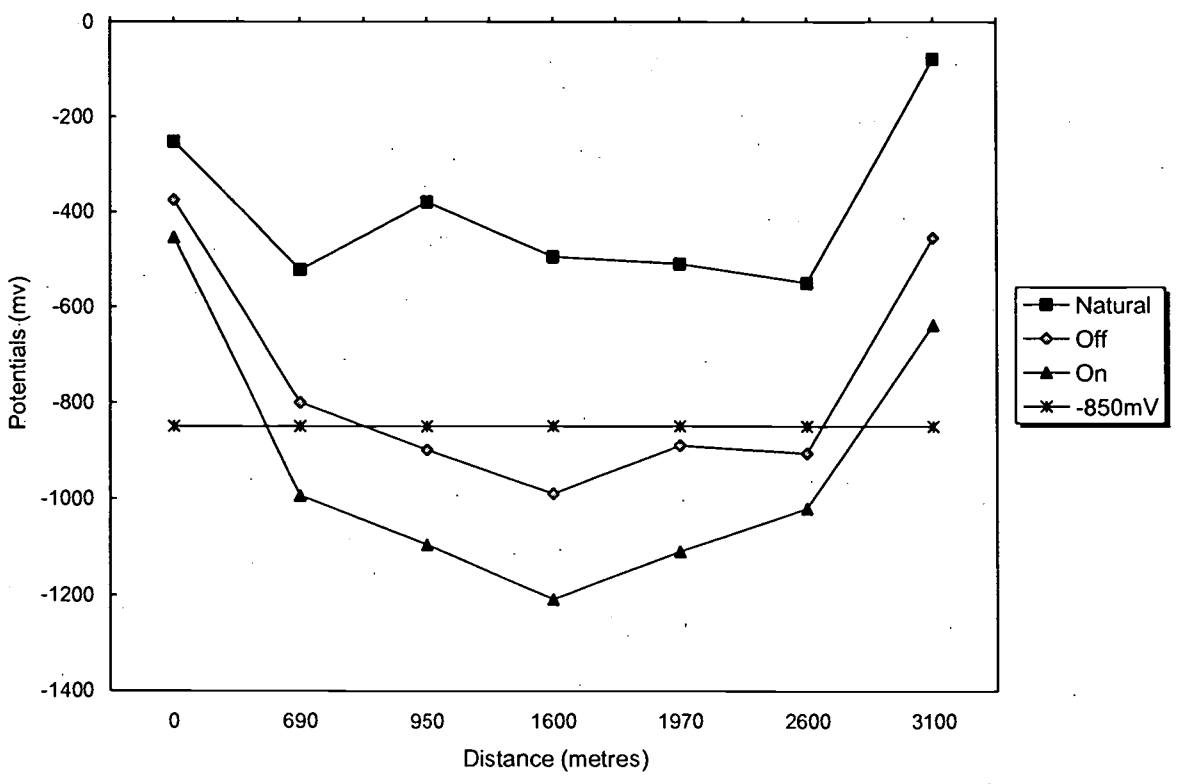
Electrical Engineering Unit

Cathodic Protection System Potential Recording Form

Project Eildon Hill to Bartleys Hill S42 **Date** 12th May 2005

Test Point number	Distances to T.P. (metres)	Potentials to CuSO4 Natural (mV)	Off (mV)	On (mV)	Distance	
1	0	-252	-375	-454	0	
2	690	-522	-800	-994	690	
3	950	-379	-899	-1095	950	
4	1600	-495	-990	-1209	1600	Rectifier at
5	1970	-510	-890	-1110	1970	TP. No4
6	2600	-550	-906	-1020	2600	
7	3100	-78	-455	-638	3100	
8						
9						
10						
11						
12						
13						
14						

Graph of potentials vs pipelength



Revision 8/08/2005 PTEILDONBARTLEY42

Brisbane Water Engineering Services

CP Form No. 23

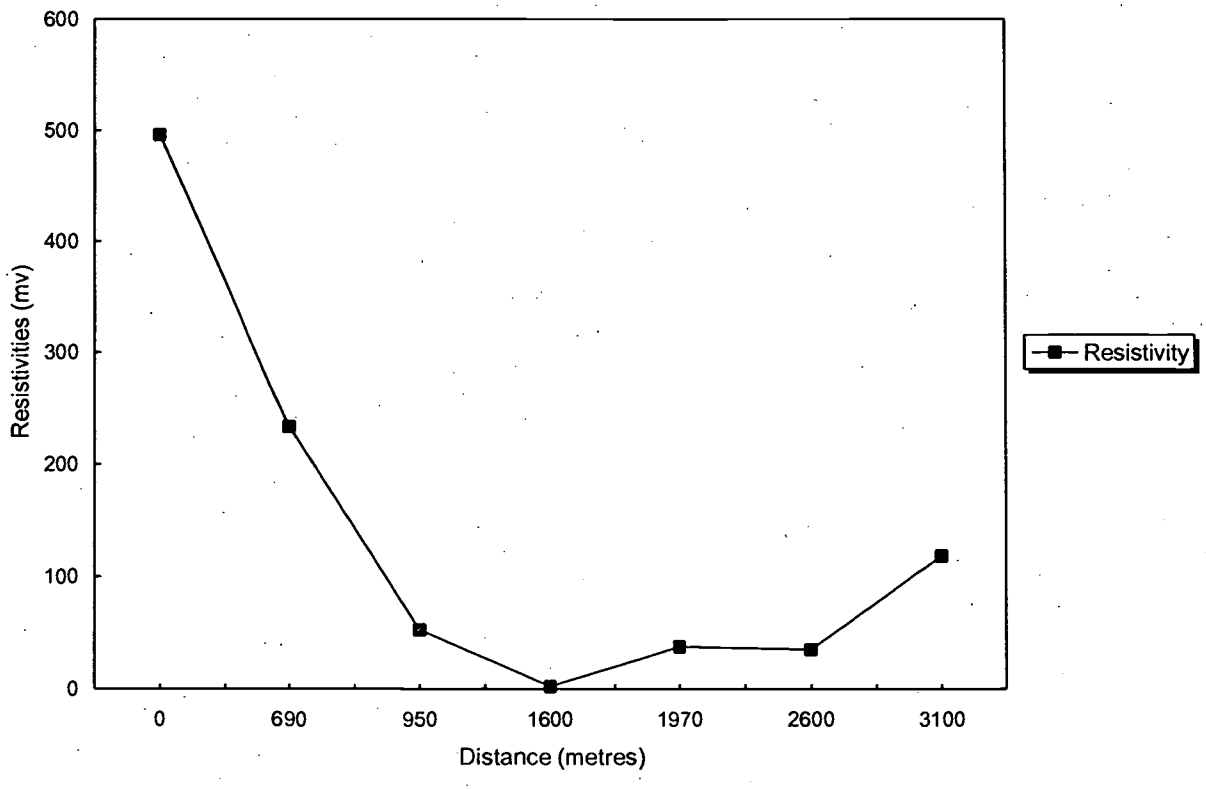
Electrical Engineering Unit

Cathodic Protection System Resistivities Recording Form

Project Eildon Hill to Bartleys Hill S42 **Date** 12th May 2005

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres ohm metres
1	0	496.1
2	690	233.1
3	950	52.7
4	1600	1.9
5	1970	37.68
6	2600	35.1
7	3100	118.1
8		
9		
10		
11		
12		
13		
14		

Graph of resistivities vs pipelength



Revision 12/05/2005

Brisbane Water Engineering Services

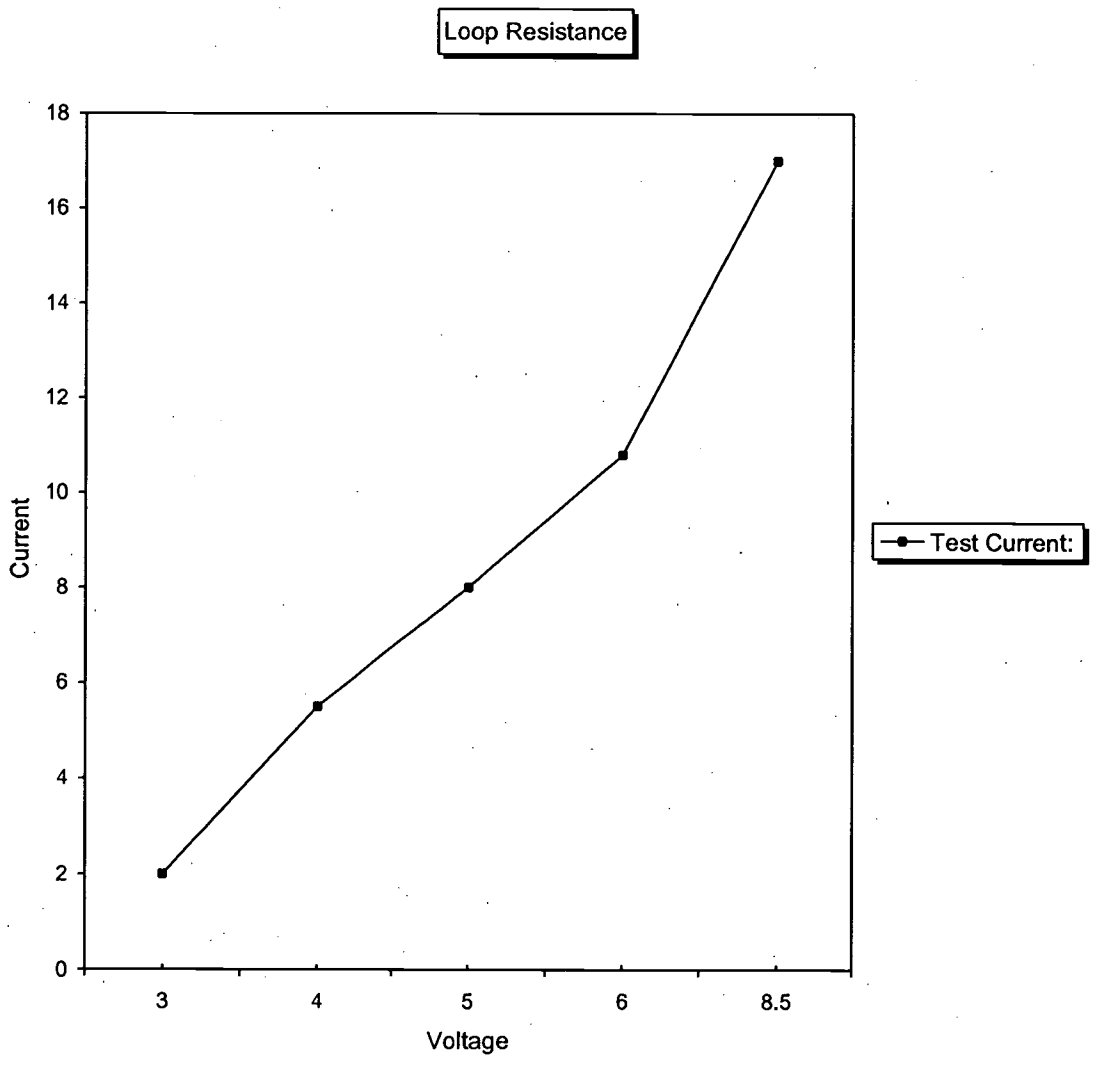
Electrical Engineering Unit

Cathodic Protection System Loop Resistance — McDonald Rd. Rectifier CPS 214

Date: 12th May 2005
Cathodic Protection System: Eildon Hill to Bartleys Hill S42 Trunk Main
System Operating Volts: 8.5 System Operating amps 17

Test Voltage: (volts)		Test Current: (amps)	
3		2	
4		5.5	
5		8	
6		10.8	
8.5		17	

Loop Resistance (ohms)
0.3888889



22/12/2005

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:	Kerry McGovern	
		TEL 07 34078364

Type of Application: (Tick as appropriate)			
	√ New System		
	☐ Alteration to an existing system, Registration No:		
	☐ Renewal of system, Registration No:		
Location of system:	From Eildon Hill Reservoir Hawdon St. Windsor. to Bartleys Hill Reservoir Massey St Ascot		
	Rectifier (Windsor Park) Grafton St. Windsor		POST CODE 4030
Structure to be protected:	910 mm dia Mild Steel Trunk Main		
Maximum operating current:	20.00 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.

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S42 EILDON HILL TO BARTLEYS HILL Date 18-11-04

TP Location EILDON HILL RESERVOIR V127 TP No. 1

Mains Size 910 mm TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.25V
ZINC REFERENCE TO PIPE	+851
CuSo4 REFERENCE TO PIPE	-266
ZINC TO CuSo4	-1036

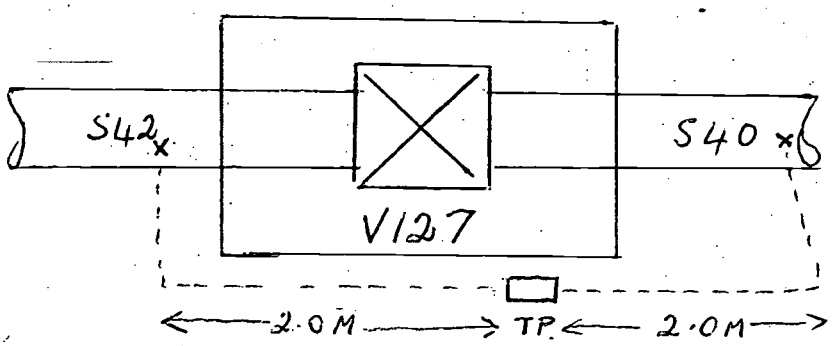
EARTH TESTING

TEST NO. 1
PIN SPACING 2m RESISTIVITY 273-8.m
MEGGER READIN(21.8

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.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Eildon Hill To Bartleys Hill Date 3-11-04

TP Location 40 Constitution Rd TP No. 2

Mains Size ..... TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	·2 Ω
ZINC REFERENCE TO PIPE	+500
CuSo4 REFERENCE TO PIPE	-522
ZINC TO CuSo4	-1024

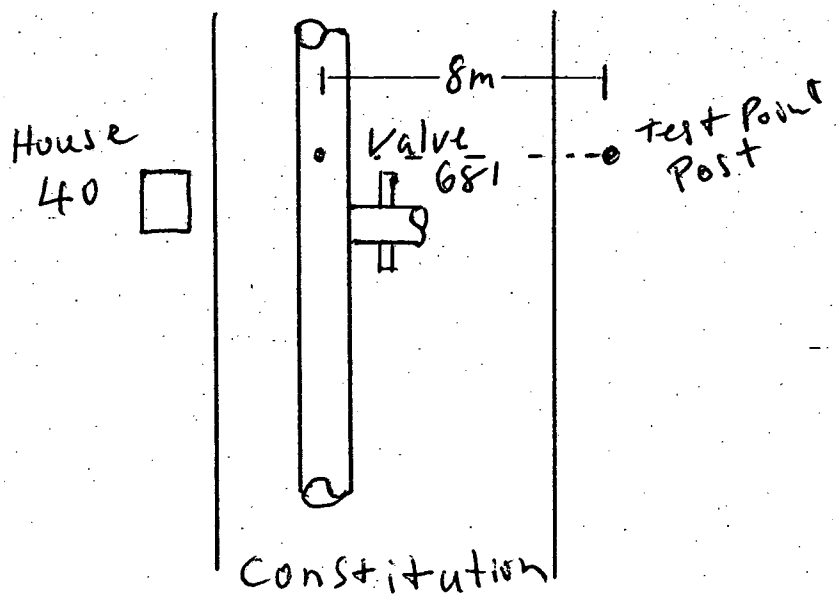
EARTH TESTING

TEST NO. 1
PIN SPACING 2
MEGGER READING 18.5
RESISTIVITY 232.3 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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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Sct 42 Eildon Hill to Bartleys Hill Date 15-11-04

TP Location Cnr Lutwyche Rd + Grafton TP No. 3

Mains Size ..... TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+625
CuSo4 REFERENCE TO PIPE	−579
ZINC TO CuSo4	−1203

EARTH TESTING

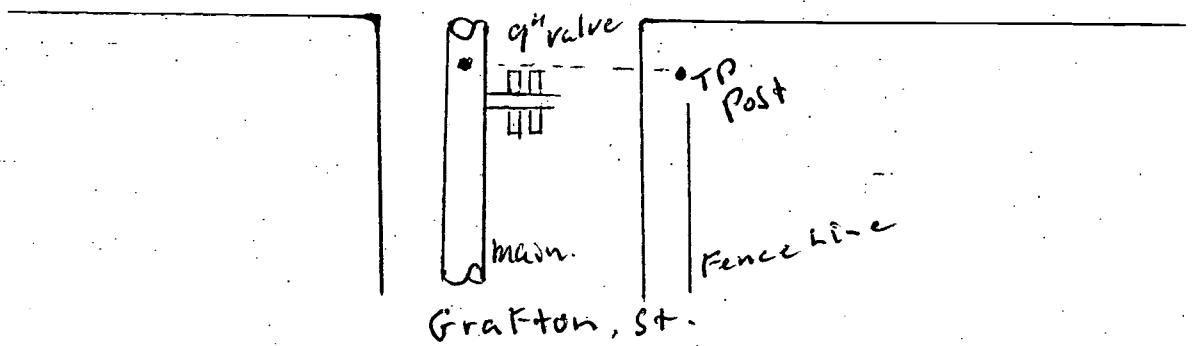
TEST NO. 1
PIN SPACING 2m
MEGGER READING 4.2Ω
RESISTIVITY 52.7 Ωpm

TEST NO 2
PIN SPACING
MEGGER READING
RESISTIVITY

TEST NO 3
PIN SPACING
MEGGER READING
RESISTIVITY

COMMENTS / LOCATION DRAWING

Lutwyche Rd



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Eildon Hill - Bartleys Hill Date 3-11-04

TP Location Mcdonald Rd. 140 C 14 TP No. 14

Mains Size ..... TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1 Ω
ZINC REFERENCE TO PIPE	
CuSo4 REFERENCE TO PIPE	
ZINC TO CuSo4	

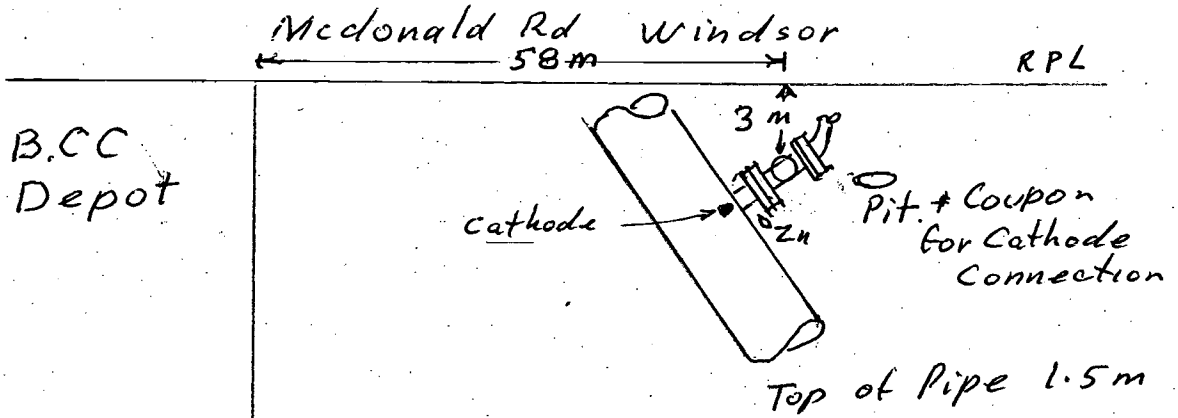
EARTH TESTING

TEST NO. 1

PIN SPACING _____ RESISTIVITY _____

MEGGER READING _____

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S42 Eildon Hill - Bartleys Hill Date 28-2-05

TP Location Cnr Gore & Lavanden Lane TP No. 5

Mains Size ..... TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1 Ω
ZINC REFERENCE TO PIPE	+580
CuSo4 REFERENCE TO PIPE	−510
ZINC TO CuSo4	−1070

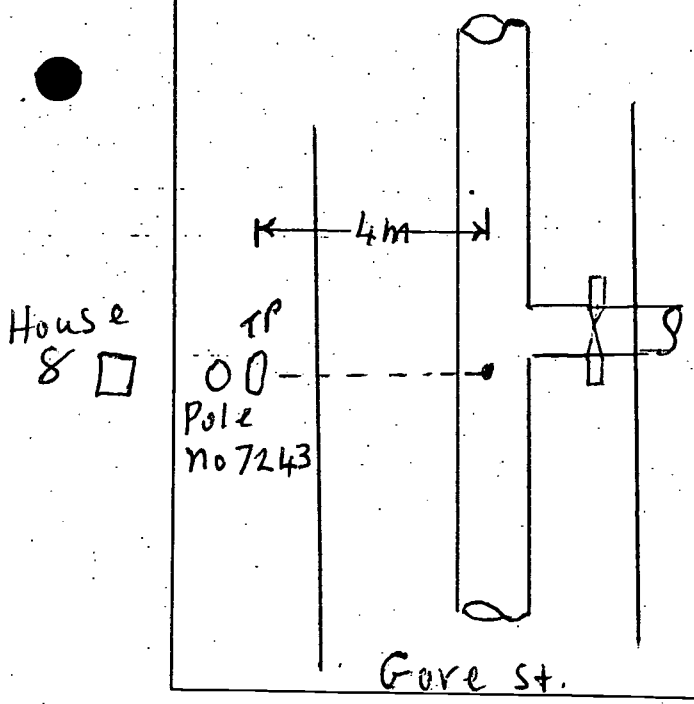
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 37.68 Ωm
MEGGER READING 3

TEST NO 2
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

TEST NO 3
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Eildon Hill To Bartleys Hill 140 G 15 Date -12-04

TP Location Crosby Rd Lapraik st Albion TP No. 6

Mains Size ..... TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1
ZINC REFERENCE TO PIPE	-1008
CuSo4 REFERENCE TO PIPE	-550
ZINC TO CuSo4	+459

EARTH TESTING

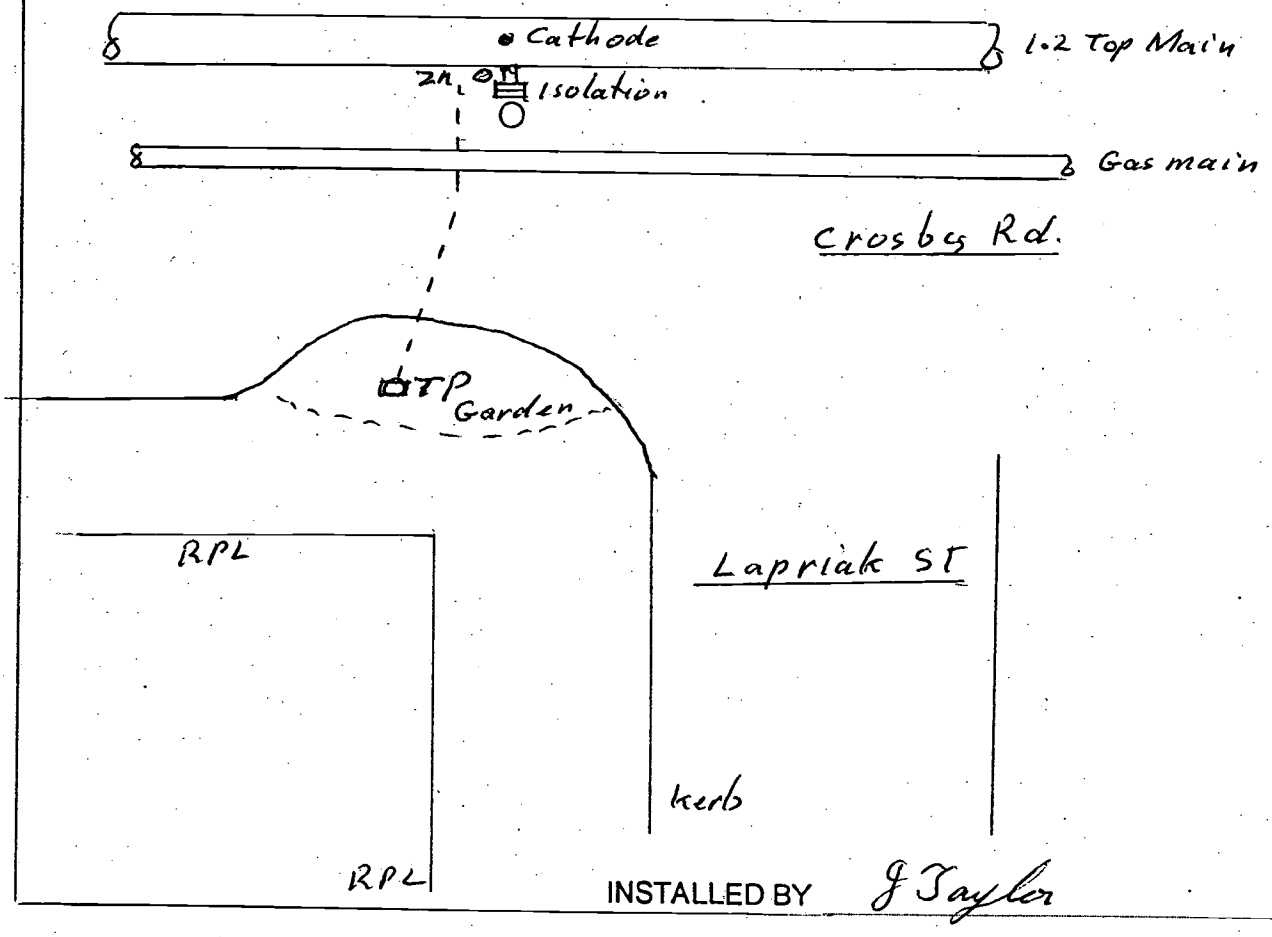
TEST NO. 1

PIN SPACING 2

MEGGER READING 2.8

RESISTIVITY 35 Ω PM

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S42 EILDON HILL TO BARTLEYS HILL Date 18·11·04

TP Location BARTLEYS HILL RES V234 & V115 TP No. 7

Mains Size 600 mm TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)		0.2 Ω
ZINC REFERENCE TO PIPE		+791
CuSo4 REFERENCE TO PIPE	-58	-234
ZINC TO CuSo4		-1080

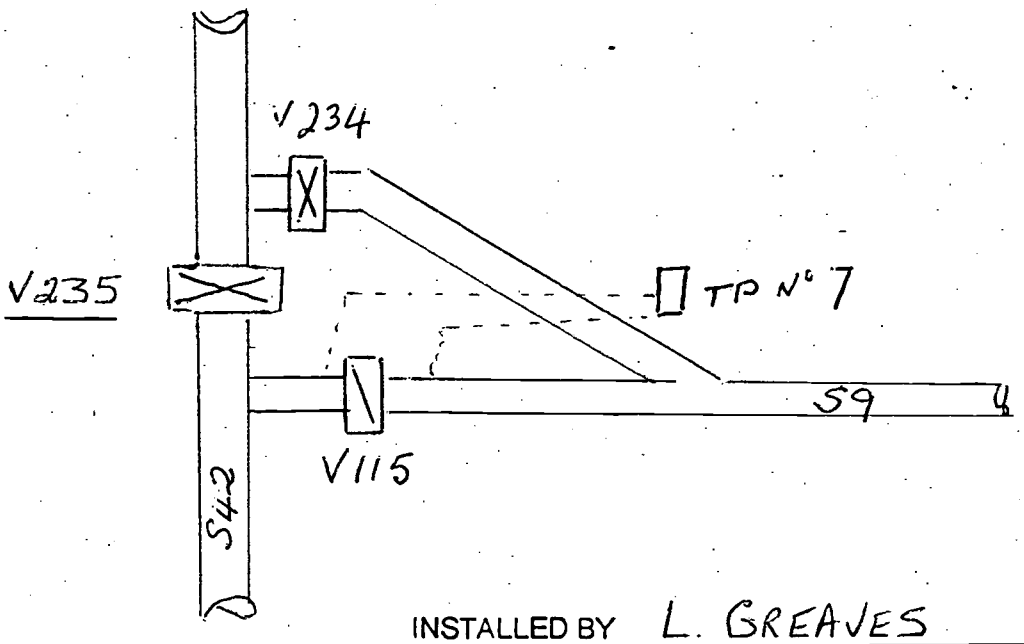
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 315 Ω/m
MEGGER READING 23·1

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

ISOLATION N°9

Project BARTLEYS H - Eildon Hill. S42 Date 29-7-05

DESCRIPTION

MAINS DETAILS: Eildon Hill.
LOCATIONS: Resivior.
SIZE: 42"
MATERIAL: Mild Steel
COATING:
VALVE No. 127

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200 Ω
NUMBER OF BOLT: 24
FLANGE TO FLANGE RESISTANCE: 96.6 KΩ
INSULATION CHECKER MODEL 702: N/A

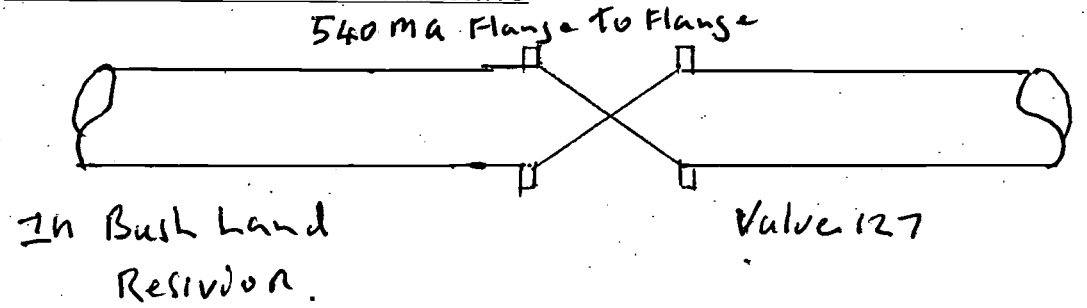
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: S40 -369
UNPROTECTED SIDE: S42 -501

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 10

Project S42 Eildon Hill To Bartleys Hill Date 15-11-04

DESCRIPTION

- MAINS DETAILS:
  LOCATIONS: Cnr Main ave + Silvester St
  SIZE: 18"
  MATERIAL: Mild Steel
  COATING: T/A
  VALVE No. 18" Cross Connection.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts. 7200 Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 198 Ω
INSULATION CHECKER MODEL 702: N/A.

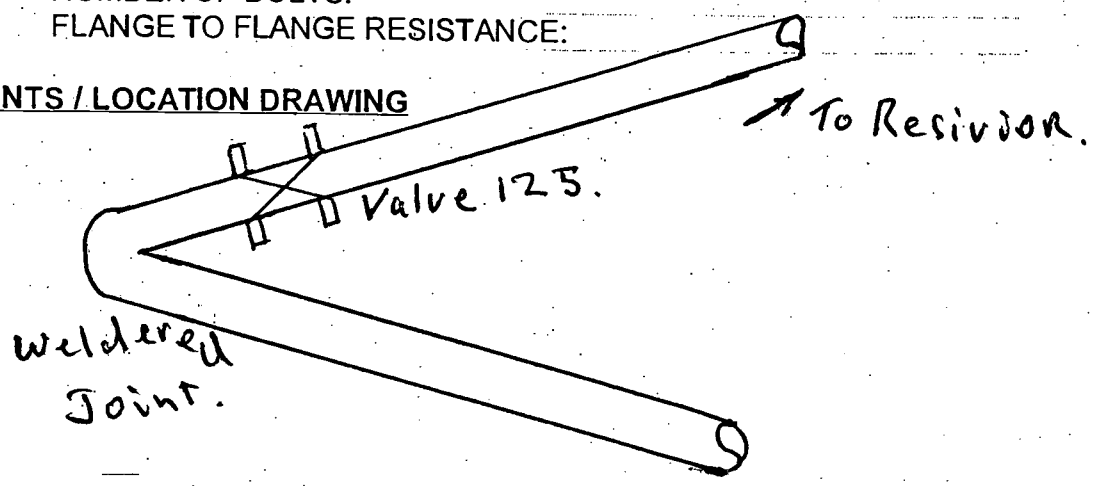
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -220 mV
UNPROTECTED SIDE: -175 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth

Valve 125 in pit. in Bushland

Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation No 11

Project S42 Eildon Hill to Bartleys Hill Date 28-2-05

DESCRIPTION

MAINS DETAILS:
LOCATIONS: 40 Constitution Rd
SIZE: 12"
MATERIAL: Mild Steel
COATING:
VALVE No. 12" Cross Connection.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .74 KΩ
INSULATION CHECKER MODEL 702: N/A

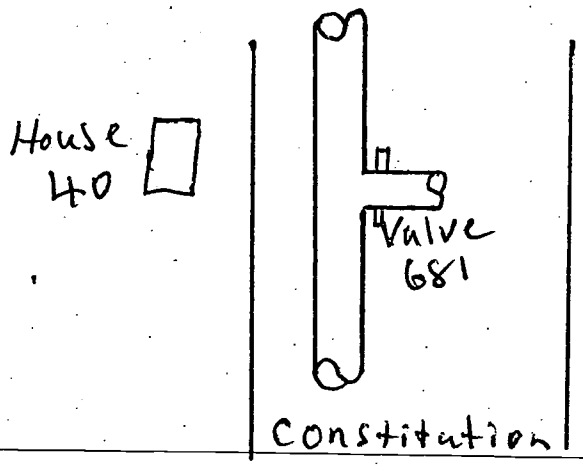
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: — 502 mv
UNPROTECTED SIDE: — 560 mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 12.

Project S42 Eildon Hill to Bartleys Hill Date 15-11-04

DESCRIPTION

- MAINS DETAILS:
  LOCATIONS: Cnr Lutwyche & Grafton
  SIZE: 9"
  MATERIAL: Mild Steel
  COATING:
  VALVE No. 9" Take OFF

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200 Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 63 KΩ
INSULATION CHECKER MODEL 702:

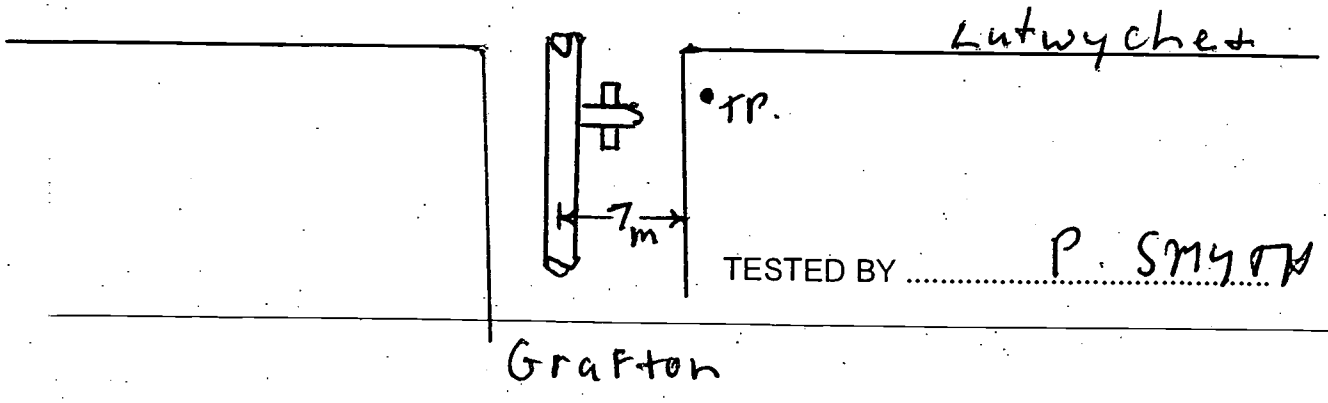
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -563 mv
UNPROTECTED SIDE: -450 mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P. SMYTH

Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation No 13

Project S42 Eildon Hill To Bartleys Hill **Date** 3-11-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Mcdonald Rd Windsor 140 c14
SIZE:
MATERIAL: MSCL
COATING: Tar Esbestos
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: 0.6 mΩ
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 1.4 mΩ
INSULATION CHECKER MODEL 702:

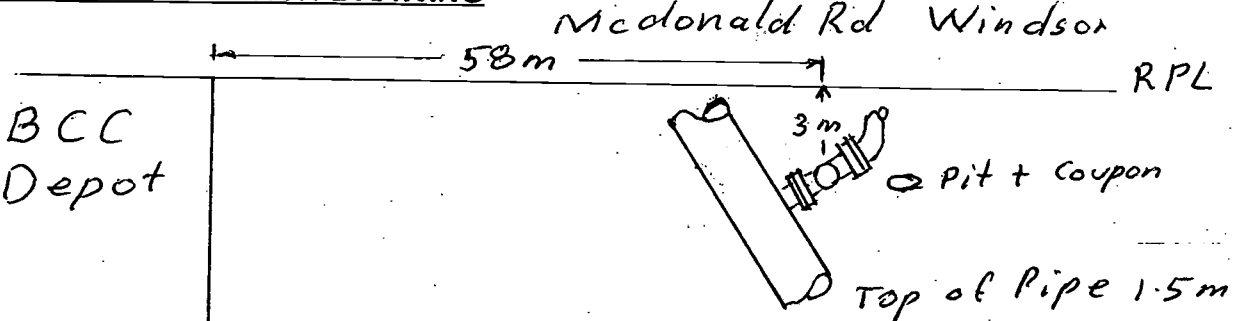
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -543
UNPROTECTED SIDE: -369

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY J. Taylor

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 15

Project S42 Eildon Hill to Bartleys Hill Date 28-2-05

DESCRIPTION

- MAINS DETAILS:

LOCATIONS: Cnr Gore & Lavander
SIZE: 12"
MATERIAL: Mild Steel
COATING:
VALVE No. 12" Take off.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200 Ω
NUMBER OF BOLT: 6
FLANGE TO FLANGE RESISTANCE: 9.5 KΩ
INSULATION CHECKER MODEL 702: N/A

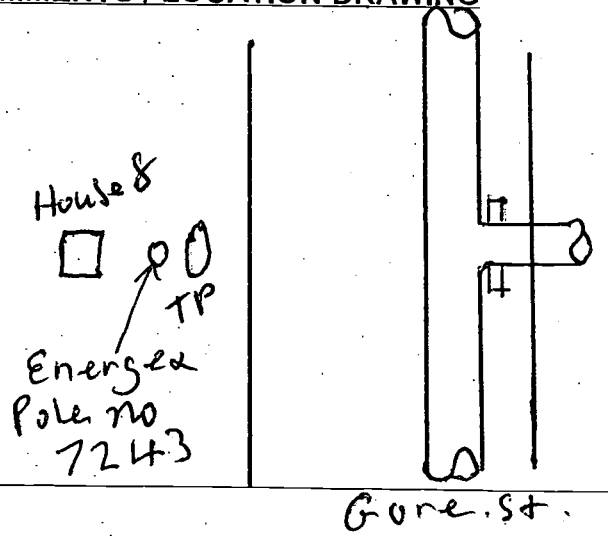
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -682
UNPROTECTED SIDE: -478

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 16

Project Set 42 Eildon Hill to Bartleys Hill Date 13-12-05

DESCRIPTION

- MAINS DETAILS:

LOCATIONS: cnr Sandgate + Crosby
SIZE: 12"
MATERIAL: Mild Steel
COATING:
VALVE No. 12" take OFF

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200 Ω
NUMBER OF BOLT: 6
FLANGE TO FLANGE RESISTANCE: 1.3 mΩ
INSULATION CHECKER MODEL 702: N/A

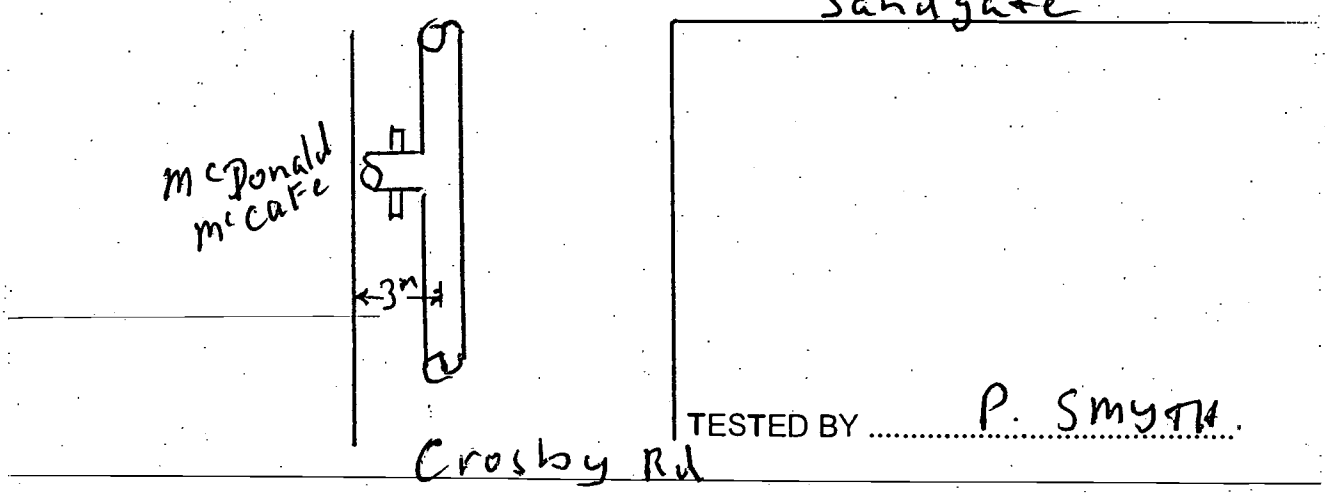
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: 545 mV
UNPROTECTED SIDE: 489 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth

Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation no 17

Project S42 Eildon Hill to Bartleys Hill **Date** -12-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Crosby Lapriak st Albion 140 G15
SIZE:
MATERIAL: MSCL
COATING: Tar Asbestos
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: 1.2 k-2
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 1.2 K
INSULATION CHECKER MODEL 702: 1 N 11

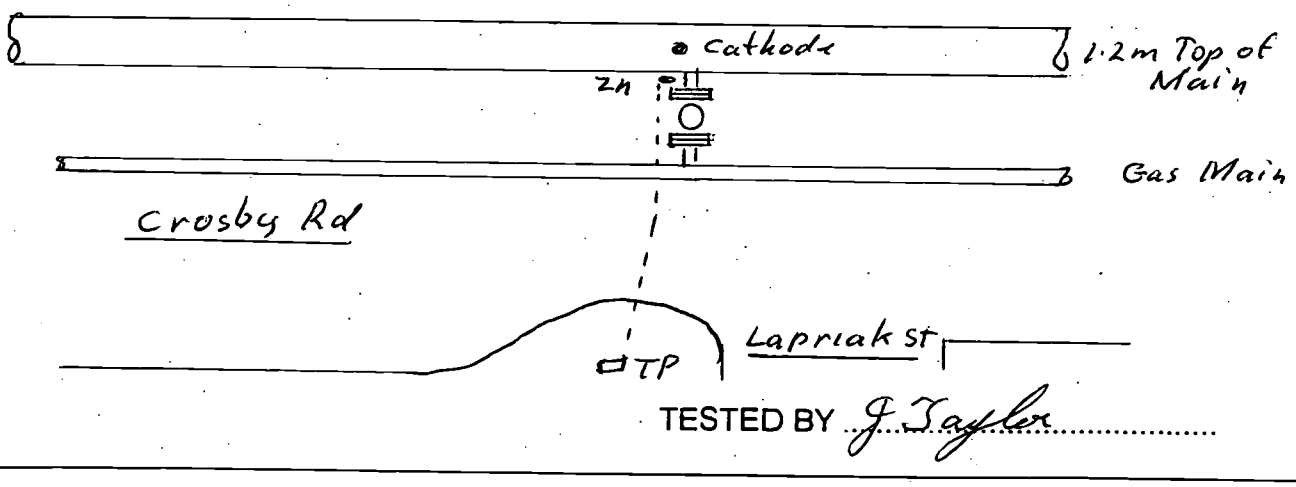
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -420
UNPROTECTED SIDE: -360

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY J Taylor

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation No 18

Project S42 Eildon Hill to Bartleys Hill Date 31-12-04

DESCRIPTION

- MAINS DETAILS:
  LOCATIONS: Cnr Massey & Sykes St
  SIZE: 24" Cross Connection
  MATERIAL:
  COATING:
  VALVE No. V 113

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .465 mΩ
INSULATION CHECKER MODEL 702: N/A

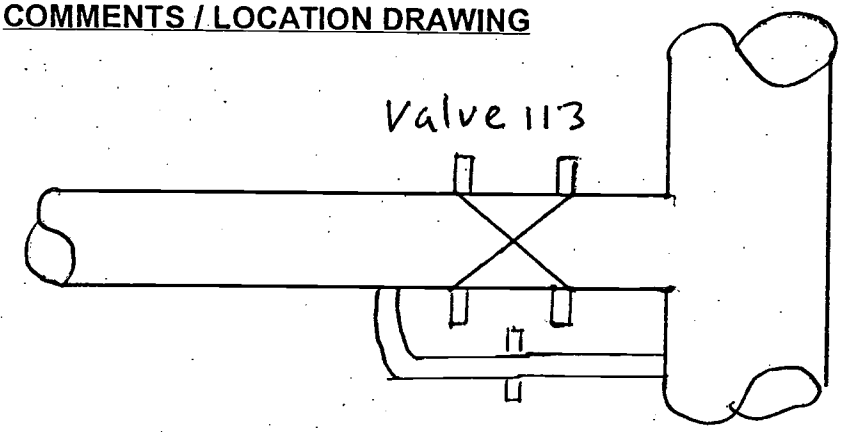
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: 104 mV
UNPROTECTED SIDE: 54 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth.

Valve in Scrubland in Pit.

Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 19

Project S42 Eildon Hill To Bartleys Hill Date 13-12-05

DESCRIPTION

- MAINS DETAILS:
  LOCATIONS: Cnr Massey & Sykes St
  SIZE:
  MATERIAL: Mild Steel
  COATING:
  VALVE No. V236

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 31 Ω
INSULATION CHECKER MODEL 702: N/A

POTENTIAL DIFFERENCE TO REFERENCE CELL:

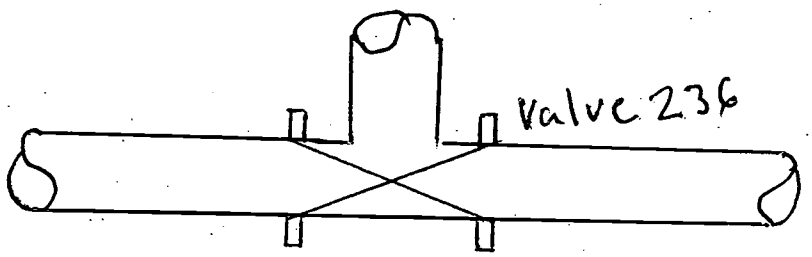
PROTECTED SIDE: -105 mV
UNPROTECTED SIDE: -92 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING

4ma F to F



TESTED BY P Smyth

Valve in Pit at End of Road

Revision 14/02/2000

BRISBANE CITY COUNCIL
MEMORANDUM

To	File No.
From	Date 20 13 195
Subject BARTLEY'S HILL TO PINKENBA TRUNK MAIN.	

VALVE 234 ISOLATION N° 21 ON S42. CHECKED 18/11/04

INSULATION JOINT AT VALVE 234.

Flange to Flange = 1·2MV

Bolt to Flange = 1·2MV

Bolt N° = 30

Pot Diff to $CuSO_4$ Ref Cell

Reservoir Side = 75mV

Protected Side = 64mV.

INSULATION JOINT AT VALVE 115

Flange to Flange = 1·1MV

Bolt to Flange = 1·1MV

Bolt N° = 30

Pot Difference to $CuSO_4$ Ref Cell

Reservoir Side = 66 mV

Protected Side = 49 mV

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Bartleys H.M to Eildon H.M **Unit Reading** 9V 20a **Date** 12-4-05

	Reading	Test Point I. D.	Location	Swing	
On	-1156		Garfton. St.		
Off	-840	Men	Pole no 6367	-316	
On	-372				
Off	-450	Men	Pole no 6376	+75	*
On	-270				
Off	-279	Men	Pole no 50420	+9	
On	-810				
Off	-570	Light	Park Light. 582	-240	
On	-526				
Off	-500	Light	Park Light 583	-26	
On	-504				
Off	-494	Light	Park Light 43128	-10	
On	-1325		McDonald Rd		
Off	-715	Men	Pole no 43127	-610	
On	-401		Gore		
Off	-408	Men	Pole no 7244	+7	
On	-430		Gore		
Off	-460	Men	Pole no 7242	+30	*
On	-385		Crosby		
Off	-425	Men	Pole no 15947	+40	*
On	-377		Crosby		
Off	-414	Men	Pole no 20517	+37	*
On	-384		Crosby		
Off	-393	Men.	Pole no SP552045	+9	
On	-300		Crosby.		
Off	-308	Men	Pole no 20510	+8	
On	-342		Constitution		
Off	-342	Men	Pole no 28604	0	
On	-220		Constitution.		
Off	-220	Men	Pole no 6051	0	

TESTED BY P. Smyth

* See Bleed Sheet

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 29

Electrical Engineering Unit

Cathodic Protection Interference Results Form

Project Bartleys Hill – Eildon Hill **Unit Reading** 9v 20a **Date** 4-5-05

Type of Bleed	Current in Bleed	Test Point Number	Bond Off			Bleed On			Resultant Swing
			Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
ZN no112	2ma	6376	-450	-502	-52	-502	-456	+46	-6
ZN no110	2·9ma	7242	-526	-751	-225	-751	-748	+3	-222
ZN no109	4·55ma	20517	-414	-673	-259	-673	-650	+23	-236
ZN no113	2·7ma	15947	-425	-505	-80	-505	-489	+16	-64

TESTED BY P SMYTH

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details Form

Project Bartleys Hill. Eildon Hill. Date 4-5-05

Bleed Location Crosby Rd CPB No. 109

FOREIGN STRUCTURE OWNER: Energex.

F.S. LOCATION: Crosby Rd

F.S. IDENTIFICATION: Men Pole no 20517

REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:

REFERENCE TYPE: ZN

POTENTIAL OFF: -414 ON: -377 SW: +37

BLEED TYPE: ZN

BLEED MATERIAL: ZN

BLEED WEIGHT:

BLEED O/C POTENTIAL: -1095

BLEED CURRENT OFF: 4.55ma ON: 4.55ma

REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
-414	-673	-259	-673	-650	+23	-236

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N) Yes

IDENTIFICATION TAG INSTALLED? (Y/N) Yes 109

COMMENTS:

INSTALLED / TESTED BY P. Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details Form

Project Bartleys Hill - Eildon Hill Date 4-5-05

Bleed Location Gore St CPB No. 110

FOREIGN STRUCTURE OWNER: Energex

F.S. LOCATION: Gore St Pole no 7242

F.S. IDENTIFICATION: Men. 7242

REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:

REFERENCE TYPE: ZN

POTENTIAL OFF: -526 ON: -496 SW: +30

BLEED TYPE: ZN.

BLEED MATERIAL: ZN

BLEED WEIGHT:

BLEED O/C POTENTIAL: -1108 mV

BLEED CURRENT OFF: 2.9ma ON: 2.9 ma

REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
-526	-751	-225	-751	-748	+3	-222

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N) Yes.

IDENTIFICATION TAG INSTALLED? (Y/N) 110

COMMENTS:

INSTALLED / TESTED BY P. Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details Form

Project Bartleys Hill - Eildon Hill Date 4-5-05

Bleed Location Garton St CPB No. 112

FOREIGN STRUCTURE OWNER: Energex Pole no 6376

F.S. LOCATION: Garton St.

F.S. IDENTIFICATION: Men

REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:

REFERENCE TYPE: ZM

POTENTIAL OFF: 450 ON: 372 SW: +75

BLEED TYPE: ZN

BLEED MATERIAL: ZN

BLEED WEIGHT:

BLEED O/C POTENTIAL: -1098 mV

BLEED CURRENT OFF: 2.9 ma ON: 2.9 ma

REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
-450	-502	-52	-502	-456	-46	-6

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N) Yes.

IDENTIFICATION TAG INSTALLED? (Y/N) CPB 112

COMMENTS:

INSTALLED / TESTED BY P. Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details Form

Project Bartleys Hill - Eildon Hill Date 4-5-05

Bleed Location Crosby Rd CPB No. 113

FOREIGN STRUCTURE OWNER: Energex

F.S. LOCATION: Crosby Rd

F.S. IDENTIFICATION: Mon Pole no 15947

REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:

REFERENCE TYPE: Zn

POTENTIAL OFF: -425 ON: -385 SW: +40

BLEED TYPE: Zn

BLEED MATERIAL: Zn

BLEED WEIGHT:

BLEED O/C POTENTIAL: -1120

BLEED CURRENT OFF: 2.7 ma ON: 2.7 ma

REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
-425	-505	-80	-505	-489	+16	-64

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N) Yes

IDENTIFICATION TAG INSTALLED? (Y/N) Yes

COMMENTS:

INSTALLED / TESTED BY P. Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 17

Electrical Engineering Unit

Cathodic Protection Anode Bed Testing

MacDonald Rd

Project S42 Eildon Hill to Bartleys Hill. **Date** 27-10-04

ANODE MATERIAL:	S IRON	BURIAL:	TP4
ANODE SIZE/WEIGHT:	75mm	TEST POINT TYPE:	Rectifier
ANODE PACKAGING:		SOIL RESISTIVITY:	1-9Ωpm
ANODE DEPTH:		SIGNAGE:	Yes.

A1 2·6m A2 2·4m A3 2·6m A4 2·5m

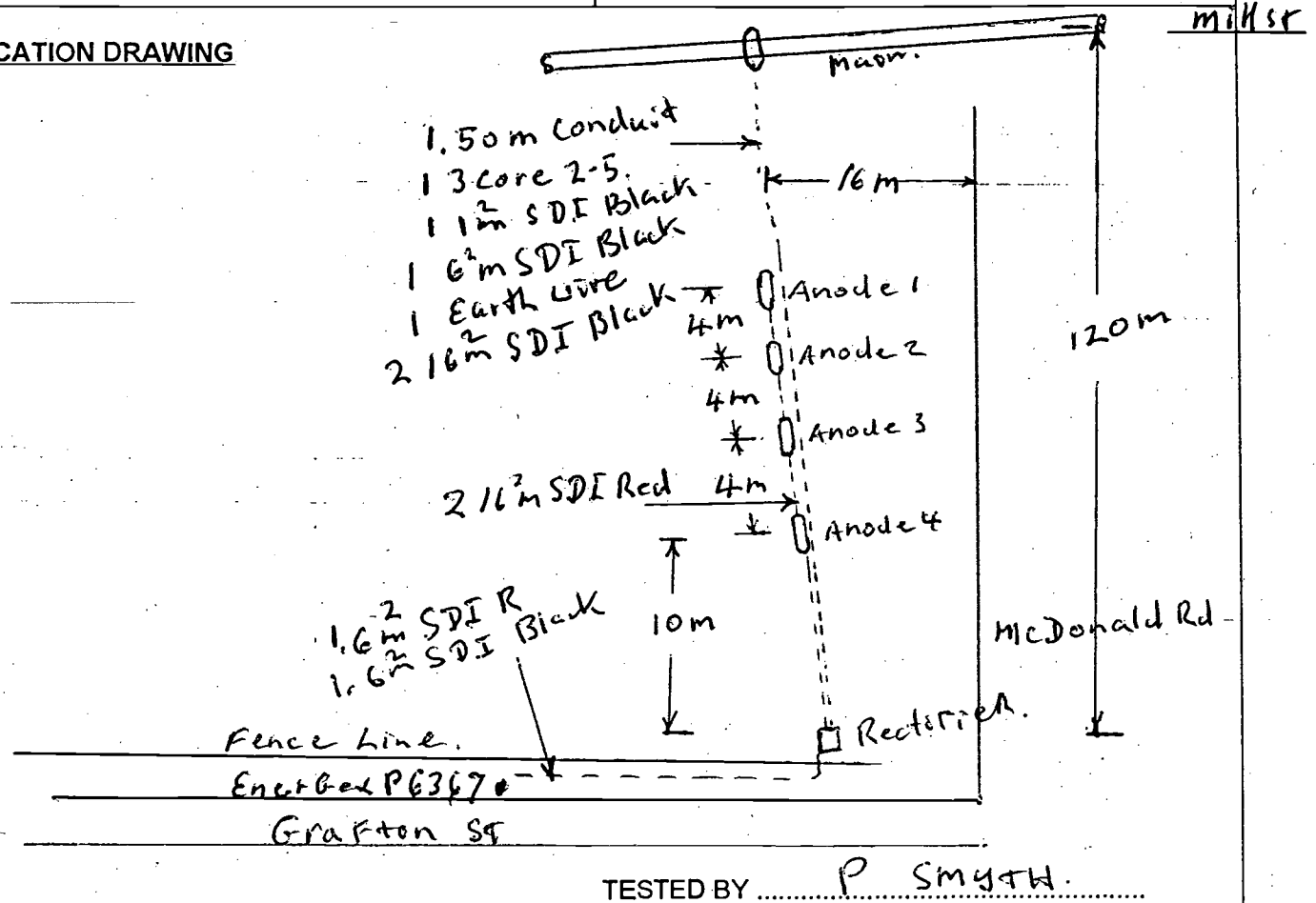
RESISTANCE TO GROUND:

ANODE NO.1	·2Ω
ANODE No.2	·3Ω
ANODE No.3	·3Ω
ANODE No.4	·2Ω
ANODE No.5	
TOTAL	

ANODE CURRENT

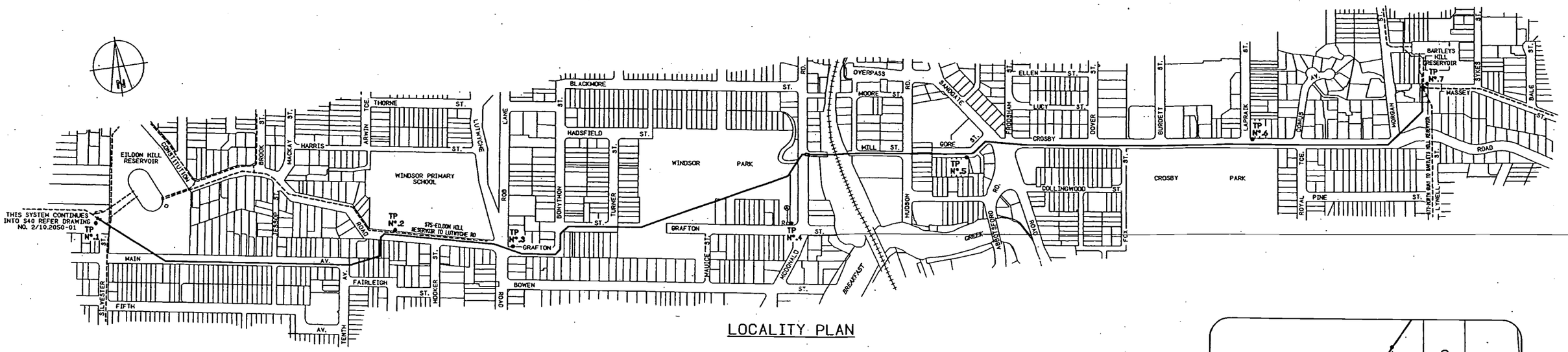
ANODE No.1	
ANODE No.2	
ANODE No.3	
ANODE No.4	
ANODE No.5	
TOTAL	

LOCATION DRAWING

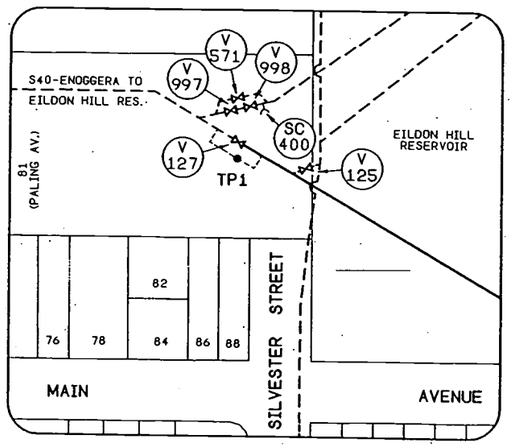


TESTED BY P SMYTH.

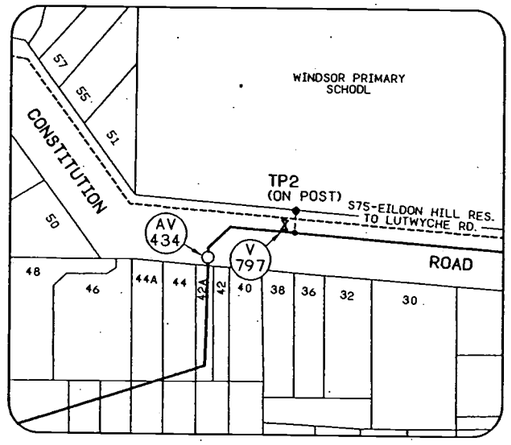
Revision 09/28/95



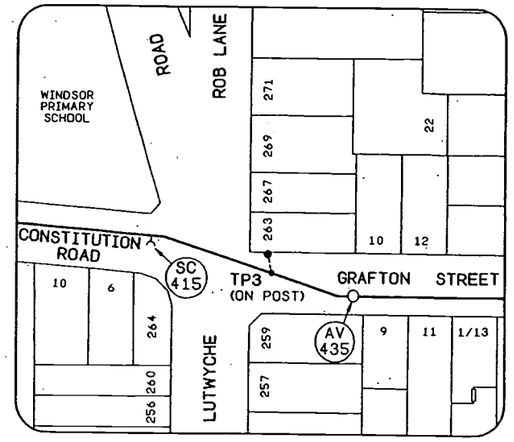
LOCALITY PLAN



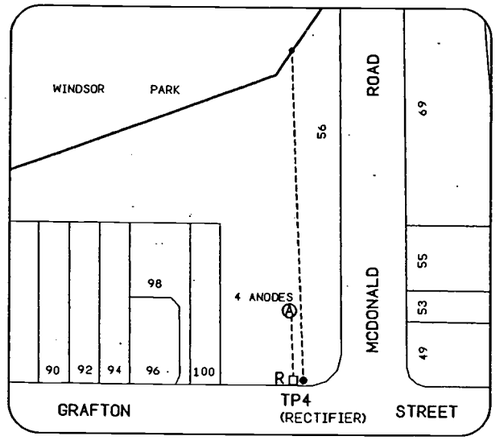
TEST POINT NO.1



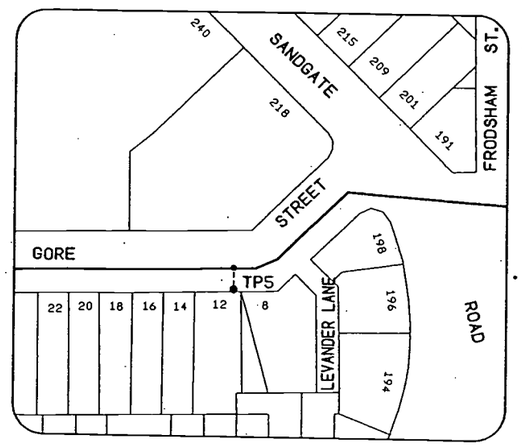
TEST POINT NO.2



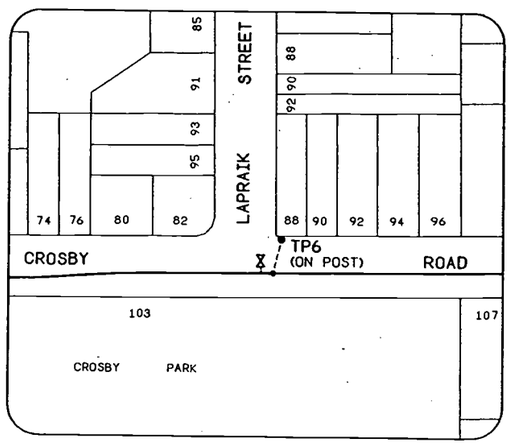
TEST POINT NO.3



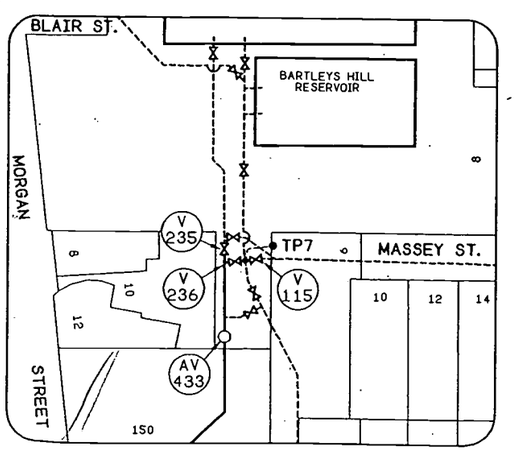
TEST. POINT NO.4



TEST POINT NO.5



TEST POINT NO.6



TEST POINT NO.7

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

CADD FILE	\WATER\INFRASTRUCTURE\210207001.DTA		DESIGN		
FILE NO.			DESIGN CHECK		
SURVEYED			DRAWN	B.O.B	MAR. 2005
SURVEY NO.		FIELD BOOK	DRAFTING CHECK		

Brisbane Water

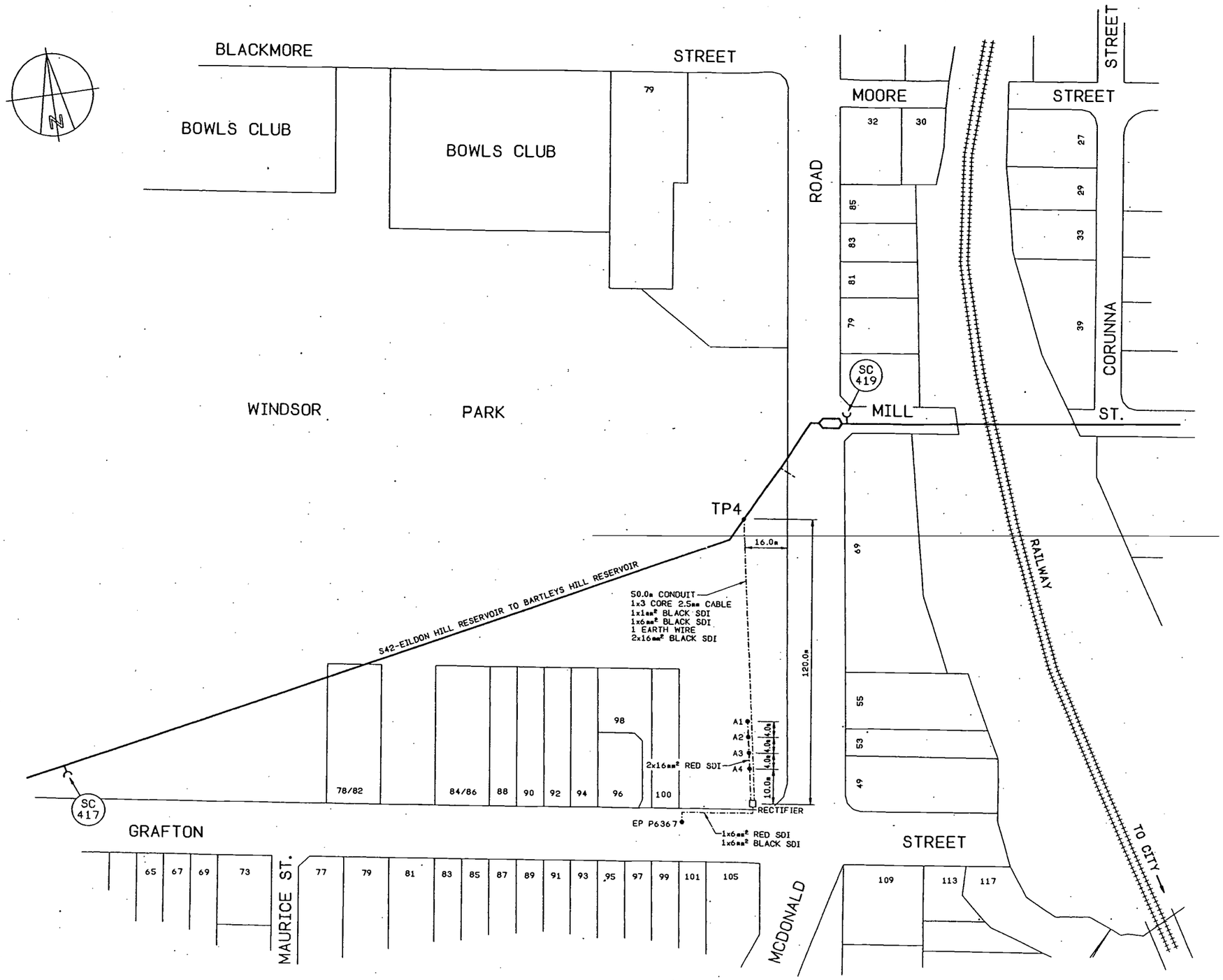
PROJECT: S42-EILDON HILL RESERVOIR TO BARTLEYS HILL RESERVOIR

TITLE: CATHODIC PROTECTION TEST POINT LOCATIONS TEST POINT NOS. 1 TO 7

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/REC'D	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BMAP CAPTURE	
JOB NUMBER	
ORDER CODE	
DATE	
BMAP COMMENTS	

SCALE	A.H. DATUM
	N° 1 OF 2 SHEETS
DRAWING N°	2/10.2070-01
AMEND.	P



TEST POINT NO.4 AND ANODE BED DETAILS

DESIGN CHARGE Nº	
	PA000820
CONSTRUCTION PROJECT Nº	

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/REC'D	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BIMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	
BIMAP COMMENTS	

NO.	DATE	AMENDMENT	INITIALS

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

CADD FILE	\WATER\INFRASTRUCTURE\210207002.DTA		
FILE NO.			
SURVEYED			
SURVEY NO.		FIELD BOOK	

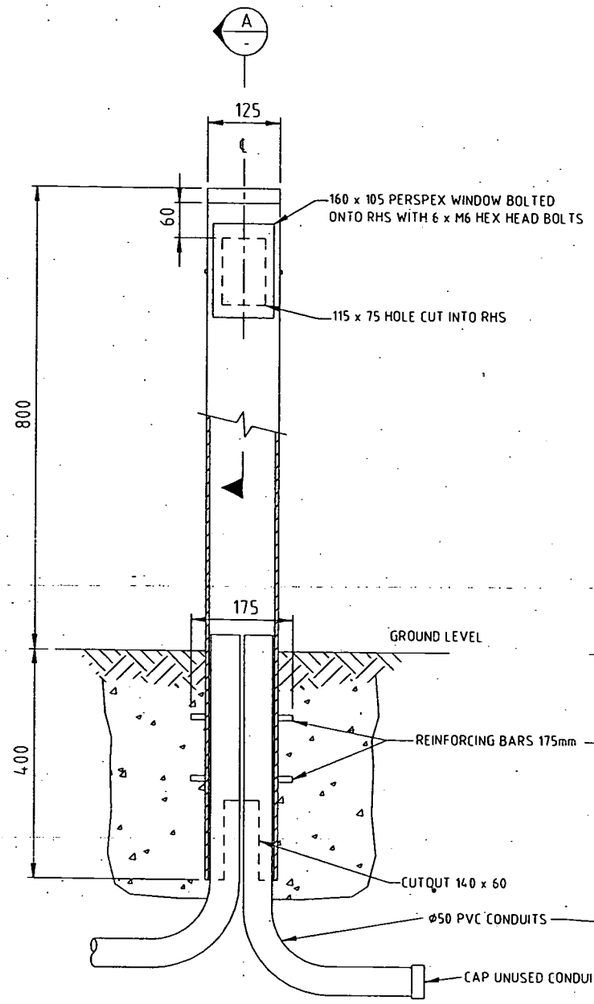
DESIGN			
DESIGN CHECK			
DRAWN	8.0.8	APR. 2005	
DRAFTING CHECK			

Brisbane Water

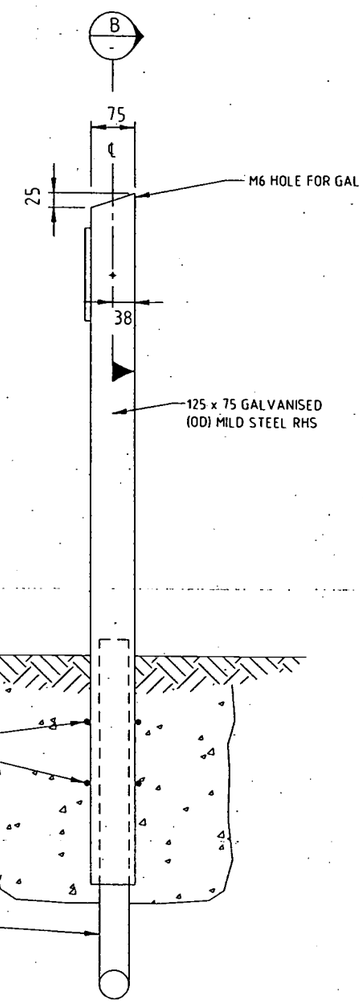
PROJECT	S42-EILDON HILL RESERVOIR TO BARTLEYS HILL RESERVOIR
TITLE	CATHODIC PROTECTION TEST POINT NO. 4 AND ANODE BED DETAILS
SCALE	A.H. DATUM
	Nº 2 OF 2 SHEETS
DRAWING Nº	2/10.2070-02
AMEND.	P

NOTES

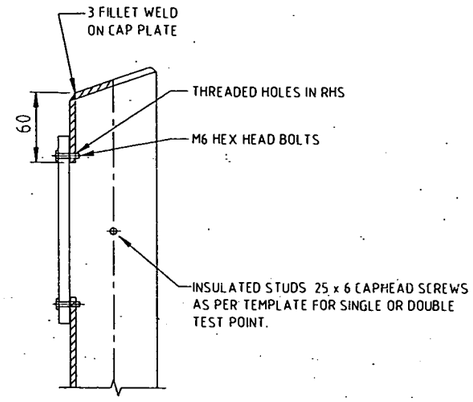
1. HOT DIP GALVANISE AFTER FABRICATION.



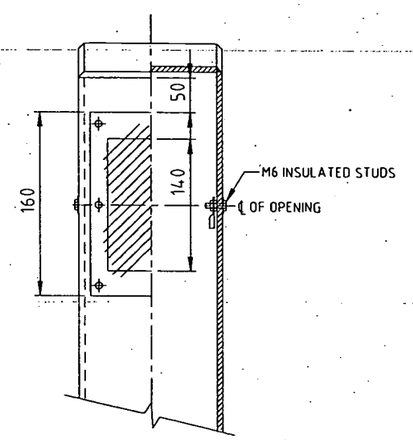
FRONT ELEVATION SECTIONED



SIDE ELEVATION



SECTION A-A



SECTION B-B

NO.	DATE	AMENDMENT	INITIALS
C	9-92	NOTE 3 REVISED	MJ
B	11-95	MODIFIED	D.L.P.
A	5-92	ISSUED FOR APPROVAL	D.L.P.

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 2210001-RevA — SHEET SIZE A1
SURVEY No. — FIELD BOOK
SURVEYED — A.H. DATUM

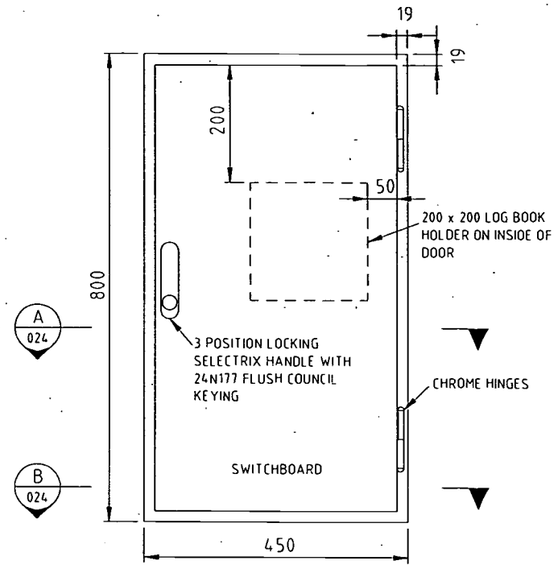
Brisbane Water — Professional Services — Engineering

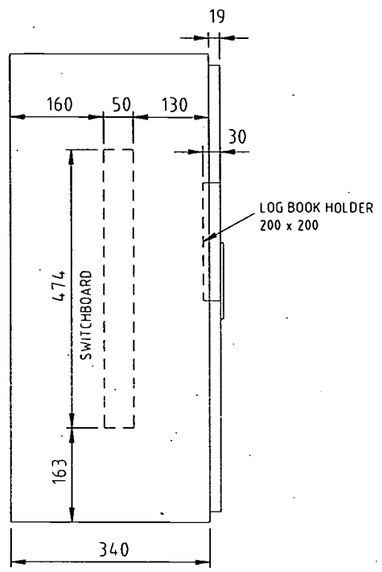
PROJECT: CATHODIC PROTECTON

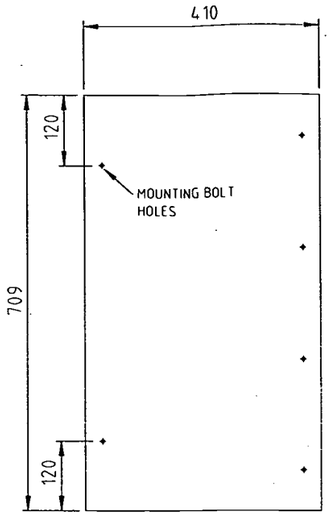
TITLE: STANDARD TEST POINT CONSTRUCTION DETAILS

SCALE NTS — N° 1 OF 1 SHEETS

DRAWING N° 486/1/22-AAT0001E — AMEND C







FRONT INSULATED PANEL
(6mm THICK SUPPLIED)

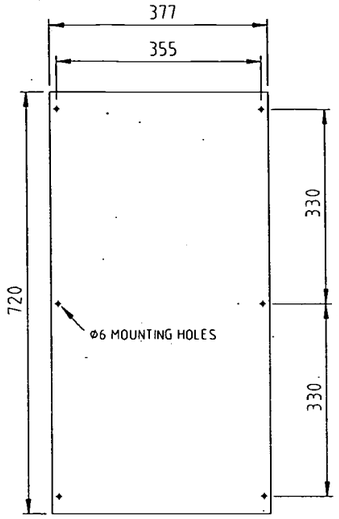


FIG.1
EQUIPMENT PANEL DETAILS

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.

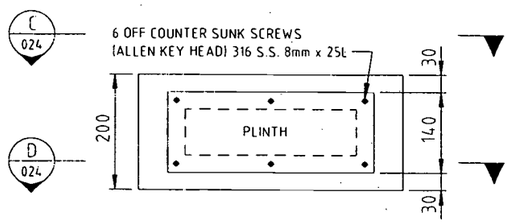
4. DOUBLE HINGED PANEL SUPPLIED BY B.C.C.

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

6. DEGREE OF WEATHER PROTECTION IP55.

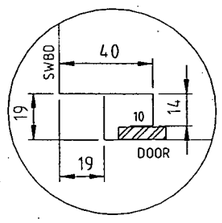
7. SELECTRIX TYPE HANDLE TO BE SUPPLIED & FITTED BY SWITCHBOARD MANUFACTURER. HANDLE TO BE 1107 SS CU1. KEY TO BE 24N177.

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

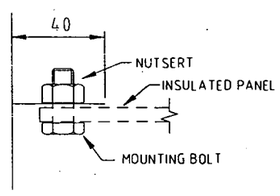


FRONT ELEVATION
SWITCHBOARD & PLINTH

SIDE ELEVATION
SWITCHBOARD & PLINTH

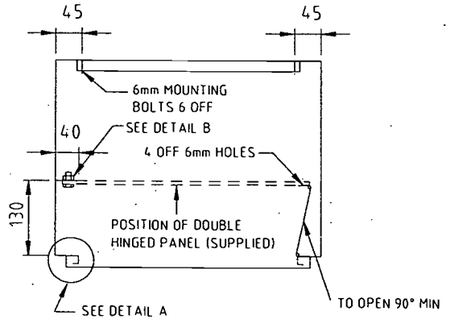


DETAIL A
DOOR/CORNER DETAIL

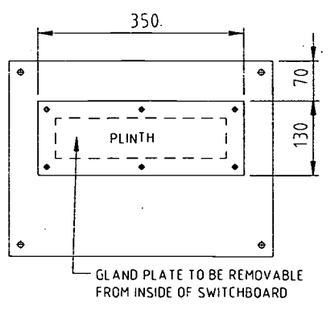


DETAIL B

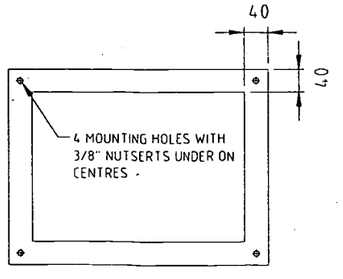
NUMBER OF SWITCHBOARDS REQUIRED	
NUMBER OF PLINTHS REQUIRED	



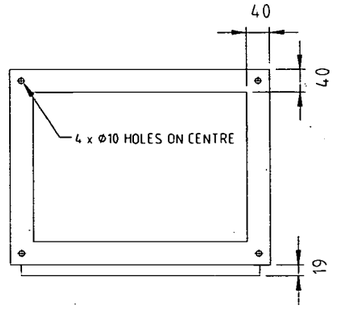
SECTION A-A
(SHOWING HINGED PANEL)



SECTION B-B
(SHOWING GLAND PLATE)



SECTION C-C
PLINTH MOUNTING DETAILS



SECTION D-D
PLINTH MOUNTING DETAILS

NO.	DATE	AMENDMENT	INITIALS
C	9-92	NOTE 7 REVISED	WT
B	11-95	MODIFIED	D.L.P.
A	5-92	ISSUED FOR APPROVAL	D.L.P.

DIRECTOR OF P.D. & P.S. — DATE
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	22E0024-Rev-C	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water — Professional Services in 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

TO DATA LOGGER (GPO)

VARISTOR

NEON

INTERUPT SWITCH

TRANSFORMER (SEE NOTE 1)

DIODE FUSE 25A

BRIDGE

+VE

-VE

VARISTOR

+VE OUTPUT SEE NOTE

-VE

AMMETER

LINK

VOLTMETER

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	07.03.95	VARIAC REMOVED, TRANSFORMER MULTI-TAP SEC ADDED	DPH
C	14.10.94	TELEMETRY REMOVED, BW BORDER UPDATED	DPH
B	11.4.94	CHANGES AS SHOWN	R.L.
A	18.10.93	CHANGES AS SHOWN	R.L.
1	25.8.93	ISSUED FOR CONSTRUCTION	R.L.

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:\PSED\RAWING2\Standard Drawings\Sewerage\Infrastr\Cathodic\Protection\a625c21e-RevD.dwg, 08/03/2005 02:24:12 PM